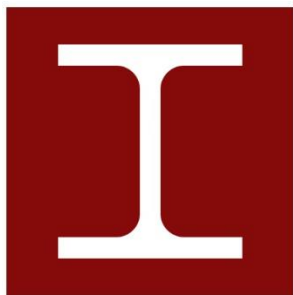


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County SCHOOL DISTRICT

Malcolm C. Hursey
New Montessori School

Bid Documents
12.17.2021

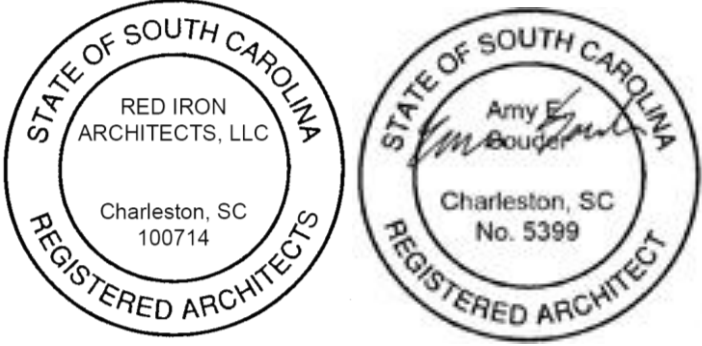
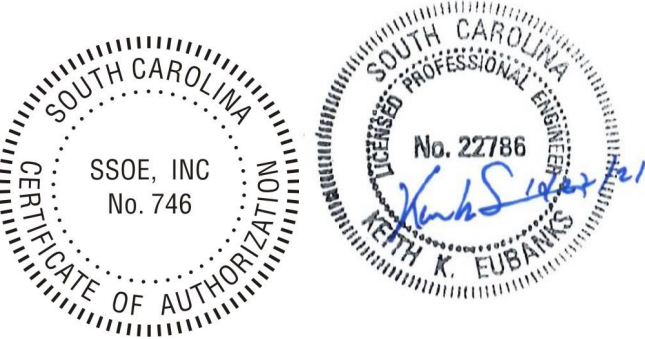
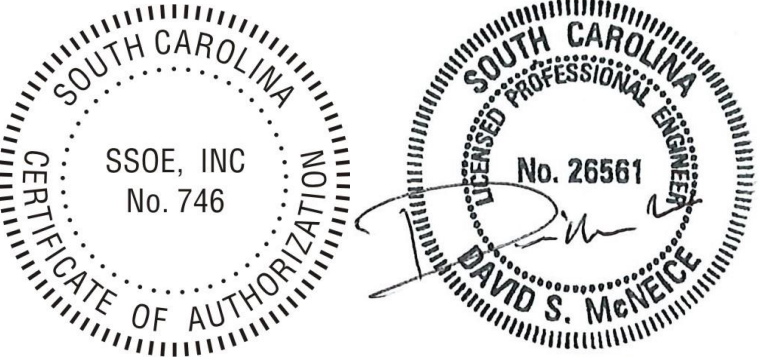
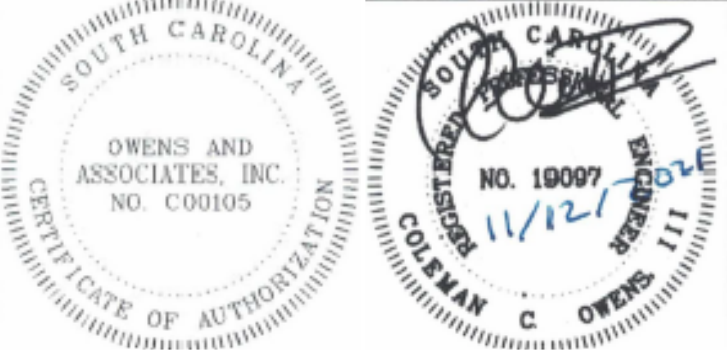
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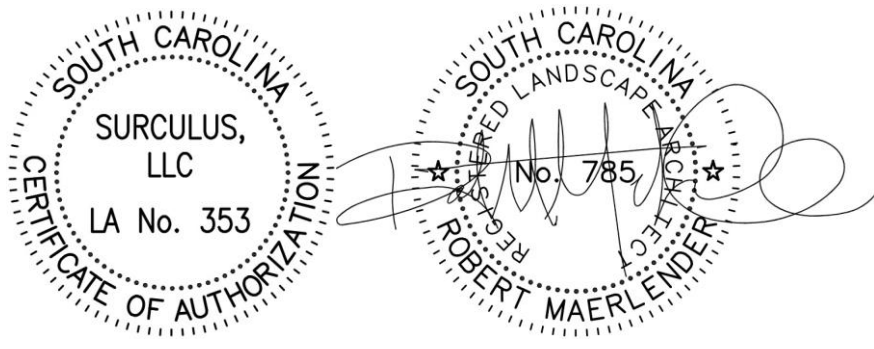


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North Charleston, SC, 29405



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<p>STRUCTURAL ENGINEERS</p> <p>SSOE/Stevens & Wilkinson 1501 Main Street, Ste 730 Columbia, SC 29201 803-765-0320 Keith Branham dmcneice@ssoe.com</p>	
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<p>ELECTRICAL ENGINEER</p> <p>Critical Systems Engineering 845 Lowcountry Blvd, Ste H Mt Pleasant, SC 29464 843-972-4999 Miles Jordan miles@criticalsystemseng.com</p>	
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SCHOOL BUILDING NO. 0734
SECTION 000101**

PROJECT TITLE PAGE

OWNER	Charleston County School District 3999 Bridgeview Drive North Charleston, SC 29405
PROGRAM MANAGER	Brownstone Construction Group 4055 Faber Place Drive, Suite 202 North Charleston, SC 29405 P (843) 973.8660 Attention: Margarita Perez
ARCHITECT	Red Iron Architects 4591 Durant Ave. North Charleston, SC 29405 P (843) 834-2677 Attention: Emma Souder
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MECH/PLUMB ENGINEER	Owens and Associates, Inc 1007 Lake Hunter Circle Mount Pleasant, SC 29464 P (843) 849-6457 F (843) 849-6551 Attention: Cole Owens
ELECTRICAL ENGINEER	Critical Systems Engineering, LLC 845 Lowcountry Boulevard, Suite H Mount Pleasant, SC 29464 P (843) 972-4999 Attention: Miles Jordan

END OF SECTION

**PROJECT TITLE PAGE
000101**

**MALCOLM C. HURSEY MONTESSORI SCHOOL
SCHOOL BUILDING NO. 0734
SECTION 000115**

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- 1.1 Drawings Accompanying Specifications: following Drawings bearing Architect's Commission No. 5399 and dated 12.17.2021 and entitled as indicated on the list that accompanies this specification and is a part thereof:

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**MALCOLM C. HURSEY MONTESSORI SCHOOL
SCHOOL BUILDING NO. 0734
SECTION 000115**

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**MALCOLM C. HURSEY MONTESSORI SCHOOL
SCHOOL BUILDING NO. 0734
SECTION 000115**

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**MALCOLM C. HURSEY MONTESSORI SCHOOL
SCHOOL BUILDING NO. 0734
SECTION 000115**

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**MALCOLM C. HURSEY MONTESSORI SCHOOL
SCHOOL BUILDING NO. 0734
SECTION 000115**

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**MALCOLM C. HURSEY MONTESSORI SCHOOL
SCHOOL BUILDING NO. 0734
SECTION 000115**

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 - S1.13b PARTIAL LEVEL 3 FRAMING PLAN - AREA 2
 - S1.13c PARTIAL LEVEL 3 FRAMING PLAN - AREA 3
 - S1.13d PARTIAL LEVEL 4 FRAMING PLAN - AREA 4
 - S1.14a PARTIAL LEVEL 4 FRAMING PLAN - AREA 1
 - S1.14b PARTIAL LEVEL 4 FRAMING PLAN - AREA 2
 - S2.01 WALL SECTIONS - AREA 1
 - S2.02 WALL SECTIONS - AREA 2
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 - S2.06 WALL SECTIONS - AREA 4
 - S2.10 BUILDING SECTIONS
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 - S3.01 SHEAR WALL ELEVATIONS
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 - S5.01 CMU DETAILS
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- FIRE PROTECTION**
- FS1.01 FIRST FLOOR FIRE SPRINKLER PLAN - AREA 1
 - FS1.02 FIRST FLOOR FIRE SPRINKLER PLAN - AREA 2
 - FS1.03 FIRST FLOOR FIRE SPRINKLER PLAN - AREA 3
 - FS1.04 FIRST FLOOR FIRE SPRINKLER PLAN - AREA 4
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**LIST OF DRAWINGS
000115**

**MALCOLM C. HURSEY MONTESSORI SCHOOL
SCHOOL BUILDING NO. 0734
SECTION 000115**

LIST OF DRAWINGS

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P1.02 FIRST FLOOR DWV PLUMBING PLAN - AREA 2
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P1.07 SECOND FLOOR DWV PLUMBING PLAN - AREA 3
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P1.09 THIRD FLOOR DWV PLUMBING PLAN - AREA 2
P2.01 FIRST FLOOR DOMESTIC WATER PLAN - AREA 1
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P2.03 FIRST FLOOR DOMESTIC WATER PLAN - AREA 3
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**LIST OF DRAWINGS
000115**

**MALCOLM C. HURSEY MONTESSORI SCHOOL
SCHOOL BUILDING NO. 0734
SECTION 000115**

LIST OF DRAWINGS

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M3.03 MECHANICAL SCHEDULES AND DETAILS
M3.04 MECHANICAL SCHEDULES AND DETAILS
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E5.03 ELECTRICAL PANEL SCHEDULES
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**LIST OF DRAWINGS
000115**

**MALCOLM C. HURSEY MONTESSORI SCHOOL
SCHOOL BUILDING NO. 0734
SECTION 000115**

LIST OF DRAWINGS

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- E5.06 POWER DISTRIBUTION SCHEDULE & DETAILS
- E5.07 LIGHTING SCHEDULES & DETAILS
- E5.08 LIGHTING SCHEDULES & DETAILS
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- T1.00 TECHNOLOGY - SITE PLAN
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- T1.11a TECHNOLOGY - PARTIAL FIRST FLOOR PLAN - AREA 1
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- T1.11d TECHNOLOGY - PARTIAL FIRST FLOOR PLAN - AREA 4
- T1.12a TECHNOLOGY - PARTIAL SECOND FLOOR PLAN - AREA 1
- T1.12b TECHNOLOGY - PARTIAL SECOND FLOOR PLAN - AREA 2
- T1.12c TECHNOLOGY - PARTIAL SECOND FLOOR PLAN - AREA 3
- T1.13a TECHNOLOGY - PARTIAL THIRD FLOOR PLAN - AREA 1
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- T6.00 TECHNOLOGY - SECURITY DETAILS

END OF SECTION

 <p>Charleston > excellence is our standard County SCHOOL DISTRICT</p> <p>INVITATION FOR BIDS/BID FORM SECTION 000116</p>	Solicitation Number	21-BCG-B-002
	Date Issued	December 17, 2021
	Procurement Official	Lawrence Lutrario
	Phone E-Mail	843-566-8150
	Address	lawrence_lutrario@charleston.k12.sc.us

DESCRIPTION: **Malcolm C. Hursey Montessori School at Ron McNair Campus**

The Term "Offer" Means Your "Bid" or "Proposal".

SUBMIT OFFER BY: **January 25, 2022 @ 2:00 P.M.**

QUESTIONS MUST BE RECEIVED BY: January 14, 2022 @ 3:00 P.M EDT via above e-mail

NUMBER OF COPIES TO BE SUBMITTED: **One (1) original and One (1) copy (marked 'copy')**

Offers must be submitted in a sealed package. Solicitation Number & Opening Date must appear on package exterior.

SUBMIT YOUR SEALED OFFER TO:

Construction Procurement Services c/o

Brownstone Construction Group

4055 Faber Place Drive, Suite 202

North Charleston SC 29405

See "Submitting Your Offer" provision

<p>CONFERENCE TYPE: Pre-Bid Conference</p> <p>DATE & TIME: January 4, 2022 @ 10:00 A.M.</p> <p>As appropriate, see "Conferences - Pre-Bid/Proposal" & "Site Visit" provisions</p>	<p>LOCATION:</p> <p>Pre-Bid Conference will be hosted at Cooper River Center for Advanced Studies at 1088 E. Montague Avenue, North Charleston</p>
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AWARD & AMENDMENTS	Award will be posted at the Physical Address stated above on January 26, 2022. The award, this solicitation, and any amendments will be posted at the following web address: www.ccsdschools.com
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You must submit a signed copy of this form with Your Offer. By submitting a bid or proposal, you agree to be bound by the terms of the Solicitation. You agree to hold Your Offer open for a minimum of sixty (60) calendar days after the Opening Date.

<p>NAME OF OFFEROR <small>(Full legal name of business submitting the offer)</small></p>	<p>OFFEROR'S TYPE OF ENTITY: <small>(Check one)</small></p> <p><input type="checkbox"/> Small (15 employees or less)</p> <p><input type="checkbox"/> Women</p> <p><input type="checkbox"/> Minority</p> <p><input type="checkbox"/> Other _____ <small>(See "Signing Your Offer" provision.)</small></p>
<p>AUTHORIZED SIGNATURE</p> <p><small>(Person signing must be authorized to submit binding offer to enter contract on behalf of Offeror named above.)</small></p>	
<p>TITLE <small>(Business title of person signing above)</small></p>	
<p>PRINTED NAME <small>(Printed name of person signing above)</small></p>	<p>DATE SIGNED</p>

Instructions regarding Offeror's name: Any award issued will be issued to, and the contract will be formed with, the entity identified as the offeror above. An offer may be submitted by only one legal entity. The entity named as the offeror must be a single and distinct legal entity. Do not use the name of a branch office or a division of a larger entity if the branch or division is not a separate legal entity, *i.e.*, a separate corporation, partnership, sole proprietorship, etc.

STATE OF INCORPORATION (If offeror is a corporation, identify the state of Incorporation.)

TAXPAYER IDENTIFICATION NO.	SOUTH CAROLINA GENERAL CONTRACTOR LICENSE NO.
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(See "Taxpayer Identification Number" provision)	
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PAGE TWO
(Return Page Two with Your Offer)

HOME OFFICE ADDRESS (Address for offeror's home office / principal place of business)	NOTICE ADDRESS (Address to which all procurement and contract related notices should be sent.)			
	Area Code	Number	Extension	Facsimile
	E-mail Address			

PAYMENT ADDRESS (Address to which payments will be sent.)	ORDER ADDRESS (Address to which purchase orders will be sent)
<input type="checkbox"/> Payment Address same as Home Office Address <input type="checkbox"/> Payment Address same as Notice Address (check only one)	<input type="checkbox"/> Order Address same as Home Office Address <input type="checkbox"/> Order Address same as Notice Address (check only one)

ACKNOWLEDGMENT OF AMENDMENTS	Amendment No.	Amendment Issue Date	Amendment No.	Amendment Issue Date	Amendment No.	Amendment Issue Date	Amendment No.	Amendment Issue Date
	Offerors acknowledges receipt of amendments by indicating amendment number and its date of issue.							
See "Amendments to Solicitation" Provision								

DISCOUNT FOR PROMPT PAYMENT	10 Calendar Days (%)	20 Calendar Days (%)	30 Calendar Days (%)	_____ Calendar Days (%)
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Solicitation Outline

- I. Scope of Solicitation**
- II. Instructions to Offerors**
 - A. General Instructions**
 - B. Special Instructions**
- III. Scope of Work / Specifications**
- IV. Information for Offerors to Submit**
- V. Qualifications**
- VI. Award Criteria**
- VII. Terms and Conditions**
 - A. General**
 - B. Special**
- VIII. Bid Form/Cost Proposal**
- IX. Attachments to Solicitation**

I. Scope of Solicitation

Sealed bids for Malcolm C. Hursey Montessori School at Ron McNair Campus School Building No. 0794 (Solicitation No. 21-BCG-B-002) will be received from General Contractors, properly licensed under the laws of the State of South Carolina, opened and read aloud by the Owner in the office of Brownstone Construction Group, 4055 Faber Place Drive, Suite 202, N. Charleston, SC 29405, on **January 25, 2021 @ 2:00 P.M.** Bids received after 2:00 PM will be rejected and returned to the Bidder unopened.

The name of the project is: Malcolm C. Hursey Montessori School at Ron McNair Campus
School Building No. 0734

Address: 3910 Verde Avenue (Formally 3595 Spruill Avenue)
North Charleston, SC 29405

The Owner is: Charleston County School District
3999 Bridge View Drive
North Charleston, South Carolina 29405

The Architect is: Red Iron Architects
4591 Durant Avenue
North Charleston, South Carolina 29405
Telephone: 843.834.2677
Contact: Emma Souder

The Program Manager is: Brownstone Construction Group, LLC
4055 Faber Place Drive, Suite 202
North Charleston, South Carolina 29405
Telephone: 843.973.8660
Project Manager: Margarita Perez

II. Instructions to Offerors

A. General Instructions

DEFINITIONS Except as otherwise provided herein, the following definitions are applicable to all parts of the solicitation. For additional definitions, see the terms and conditions below.

1. **Amendment** - means a document issued to supplement the original solicitation document.
2. **Board** - means the Charleston County School District Board of Trustees.
3. **Buyer** - means the Procurement Official.
4. **Change Order** - means any written alteration in specification, delivery point, rate of delivery, period of performance, price, quantity, or other provisions of any contract accomplished by mutual agreement of the parties of the contract.
5. **Contract Modification** - means a written order signed by the Procurement Official, directing the contractor to make changes which the changes clause of the contract authorizes the Procurement Official to order with the consent of the contractor.
6. **Contractor** – means the Offeror receiving an award as a result of this solicitation.
7. **Cover Page** - means the top page of the original solicitation on which the solicitation is identified by number. Offerors are cautioned that. Amendments may modify information provided on the Cover Page.
8. **District** - means Charleston County School District.
9. **Offer** - means the bid, or proposal submitted in response to this solicitation. The terms “Bid” and “Proposal” are used interchangeably with the term “Offer.”

10. **Offeror** - means the single legal entity submitting the offer. The term “Bidder” is used interchangeably with the term “Offeror.” See bidding provisions entitled “Signing Your Offer” and “Bid/Proposal as Offer to Contract.”
11. **Page two** – means the second page of the original solicitation, which is labeled Page Two.
12. **Procurement Official** - means the person, or designee, identified as such on the Cover Page.
13. **Solicitation** - means this document, including all its parts, attachments, and any Amendments.
14. **Subcontractor** - means any person having a contract to perform work or render service to Contractor as a part of the Contractor’s agreement arising from this solicitation.
15. **You and Your** - means Offeror.

AMENDMENTS TO SOLICITATION (a) The Solicitation may be amended at any time prior to opening. The Solicitation may be amended at any time prior to opening. **It is solely the responsibility of the Offeror to ensure that it has received all pre-bid addenda. Failure to acknowledge each pre-bid addendum may render the Offer nonresponsive.** All actual and prospective Offerors should monitor the following web site for the issuance of Amendments: <https://www.ccsdschools.com/Page/429> (**Finance/contracts and procurement**). (b) Bidders shall acknowledge receipt of any Amendment to this solicitation (1) by signing and returning the Amendment, (2) by letter, or (3) by submitting a bid that indicates in some way that the bidder received the Amendment. **Addenda notifications are sent via email from the mail account of “addendaNotification@dpibidroom.com” and could be flagged as spam by your company network firewall. Bidder / Offeror shall be responsible for the following: To prevent not receiving timely notification of these addenda, please contact your company Information Technology Manager and ask that he “white list” the domain of dpibidroom.com to prevent emails from being captured.**

AWARD NOTIFICATION Notice regarding any award or cancellation of award will be posted at the location specified on the Cover Page. If the contract resulting from this Solicitation has a total or potential value in excess of fifty thousand dollars or more, such notice will be sent to all Offerors responding to the Solicitation. Should the contract resulting from this Solicitation have a total or potential value of one hundred thousand dollars or more, such notice will be sent to all Offerors responding to the Solicitation and any award will not be effective until the eleventh day after such notice is given.

BID / PROPOSAL AS OFFER TO CONTRACT By submitting the District a signed Bid and/or Proposal, you are offering to enter into a contract with Charleston County School District and agreeing to all terms and conditions provided herein. Your bid and/or proposal as well as the terms and conditions of this solicitation will become part of any contract created as a result of this solicitation. **THEREFORE, ANY OBJECTION TO THE TERMS AND CONDITIONS CONTAINED HEREIN MUST BE ADDRESSED WITH THE DISTRICT PRIOR TO SUBMITTAL OF YOUR BID AND/OR PROPOSAL. SUCH OBJECTIONS MUST BE SUBMITTED IN WRITING AS DESCRIBED HEREIN FOR ANY INQUIRIES.** Without further action by either party, a binding contract shall result upon final award. Any award issued will be issued to, and the contract will be formed with, the entity identified as the Offeror on the Cover Page. An Offer may be submitted by only one legal entity; “joint bids” are not allowed.

BID ACCEPTANCE PERIOD In order to withdraw your Offer after the minimum period specified on the Cover Page, you must notify the Procurement Official in writing.

BID IN ENGLISH & DOLLARS Offers submitted in response to this solicitation shall be in the English language and in US dollars, unless otherwise permitted by the solicitation.

BOARD AS PROCUREMENT AGENT (a) **Authorized Agent.** All authority regarding the conduct of this procurement is vested solely with the responsible Procurement Official. Unless specifically delegated in writing, the Procurement Official is the only District official authorized to bind the District with regard to this procurement. (b) **Purchasing Liability.** The Procurement Official acts on behalf of Charleston County School District pursuant to the Charleston County School District Procurement Code. Any purchase orders awarded as a result of this procurement are between the Vendor and the District. The Board is not a party to such purchase orders, unless and to the extent that the Board is a using District unit, and bears no liability for any party’s losses arising out of or relating in any way to the purchase order.

CERTIFICATION REGARDING DEBARMENT AND OTHER RESPONSIBILITY MATTERS

(a)

- (1) By submitting an Offer, Offeror certifies, to the best of its knowledge and belief, that
 - (i) Offeror and/or any of its Principals

- (A) Are not presently debarred, suspended, proposed for debarment, or declared ineligible for the award of contracts by a state or federal agency;
 - (B) Have not, within a three-year period preceding this offer, been convicted of or had a civil judgment rendered against them for: commission of fraud or a criminal offense in connection with obtaining, attempting to obtain or performing a public (federal, state, or local) contract or subcontract; violation of Federal or State antitrust statutes relating to the submission of offers; or destruction of records, making false statements, tax evasion, or receiving stolen property; and
 - (C) Are not presently indicted for, or otherwise criminally or civilly charged by a governmental entity with, commission of any of the offenses enumerated in paragraph (A) (1) (i) (B) of this provision.
- (ii) Offeror has not, within a three-year period preceding this offer, had one or more contracts terminated for default by any public (federal, state, or local) entity.

(2) ‘Principals.’ For the purpose of this certification, means Officials; directors; owners; partners; and, persons having primary management or supervisory responsibilities within a business entity (e.g., general manager; plant manager; head of a subsidiary, division, or business segment, and similar positions).

- (b) Offeror shall provide immediate written notice to the Procurement Official if, at any time prior to contract award, Offeror learns that its certification was erroneous when submitted or has become erroneous by reason of changed circumstances.
- (c) If Offeror is unable to certify the representations stated in paragraphs (a) (1), Offeror must submit a written explanation regarding its inability to make the certification. The certification will be considered in connection with a review of the Offeror’s responsibility. Failure of the Offeror to furnish additional information as requested by the Procurement Official may render the Offeror non-responsible.
- (d) Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render, in good faith, the certification required by paragraph (a) of this provision. The knowledge and information of an Offeror is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.
- (e) The certification in paragraph (a) of this provision is a material representation of fact upon which reliance was placed when making award. If it is later determined that the Offeror knowingly or in bad faith rendered an erroneous certification, in addition to other remedies available to the District, the Procurement Official may terminate the contract resulting from this solicitation for default.

CODE OF LAWS AVAILABLE The Charleston County School District Procurement Code is available at <https://www.ccsdschools.com/Page/257>. (Finance/Contracts and Procurement).

COMPLETION OF FORMS/CORRECTION OF BIDS AND/OR ERRORS All prices, entries and notations should be printed in ink or typewritten on the forms provided herein. Any change to the bid information including, but not limited to, changes to bid pricing or correction of errors or information must be made by crossing out the original entry, entering the change or correction on the bid form or appropriate attachment, and initialing same. Any alteration of the Offer must be made on the bid form or attachments provided herein and must be initialed by the person signing the bid. Any other alterations may result in the Offer being deemed nonresponsive. (Alterations are not allowed elsewhere in the solicitation, on the face of the envelope submitting the Offer, or otherwise.)

DEADLINE FOR SUBMISSION OF OFFER Any offer received after the Procurement Official or designee has declared that the time set for opening has arrived, shall be rejected unless the offer has been delivered to the designated purchasing office prior to the bid opening.

DRUG FREE WORK PLACE CERTIFICATION By submitting an Offer, Contractor certifies that, if awarded a contract, Contractor will comply with all applicable provisions of the Drug-Free Workplace Act, Title 44, Chapter 107 of the South Carolina Code of Laws, as amended.

DUTY TO INQUIRE Offeror, by submitting an Offer, represents that it has read and understands the Solicitation and that its Offer is made in compliance with the Solicitation. Offerors are expected to examine the Solicitation thoroughly and should request an explanation of any ambiguities, discrepancies, errors, omissions, or conflicting statements in the Solicitation. Failure to do so will be at the Offeror’s risk. Offeror assumes responsibility for any patent ambiguity in the Solicitation that Offeror does not bring to the District’s attention.

ETHICS ACT By submitting an Offer, you certify that you are in compliance with South Carolina's Ethics, Government Accountability, and Campaign Reform Act of 1991, as amended. The following statutes require special attention: (a) Offering, giving, soliciting, or receiving anything of value to influence action of public employee-Section 8-13-790, (b) Recovery of Kickbacks-Section 8-13-790m (c) Offering, soliciting, or receiving money for advice or assistance of public official - Section 8-13-720, (d) Use or disclosure of confidential Information-Section 8-1 3-725, and (e) Persons hired to assist in the preparation of specifications or evaluation of bids Section 8-1 3-1 150

NO PROPOSAL REPLY: Any contractor electing to submit no proposal in response to this IFB may do so by sending a letter of "no reply" to the procurement Officer. Entities not replying in any way to three (3) consecutive IFB's from a government body may be placed in an inactive status and must then reapply to the active bidders list.

PROTESTS Any prospective bidder, Offeror, vendor, or sub vendor who is aggrieved in connection with the solicitation of a contract shall protest within fifteen (15) days of issuance of the Invitation for Bids or Requests for Proposals or other solicitation documents, whichever is applicable, or any amendment to it, if the amendment is at issue. An Invitation for Bids or Request for Proposals or other solicitation document, not including an amendment to it, is considered to have been issued on the date required notice of the issuance is given in accordance with this Code.

Any actual bidder, offeror, contractor, or subcontractor who is aggrieved in connection with the intended award or award of a contract shall protest to the Chief Procurement Officer within ten (10) days of the date award or notification of intent to award, whichever is earlier, is posted in accordance with the CCSD Procurement Code; except that a matter that could have been raised pursuant to § 4210.1.1 (Protest of Solicitation) as a protest of the solicitation may not be raised as a protest of the award or intended award of a contract.

PUBLIC OPENING Offers will be publicly opened at the date / time and at the location identified on the Cover Page, or last Amendment, whichever is applicable.

QUESTIONS FROM OFFERORS (a) Any prospective Offeror desiring an explanation or interpretation of the solicitation, drawings, specifications, etc., must request it in writing. The Procurement Official must receive questions no later than five (5) days prior to opening unless otherwise stated on the Cover Page. Oral explanations or instructions will not be binding. Any information given a prospective Offeror concerning a solicitation will be furnished promptly to all other prospective Offerors as an Amendment to the solicitation, if that information is necessary for submitting offers or if the lack of it would be prejudicial to other prospective Offerors. (b) The District seeks to permit maximum practicable competition. Offerors are urged to advise the Procurement Official, as soon as possible, regarding any aspect of this procurement, including any aspect of the Solicitation that unnecessarily or inappropriately limits full and open competition.

REJECTION/CANCELLATION The District may cancel this solicitation in whole or in part. The District may reject any or all proposals in whole or in part.

RESPONSIVENESS/IMPROPER OFFERS (a) Bid as Specified. Offers for supplies or services other than those specified will not be considered unless authorized by the Solicitation.

(b) Responsiveness. Any Offer that fails to conform to the material requirements of the Solicitation may be rejected as nonresponsive. Offers that impose conditions that modify material requirements of the Solicitation may be rejected. If a fixed price is required, an Offer will be rejected if the total possible cost to the District cannot be determined. Offerors will not be given an opportunity to correct any material nonconformity. Any deficiency resulting from a minor informality may be cured or waived at the sole discretion of the Procurement Official.

(c) Unbalanced Bidding. The District may reject an Offer as non-responsive if the prices bid are materially unbalanced between line items or sub-line items. A bid is materially unbalanced when it is based on prices significantly less than cost for some work and prices which are significantly overstated in relation to cost for other work, and if there is a reasonable doubt that the bid will result in the lowest overall cost to the District even though it may be the low evaluated bid, or if it is so unbalanced as to be tantamount to allowing an advance payment.

RESTRICTIONS APPLICABLE TO OFFERORS Violation of these restrictions may result in disqualification of your offer, suspension or debarment, and may constitute a violation of the State Ethics Act. (a) After issuance of the solicitation, you agree not to discuss this procurement activity in any way with any District employees, its agents or officials. All communications must be solely with the Procurement Official. This restriction expires once a purchase order has been formed and may be lifted by express written permission from the Procurement Official. (b) Unless otherwise approved in writing by the Procurement Officer, You agree not to give anything to any District employee, agent or official prior to award.

SIGNING YOUR OFFER Every Offer must be signed by an individual with actual authority to bind the Offeror. (a) If the Offeror is an individual, the Offer must be signed by that individual. If the Offeror is an individual doing business as a firm, the Offer must be submitted in the firm name, signed by the individual, and state that the individual is doing business as a firm. (b) If the Offeror is a partnership, the Offer must be submitted in the partnership name, followed by the words “by its Partner,” and signed by a general partner. (c) If the Offeror is a corporation, the Offer must be submitted in the corporate name, followed by the signature and title of the person authorized to sign. (d) An Offer may be submitted by a joint venture involving any combination of individuals, partnerships, or corporations. If the Offeror is a joint venture, the Offer must be submitted in the name of the joint venture and signed by every participant in the joint venture in the manner prescribed in paragraphs (a) through (c) above for each type of participant. (e) If an Offer is signed by an agent, other than as stated in subparagraphs (a) through (d) above, the Offer must state that it is and has been signed by an Agent. Upon request, Offeror must provide proof of the agent’s authorization to bind the principal.

OFFICE CLOSING If an emergency or unanticipated event interrupts normal District processes so that offers cannot be received at the District office designated for receipt of bids by the exact time specified in the solicitation, the time specified for receipt of offers will be deemed to be extended to the same time of day specified in the solicitation on the first work day on which normal District’s processes resume. In lieu of an automatic extension, an amendment may be issued to reschedule bid opening. If District offices are closed at the time a pre-bid or pre-proposal conference is scheduled, an amendment will be issued to reschedule the conference.

SUBMITTING CONFIDENTIAL INFORMATION For every document Offeror submits in response to or with regard to this solicitation or request, Offeror must separately mark with the word “CONFIDENTIAL” every page, or portion thereof, that Offeror contend contains information that is exempt from public disclosure because it is either (a) a trade secret as defined in Section 30-4-40(a)(1), or (b) privileged and confidential, as that phrase is used in Section 11-35-410. For every document Offeror submits in response to or with regard to this solicitation or request, Offeror must separately mark with the words “TRADE SECRET” every page, or portion thereof, that Offeror contends contains a trade secret as that term is defined by Section 39-8-20 of the Trade Secrets Act.

For every document Offeror submits in response to or with regard to this solicitation or request, Offeror must separately mark with the word “PROTECTED” every page, or portion thereof, that Offeror contends is protected by Section 11-351810. All markings must be conspicuous; use color, bold, underlining, or some other method in order to conspicuously distinguish the mark from the other text. Do not mark your entire response (bid, proposal, quote, etc.) as confidential, trade secret, or protected! If your response or any part thereof, is improperly marked as confidential or trade secret or protected, the District may, in its sole discretion, determine it non-responsive. If only portions of a page are subject to some protection, do not mark the entire page. By submitting a response to this solicitation or request, Offeror (1) agrees to the public disclosure of every page of every document regarding this solicitation or request that was submitted at any time prior to entering into a contract (including, but not limited to, documents contained in a response, documents submitted to clarify a response, and documents submitted during negotiations), unless the page is conspicuously marked “TRADE SECRET” or “CONFIDENTIAL” or “PROTECTED”, (2) agrees that any information not marked, as required by these bidding instructions, as a “Trade Secret” is not a trade secret as defined by the Trade Secrets Act, and (3) agrees that, notwithstanding any claims or markings otherwise, any prices, commissions, discounts, or other financial figures used to determine the award, as well as the final contract amount, are subject to public disclosure. In determining whether to release documents, the District will detrimentally rely on Offeror’s marking of documents, as required by these bidding instructions, as being either “Confidential” or “Trade Secret” or “PROTECTED”. By submitting a response, Offeror agrees to defend, indemnify and hold harmless the District, its Officials and employees, from every claim, demand, loss, expense, cost, damage or injury, including attorney’s fees, arising out of or resulting from the District withholding information that Offeror marked as “confidential” or “trade secret” or “PROTECTED”. (All references to S.C. Code of Laws.)

SUBMITTING YOUR OFFER OR MODIFICATION (a) Offers and offer modifications shall be submitted in sealed envelopes or packages (unless submitted by approved electronic means) - (1) Addressed to the office specified in the Solicitation; and (2) Showing the time and date specified for opening, the solicitation number, and the name and address of the bidder. (b) Each Offeror must submit the number of copies indicated on the Cover Page. (c) Offerors using commercial carrier services shall ensure that the Offer is addressed and marked on the outermost envelope or wrapper as prescribed in paragraphs (a)(1) and (2) of this provision when delivered to the office specified in the Solicitation. (d) Facsimile Offers, modifications, or withdrawals, will not be considered unless authorized by the Solicitation. (e) Offers submitted by electronic commerce shall be considered only if the electronic commerce method was specifically stipulated or permitted by the solicitation.

TAXPAYER IDENTIFICATION NUMBER

(a) If Offeror is owned or controlled by a Common Parent as defined in paragraph (b) of this provision, Offeror shall submit with its Offer the name and TIN of common parent. (b) Definitions:

- 1) "Common Parent," as used in this provision, means that corporate entity that owns or controls an affiliated group of corporations that files its Federal income tax returns on a consolidated basis, and of which the Offeror is a member.
- 2) "Taxpayer Identification Number (TIN)," as used in this provision, means the number required by the Internal Revenue Service (IRS) to be used by the Offeror in reporting income tax and other returns. The TIN may be either a Social Security Number or an Employer Identification Number.

(c) If Offeror does not have a TIN, Offeror shall indicate if either a TIN has been applied for or a TIN is not required. If a TIN is not required, indicate whether

- 1) Offeror is a nonresident alien, foreign corporation, or foreign partnership that does not have income effectively connected with the conduct of a trade or business in the United States and does not have an office or place of business or a fiscal paying agent in the United States;
- 2) Offeror is an agency or instrumentality of a state or local government;
- 3) Offeror is an agency or instrumentality of a foreign government; or
- 4) Offeror is an agency or instrumentality of the Federal Government.

WITHDRAWAL OR CORRECTION OF OFFER AFTER BID OPENING Offers may be withdrawn by written notice received at any time before the exact time set for opening. If the solicitation authorizes facsimile offers, offers may be withdrawn via facsimile received at any time before the exact time set for opening. A bid may be withdrawn in person by a bidder or its authorized representative if, before the exact time set for opening, the identity of the person requesting withdrawal is established and the person signs a receipt for the bid. Correction or withdrawal of bids are only allowed pursuant to the express terms of the CCSD Procurement Code as determined by CCSD.

NOTICES All contact should be directed to Lawrence Lutrario, Construction Procurement Officer. No company should contact District staff directly. All questions should be submitted to Lawrence Lutrario prior to the deadline for receipt of questions via Email lawrence_lutrario@charleston.k12.sc.us with copy to Margarita Perez @ mperez@bstonegroup.com and Taylor Neeley @ tneeley@bstonegroup.com Answers to any questions submitted will be sent to all companies via solicitation amendment.

B. Special Instructions

Conference – Pre-Bid

Pre-Bid/Proposal Conference Date and Time:

Due to the importance of all offerors having a clear understanding of the specifications and requirements of this solicitation, a conference of potential offerors will be held on the date specified on the cover page. Your failure to attend will not relieve the Contractor from responsibility for estimating properly the difficulty and cost of successfully performing the work, or for proceeding to successfully perform the work without additional expense to the District. The District assumes no responsibility for any conclusions or interpretations made by the Contractor based on the information made available at the conference. Nor does the District assume responsibility for any understanding reached or representation made concerning conditions which can affect the work by any of its officers or agents before the execution of this contract, unless that understanding or representation is expressly stated in this contract.

A Pre-Bid Conference will be hosted on January 4, 2022. at Cooper River Center for Advanced Studies at 1088 E. Montague Ave., North Charleston. The Pre-Bid Conference is intended to answer any questions relating to instructions to the bidder, project scope of work, etc. All prospective Offerors are strongly urged to attend this conference.

1. Schedule and Activities

Listed below are the planned activities/milestones/dates/times pertaining to this solicitation. A milestone schedule is included in the documents. All information is subject to change. Changes will be communicated to prospective Offerors via an Amendment to the solicitation as necessary.

Issue of Bid Documents	<u>December 17, 2021</u>
Pre-Bid Conference	<u>January 4, 2022</u>
Deadline for Receipt of Questions	<u>January 14, 2022</u>
Public Opening of Bid	<u>January 25, 2022</u>
Posting of Intent to Award	<u>January 26, 2022</u>
Notice To Proceed	<u>February 7, 2022</u>
Access to Site	<u>February 15, 2022</u>
Substantial Completion (<u>471</u> Calendar Days)	<u>May 31, 2023</u>
Final Completion (<u>30</u> Calendar Days)	<u>June 30, 2023</u>

2. CCSD Board of Trustees approval required: any award is subject to prior approval by the CCSD Board of Trustees.
3. The successful bidder will be required to furnish Performance Bond and Labor and Materials Bond in the amount of one hundred percent (100%) of the Contract Amount.
4. Discussion with bidders: After opening, discussions may be conducted with apparent responsive bidders for the purpose of clarification to assure full understanding of the requirements of the invitation for bids. All bids, in the Procurement Official's sole judgment, needing clarification must be accorded that opportunity.
5. **PROTEST**
Any protest must be addressed to the Director Contracts and Procurement Services, and submitted in writing (a) by email to wayne_wilcher@charleston.k12.sc.us, (b) by facsimile at 843-566-7391, or (c) by post or delivery to 3999 Bridge View Dr., N. Charleston, SC 29405.

III. Scope of Work / Specifications

The Owner has retained the services of a Program Manager to represent the Owner's interest during the construction of the work.

The work includes, but is not limited to, the construction of a new, three-story, fully sprinkled, 125,000 square foot building located on the site of the former Ronald McNair Elementary School (3795 Spruill Avenue, North Charleston, SC 29405). The facility will be composed predominantly of load bearing masonry veneered with utility brick and reinforced with structural steel, joists, trusses, and metal decking. The roof system is a 2-ply modified bitumen system. A 4-pipe chiller/boiler system will be used for the majority of the spaces with a separate make-up air system providing outside air. Finishes will include but are not limited to: SVT, terrazzo, ceramic and quarry tile, sealed concrete flooring, carpet, acoustical ceilings, paint, casework, marker/tack boards, and kitchen equipment. The package includes an elevator, basic electrical services, life safety systems, information technology systems, and cable trays. Sitework is also part of this contract and consists of the installation of utilities, paving, sidewalks, curb & gutter, fencing, grassing and landscaping. Project will be required to be designed and constructed in accordance with CCSD's Educational Specifications and Design Requirements.

INSTALLATION:

The first day the contractor will have access to the site for will be February 15, 2022. Substantial Completion by May 31, 2023.

PERMITS AND LICENSES:

The Contractor shall obtain and pay for applicable licenses and fees.

Contractor must have valid South Carolina Contractors License.

The contractor or sub-contractor performing this work must have all required licenses, both State of South Carolina and Federal, prior to start of work.

BID BOND: BID BOND in the amount of 5% of the bid is required.

LIENS AND INCUMBRANCES:

The Contractor shall satisfy immediately any lien or encumbrance, which because of any act or default of the Contractor, is filed against the District.

NON-ARBITRATION:

Disputes pertaining to this contract are not eligible for solution through arbitration procedures.

QUALITY ASSURANCE:

Protection of District Property:

The Contractor shall protect from damage due to his work, methods, procedures and workmen, the District's property including building surfaces, finishes, systems, equipment, furniture, supplies, and other components.

The Contractor shall repair or cause to be repaired damage to District property.

Products and Materials:

The Contractor shall use materials and products in the work which are new and of top quality. The Contractor shall assume full responsibility for protection, storage, safety and damage to stored and installed materials until Substantial Completion.

Qualifications of Work Persons:

The Contractor shall use skilled work persons who are thoroughly trained and experienced in the necessary crafts and trades.

Workmanship:

The Contractor shall cause the parts to be securely anchored, bonded, joined and secured together, the installation to be done in a workman-like manner in accordance with the best recognized practices, and the working parts to be adjusted and left in perfect working order.

Corrections in the Work:

The Contractor shall replace work rejected by the District as defective or as non-conforming within ten (10) days from written notice of rejection at no cost to the District.

PROJECT COORDINATION:

The Contractor shall verify field measurements before ordering materials and prefabricated items. The Contractor shall coordinate the work of all trades and schedule the timing so as not to cause delays to any phase of construction. The Contractor shall plan the work to minimize the disruption of District operations. The Contractor shall cooperate with reasonable scheduling requirements of the District.

School may be in session during the construction, and the contractor shall coordinate with the District to avoid disruption of the school activities.

SAFETY:

The Contractor shall provide safety barricades, fences, temporary walks, and signals in compliance with legal requirements, police regulations, and/or as requested by Charleston County School District at no additional cost.

CLEANING:

The Contractor shall clean up job site as frequently as necessary, but no less than, on a daily basis. Upon Substantial Completion, the Contractor shall clean the job site of all debris, miscellaneous construction materials, trash and unused materials. The Contractor shall remove and legally dispose of all debris.

CONSTRUCTION FACILITIES AND TEMPORARY CONTROL:

Utilities: Contractor's use of Owner's utilities shall be paid for by the contractor.

Sanitary Facilities: Provide and maintain, in sanitary condition, enclosed weather tight chemical toilets for use of construction personnel. Installation shall be in accord with applicable codes and of authorities having jurisdiction. Upon completion of the work, toilets and appurtenance shall be removed, leaving premises in satisfactory condition as approved by the owner.

NOTE: Under no circumstances will workmen be allowed to use any student's or teacher's toilet facility within the facility.

Barricades and Fencing: Provide and maintain safety barricades, fences with windscreens, temporary walks, bracing and shoring and signals in compliance with local requirements, police regulations and as necessary to separate non-project persons from construction areas.

Entrances: Contractor shall maintain the construction entrances. This shall include (but not necessarily be limited to) grading, filling of ruts and potholes, and maintaining proper drainage. Maintenance of entry gates shall also be the contractor's responsibility. Adjacent public streets, sidewalks, curbs, and parking lots shall be swept, scraped, washed and kept clean daily (more often as necessary) throughout all operations.

WARRANTY:

All products and services shall carry, after proper completion, and under normal use, a one (1) year warranty against all defects in materials and workmanship unless noted otherwise in the individual Specifications.

TERMINATION OF AGREEMENT

The District may terminate this agreement in whole or in part at any time, upon written notification to the successful bidder, for any reason at District's convenience. The District may terminate this agreement in whole or in part at any time upon written notification to successful bidder for any default involving:

(A) Failure to develop or deliver products and/or render the services within the schedule requirements of the District or the District's Designee.

(B) Successful bidder's failure to make progress reasonably satisfactory to the District, in the performance of its obligations under this Agreement. With respect to any such default, District's right to terminate shall be conditioned upon successful bidder's failure within ten (10) days after District's notification to provide a remedy satisfactory to District to cure failure of non-compliance.

(C) In the event successful bidder becomes the subject of any proceedings under State or Federal Law for the relief of debtors or otherwise becomes insolvent, bankrupt or makes assignments for the benefit of creditors.

IV. Information for Offerors to Submit

Bids are to be submitted on the Bid Form provided *accompanied by the Attachments contained herein and described below pursuant to the terms of this solicitation*; enclosed in a sealed, opaque envelope bearing the name and address of the bidder, CCSD Identification Number/Solicitation Number of contract being bid, the name of project and the offerors South Carolina General Contractor License Number. All Bids must comply with the laws of the State of South Carolina. Indicate your company name on each page of the Bid Form.

Complete and Submit Attachments B, C, D, E, F and G with the bid. Complete and submit attachments E and G as applicable. Offeror must list subcontractors identified in the table appearing on Attachment B. Instructions for subcontractor listings appear on that page. Failure to properly comply with subcontractor listing requirements may render

the Offeror nonresponsive and/or nonresponsible. The SWMBE information required in attachments C, D, and F will be required to be submitted by 11:00 a.m. the following day of Bid Opening along with the bid verification.

V. Qualifications

PROPOSER'S QUALIFICATIONS Bids shall be considered only from bidders who are regularly established in the business called for and who in the judgment of the District are financially responsible and able to show evidence of their reliability, ability, experience, to render prompt and satisfactory service in the volume called for under this contract.

To be eligible for award of a contract, a prospective contractor must be responsible. In evaluating an Offeror's responsibility, CCSD Standards of Responsibility and information from any other source may be considered. An Offeror must, upon request of CCSD, furnish satisfactory evidence of its ability to meet all contractual requirements. Unreasonable failure to supply information promptly in connection with a responsibility inquiry may be grounds for determining that you are ineligible to receive an award.

Before a submittal is considered for award, the bidder may be requested by the Procurement Official to submit completed form SE-350 as to his/her previous experience in performing similar or comparable work and of his/her business and technical organization and financial resources.

VI. Award Criteria

The District intends to award a contract to the contractor whose offer, conforming to the solicitation, is the most advantageous on the basis for all products, services and requirements contained herein.

In all cases, the District will be the sole judge as to whether a vendor's bid has or has not satisfactorily met the requirement of this bid.

Award will be made to the lowest responsive, responsible bidder who submits a responsive bid which is most advantageous to the Charleston County School District.

VII. Terms and Conditions A. General

Charleston County School District reserves the right to make the final determination as to the bidder's ability to provide the products or services requested herein.

ASSIGNMENT No contract or its provisions may be assigned, sublet, or transferred without the written consent of the Procurement Officer.

BANKRUPTCY (a) Notice. In the event the Contractor enters into proceedings relating to bankruptcy, whether voluntary or involuntary, the Contractor agrees to furnish written notification of the bankruptcy to the District. This notification shall be furnished within five (5) days of the initiation of the proceedings relating to the bankruptcy filing. This notification shall include the date on which the bankruptcy petition was filed, the identity of the court in which the bankruptcy petition was filed, and a listing of all District contracts against which final payment has not been made. This obligation remains in effect until final payment under this Contract (b) Termination. This contract is voidable and subject to immediate termination by the District upon the contractor's insolvency, including the filing of proceedings in bankruptcy.

CHOICE-OF-LAW The agreement, any dispute, claim, or controversy relating to the Agreement, and all the rights and obligations of the parties shall, in all respects, be interpreted, construed, enforced and governed by and under the laws of the State of South Carolina, except its choice of law rules. As used in this paragraph, the term "Agreement" means any transaction or agreement arising out of, relating to, or contemplated by the solicitation.

ORDER OF PRECEDENCE In the event of inconsistency between provisions of this solicitation, the inconsistency shall be resolved by giving precedence in the following order: (a) bid pricing schedule, (b) bid specifications, (c) standard solicitation provisions/general contract clauses, whether incorporated by reference or otherwise, (d) special solicitation provisions/special contract clauses and (e) instructions to bidders.

DISCOUNT FOR PROMPT PAYMENT:

- a) Discounts for prompt payment will not be considered in the evaluation of Offers. However, any offered discount will form a part of the award, and will be taken if payment is made within the discount period indicated in the offer by the Offeror. As an alternative to offering a discount for prompt payment in conjunction with the Offer, Offerors awarded contracts may include discounts for prompt payment on individual invoices.
- b) In connection with any discount offered for prompt payment, time shall be computed from the date of the invoice. If the Contractor has not placed a date on the invoice, the due date shall be calculated from the date the designated billing office receives a proper invoice, provided the District annotates such invoice with the date of receipt at the time of receipt. For the purpose of computing the discount earned, payment shall be considered to have been made on the date that appears on the payment check or, for an electronic funds transfer, the specified payment date. When the discount date falls on a Saturday, Sunday, or legal Holiday when Federal Government offices are closed and Government business is not expected to be conducted, payment may be made on the following business day.

DISPUTES (a) Choice-of-Forum: All disputes, claims, or controversies relating to the Agreement shall be resolved exclusively by the Director Contracts and Procurement Services in accordance with the Charleston County School District Procurement Code, or in the absence of jurisdiction, only in the Court of Common Pleas for, or a federal court located in, Charleston County, State of South Carolina. Contractor agrees that any act by the Government regarding the Agreement is not a waiver of either the Government's sovereign immunity or the Government's immunity under the Eleventh Amendment of the United States Constitution. As used in this paragraph, the term "Agreement" means any transaction or agreement arising out of, relating to, or contemplated by the solicitation. (b) Service of Process: Contractor consents that any papers, notices, or process necessary or proper for the initiation or continuation of any disputes, claims, or controversies relating to the Agreement; for any court action in connection therewith; or for the entry of judgment on any award made, may be served on Contractor by certified mail (return receipt requested) addressed to Contractor at the address provided as the Notice Address on Page Two or by personal service or by any other manner that is permitted by law, in or outside South Carolina. Notice by certified mail is deemed duly given upon deposit in the United States mail.

EQUAL OPPORTUNITY Contractor is referred to and shall comply with all applicable provisions, if any, of Title 41, part 60 of the Code of Federal Regulations, including but not limited to Sections 60-1.4, 60-4.2, 60-4.3, 60-250.5(a), and 60741.5(a), which are hereby incorporated by reference.

ILLEGAL IMMIGRATION By submitting an offer, Contractor certifies that it will comply with the applicable requirements of Title 8, Chapter 14 of the South Carolina Code of Laws (originally enacted as Section 3 of The South Carolina Illegal Immigration Reform Act, 2008 S.C. Act No. 280) and agrees to provide upon request any documentation required to establish either: (a) the applicability of Title 8, Chapter 14 to Contractor and any subcontractors or subcontractors; or (b) the compliance with Title 8, Chapter 14 by Contractor and any subcontractor or sub-subcontractor. Pursuant to Section 8-14-60, "A person who knowingly makes or files any false, fictitious, or fraudulent document, statement, or report pursuant to this chapter is guilty of a felony and, upon conviction, must be fined within the discretion of the court or imprisoned for not more than five years, or both." Contractor agrees to include in any contracts with its subcontractors language requiring the subcontractors to (a) comply with the applicable requirements of Title 8, Chapter 14, and (b) include in any contracts with the sub-subcontractors language requiring the sub-subcontractor to comply with the applicable requirements of Title 8, Chapter 14.

FALSE CLAIMS According to the S.C. Code of Laws Section 16-13-240, "a person who by false pretense or representation obtains the signature of a person to a written instrument or obtains from another person any chattel, money, valuable security, or other property, real or personal, with intent to cheat and defraud a person of that property is guilty "of a crime.

FIXED PRICING REQUIRED Any pricing provided by contractor shall include all costs for performing the work associated with that price. Except as otherwise provided in this solicitation, contractor's price shall be fixed for the duration of this contract, including option terms. This clause does not prohibit contractor from offering lower pricing after award.

NON-INDEMNIFICATION Any term or condition is void to the extent it requires CCSD to indemnify anyone.

NOTICE (A) After award, any notices shall be in writing and shall be deemed duly given (1) upon actual delivery, if delivery is by hand, (2) upon receipt by the transmitting party of automated confirmation or answer back from the recipient's device if delivery is by telex, telegram, facsimile, or electronic mail, or (3) upon deposit into the United States mail, if postage is prepaid, a return receipt is requested, and either registered or certified mail is used. (B) Notice to contractor shall be to the address identified as the Notice Address on Page Two. Notice to the District shall be to the Procurement Officer's address on the cover Page. Either party may designate a different address for notice by giving notice in accordance with this paragraph.

PAYMENT CCSD shall pay the Contractor, after the submission of proper invoices or vouchers, the prices stipulated in this Contract for supplies delivered and accepted or services rendered and accepted, less any deductions provided in this contract. Unless otherwise specified in this Contract, including the purchase order, payment shall not be made on partial deliveries accepted by CCSD. Unless the purchase order specified another method of payment, payment will be made by check. Payment and interest shall be made in accordance with S.C. code Section 11-35-45. Contractor waives imposition of an interest penalty unless the invoice submitted specifies that the late penalty is applicable.

PUBLICITY RELEASES Contractor agrees not to refer to award of this contract in commercial advertising in such a manner as to state or imply that the products or services provided are endorsed or preferred by the user.

PURCHASE ORDER A purchase order may be enclosed with or issued pursuant to this contract, and will be an integral part of the resulting contract. The purchase order indicates that sufficient funds have been obligated in accordance with the budget of the district and assures distribution of the necessary receiving reports. The purchase order does not supersede any provisions of the resulting contract. Performance time and dates are determined solely by the contract and any modification thereto.

SETOFF CCSD shall have all of its common law, equitable, and statutory rights of set-off. These rights shall include, but not be limited to CCSD's option to withhold for the purposes of set-off any moneys due to the Contractor under this Contract up to any amounts due and owing to the CCSD with regard to this Contract, any other contract with any CCSD department or agency, including any contract for a term commencing prior to the term of this Contract, plus any amounts due and owing to the CCSD for any other reason including, without limitation, tax delinquencies, fee delinquencies or monetary penalties relative thereto.

SURVIVAL OF OBLIGATIONS The Parties' rights and obligations which, by their nature, would continue beyond the termination, cancellation, rejection, or expiration of this Contract shall survive such termination, cancellation, rejection, or expiration, including, but not limited to, the rights and obligations created by the following clauses: Indemnification - Third Party Claims, Intellectual Property Indemnification, and any provisions regarding warranty or audit.

TAXES: This is not a tax exempt project.

TERMINATION DUE TO UNAVAILABILITY OF FUNDS Payment and performance obligations for succeeding fiscal periods shall be subject to the availability and appropriation of funds therefore. When funds are not appropriated or otherwise made available to support continuation of performance in a subsequent fiscal period, the Contract shall be canceled. In the event of a cancellation pursuant to this paragraph, Contractor will be reimbursed the resulting unamortized, reasonably incurred, nonrecurring costs. Contractor will not be reimbursed any costs amortized beyond the initial contract term.

THIRD PARTY BENEFICIARY This Contract is made solely and specifically among and for the benefit of the parties hereto, and their respective successors and assigns, and no other person will have any rights, interest, or claims hereunder or be entitled to any benefits under or on account of this Contract as a third-party beneficiary or otherwise.

WAIVER CCSD does not waive any prior or subsequent breach of the terms of the Contract by making payments on the Contract, by failing to terminate the Contract for lack of performance, or by failing to strictly or promptly insist upon any term of the Contract. Only the Procurement Officer has actual authority to waive any of CCSD's rights under this Contract. Any waiver must be in writing.

PURCHASE ORDER AMENDMENTS, MODIFICATIONS AND CHANGE ORDERS Any change orders, alterations, amendments or other modifications hereunder shall not be effective unless reduced to writing and approved by the Procurement Official responsible for this solicitation and the vendor. All questions, problems or changes arising after award of this purchase order shall be directed to the Procurement Official responsible for this solicitation, at 3999 Bridge View Drive, North Charleston, SC 29405.

COMPLIANCE WITH STATUTES: During the term of the contract, it shall be the Contractor's responsibility to ensure compliance with all applicable provisions of laws, codes, ordinances, rules, regulations, and tariffs.

INSURANCE: The Contractor (or Subcontractor, or anyone directly or indirectly employed by any of them) will provide and maintain, as a minimum or greater, if required by law, the following types and amounts of insurance:

1. Commercial General Liability: Contractor must provide Commercial General Liability insurance using the 1993 ISO Occurrence For (CG 00 01 10/93) or an equivalent form. The Commercial General Liability insurance must include coverage

for premises-operations, independent contractors, products-completed operations, personal injury and contractual liability. The contractual liability must include the tort liability of another assumed in a business contract. The Contractor or his agent shall verify that there is no endorsement or modification of the CGL limiting the scope of coverage for liability arising from explosion, collapse or underground property damage. This insurance shall be maintained throughout the duration of the project and for a minimum of one year after final payment as provided for in Article 9.10. Limits shall be as follows:

Each Occurrence Limit	
Bodily Injury/Property Damage Liability	\$1,000,000
Personal Injury Liability	\$1,000,000
General Aggregate Limit	\$2,000,000
Products/Completed Operations Aggregate Limit	\$2,000,000

2. The General Aggregate Limit is to be written on a “per project” basis using contractor’s per project endorsement Amendment-Aggregate Limits of Insurance (CG2503) The Project/Completed Operations Aggregate Limit must be at least \$2,000,000 or written confirmation provided that the Commercial Umbrella coverage includes liability coverage for damage to the insured’s completed work equivalent to that provided under the CG 00 01 10/93 coverage form.

3. The Owner is to be named as an additional insured in the Contractor’s policy with respect to this project using the ISO Additional Insured-Owners, Contractors endorsement (CG 20 10) or a substitute providing equivalent coverage. Verification of additional insured status shall be furnished to the Owner by mailing a copy of the endorsement or Certificate of Insurance.

4. Insurance for all owned, non-owned and hired vehicles on ISO form CA 00 01 12/4. This insurance will apply as primary insurance with respect to any other insurance or self-insurance the Owner may have or elect to carry with respect to this Project.

5. Comprehensive Automobile Liability Insurance: Contractor must provide and maintain business auto liability 90 or equivalent coverage form with the following limits;

Combined Single Limit	\$1,000,000 per accident (or equivalent “split limits” satisfying Umbrella Excess Liability requirements).
-----------------------	--

If necessary, the policy shall be indorsed to provide contractual liability coverage equivalent to that provided in the 1990 and later editions of the ISO CA 00 01 form.

6. Workers Compensation: Contractor shall provide and maintain workers compensation and employers liability insurance providing coverage in South Carolina. Limits and coverage shall be as follows;

Workers Compensation Insurance	SC statutory benefits
Employers Liability Insurance	\$500,000 each accident
	\$1,000,000 policy limit
	\$500,000 each employee

If the project involves work which may be subject to the US Longshore and Harborworkers Act (USL&HW), or which may involve watercraft, Contractor will attach the respective endorsements to provide this coverage. USL&HW (WC 00 01 06 A) and maritime Coverage (WC 00 02 01 A).

7. Umbrella Excess Liability: Contractor shall provide umbrella excess liability insurance on an “occurrence” basis providing “following form” coverage for the underlying coverages outlined above with the following limits:

Excess Liability (Umbrella Form)	
General Aggregate	\$5,000,000
Each Occurrence	\$5,000,000

8. Certificates of insurance which shall be signed by a duly authorized representative of each insurance company, showing compliance with the insurance requirements attached hereto and which shall be acceptable to the Owner shall be submitted to the Owner upon execution of this Agreement. When requested by the Owner, the Contractor shall furnish copies of Certificates of Insurance for each subcontractor as well. All Certificates of Insurance shall include a statement that the Owner will receive written notice 30 days prior to cancellation of any policy. Further, the Charleston County School District will be named as an additional insured on all policies.

9. *The Owner is responsible for providing the Builder's Risk Policy. The General Contractor is responsible for a Supplemental Policy to cover Charleston Count School District's \$100,000.00 deductible. Contractor shall submit proof of such insurance prior to the start of work on site.*

CONTRACTOR PERSONNEL: The Contractor shall enforce strict discipline and good order among the Contractor's employees and other persons carrying out the Contract. The Contractor shall not permit employment of unfit persons or persons not skilled in tasks assigned to them.

CONTRACTOR SOLELY RESPONSIBLE FOR PERFORMANCE: The District will rely upon the Contractor for full, complete, and satisfactory performance under the terms and conditions of this agreement.

If the Contractor's services provided for hereunder include services, equipment, or materials supplied by a subcontractor, the Contractor must act as the prime Contractor for these items and assume full responsibility for performance hereunder. The Contractor will be considered the sole point of contact with regard to all situations, including payment of all charges and the meeting of all other requirements.

TERMINATION Subject to the conditions below, the District providing a 30-day advance notice in writing is given to the vendor may terminate the purchase order for any reason.

NON-APPROPRIATIONS Any purchase order entered into by the District resulting from this bid invitation shall be subject to cancellation without damages or further obligation when funds are not appropriated or otherwise made available to support continuation of performance in a subsequent fiscal period or appropriated year.

FOR CONVENIENCE In the event that this purchase order is terminated or canceled upon request and for the convenience of the District without the required thirty (30) days advance written notice, then the District may negotiate reasonable termination costs, if applicable.

FOR CAUSE Termination by the District for cause, default or negligence on the part of the vendor shall be excluded from the foregoing conditions; termination costs, if any, shall not apply. The thirty (30) days advance notice requirement is waived and the default clause in this bid shall apply.

DEFAULT In case of default by the vendor, the District reserves the right to purchase any or all items in default in the open market, charging the vendor with any additional costs. The defaulting vendor shall not be considered a responsible bidder until the assessed charge has been satisfied.

INDEMNIFICATION

1. To the fullest extent permitted by law, the Contractor shall indemnify and hold harmless the Owner, Charleston County School District, its agents, Board, officers and/or officials, employees and volunteers (hereinafter, the "Indemnitees") 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 including loss of use resulting therefrom, but only to the extent caused in whole or in part by negligent acts or omissions of the Contractor, a Subcontractor, anyone directly or indirectly employed by them or anyone for whose acts they may be liable, regardless of whether or not such claim, damage, loss or expense is caused in part by a party indemnified hereunder. Such obligation shall not be construed to negate, abridge or reduce other rights or obligations of indemnify which would otherwise exist as to a party or person described herein.
2. In claims against any person or entity indemnified herein by an employee of the Contractor, a Subcontractor, anyone directly or indirectly employed by them or anyone directly or indirectly employed by them or anyone for whose acts they may be liable, the indemnification obligation herein 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. Further, any performance bond or insurance protection required by the contract, or otherwise provided by the Contractor, shall in no way limit the responsibility to indemnify, keep and save harmless and defend the Indemnitees as herein provided.
3. The Contractor's indemnity obligations shall also specifically include, without limitation, all fines, penalties, damages, liability, costs, expenses (including, without limitation, reasonable attorneys' fees and court costs), and punitive damages (if

any) arising out of, or in connection with, and (1) violation of or failure to comply with any law, statute, ordinance, rule, regulation, code or requirement of a public authority that bears upon the performance of this contract by the Contractor, a Subcontractor, or any person or entity for whom either is responsible, (2) means, methods, procedures, techniques or sequences or execution or performance of the services required, and (3) failure to secure and pay for permits, fees, approvals, and/or licenses related to performance of the contract by the Contractor, a Subcontractor or any person or entity for whom either is responsible.

4. The Contractor shall indemnify and hold harmless all of the Indemnitees from and against any costs and expenses (including reasonable attorneys' fees and court costs) incurred by any of the Indemnitees in enforcing any of the Contractor's defense, indemnity and hold-harmless obligations under this contract.

5. The Contractor shall further indemnify and hold harmless the Indemnitees from all suits or claims of any character brought by reason of infringing on any patent, trademark or copyright. Contractor shall have no liability to the Indemnitees if such patent, trademark or copyright infringement or claim is based upon the Contractor's use of materials furnished to the Contractor by an Indemnitee.

LICENSES AND PERMITS: During the term of the contract, the Contractor shall be responsible for obtaining, and maintaining in good standing, all licenses (including professional licenses, if any), permits, inspections and related fees for each or any such licenses, permits and /or inspections required by the District, county, city or other government entity or unit to accomplish the work specified in this solicitation and the contract.

QUALITY OF PRODUCT (This clause does not apply to solicitations for service requirements). Unless otherwise indicated in this bid it is understood and agreed that any item offered or shipped on this bid shall be new and in first class condition, that all containers shall be new and suitable for storage or shipment, and that prices include standard commercial packaging. For information technology procurements as defined in Provision I., of the Charleston County School District Procurement Code, if items that are other than new (i.e. remanufactured or refurbished) are desired to be bid, the bidder must obtain written permission to bid such items at least 5 days in advance of bid opening from the person to whom inquiries are to be directed as listed on the front page of the invitation for bid.

PRICE ADJUSTMENTS: (1) Method of Adjustment. Any adjustment in the contract price made pursuant to a clause in this contract shall be consistent with this Contract and shall be arrived at through whichever one of the following ways is the most valid approximation of the actual cost to the Contractor (including profit, if otherwise allowed):

(a) by agreement on a fixed price adjustment before commencement of the pertinent performance or as soon thereafter as practicable;

(b) by unit prices specified in the Contract or subsequently agreed upon;

(c) by the costs attributable to the event or situation covered by the relevant clause, including profit if otherwise allowed, all as specified in the Contract; or subsequently agreed upon;

(d) in such other manner as the parties may mutually agree; or,

(e) in the absence of agreement by the parties, through a unilateral initial written determination by the Procurement Officer of the costs attributable to the event or situation covered by the clause, including profit if otherwise allowed, all as computed by the Procurement Officer in accordance with generally accepted accounting principles, subject to the provisions of Section 4210 of CCSD Procurement Codes. (2) Submission of Price or Cost Data. Upon request of the Procurement Officer, the contractor shall provide reasonably available factual information to substantiate that the price or cost offered, for any price adjustments is reasonable, consistent with the provisions of Section 1830.

RISK OF LOSS The contractor shall assume all risk of loss, and shall maintain insurance coverage on all items installed, up to the time of final acceptance.

RECORDS RETENTION AND RIGHT TO AUDIT Charleston County School District has the right to audit the books and records of the contractor as they pertain to this contract, both independent of, and pursuant to, the District Procurement Code. Such books and records shall be maintained for a period of three (3) years from the date of final payment under the contract.

The District may conduct, or have conducted, performance audits of the contractor. The District may conduct, or have conducted, audits of specific requirements of this bid as determined necessary by the District.

Pertaining to all audits, contractor shall make available to the District access to its computer files containing the history of contract performance and all other documents related to the audit. Additionally, any software used by the contractor shall be made available for auditing purposes at no cost to the District.

FORCE MAJEURE The contractor shall not be liable for any excess costs if the failure to perform the contract arises out of causes beyond the control and without the fault or negligence of the contractor. Such causes may include, but are not restricted to acts of God or of the public enemy, acts of the government in either its sovereign or contractual capacity, fires, floods, epidemics, quarantine restrictions, strikes, freight embargoes, and unusually severe weather but in every case the failure to perform must be beyond the control and without the fault or negligence of the contractor. If the failure to perform is caused by default of a subcontractor, and if such default arises out of causes beyond the control of both the contractor and subcontractor, and without the fault or negligence of either of them, the contractor shall not be liable for any excess costs for failure to perform, unless the supplies or services to be furnished by the subcontractor were obtainable from other sources in sufficient time to permit the contractor to meet required delivery schedule.

SOUTH CAROLINA GOVERNING LAW CLAUSE The agreement and any dispute, claim, or controversy relating to the agreement shall, in all respects, be interpreted, construed, enforced and governed by and under the laws of the State of South Carolina. All disputes, claims, or controversies relating to the agreement shall be resolved exclusively by the Purchase orders and Procurement Services Director in accordance with the District Procurement Code, or in the absence of jurisdiction, only in the court of common pleas for, or a federal court located in, Charleston County, State of South Carolina. Vendor agrees that any act by the government regarding the agreement is not a waiver of either the government's sovereign immunity or the government's immunity under the eleventh amendment of the United States Constitution. As used in this paragraph, the term "agreement means any transaction or agreement arising out of, relating to, or contemplated by the solicitation.

SWMBE PARTICIPATION Charleston County School District encourages SWMBE businesses to participate in the Bid process. It is the intent of the Charleston County School District to provide equal opportunity to small, minority, and woman-owned businesses in every aspect of procurement. All business conducted with SWMBE businesses certified by the South Carolina Governor's Office of Small and Minority Business Assistance is recorded in a yearly report submitted to the Charleston County School District Board of Trustees. In order to be included in this report you must submit a copy of your certificate with your proposal.

ITEM SUBSTITUTION (This clause does not apply to solicitations for service requirements). No substitutes will be allowed on purchase orders received from the District without permission from the Procurement Official.

RESTRICTIONS/LIMITATIONS No purchases are to be made from this contract for any item that is not listed or for any item that is currently authorized under any other contract awarded prior to this contract.

NON INTERFERENCE: In the event Contractor is unable for any reason to provide any material, services, supplies, products or other items of any type or variety to the District under this agreement, including but not limited to any such materials, services, supplies, etc. available from any other party (such as subcontractors) supplying said materials, services, etc. to Contractor, the District will have the right to deal directly with the other supplier without penalty or interference from Contractor.

SUBCONTRACTORS: Subcontractors are subject to same terms and conditions of this agreement as the Contractor.

LIENS AND ENCUMBRANCES The Contractor shall satisfy immediately any lien or encumbrance which, because of any act or default of the Contractor, is filed against the District.

PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT The District requires all vendor activities to be in compliance with local, state, and federal mandates concerning "protection of human health and the environment". Any vendor doing business with the District will be required to document compliance and to specify prudent practices used by the vendor to address applicable mandates including, but not restricted to "the hazard communication standard" OSHA CFR 191 0.1200 (SCRR article 1,71-1910.1200). By submission of this bid, the vendor agrees to take all necessary steps to ensure compliance with these requirements.

COMPLIANCE WITH LAWS During the term of the Contract, Contractor shall comply with all applicable provisions of laws, codes, ordinances, rules, regulations, and tariffs.

LIQUIDATED DAMAGES If the Contractor fails to achieve Substantial Completion of the Work within the Contract Time and as otherwise required by the Contract Documents, the Owner shall be entitled to retain or recover from the Contractor, as liquidated damages and not as a penalty, daily amounts of **\$500.00** commencing upon the first day following expiration of

the Contract Time and continuing until the actual date of Substantial Completion. Such liquidated damages are hereby agreed to be a reasonable pre-estimate of damages the Owner will incur as a result of delayed completion of the Work. If the Contractor fails to obtain Final Completion with 100% of the punchlist completed within thirty days from the date of Substantial Completion, the Owner shall be entitled to retain or recover from the Contractor as liquidated damages the amount of **\$750.00** per calendar day from the thirty-first day following the date of Substantial Completion until completion of the punchlist and until a Final Completion Certificate is obtained, regardless of how the punchlist is completed.

STORAGE OF MATERIALS Absent approval of CCSD, Contractor shall not store items on the premises of CCSD prior to the time set for installation.

MINORITY BUSINESS ENTERPRISE (MBE) PLAN

Statement of Policy

It is the policy of the Charleston County School District that discrimination against businesses on the basis of race, color, national origin, and gender is prohibited. No person shall be denied the benefit of, or otherwise discriminated against, on the grounds of race, color, national origin or gender in connection with the award and/or performance of any contract or modification of a contract between a vendor or contractor and the Board which contract is paid or is to be paid for, in whole or part, with monetary appropriations of the Board. Further, it is the policy of CCSD to encourage and promote on an inclusionary basis contracting opportunities for all business, without regard to race, color, national origin or gender. It is expected that all firms seeking to do business with the Charleston County School District will comply with this CCSD policy.

MBE Designated Procurement Plan

The regulations and procedures for implementation of this program are outlined in the procurement code approved by the Board of Trustees. The Charleston County School District will establish goals that include expending, with Minority Business Enterprises certified by the Office of Small and Minority Business Assistance and non-certified Minority business Enterprises, an amount equal to twenty percent (20%) of the District's controllable dollars expended (with the exclusion of salary, benefits, professional services, utilities and travel) for the procurement of supplies, services, Information Technology and construction. Bidders are requested to provide good faith effort in helping the District meet this goal.

MBE Subcontractor Participation

Charleston County School District, through its contract documents, encourages contractors to utilize minority subcontractors on their projects.

A prime contractor must identify MBE utilization expenditures to certified MBE subcontractors that perform a commercially useful function in the work of the contract. An MBE subcontractor is considered to perform a commercially useful function when it is responsible for the execution of a distinct element of the work of a contract for which the MBE has the skill and expertise and carries out its responsibility by actually performing, managing and supervising the work involved.

MBE Utilization Commitment Report

In order to facilitate an effective monitoring system, each contractor, bidder or offeror must submit a completed and signed MBE Utilization Commitment Report (Attachment D) with the proposal submission which lists the names, addresses and contact persons of the MBE and minority owned businesses, if any, to be used in the contract, the type of work each business will perform, the dollar value of the work and the scope of work. The Utilization Report submitted by the contractor shall be submitted as a part of the contract with CCSD. If the information contained in the Contractors Utilization Report changes by the time the contract is executed, the Contractor shall amend the Utilization Report and such amended Utilization Report shall be incorporated into the contract.

All employees involved in the execution of this contract must be of legal status and be in adherence to all Federal and South Carolina State Laws.

VIII. Bid Form /Cost Proposal

Malcolm C. Hursey Montessori School at Ron McNair Campus School Building No. 0734

A. ALLOWANCES

1. General Contingency Allowance	\$ 450,000.00
2. Dispute Resolution Board Allowance	\$ 10,000.00
3. Fire Alarm System Allowance	\$ 286,000.00
4. Intrusion Detection System Allowance	\$ 40,000.00
5. Energy Management System Allowance	\$1,050,000.00
6. Security Access Control Hardware Allowance	\$ 175,000.00
7. Door Hardware Punch Allowance	\$ 21,000.00
8. Fencing and Gates Allowance	\$ 375,000.00

B. BASE BID

1. Total Base Bid <u>without</u> Allowances	\$ _____
2. Total of Allowances	\$ <u>2,407,000.00</u>
3. Total of Base Bid <u>with</u> Allowances	\$ _____

C. ALTERNATES

Alternate No. 1A Add Laminated Glazing	\$ _____
Alternate No. 1B Add Windborne-Debris Impact Resistant Glazing	\$ _____
Alternate No. 1C Add Bullet Resistant Glazing	\$ _____
Alternate No. 2 Add Epoxy Terrazzo at Lobby 100	\$ _____
Alternate No. 3 Add Emergency Responder Radio Repeater System	\$ _____

D. UNIT PRICES

<u>ITEM</u>	<u>UNIT</u>	<u>COST</u>
Concrete Paving (4" Sidewalks)	SF	_____
Sod, In Place	SF	_____
Hydro Seeding	SY	_____
Imported Top Soil	CY	_____
Concrete Curb & Gutter	LF	_____
Over-excavate footings by 1-foot and install #57	LF	_____
Unsuitable Soils, Remove, Replace, Compact-in-Place	CY	_____
Structural fill material using approved offsite borrow	CY	_____
8'-0" Black Vinyl Chain Link Fencing	LF	_____
EARTH EXCAVATION:		
Earth Excavation, Machine	CY	_____
Earth Excavation, Hand	CY	_____

Earth Excavation, Trench	CY	_____
EARTH BACKFILL USING APPROVED OFFSITE BORROW:		
Earth Backfill, Machine	CY	_____
Earth Backfill, Hand	CY	_____
Earth Backfill, Trench	CY	_____

GC License # _____

COMPANY NAME _____

ADDRESS _____

COMPANY _____

REPRESENTATIVE BY _____

Authorized to Sign _____

TITLE _____

TELEPHONE _____

ADDENDA RECEIPT () Addendum #1 Date _____
(if applicable)

() Addendum #2 Date _____

The undersigned, as bidder, proposes and agrees, if this bid is accepted, to contract with Charleston County School District, in the form of contract specified, to pay all required fees and permits, and to furnish any necessary materials, tools, equipment, apparatus, transportation, and labor to complete the projects, and has bid in full and complete accordance with the shown, noted, described and reasonably intended requirements of the contract documents.

1. The bidder further declares that he/she has examined the site of work and has become thoroughly familiar with all conditions pertaining to the work to be performed. The bidder also has examined the plans and specifications for the work and contractual documents relative thereto, and has read all special provisions furnished prior to the opening of bids; that he/she has been satisfied relative to the work to be performed.
2. The bidder agrees that this Bid Proposal is valid from bid date and for a minimum of 60 days hence.
3. The bidder finally agrees that this IFB supersedes any and all previous agreements, both written and oral, and that the terms and conditions of this Agreement shall exclusively govern the agreement between the parties.
4. CHARLESTON COUNTY SCHOOL DISTRICT RESERVES THE RIGHT TO REJECT A CONTRACTOR'S BID IF THE CONTRACTOR IS CURRENTLY PERFORMING WORK FOR THE DISTRICT AND HIS CURRENT PROJECT IS BEHIND SCHEDULE.
5. Time is of the essence. By submitting a bid and signing this bid form, Contractor acknowledges that the time for completion of this project is reasonable and that it can complete this project in the time allotted. Further, Contractor acknowledges that it has notice of the liquidated damages provisions contained within Article 3.6 of the AIA A132 Standard Form of Agreement Between Owner and Contractor, Program Manager as Adviser Edition, as amended.

6.

Company Name

Name of Authorized Rep. – Typed or Printed

Signature of Authorized Representative

Street Address

City / State / Zip Code

Date

ATTACHMENT LISTING

- A. Offeror's Checklist**
- B. List of Sub-Contractor's**
- C. Minority Participation Affidavit**
- D. MBE Utilization Commitment Form**
- E. Statement of Intent to Perform Work without Subcontracting**
- F. Certificate of Minority Business Enterprise Unavailability**
- G. Charleston County School District No Bid Form**

Attachment A

OFFEROR'S CHECKLIST
AVOID COMMON MISTAKES

Web site:

Review this checklist prior to submitting your proposal
If you fail to follow this checklist, you risk having your proposal rejected.

- COMPLETED AND SIGNED ALL REQUIRED DOCUMENTS.
- DO NOT INCLUDE ANY OF YOUR STANDARD CONTRACT FORMS!
- UNLESS EXPRESSLY REQUIRED, DO NOT INCLUDE ANY ADDITIONAL BOILERPLATE CONTRACT CLAUSES.
- REREAD YOUR ENTIRE PROPOSAL TO MAKE SURE YOUR PROPOSAL DOES NOT TAKE EXCEPTION TO ANY OF THE DISTRICTS MANDATORY REQUIREMENTS.
- MAKE SURE YOU HAVE PROPERLY MARKED ALL PROTECTED, CONFIDENTIAL, OR TRADE SECRET INFORMATION IN ACCORDANCE WITH THE HEADING ENTITLED: FOIA BIDDING INSTRUCTIONS, SUBMITTING CONFIDENTIAL INFORMATION. ***DO NOT MARK YOUR ENTIRE BID AS CONFIDENTIAL, TRADE SECRET, OR PROTECTED! Do NOT INCLUDE A LEGEND ON THE COVER STATING THAT YOUR ENTIRE RESPONSE IS NOT TO BE RELEASED!***
- HAVE YOU PROPERLY ACKNOWLEDGED ALL AMENDMENTS? INSTRUCTIONS REGARDING HOW TO ACKNOWLEDGE AN AMENDMENT SHOULD APPEAR IN ALL AMENDMENTS ISSUED.
- MAKE SURE YOUR PROPOSAL INCLUDES A COPY OF THE SOLICITATION COVER PAGE.
- MAKE SURE A PERSON THAT IS AUTHORIZED TO CONTRACTUALLY BIND YOUR BUSINESS SIGNS THE COVER PAGE.
- MAKE SURE YOUR PROPOSAL INCLUDES THE NUMBER OF COPIES REQUESTED.
- CHECK TO ENSURE YOUR PROPOSAL INCLUDES EVERYTHING REQUESTED INCLUDING A BID SUBMITTAL AS REQUIRED BY PARAGRAPH VIII OF THE INVITATION FOR BIDS!
- IF YOU HAVE CONCERNS ABOUT THE SOLICITATION, DO NOT RAISE THOSE CONCERNS IN YOUR RESPONSE! **AFTER OPENING, IT IS TOO LATE! IF THIS SOLICITATION INCLUDES A PRE-PROPOSAL CONFERENCE OR A QUESTION & ANSWER PERIOD, RAISE YOUR QUESTIONS AS A PART OF THAT PROCESS! PLEASE SEE BIDDING INSTRUCTIONS AND ANY PROVISIONS REGARDING PRE-BID CONFERENCES.**

NOTE: This checklist is included only as a reminder to help Offerors avoid common mistakes Responsiveness will be evaluated against the solicitation **not** against this checklist. You do not need to return this checklist with your response.

Attachment B

LIST OF SUBCONTRACTORS

SPECIALTY	NAME
MECHANICAL	
ELECTRICAL	
PLUMBING	
MASONRY	
ROOFING	

Any Bidder in response to this Invitation for Bids shall list in his bid, at Attachment B List of Subcontractors, the name of only those SUBCONTRACTOR(S) that will perform the category of work so identified.

If the Bidder will use his own employees to perform any category of the work for which he would otherwise be required to list a SUBCONTRACTOR, The Bidder must be qualified to perform such work under the terms of the “Invitation for Bids”, the Contract, and South Carolina law and the Bidder shall list his company name in the appropriate place herein.

A SUBCONTRACTOR is an entity who is properly licensed pursuant to SC law that will perform work or render service to the prime contractor. Material suppliers, manufacturers and fabricators are not SUBCONTRACTORS and are not to be listed. Bidders should insure that listed subcontractors hold the proper license (both subcategory and financial level required) for the entire scope of work in their category. If the prime contractor intends to submit more than one subcontractor for a particular category listing, it must designate which portion of work each subcontractor will perform on the subcontractor listing submitted with its bid. (Ex: one listed subcontractor for BUR and another listed subcontractor for metal roofing.)

FAILURE BY THE RESPONDENT TO LIST THE NAME(S) OF SUBCONTRACTORS IN ACCORDANCE WITH THIS REQUEST MAY RENDER THE PROPOSAL NONRESPONSIVE AND/OR NONRESPONSIBLE.

Attachment C

Minority Participation Affidavit

- Is the bidder a South Carolina Certified Minority Business? (Yes) _____ (No) _____
- Is the bidder a Minority Business certified by another governmental entity?
(Yes) _____ (No) _____
- If so, please list the certifying governmental entity: _____

- Will any of the work under this contract be performed by a SC certified Minority Business as a subcontractor? (Yes) _____ (No) _____
- If so, what percentage of the total value of the contract will be performed by a SC certified Minority Business as a subcontractor? _____%
- Will any of the work under this contract be performed by a minority business certified by another governmental entity as a subcontractor? (Yes) _____ (No) _____
- If so, what percentage of the total value of the contract will be performed by a minority business certified by another governmental entity as a subcontractor? _____%

If a certified Minority Business is participating in this contract, please indicate all categories for which the Business is certified:

- _____ Traditional minority
- _____ Traditional minority, but female
- _____ Women (Caucasian females)
- _____ Hispanic minorities
- _____ Temporary certification
- _____ Other minorities (Native American, Asian, etc.)

Note: *If more than one minority Contractor will be utilized in the performance of this contract, please provide the information above for each minority business.*

Attachment D

MINORITY BUSINESS ENTERPRISE (MBE) UTILIZATION COMMITMENT

Project: _____

Bid/Proposal #: _____

Signature: _____

The bidder/proposer will utilize the following MBE firms:

Name/address/city/telephone/ of MBE Firm	Type of MBE *	Trade/service category	Dollar Value
Name:			
Address:			
City & State:			
Telephone:			
Name:			
Address:			
City & State:			
Telephone:			
Name:			
Address:			
City & State:			
Telephone:			
Name:			
Address:			
City & State:			
Telephone:			
Name:			
Address:			
City & State:			
Telephone:			
Total			\$

_____ % with ethnic minority firms
 _____ % with women-owned firms

MBE – Minority Business Enterprise, a business concern that is at least fifty-one percent owned and daily managed by one or more of the following citizens of the United States: B-Black/African Americans, H-Hispanic Americans, N-Native Americans (includes American Indians, Eskimos, Aleuts and Native Hawaiians), AP-Asian Pacific Americans, A-Asians, W-Woman citizen of the United States, regardless of race or origin. Code by type of MBE: B, H, N, AP, A, W.

NOTE: A business that presents itself as a minority business may participate in the project but may not be counted toward the MBE goal until it is a certified minority business enterprise. Certification must be obtained prior to the completion of the project. The Program Manager accepts firms that have MBE certification from the South Carolina Governor’s Office of Small and Minority Business Assistance, a Minority Supplier Development Council, a SDB certification from the U.S. Small Business Administration or others as approved.

The responding firm agrees to furnish additional information as required by Program Manager.

Attachment E

STATEMENT OF INTENT TO PERFORM WORK WITHOUT SUBCONTRACTING

Project: _____

Bid/Proposal #: _____

Signature: _____

It is the intent of the above named firm to self-perform 100% of the work as outlined in this bid/proposal.

The bidder/proposer states the following:

1. That it is a normal business practice of the bidder to perform **all elements** of this type contract with its own employees.
2. That if it should become necessary to subcontract some portion of the work at a later date, the bidder/proposer will notify program manager and provide documented good-faith efforts to comply with all requirements of the MBE program in providing equal opportunities to MBE firms.
3. Bidder/proposer will provide equal opportunity for MBEs to participate in significant material-supplier opportunities available under this scope of work and will document good faith efforts as required by program manager.

Attachment F

CERTIFICATE OF MINORITY BUSINESS ENTERPRISE UNAVAILABILITY

Firm Name: _____

Project: _____

Bid/Proposal #: _____

Signature: _____

Trade/Service Category	Business Name	Address/Phone	Contact Person	Reason MBE Firm Not Participating	Date of Contact

Bidder/proposer in accordance with the bid/proposal documents, states that the above MBE firm(s): a) are capable subcontractor(s) and (b) were contacted in good faith and (c) that the MBE firm(s) are not participating in this bid/proposal as indicated above. Form may be copied and supplemental information attached.

A finding that any of the information submitted is false will constitute grounds for recommending that the bid/proposal not responsive



NO BID REPLY FORM
CHARLESTON COUNTY SCHOOL DISTRICT

BID TITLE:
Malcolm C. Hursey Montessori School at Ron McNair Campus School Building No. 0734

IF YOU INTEND TO ENTER A "NO BID" RESPONSE TO OUR REQUEST FOR BIDS, PLEASE INDICATE YOUR REASONS BELOW. WE WILL USE THIS INFORMATION TO BETTER IDENTIFY BIDDERS FOR PARTICULAR COMMODITIES, UPDATE OUR RECORDS AND IMPROVE THE QUALITY AND CONTENT OF OUR REQUESTS FOR BIDS. THIS INFORMATION WILL NOT PRECLUDE YOUR RECEIPT OF FUTURE INVITATIONS UNLESS YOU REQUEST REMOVAL FROM THE BIDDERS LIST OR FROM A PARTICULAR PRODUCT CATEGORY. WE TREAT THIS "NO BID" RESPONSE AS A PROPER REPLY TO AN INVITATION. FAILURE TO RETURN THIS FORM FOR A "NO BID" COULD RESULT IN YOUR BEING REMOVED FROM THE BIDDERS LIST AS "NOT INTERESTED".

- () 1. We do not wish to participate in the bid process.
() 2. We do not wish to bid under the terms and conditions of the request for bid document. Our objections are.....

Horizontal lines for response to item 2.

- () 3. We do not feel we can be competitive.
() 4. We cannot submit a bid because of the marketing or franchising policies of the manufacturing company.
() 5. We do not wish to sell to Charleston County School District. Our objections are.....

Horizontal lines for response to item 5.

- () 6. We do not sell the items/service on which bids are requested.
() 7. Other

Horizontal line for response to item 7.

- () 8. We wish to remain on the bidders' list.
() 9. We wish to be deleted from the bidders' list.
() 10. Remove us from this item(s)/service only.

COMPANY NAME

SIGNED Date:

**MALCOLM C. HURSEY MONTESSORI SCHOOL
SCHOOL BUILDING NO. 0734
SECTION 002113**

INSTRUCTIONS FOR BIDDERS

1. EXPLANATION TO BIDDERS

Any pre-bid explanations desired by bidders regarding the meaning or interpretation of the drawings and specifications should be requested in written form from the Procurement Official pursuant to the requirements found on the Cover Sheet of the Solicitation. Oral explanations or instruction given before the award of the Contract will not be binding. Any interpretations made will be in the form of an addendum to the Specifications or Drawings and will be furnished to all bidders and its receipt by the bidder shall be acknowledged on the bid form in the space provided.

2. APPROVAL OF MATERIALS, EQUIPMENT AND SUBSTITUTIONS PRIOR TO OPENING OF BIDS

A. Substitutions:

The Contract shall be based on the standards of quality established in the Contract Documents. Products specified by reference to standard specifications such as ASTM and similar standards do not require further approval except for interface within the Work. Do not substitute materials, equipment, or methods unless such substitution has been specifically approved in writing for this Work via a pre-bid Amendment

B. "Or equal":

Where the phrase "or equal," or "equal as approved by the Architect", occurs in the Contract Documents, do not assume that the materials, equipment, or methods will be approved as equal unless the item has been specifically approved for this Work by the Architect. The decision of the Architect shall be final.

C. Approval of Substitutions and "Or equal" Materials:

In cases where a bidder is in doubt concerning the acceptability of a material that he desires to use as a basis for this bid, the bidder may request the Architect/Engineer's approval to use such material in lieu of that particularly mentioned as a basis of this bid. Requests from material dealers and subcontractors must be made through a bidder. Such requests shall be submitted in writing to the Procurement Official pursuant to the requirements found on the Cover Sheet of the Solicitation who will provide it to the Program Manager, in duplicate, so that this request may then be forwarded to the Architect/Engineer for approval. The Architect/Engineer's approval to use the materials as a basis of bids will, if granted, be in writing and a copy will be forwarded to all other bidders as a pre-bid Amendment. Approval to use a material as a basis of bids shall not constitute final approval. Such approval granted prior to opening of bids shall be subject to reconsideration after the bids are received and before the award of the Contract. Final approval of all materials proposed in lieu of those particularly mentioned will be submitted through the apparent low Contractors as provided in Division 1 of the Contract Specifications, the General Conditions of the Contract for Construction, and otherwise as required by the Contract Documents. In view of the relatively short time available for consideration of requests and advising all parties concerned prior to opening bids, bidders should limit such requests to those they consider particularly important and should submit such requests as far in advance of the opening of bids as practical and no less than ten (10) days prior to bid opening.

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INSTRUCTIONS FOR BIDDERS

3. AMENDMENT

Changes or corrections may be made in the General Drawings and Specifications after they have been issued and before bids are received. In such cases, a written Amendment describing the change or corrections will be issued by the Program Manager to all bidders. Such Amendment will take precedence over the portion of the General Drawings and Specifications concerned and will be considered a part of the Contract Documents. Except in unusual cases, an Amendment will be issued to reach the bidder at least four (4) days prior to bid opening time.

4. EXAMINATION OF DRAWINGS AND SPECIFICATIONS

Each bidder shall carefully examine Drawings and Specifications and all Amendments or other revisions thereto and thoroughly familiarize himself with the detailed requirements thereof prior to submitting a bid. If any bidder is in doubt as to the true meaning of any part of the Drawings, Specifications or other documents, or if any part of the error, discrepancy, conflict or omission is noted, the bidder should immediately contact the Procurement Official in writing and request clarification pursuant to the requirements of the Cover Page of the Solicitation. The Program Manager and/or Architect/Engineer will clarify discrepancy, conflict or omission and will notify all bidders by Addendum in cases where the extent of the Work or the cost thereof will be appreciably affected. No allowance will be made after the bids are received for oversight by a bidder.

5. EXAMINATION OF OTHER CONDITIONS AFFECTING THE WORK

Each bidder shall examine and thoroughly familiarize himself with all existing conditions including all applicable laws, ordinances, rules and regulations that will affect the work prior to submitting a bid. He shall visit the site, examine the grounds and all existing buildings, utilities and roads and shall ascertain by any reasonable means all conditions that will in any manner affect his work. He shall ask the Procurement Official pursuant to the requirements found on the Cover Sheet of the Solicitation for any additional information that he deems necessary for him to be fully informed as to exactly what is to be expected prior to submitting a proposal. The drawings have been prepared on the basis of surveys and inspections of the site and physical conditions at the site. This, however, shall not relieve the bidder of the necessity for fully informing himself as to the existing physical conditions. Each bidder shall carefully examine the existing conditions as compared to the Contract Documents. Any discrepancies noted between same shall be noted in writing to the Procurement Official pursuant to the requirements found on the Cover Sheet of the Solicitation seven (7) days prior to the established bid date for inclusion in a written Amendment. Verbal or telephone changes will not be considered binding.

6. DRAWINGS AND SPECIFICATIONS

All copies of Drawings, Specifications and other documents furnished to bidders, sub-bidders and material suppliers shall be returned to the Program Manager within ten (10) days following the opening of bids.

7. PREPARATION AND SUBMISSION OF BID

Bids to be entitled to consideration must be made on the form provided by the solicitation and found in the Project Manual. All conditions set forth in the "Bid Form" and "Invitation to Bid" must be complied with. Figures shall be entered on the bid form in writing. All blank spaces shall be filled in properly or indicated as not applicable as necessary. No interlineations or alteration will be made on the bid form. If erasures are

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INSTRUCTIONS FOR BIDDERS

necessary and appear on the forms, each such erasure must be initialed by the person signing the bid. Bids shall be placed in an opaque envelope, sealed, addressed and delivered in the manner and at the time stipulated in the Invitation and/or Advertisement for Bids. Facsimile or telegraphic bids or bid modifications will not be considered.

8. BID GUARANTEE

The bidder shall include with his proposal a certified check or bid bond for the sum of not less than five percent (5%) of the total amount of the bid, as evidence of good faith and as a guarantee that if awarded the Contract, the bidder will execute the Contract and give performance and payment bond(s) as required by the Specifications.

9. RETURN OF BID BONDS OR CHECKS

Bid bonds and checks will be returned to all except the three lowest bidders within ten (10) days after the formal opening of bids. The bid bond or check of the three lowest bidders will be returned within 48 hours after the Owner and Contractor have executed a Contract and the executed performance bond and payment bonds has been approved by the Owner, or, if no award has been made within 60 days after the opening of bids so long as he has not been notified of the acceptance of this bid.

10. LIQUIDATED DAMAGES FOR FAILURE TO ENTER INTO CONTRACT

The successful bidder, upon his failure or refusal to execute and deliver the Contract and performance and payment bonds required within ten (10) days after he has received notice of the acceptance of this bid, shall forfeit to the Owner, as liquidated damages for such failure or refusal, the security deposited with his bid.

11. BIDDERS QUALIFICATIONS

Proposals for each contract will be accepted from bidders who are regularly engaged in, and licensed to perform, the work they are bidding, which represents a significant portion of their total volume and who perform this work with workers regularly employed on their direct payrolls. Before a bid is considered for award, the bidder may be requested by the Program Manager to submit completed form SE-350 as to his previous experience in performing similar or comparable work and of his business and technical organization and financial resources and plant available to be used in contemplated work. The bidder may also be required to submit a statement of facts in detail on his proposed subcontractors as to their previous experience and past performance in performing similar work or comparable work.

12. ACCEPTANCE OR REJECTION OF BIDS

The Owner reserves the right to reject any and all bids when such rejection is in the best interest of the Owner to reject the bid of the bidder who has previously failed to perform or to complete on time Contracts of a similar nature; and to reject the bid of a bidder who is not, in the opinion of the Architect/Engineer and/or Program Manager, in a position to perform the Contract. The Owner reserves the right to reject any subcontractor who has previously failed to perform properly in the opinion of the Architect/Engineer, Program Manager or the Owner. The Owner also reserves the right to waive any minor informalities and technicalities in bidding. The Owner may also accept or reject any of the alternates that may be set forth on the "Bid Form", may accept any and all Alternates in any order or combination, and will determine the low

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bidder on the basis of the sum of the Base Bid and the Alternate(s) accepted. The Contract will be awarded (unless all bids are rejected), under normal circumstances, to the lowest responsive, responsible bidder. The Owner reserves the right; however, to award the Contract in its best interest and therefore may select a bidder other than the lowest if it considers such to be advantageous.

13. WITHDRAWAL OF BIDS

Bids may be withdrawn by written request received from bidders prior to the time fixed for the opening. Negligence on the part of the bidder or its subcontractors in preparing the bid confers no right for the withdrawal of the bid after it has been opened.

14. CONTRACTOR'S LICENSES

- A. Each bidder shall obtain a Contractor's License as required by and pursuant to the provisions of the Contractor's Licensing Law (1976 Code) Volume 14, Chapter 11, Section 40-11-10 through 40-11-340 as amended. Specialty Contractor's Licenses can be obtained for the various building trades and information regarding these licenses can be obtained from the South Carolina Licensing Board for Contractors. It shall be the bidder's responsibility to provide appropriate licensing to perform the work described in the contract documents.
- B. Any Owner hiring or contracting or having a Contract with any non-resident Contractor, where such contract exceeds \$10,000 or can be expected to exceed that amount, shall be required by law to withhold two percent (2%) of each and every payment made after January 1, 1959, to such non-resident individuals and partnerships, and foreign corporations as well.
- C. If a Contractor has any employees earning income in South Carolina who are legal residents of another state, he also becomes a withholding agent and must withhold South Carolina Income Taxes from the earnings of the non-resident employees on the basis of tables furnished by the South Carolina Tax Commission. If a Contractor subcontracts with other non-resident Contractors, he must withhold two percent (2%) of each and every payment made to the subcontractor if the total amount of the subcontract exceeds \$10,000 or can be expected to exceed that amount. The subcontractor may obtain in the same relief as a Contractor by posting bond, per stipulations of this Act.

15. CLEANLINESS

A particularly high standard of cleanliness will be rigidly enforced. Contractors will be required to perform daily clean-up and failure to do so will result in the work being performed by other forces.

16. WORK BY OTHER CONTRACTORS

By submission of this bid, bidder acknowledges that he has read and is totally familiar with the scope of any other Contractor's work.

17. EXISTING UTILITIES

Each Contractor shall be responsible for the protection of underground and overhead utilities in the work

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INSTRUCTIONS FOR BIDDERS

area which are shown on the Drawings and/or which can be detected by a visual inspection of the job site. Each Contractor is cautioned, however, that there may be existing unknown underground utilities neither visible nor shown on the Drawings. Each Contractor will take all reasonable precautions necessary to detect and preserve the service which these utilities provide. Should additional work be caused to the Contractor by the presence of such unknown underground utilities, the cost borne by the Contractor as a result of same shall be reimbursed by the Owner through the use of a negotiated Change Order.

18. PROHIBITION AGAINST GRATUITIES, ETC.

The Contractor's attention is directed to Section 8-13-705 of the South Carolina Code of Laws, 1976 as amended regarding the prohibition against gratuities and kickbacks, etc.

19. CONSTRUCTION SCHEDULE

The Contractor will be required to perform the work within the allocated time as outlined in the Specifications.

20. BONDS

A Performance Bond and Labor and Material Bond, executed on AIA Document A312-2009, will be required in the amount of one hundred percent (100%) of the Contract amount. Cost of bonds to be included with the bid.

21. ACCESS TO PROJECT

The Contractor will not be permitted to occupy the site of the Work or allowed on the property of the Owner until the written Notice to Proceed has been issued.

22. MINORITY PARTICIPATION

Charleston County School District strongly encourages Minority Participation in the bidding process. All businesses that are certified by the State of South Carolina as a Certified Minority Business must submit a copy of their certificate with their bid. Successful Bidder will be required to submit to the Program Manager, on a form provided, with each Application for Payment, a listing of all SWMBE subcontracts, whether certified or not.

23. PROTEST CLAUSE

Any actual or prospective bidder, offeror, contractor or subcontractor who is aggrieved in connection with the solicitation of a contract shall protest to the Chief Procurement Officer within fifteen (15) days of the date of issuance of the Invitation for Bids or Requests for Proposals or other solicitation documents, whichever is applicable, or any amendment thereto, if the amendment is at issue. Any actual or prospective bidder, offeror, contractor or subcontractor who is aggrieved in connection with the intended award or award of a contract shall protest to the Chief Procurement Officer within ten (10) days of the date of the notification of award posting in accordance with the Charleston County School District Procurement Code and Regulations.

END OF SECTION

**INSTRUCTIONS FOR BIDDERS
002113**

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SECTION 002200**

SUPPLEMENTARY INSTRUCTIONS

SPECIAL CONDITIONS

RELATED DOCUMENTS

Attention is directed to Division 1, General Requirements, AIA A132 (2018) Agreement Between Owner and Contractor with a Program Manager as Advisor, as amended, A232 (2018) General Conditions of the Contract for Constructions amended and Instructions to Bidders which are binding in their entirety on this portion of the work and in particular to paragraphs concerning materials, workmanship and SUBSTITUTIONS.

GENERAL

Definition of Terms

1. The term "Architect/Engineer" refers to:

Red Iron Architects
4591 Durant Ave.
N. Charleston, SC 29405

2. The term "Owner" refers to:

Charleston County School District
3999 Bridgeview Drive
N. Charleston, SC 29405

3. The term "Program Manager" refers to:

Brownstone Construction Group
4055 Faber Place Drive, Suite 202
North Charleston, SC 29405

4. The term "Contractor" refers to the prime contracting firms or person who, for a lump sum, fixed or wage, perform construction on the work included in the Plans and Specifications.

Location of Site

3910 Verde Avenue, North Charleston, SC 29405 (Formerly 3595 Spruill Avenue)

Scope of Work: The work includes, but is not limited to, the construction of a new, three-story, fully sprinkled, 125,000 square foot building located on the site of the former McNair Campus Elementary School (3795 Spruill Avenue, North Charleston, SC 29405). The facility will be composed predominantly of load bearing masonry veneered with utility brick and reinforced with structural steel, joists, trusses, and metal decking. The roof system is a 2-ply modified bitumen system. A 4-pipe chiller/boiler system will be used for the majority of the spaces with a separate make-up air system providing outside air. Finishes will include, but are not limited to: SVT, terrazzo, ceramic and quarry tile, polished concrete flooring, carpet, acoustical ceilings, paint, casework, marker/tack boards, and kitchen equipment. The package also includes an elevator, basic electrical services, life safety systems, information technology systems, and

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SUPPLEMENTARY INSTRUCTIONS

cable trays. Sitework is also part of this contract and consists of the installation of utilities, paving, sidewalks, curb & gutter, fencing, grassing and landscaping. Project will be required to be designed and constructed in accordance with CCSD's Educational Specifications and Design Requirements.

Time of Completion

It is the intent of the Owner to award the Contract and issue a Notice of Award if the bid is acceptable and is within the funds available for the project. Based on this, the Contractor shall commence work under this Contract within 17 days of the date of Notice to Proceed and achieve Substantial Completion date of 485 calendar days from date of "Notice to Proceed". Any change from this schedule must have written approval of the Owner.

Bidder expressly understand and agrees that the Owner may withhold Project liquidated damages for each consecutive calendar day thereafter the project remains incomplete in accordance with AIA Document A132 - 2018, Standard Form of Agreement Between Owner and Contractor, Program Manager as Advisor Edition, as amended and AIA Documents A232 – 2018, General Conditions of the Contract for Construction, Program Manager as Advisor Edition, as amended, and as outlined in Division 1 General Requirements, Section 017700 Closeout Procedures, Punch List and Deficiency List and Punchlist Liquidated Damages as also described therein.

Contractor's Construction Schedule

The Contractor shall submit to the Program Manager a Construction schedule, as required in the AIA Document A232 -2018 General Conditions, within thirty (7) calendar days of the Notice to Proceed. No Pay Applications will be processed until the Contractor has delivered an acceptable Construction Schedule as outlined in Section 013201 Project Schedule and as required in the AIA Document A232 General Conditions.

Pumping and Dewatering:

Any and all pumping and dewatering as needed to perform and protect work and/or to maintain the Construction Schedule shall be performed by the Contractor.

Contractors Quality Control:

The Contractor shall establish a Quality Control Program for his work acceptable to the Program Manager and Architect and in accordance with the Contract Documents, and as outlined in Section 014500 Quality Control.

Contractor is to assign the duties of quality control (QC) to a dedicated Quality Control Manager who will be on site at all times that work is in progress.

The Superintendent may not act as the Quality Control Manager.

Contractors Supervision:

The Contractor shall have on-site for the duration of his work and at all times that work is being performed a competent representative, capable of the following:

1. Supervision of tradesmen and coordination of the work of subcontractors.

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SECTION 002200**

SUPPLEMENTARY INSTRUCTIONS

2. Reading and interpreting the Contract Documents.
3. Orderly coordination of this work with the Program Manager and Architect in the daily execution of the work.
4. Laying out his work.

The Contractor's Superintendent shall be the sole supervisor of the Contractor's Labor Force and shall be on site whenever work is being performed. He shall attend the regularly scheduled progress meetings on-site, keep himself and his company informed of scheduled requirements, safety hazards and general job conditions. He shall plan and pursue the work under his supervision in a professional and expeditious manner, in close coordination with the requirements of the Contractor's approved Construction Schedule.

The Contractor's Superintendent shall maintain a written daily report/log of the progress of the work. This Log shall be kept at the jobsite, and made available to the A/E, Program Manager or Owner. A copy of the Contractor's Daily Report/Log shall be delivered to the Program Manager by 11:00 AM the following work day. These reports shall contain as a minimum: Date, Day, Low and High Temperatures, Record of Precipitation, Quantity of the Contractor and Sub-Contractor's personnel on site, A general description of work activities performed, Visitors, Deliveries, Inspections and any other comments that pertain to job progress. Receipt of Daily Reports shall be a prerequisite for approval of Monthly Progress Payments by the Program Manager.

The Contractor shall submit resume/qualifications of the Contractor's Superintendent within 7 days of Notice to Proceed and prior to the start of work on site, unless previously submitted.

Owner Approval of Subcontractors and Personnel

The Contractor shall not employ any subcontractor, superintendent or workmen whose employment on the project is objectionable to the Owner, Architect/Engineer or Program Manager.

The Contractor shall submit a list of all Subcontractors within 7 days of Notice to Proceed.

Contract Sublet, Assign and Transfer

The Contractor shall not sublet, assign or transfer this contract without written approval of the Owner.

Submittals

The Contractor shall submit for review by the Architect/ Engineer, Shop Drawings, and Schedules, required by the Contract Documents, individual Specification Sections, and as outlined in Section 013300 Submittal Procedures. No Pay Applications will be processed until the Contractor has provided a "Submittal Schedule" and acceptable submittal information.

All submittals shall be transmitted to the Program Manager for forwarding to the Architect/ Engineer for review based upon the Submittal Schedule which shall be prepared in conjunction with the Construction Schedule.

Initial Submittals required are as follows:

1. Prior to Mobilizing On-Site.

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SUPPLEMENTARY INSTRUCTIONS

- a. Insurance Certificates.
2. Following Notice to Proceed.
- a. Labor and Material Payment bond (within 7 days after Contract execution by Owner and prior to mobilizing on site)
 - b. Performance Bond (within 7 days after Contract execution by Owner and prior to mobilizing on site)
 - c. Shop Drawing Submittal Schedule (within 7 days)
 - d. Schedule of Values (within 7 days)
 - e. Superintendent's and Quality Control Representative's Resume (within 7 days unless previously submitted)
 - f. Detailed Construction Schedule (within 10 days)
 - g. Subcontractors listing and Major Material Suppliers (within 7 days)
 - h. All required Submittals (within 14 days)
 - i. A letter accepting all project conditions prior to the start of work as required by Special Condition I. herein.

Project Closeout, Punch List, and Deficiency List

The Contractor shall complete all punch list and deficiency items, and submit all close out documents as outlined in Division 01 General Requirements, Section 017700 Closeout Procedures, Punch List and Deficiency List.

Liquated Damages will resume if all punch list items are not completed within 30 days of Substantial Completion. Retainage will continue to be withheld, and Final Payment will not be processed until all Closeout Documents, As Built and Record Drawings, Warranties and Guarantees and other items required for closeout are transmitted to the Program Manager.

Program Manager

The Owner has contracted with the Program Manager to serve as his agent throughout this project. The Program Manager will provide a Site Manager to represent the Owner during the construction work.

Cleanliness

A particularly high standard of cleanliness will be rigidly enforced. The Contractor will be required to perform daily cleanup in accordance with paragraphs 3.15.1 and 3.15.2 of AIA Document AIA-232 – General Conditions, and as outlined in Section 014700, Cleaning.

Special Conditions

The following scope of work (and/or special conditions) is considered a part of the bid requirements for this project. All terms and conditions as outlined in the project plans, specifications and amendments shall apply.

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SUPPLEMENTARY INSTRUCTIONS

1. Contractor shall maintain the construction entrances. This shall include (but not necessarily be limited to) grading, filling of ruts and potholes, and maintaining proper drainage. Maintenance of entry gates shall also be the contractor's responsibility. Adjacent public streets, sidewalks, curbs, and parking lots shall be swept, scraped, washed and kept clean daily (more often as necessary) throughout all operations.
2. Contractor is to protect the existing sewer line that serves the Pinecrest Apartments.
3. Contractor to schedule his work in accordance with all noise ordinances per the authority having jurisdiction.
4. Contractor shall provide video documentation of all below grade DWV Systems under building slab. Video is to show all mains and branch connections. Continuous measurement of pipe length is to be included. Video is to be included in Plumbing and Commissioning Closeout Documentation.
5. The Fire Alarm contractor shall contract directly with the general contractor in lieu of with the mechanical or any other subcontractor. Pricing for this work will be included as an allowance. Refer to Section 012100 - Allowances. General Contractor is responsible for installing conduit and raceway for the fire alarm system; this work is not included in the allowance.
6. The Intrusion Detection contractor shall contract directly with the general contractor in lieu of with the mechanical or any other subcontractor. Pricing for this work will be included as an allowance. Refer to Section 012100 - Allowances. General Contractor is responsible for installing conduit and raceway for the fire alarm system; this work is not included in the allowance.
7. The Energy Management System contractor shall contract directly with the general contractor in lieu of with the mechanical or any other subcontractor. Pricing for this work will be included as an allowance. Refer to Section 012100 - Allowances. General Contractor is responsible for installing conduit and raceway for the fire alarm system; this work is not included in the allowance.
8. The Security Access Hardware contractor shall contract directly with the general contractor in lieu of with the hardware supplier or any other subcontractor. Pricing for this work will be included as an allowance. Refer to Section 012100 – Allowances
9. The Door Hardware Punch contractor shall contract directly with the general contractor in lieu of with the hardware supplier or any other subcontractor. Pricing for this work will be included as an allowance. Refer to Section 012100 – Allowances
10. The Fencing contractor shall contract directly with the general contractor in lieu of the site contractor or any other subcontractor. Pricing for this work will be included as an allowance. Refer to Section 012100 – Allowances
12. Contractor is responsible for grounds maintenance along the perimeter of the construction fence.
13. Contractor is responsible for maintaining grounds until they have been accepted by the Owner.
14. Contractor shall submit COVID-19 safety plan and protocols.
15. Contractor shall undertake any work within the Horizon Villages right-of-way along Verde Avenue until property has transferred ownership to Charleston County School District.

END OF SECTION

**SUPPLEMENTARY INSTRUCTIONS
002200**

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SECTION 004300**

SUBMITTAL OF SUBSTITUTIONS

PART 1 - GENERAL

1.1 Related Documents

- 1.1.1 Furnish and install products specified under options and conditions for substitutions stated in this section and referred to in the General Conditions.

1.2 Products Lists

- 1.2.1 Within the bidding period for non-specified manufacturers of items specified by reference standards, submit to Program Manager for review by the Architect/Engineer five (5) copies of complete list of major products which are proposed for installation.
- 1.2.2 Tabulate products by specifications' section number and title.
- 1.2.3 For products only by reference standards, list for each product:
- A. Name and address of manufacturer
 - B. Trade name
 - C. Model or catalog designation
 - D. Manufacturer's data:
 - 1) Reference standards
 - 2) Performance test data

1.3 Contractor's Options

- 1.3.1 For products specified only by reference standard, select product meeting that standard by any manufacturer.
- 1.3.2 For products specified by naming several products or manufacturers, select any one of the products and manufacturers named which complies with the specifications.
- 1.3.3 For products specified by naming several products or manufacturers and stating "or equivalent", "or equal," or "or approved equal" submit a request as for substitutions, for any product or manufacturer which is not specifically named.

1.4 Substitutions

- 1.4.1 Contractor's Base Bid shall be in strict accordance with the drawings and project manual. Contractor has the option of requesting substitutions during the bidding period by submitting completed substitution requests a minimum of ten (10) days prior to Bid Date or as described in Section 002113 Instruction to Bidders.

**SUBMITTAL OF SUBSTITUTIONS
004300**

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SUBMITTAL OF SUBSTITUTIONS

- A. After the end of that period, requests will be considered only in case of product unavailability or other conditions beyond the control of the Contractor.
- 1.4.2 Submit separate requests for each substitution. Support each request with the following:
- A. Complete data substantiating compliance of proposed substitution with requirements stated in contract documents:
 - 1) Product identification, including the manufacturer's name and address.
 - 2) Manufacturer's literature; identify:
 - a. Product description
 - b. Reference standards
 - c. Performance and test data
 - 3) Samples, as applicable.
 - 4) Name and address of similar projects on which product has been used, and date of each installation.
 - B. Itemized comparison of the proposed substitution with product specified; list significant variations.
 - C. Data relating to changes in construction schedule.
 - D. Any effect of substitution on separate contracts.
 - E. List of changes required in other work or products.
 - F. Designation of required license fees or royalties.
 - G. Designation of availability of maintenance services, sources of replacement materials.
 - H. Details regarding any difference in cost.
- 1.4.3 Substitutions will not be considered for acceptance when:
- A. They are indicated or implied on shop drawings or product data submittals without formal request from Contractor.
 - B. Acceptance will require substantial revision of contract documents.
 - C. In the judgment of Architect/Engineer, do not include adequate information necessary for a complete evaluation.
 - D. If requested after contract award directly by a trade Contractor, sub-contractor or supplier.
- 1.4.4 Substitute products shall not be ordered or installed without written acceptance of Architect/Engineer.
- 1.4.5 Architect/Engineer will determine acceptability of proposed substitutions.

**SUBMITTAL OF SUBSTITUTIONS
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SUBMITTAL OF SUBSTITUTIONS

1.5 Contractor's Representation

1.5.1 In making formal request for substitution, Contractor represents the following:

- A. He has investigated the proposed product and has determined that it is equivalent to or superior in all respects to that specified.
- B. He will provide same warranties or bonds for substitution as for product specified.
- C. He will coordinate installation of accepted substitution into the work, and make such changes as may be required for the work to be complete in all respects.
- D. He waives claims for additional costs caused by substitution which may subsequently become apparent.

1.6 Architect/Engineer Duties

1.6.1 Review Contractor's request for substitutions with reasonable promptness.

1.6.2 Notification to Contractor shall be in accordance with General Conditions.

1.7 Substitution Request Form

1.7.1 The Substitution Request Form follows this Section.

END OF SECTION

MALCOLM C. HURSEY MONTESSORI SCHOOL
SCHOOL BUILDING NO. 0734
SECTION 004300

SUBMITTAL OF SUBSTITUTIONS
SUBSTITUTION REQUEST FORM

TO:

PROJECT:

We hereby submit for your consideration the following product instead of the specified item for the above project:

<u>Drawing</u>	<u>Spec. Sect. No.</u>	<u>Paragraph</u>	<u>Specified Item</u>
_____	_____	_____	_____

Proposed Substitution:

Attach complete information on changes to Drawings and/or Specifications which proposed substitution will require for its proper installation.

Submit with request all necessary samples and substantiating data to prove equal quality and performance to that which is specified. Clearly mark manufacturer's literature to indicate equality in performance.

Fill in blanks below:

A. Does the substitution affect dimensions shown on the Drawings?

Yes ___ No ___

If yes, clearly indicate the changes:

B. Will the undersigned pay for changes to the building design, including engineering and detailing costs caused by the requested substitution? Yes ___ No ___

C. What effect does substitution have on other Contracts or other Trades?

D. What effect does substitution have on construction schedule?

E. Manufacturer's warranties of the proposed and specified items are:
Same _____ Different _____(Explain on attachment.)

F. Reason for request:

G. Itemized comparison of specified item(s) with the proposed substitution; list significant variations:

H. Accurate cost data comparing proposed substitution with product specified:

I. Designation of maintenance services and sources:
(Attach additional sheets if required.)

SUBMITTAL OF SUBSTITUTIONS
004300

MALCOLM C. HURSEY MONTESSORI SCHOOL
SCHOOL BUILDING NO. 0734
SECTION 004300

SUBMITTAL OF SUBSTITUTIONS

CERTIFICATE OF EQUAL PERFORMANCE AND
ASSUMPTION OF LIABILITY FOR EQUAL PERFORMANCE

The undersigned states that the function, appearance and
quality are equivalent or superior to the specified item.

Submitted By:

Signature:

Title:

Firm:

Address:

Telephone:

Signature shall be by person having authority to legally
bind his firm to the above terms. Failure to provide legally
binding signature will result in rejection of proposed
substitution.

For Use By Architect:

Accepted Accepted as Noted

Not Accepted

Received Too Late

By:

Date:

Remarks:

**MALCOLM C. HURSEY MONTESSORI SCHOOL
SCHOOL BUILDING NO. 0734
SECTION 005200**

CONTRACT DOCUMENTS

FORM OF AGREEMENT AND GENERAL CONDITIONS

I. FORM OF AGREEMENT

The Form of Agreement between the Owner and Contractor shall be AIA Document A132 (2019) "Standard Form of Agreement between Owner and Contractor, Program Manager as Adviser Edition as amended, and is hereby made a part of these Documents.

II. GENERAL CONDITIONS

The "General Conditions of the Contract for Construction, Program Manager as Adviser Edition", American Institute of Architects (AIA) Document A232 – 2019 Edition as amended, is hereby made a part of these Documents.

END OF SECTION

DRAFT AIA® Document A132™ - 2019

Standard Form of Agreement Between Owner and Contractor, Construction Manager as Adviser Edition

AGREEMENT made as of the day of February in the year Two-Thousand Twenty-Two (2022)

(In words, indicate day, month, and year.)

BETWEEN the Owner:

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

Charleston County School District
3999 Bridge View Drive
North Charleston, SC 29405

and the Contractor:

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

TBD

for the following Project:

(Name, location, and detailed description)

Malcolm C. Hursey Montessori School at Ron McNair Campus
3910 Verde Avenue
N. Charleston, SC 29405

The Program Manager:

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

Brownstone Construction Group
4055 Faber Place Drive, Suite
N. Charleston, SC 29405

« »

The Architect:

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

Red Iron Architects
4591 Durant Avenue
North Charleston, SC 29405

The Owner and Contractor agree as follows.

ADDITIONS AND DELETIONS:

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

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

This document is intended to be used in conjunction with AIA Documents A232™-2019, General Conditions of the Contract for Construction, Construction Manager as Adviser Edition; B132™-2019, Standard Form of Agreement Between Owner and Architect, Construction Manager as Adviser Edition; and C132™-2019, Standard Form of Agreement Between Owner and Construction Manager as Adviser. AIA Document A232™-2019 is adopted in this document by reference. Do not use with other general conditions unless this document is modified.

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4	CONTRACT SUM
5	PAYMENTS
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9	ENUMERATION OF CONTRACT DOCUMENTS
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ARTICLE 1 THE CONTRACT DOCUMENTS

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

The Contractor represents and agrees that it has carefully examined and understands this Agreement and the other Contract Documents, has investigated the nature, locality and site of the Work and the conditions and difficulties under which it is to be performed, and that it enters into this Agreement on the basis of its own examination, investigation, and evaluation of all such matters and not in reliance upon any opinions or representations of the Owner, Program Manager, Architect or any of their respective officers, agents, servants, employees or Board of Directors. The Contract Documents do not include any other documents, including, but not limited to, soils, geotechnical or other reports, surveys or analyses, which may be printed, bound, or assembled with the Contract Documents or otherwise made available to the contractor for review or information under this Agreement, unless specifically enumerated and directly incorporated by reference in Article 9 of this Agreement.

ARTICLE 2 THE WORK OF THIS CONTRACT

The Contractor shall fully execute the Work described in the Contract Documents, or reasonably inferable by the Contractor as necessary to produce the results intended by the Contract Documents, except as specifically indicated in the Contract Documents to be the responsibility of others.

ARTICLE 3 DATE OF COMMENCEMENT AND DATES OF SUBSTANTIAL COMPLETION

§ 3.1 The date of commencement of the Work

The date of commencement of the Work is the date established in a written Notice to Proceed. If there is no written Notice to Proceed, it shall be the date of the Agreement or such other date as may be established by the Program Manager or the Owner in writing.

CONTRACT START DATE – February 15, 2022

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

§ 3.3 The Contractor shall promptly commence and diligently prosecute the Work and achieve Substantial Completion of the entire Work not later than **Four Hundred Seventy-One** (471) calendar days from the date of commencement, and complete milestone work as follows:

Substantial Completion – May 31, 2023
Final Completion – June 30, 2023

, subject to adjustments of this Contract Time as provided in the Contract Documents.

§ 3.4 Time is of the essence. All times stated in the Contract Documents, including, without limitation, those for the commencement, prosecution, interim milestones, and completion of the Work, and for the delivery and installation of materials and equipment, are of the essence in this Agreement.

§ 3.5 The date of Substantial Completion of the Work or a designated portion thereof is the date, certified by the Architect, when construction is sufficiently complete in accordance with the Contract Documents that the Owner may, if it so elects, occupy and use the Work or designated portion thereof for the purposes for which it was intended. Specific requirements for Substantial Completion are detailed by Article 9.8 and elsewhere in the AIA A232 General Conditions of the Contract for Construction, Program Manager as Adviser Edition, as amended, as well as elsewhere in Contract Documents including specification sections concerning contract completion and closeout.

§ 3.6 **LIQUIDATED DAMAGES** The Contractor acknowledges and recognizes that the Owner is entitled to full and beneficial occupancy and use of the completed Work following expiration of the Contract Time. Contractor further acknowledges that the Owner has scheduled use of the premises based upon the Contractor's achieving Substantial Completion of the Work within the Contract Time and Final Completion soon thereafter. If the Contractor fails to complete the Project within the Contract Time, the Owner will sustain extensive damages and serious loss as a result of such failure. The exact amount of such damages will be extremely difficult to ascertain but may include construction of a temporary campus to provide facilities to accommodate students slated to attend this school. Therefore, the Owner and the Contractor agree to the liquidated damages as set forth below:

§ 3.6.1 If the Contractor fails to achieve Substantial Completion of the Work within the Contract Time and as otherwise required by the Contract Documents, the Owner shall be entitled to retain or recover from the Contractor, as liquidated damages and not as a penalty, daily amounts of **\$500.00** commencing upon the first day following expiration of the Contract Time and continuing until the actual date of Substantial Completion. Such liquidated damages are hereby agreed to be a reasonable pre-estimate of damages the Owner will incur as a result of delayed completion of the Work. If the Contractor fails to obtain Final Completion with 100% of the punchlist completed within thirty days from the date of Substantial Completion, the Owner shall be entitled to retain or recover from the Contractor as liquidated damages the amount of **\$750.00** per calendar day from the thirty-first day following the date of Substantial Completion until completion of the punchlist and until a Final Completion Certificate is obtained, regardless of how the punchlist is completed.

§ 3.6.2 The Owner may deduct liquidated damages as described in Article 3.6 and 3.6.1 from any unpaid amounts then or thereafter due the Contractor under this Agreement. Any liquidated damages not so deducted from any unpaid amounts due the Contractor shall be payable to the Owner at the demand of the Owner, together with interest from the date of the demand at a rate of 12%.

§ 3.7 The Contractor shall begin the Work on the Date of Commencement and shall perform the Work diligently, expeditiously, and with adequate resources so as to complete all the Work within the Contract Time. The Contractor shall reschedule or re-sequence the Work, to the extent possible, to avoid or minimize any delay to the Contract time. The Contractor shall not, without the Owner's prior approval, reschedule or re-sequence the Work so that an action, approval or activity of the Owner moves onto the critical path or otherwise becomes critical to the Contract Time. Neither the Owner, its representatives nor its agents shall be obligated or liable to the Contractor for, and the Contractor hereby expressly waives any claims against any of them, on account of any damages, costs or expenses of any nature whatsoever that the Contractor, its subcontractors or sub-subcontractors or any other person may incur as a result of any delays, interferences, suspensions, rescheduling, changes in sequences, congestion, disruptions, or the like arising from or out of any act or omission of the Owner, its representatives, or agents, it being understood and agreed that the Contractor's sole and exclusive remedy in such event shall be in accordance with the provisions of the Contract Documents.

§ 3.8 The time during which the Contractor is delayed in the performance of the Work by the acts or omissions of the Owner, the Owner’s representatives or their employees or agents, acts of God, unusually severe and abnormal climatic conditions or other conditions beyond the Contractor’s control and that the Contractor could not reasonably have foreseen and provided against shall be added to the time for completion of the Work, (i.e. the Contract Time) stated in the Agreement and as determined by AIA A232 General Conditions of the Contract for Construction, Program Manager as Adviser Edition, as amended.

§ 3.9 Program Manager to provide written notice whenever, in the opinion of the Owner after consultation with the Program Manager and/or the Architect, the Work falls behind schedule, the Contractor shall, to the extent necessary to meet said schedule, increase its labor force and/or provide overtime, Saturday, Sunday, and/or holiday work and shall have each subcontractor do likewise, all at no additional cost to or compensation from the Owner. Further, the Owner shall have the right to offset against any amounts then or thereafter due the Contractor, or to be reimbursed by the Contractor for, any additional costs the Owner may incur as a direct result of said increase in labor force or overtime, Saturday, Sunday and/or holiday work. See Article 3.10 of the AIA A232 General Conditions of the Contract for Construction, Program Manager as Adviser Edition, as amended, for further requirements concerning such “Extraordinary Measures”.

ARTICLE 4 CONTRACT SUM

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

Base Bid	\$ TBD
General Contingency Allowance	\$ 450,000.00
Dispute Resolution Board Allowance	\$ 10,000.00
Fire Alarm System Allowance	\$ 286,000.00
Intrusion Detection System Allowance	\$ 40,000.00
Energy Management Allowance	\$1,050,000.00
Security Access Hardware Allowance	\$ 175,000.00
Door Hardware Punch Allowance	\$ 21,000.00
Fencing and Gates Allowance	\$ 375,000.00
TOTAL	\$ TBD

§ 4.2 The Contract Sum is based on the following alternates, if any, which are described in the Contract Documents and are hereby accepted by the Owner.

§ 4.3 Unit prices, if any, are set forth in the “Schedule of Unit Prices” attached hereto and made a party hereof as Exhibit “C”. Such unit process are considered complete and include (1) all materials, equipment, labor, delivery, installation, overhead and profit, and (2) any other costs or expenses in connection with, or incidental to, the performance of that portion of the Work to which such unit process apply.

§ 4.4 Allowance amounts are complete and include, without limitation, 1) all materials, equipment, labor, delivery, installation, overhead, and profit, and 2) any other cost or expense in connection with, or incidental to, to performance of that portion of the Work to which each allowance applies. Allowances included in the Contract Sum, if any, include:

Item	Allowance
General Contingency Allowance	\$ 450,000.00
Dispute Resolution Board Allowance	\$ 10,000.00
Fire Alarm System Allowance	\$ 286,000.00
Intrusion Detection System Allowance	\$ 40,000.00
Energy Management System Allowance	\$1,050,000.00
Security Access Hardware Allowance	\$ 175,000.00
Door Hardware Punch Allowance	\$ 21,000.00
Fencing and Gates Allowance	\$ 375,000.00

ARTICLE 5 PAYMENTS

§ 5.1 Progress Payments

§ 5.1.1 Based upon Applications for Payment including all supporting documentation submitted by the Contractor to the Program Manager, and upon certification of the Application and Certificate for Payment by the Program Manager and the Architect as more fully described in Article 9 of the AIA A232 General Conditions of the Contract for Construction,

Program Manager as Adviser Edition, as amended, the Owner shall make progress payments on account of the Contract Sum to the Contractor.

§ 5.1.2 The period covered by each Application for Payment shall be one calendar month.

§ 5.1.3 Pay applications will be processed as follows:

- .1 Prior to submitting a formal pay application, the Contractor will submit a draft pay application and will meet with the Program Manager and the Architect to review that draft pay application and determine the amounts due for that period;
- .2 After determination of the amounts due for that period, the Contractor will submit a formal pay application invoicing amounts determined due at the meeting with the Program Manager and Architect. The formal pay application will be submitted to the Program Manager for processing.
- .3 The Program Manager will promptly forward the formal pay application to the Architect for review and certification. The Architect will return the formal pay application and certification to the Program Manager within seven (7) days of receipt. Upon its return, the Program Manager will promptly review the formal pay application, indicate its concurrence, and submit the pay application to the Owner for payment.
- .4 The Owner will make payment to the Contractor based on the formal pay application as certified by the Architect and approved by the Program Manager. Payment will be made within thirty (30) days of receipt of the formal pay application by the Program Manager from the Contractor.

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

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

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

- .1 Take that portion of the Contract Sum properly allocable to completed Work as determined by multiplying the percentage completion of each portion of the Work by the share of the total Contract Sum allocated to that portion of the Work in the schedule of values, less retainage of three and one-half percent (3.5 %). Pending final determination of cost to the Owner of changes in the Work, amounts not in dispute may be included as provided in Section 7.3.9 of the General Conditions;
- .2 Add that portion of the Contract Sum properly allocable to materials and equipment delivered and suitably stored at the site for subsequent incorporation in the completed construction (or, if approved in advance by the Owner, suitably stored off the site at a location agreed upon in writing), less retainage of three and one-half percent (3.5 %);
- .3 Subtract the aggregate of previous payments made by the Owner; and
- .4 Subtract amounts, if any, for which the Program Manager or Architect has withheld or nullified a Certificate for Payment as provided in Section 9.5 of the General Conditions.

§ 5.1.7 No progress payments made under this Agreement shall be conclusive evidence of the performance of this Agreement either in whole or in part, and no such payment shall be construed to be acceptance of defective work or improper materials.

§ 5.2 Final Payment

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

- .1 the Contractor has fully performed the Contract including, but not limited to, submission of all closeout documentation; and

- .2 a final Certificate for Payment or Project Certificate for Payment has been issued by the Architect; such final payment shall be made by the Owner not more than 30 days after the issuance of the final Certificate for Payment

ARTICLE 6 DISPUTE RESOLUTION

§ 6.1 Initial Decision Maker

Architect will serve as Initial Decision Maker pursuant to

Architect will serve as Initial Decision Maker pursuant to Section 15.2 of AIA Document A232-2019 General Conditions of the Contract for Construction, Program Manager as Adviser as Adviser Edition, as amended.

§ 6.2 When claims are not resolved pursuant to the terms of Article 15.2 and 15.3 of the AIA Document A232-2009 General Conditions of the Contract for Construction, Program Manager as Adviser Edition, as amended, they shall be filed in the Court of Common Pleas, Charleston County, South Carolina and shall be decided pursuant to South Carolina law. Either prior to or after a claim is filed, the parties may agree to mediate the dispute.

ARTICLE 7 TERMINATION OR SUSPENSION

§ 7.1 Where the Contract Sum is a Stipulated Sum

§ 7.1.1 The Contract may be terminated by the Owner or the Contractor as provided in Article 14 of AIA Document A232-2019. General Conditions of the Contract for Construction, Program Manager as Adviser Edition, as amended.

§ 7.1.2 The Work may be suspended by the Owner as provided in Article 14 of AIA Document A232-2019 General Conditions of the Contract for Construction, Program Manager as Adviser Edition, as amended.

ARTICLE 8 MISCELLANEOUS PROVISIONS

§ 8.1 Where reference is made in this Agreement to a provision of AIA Document A232-2019 or another Contract Document, the reference refers to that provision as amended therein, or as amended or supplemented by other provisions of the Contract Documents.

§ 8.2 The Contractor represents and warrants the following to the Owner (in addition to any other representations and warranties contained in the Contract Documents):

- i. that it and its subcontractors are financially solvent, able to pay all debts as they mature and possessed of sufficient working capital to complete the Work and perform all obligations hereunder;
- ii. that it is able to furnish the plant, tools, materials, supplies, equipment and labor required to complete the Work and perform its obligations hereunder;
- iii. that it is authorized to do business in the State of South Carolina and properly licensed by all necessary governmental and public and quasi-public authorities having jurisdiction over it and over the Work and the Project;
- iv. that its execution of this Agreement and its performance thereof is within its duly authorized powers;
- v. that its duly authorized representative has visited the site of the Project, familiarized himself with the local and special conditions under which the Work is to be performed and correlated his observations with the requirements of the Contract Documents;
- vi. that it possesses a high level of experience and expertise in the business administration, construction, construction management and superintendence of projects of the size, complexity and nature of this particular Project, and it will perform the Work with the care, skill and diligence of such a Contractor.

The foregoing warranties are in addition to, and not in lieu of, any and all other liability imposed upon the Contractor by law with respect to the Contractor's duties, obligations and performance hereunder. The Contractor acknowledges that the Owner is relying upon the Contractor's skill and experience in connection with the Work called for hereunder.

§ 8.6 Other provisions:

ARTICLE 9 ENUMERATION OF CONTRACT DOCUMENTS

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

§ 9.1.1 The Agreement is this executed AIA Document A132–2019, Standard Form of Agreement Between Owner and Contractor, Program Manager as Adviser Edition, as amended.

§ 9.1.2 The General Conditions are, AIA Document A232–2019, General Conditions of the Contract for Construction, Program Manager as Adviser Edition, as amended.

§ 9.1.3 The Supplementary and other Conditions of the Contract:

Document	Title	Date	Pages

§ 9.1.4 The Specifications:

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

EXHIBIT “A”

See Attached Exhibit A

§ 9.1.5 The Drawings:

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

EXHIBIT “B”

See Attached Exhibit B

§ 9.1.6 The Addenda, if any:

Number	Date	Pages
TBD		

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

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

- .1 AIA Document E201™–2007, Digital Data Protocol Exhibit, if completed, or the following:
- .2 Other documents, if any, listed below:

ARTICLE 10 INSURANCE AND BONDS

The Contractor shall purchase and maintain insurance and provide bonds as set forth in Article 11 and 16 of AIA Document A232–2019.

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

OWNER (Signature)

Lawrence Lutrario
Procurement Officer
Charleston County School District
3999 Bridge View Drive
North Charleston SC 29405

(Printed name and title)

OWNER (Signature)

Jasmeen M. Shaw
Executive Director of Capital Programs
Charleston County School District
3999 Bridge View Drive
North Charleston SC 29405

(Printed name and title)

OWNER (Signature)

Donald Kennedy
Chief Financial and Administrative Officer
Charleston County School District
3999 Bridge View Drive
North Charleston SC 29405

(Printed name and title)

CONTRACTOR (Signature)

(Printed name and title)

OWNER (Signature)

Wayne Wilcher
Director, Contracts & Procurement
Charleston County School District
3999 Bridge View Drive
North Charleston, SC 29405

(Printed name and title)

Owner (Signature)

Jeffrey T. Borowy
Chief Operating Officer
Charleston County School District
3999 Bridge View Drive
North Charleston SC 29405

(Printed name and title)

Owner (Signature)

Gerrita Poslewait
Superintendent of Schools
Charleston County School District
75 Calhoun Street
Charleston SC 29401

(Printed name and title)

TELBAR

DRAFT AIA® Document A232™ – 2009

*General Conditions of the Contract for Construction,
Construction Manager as Adviser Edition*

This Document is hereby modified to be entitled: AIA Document A232-2009, General Conditions of the Contract for Construction, Program Manager as Adviser Edition

For the following PROJECT:
(Name, and location or address)

**Malcolm C. Hursey Montessori School at Ron McNair Campus
School Building No. 0734 (Solicitation No. 21-BCG-B-002)**
3910 Verde Avenue
North Charleston, SC 29405

THE PROGRAM MANAGER:
(Name, legal status and address)

Brownstone Construction Group
4055 Faber Place Drive, Suite 202
N. Charleston, SC 29405

THE OWNER:
(Name, legal status and address)

Charleston County School District
3999 Bridge View Drive
N. Charleston, SC 29405

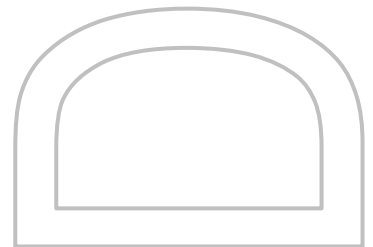
THE ARCHITECT:
(Name, legal status and address)

Red Iron Architects
4591 Durant Avenue
North Charleston, SC 29405

ADDITIONS AND DELETIONS:
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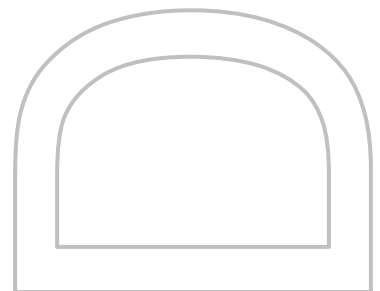
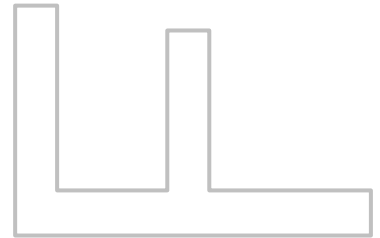
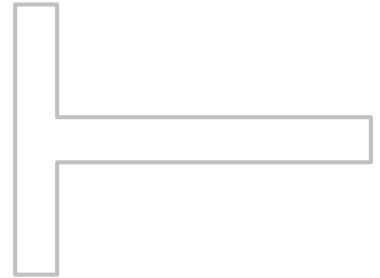
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ARTICLE 1 GENERAL PROVISIONS

§ 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 and/or Project Manual, 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 Change Order signed by both parties, (2) a Construction Change Directive or (3) 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 written 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 the Program Manager or the Program Manager's consultants, (3) between the Owner and the Architect or the Architect's consultants, (4) between the Contractor and the Program Manager or the Program Manager's consultants, (5) between the Owner and a Subcontractor or Sub-subcontractor except as set forth in Article 5, (6) between the Program Manager and the Architect, or (7) between any persons or entities other than the Owner and Contractor. The Program Manager and Architect shall, however, be entitled to performance and enforcement of obligations under the Contract intended to facilitate performance of their duties pursuant to the terms of the respective agreements between them and the Owner.

§ 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 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 other Contractors and by the Owner's own forces, including persons or entities under separate contracts not administered by the Program Manager.

§ 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 or Project Manual. 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. The Specifications may also be called the Project Manual.

§ 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 decisions on Claims in accordance with Section 15.2 and certify termination of the Agreement under Section 14.2.2. The Architect will serve as the Initial Decision Maker for this Project.

§ 1.1.9 Approved. When the words, "approved", "satisfactory", "proper", or "as directed" are used, approval by the Architect is understood.

§ 1.1.10 Provide. When the word "provide" including derivatives, is used, it shall mean to fabricate properly, complete, transport, deliver, install, erect, construct, test, and furnish all labor, materials, equipment, apparatus,

appurtenances, and all other items necessary to properly complete the Work in place, ready for operations or use under the terms of the Contract Documents.

§ 1.1.11 Addenda or Addendum. Addenda or Addendum are written or graphic instruments issued prior to the execution of the Contract that modify or interpret the bidding documents, including the Drawings and Specifications, by additions, deletions, clarifications or corrections.

§ 1.1.12 Knowledge. The terms “knowledge”, “recognize”, and “discover”, their respective derivatives and similar terms in the Contract Documents, as used in reference to the Contractor, shall mean that which the Contractor knows (or should know), recognizes (or should recognize) and discovers (or should discover) in exercising the care, skill and diligence required by the Contract Documents. Analogously, the expression “reasonably inferable” and similar terms in the Contract Documents shall be interpreted to mean reasonably inferable by a contractor exercising the care, skill and diligence required of a prudent contractor by the Contract Documents.

§ 1.1.13 Indemnitee. The term “Indemnitee” includes the Owner, Charleston County School Board, Program Manager, Architect, and consultants, agents, representatives and employees of any and all of them.

§ 1.1.14 Construction Schedule. The Schedule prepared by the Contractor which provides the schedule for the Work.

§ 1.1.15 Milestone Schedule. The Schedule prepared by the Program Manager which includes all Program requirements.

§ 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 intended results. In the event of inconsistencies within or between parts of the Contract Documents, or between the Contract Documents and applicable standards, codes and ordinances, the Contractor shall (1) provide the better quality or greater quantity of Work, or (2) comply with the more stringent requirement, either or both in accordance with the Architect’s interpretation. The terms and conditions of this Article, however, shall not relieve the Contractor of any of the obligations set forth in Article 3.2 and 3.7 or elsewhere herein.

§ 1.2.1.1 On the Drawings, given dimensions shall take precedence over scaled measurements, and large-scale drawings over small-scale drawings.

§ 1.2.1.2 Before ordering any materials or doing any Work, the Contractor and each Subcontractor shall verify measurements at the Project site and shall be responsible for the correctness of such measurements. No extra charges or compensation will be allowed on account of differences between actual dimensions and the dimensions indicated on the Drawings. Any difference that may be found shall be submitted in writing to the Program Manager for resolution before proceeding with the Work.

§ 1.2.1.3 If a minor change in the Work is found necessary due to actual field conditions, the Contractor shall submit detailed drawings of such departure to the Program Manager for approval by the Architect before making the change.

§ 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.

§ 1.2.4 Whenever a product is specified in accordance with a Federal Specification, an ASTM Standard, an American National Standards Institute Specification or other similar standard, the Contractor shall present an affidavit from the manufacturer, when requested by the Owner or Program Manager, or required in the Specifications, certifying that the product complies with the particular standard or Specification. When requested by the Owner or Program Manager, or when specified, supporting test data shall be submitted to substantiate compliance.

§ 1.2.5 Whenever a project is specified or shown by describing proprietary items, model numbers, catalog numbers, manufacturer, trade names, or similar reference, no substitutions may be made unless accepted prior to execution of the Contract or if accepted as a change in the Work. When two or more products are shown or specified, the Contractor has the option to use any of those shown or specified.

§ 1.3 Capitalization

Terms capitalized in the Contract Documents 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 Drawings, Specifications and other documents prepared by the Architect belong to the Owner and are instruments of the Architect's service through which the Work to be executed by the Contractor is described. The Contractor may retain one contract record set. Neither the Contractor nor any Subcontractor, Sub-subcontractor or material or equipment supplier shall own or claim a copyright in the Drawings, Specifications and other documents prepared by the Architect. All copies of them, except the Contractor's record set, shall be returned or suitably accounted for to the Owner or Program Manager, on request, upon completion of the Work. The Drawings, Specifications and other documents prepared by the Architect, and copies thereof furnished to the Contractor, are for use solely with respect to this Project. They are not to be used by the Contractor or any Subcontractor, Sub-subcontractor or material or equipment supplier on other projects or for additions to this Project outside the scope of the Work without the specific written consent of the Owner. The Contractor, Subcontractors, Sub-subcontractors and material or equipment suppliers are granted a limited license to use and reproduce applicable portions of the Drawings, Specifications and other documents prepared by the Architect appropriate to and for use in the execution of their Work under the Contract Documents. All copies made under this license shall bear the statutory copyright notice, if any, shown on the Drawings, Specifications and other documents prepared by the Architect.

§ 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. Contractor and other project parties will be required to use an Electronic Project Management System (EPMS), OpCenter Build as as required by Specification Section 013301.

§ 1.7 Confidentiality

§ 1.7.1 The Contractor warrants and represents that the Contractor shall not knowingly or negligently communicate or disclose at any time to any person or entity any information in connection with the Work or the Project, except (1) with prior written consent of the Owner, (2) information that was in the public domain prior to the date of the Agreement, (3) information that becomes part of the public domain by publication or otherwise not due to any unauthorized act or omission of the Contractor, or (4) as may be required to perform the Work or by any applicable law.

§ 1.7.2 The Contractor, at any time upon the request of the Owner, shall immediately return and surrender to the Owner all copies of any materials, records, notices, memoranda, recordings, drawings, specifications, and mock-ups and any other documents furnished by the Owner, Program Manager or the Architect to the Contractor.

§ 1.7.3 The Contractor shall cause all Subcontractors or any other person or entity performing any services or furnishing any materials or equipment for this Work to warrant and represent all items set forth in this Article 1.7.

§ 1.7.4 The representations and warranties contained in this Article 1.7 shall survive the complete performance of the Work or earlier termination of this Agreement.

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 provide 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 Article 4, the Program Manager and the Architect do not have such authority. The term "Owner" means the Owner or the Owner's authorized representative.

§ 2.1.2 There are no mechanic's liens allowed on school board property.

§ 2.2 Information and Services Required of the Owner

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

§ 2.2.2 The Owner may furnish surveys describing physical characteristics, legal limitations and utility locations for the site of the Project, and a legal description of the site.

§ 2.2.3 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 ten (10) copies of the Contract Documents. The Contractor will be furnished any additional copies needed after a written request for such at its sole cost and expense.

§ 2.2.6 The Owner shall forward all communications to the Contractor through the Program Manager.

§ 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.

§ 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 seven (7) 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 Program Manager's and Architect's and their respective consultants' additional services made necessary by such default, neglect or failure, as well as any other related costs including, but not limited to attorneys' fees and costs. If payments then or thereafter due the Contractor are not sufficient to cover such amounts, the Contractor shall pay the difference to the Owner plus interest of 12%.

§ 2.5 Extent of Owner's Rights

§ 2.5.1 The rights stated in this Article 2 and elsewhere in the Contract Documents are cumulative and not in limitation of any rights of the Owner, Architect or Program Manager (i) granted in the Contract Documents, (ii) at law, or (iii) in equity.

§ 2.5.2 In no event shall the Owner, Architect or Program Manager have control over, charge of, or any responsibility for construction means, methods, techniques, sequences, or procedures or for safety precautions and programs in connection with the Work, notwithstanding any of the rights and authority granted the Owner, Architect or the Program Manager in the Construction Documents.

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 and its Subcontractors shall be lawfully licensed as 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 plural term “Contractors” refers to persons or entities who perform construction under other contracts with the Owner that are administered by the Program Manager. The term does not include the Owner’s own forces, including persons or entities under separate contracts not administered by the Program Manager.

§ 3.1.3 The Contractor shall perform the Work in accordance with the Contract Documents. The Contractor and its Subcontractors shall adhere to the requirements of Section 012201 Submittal Procedures EPMS using OpCenter Build for processing all documents specified therein as well as any other items determined by the Owner, Architect, or Project Manager.

§ 3.1.4 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 Owner, Program Manager or Architect in their 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. The Contractor and each Subcontractor shall evaluate and satisfy themselves as to the conditions and limitation under which the Work is to be performed, including, without limitation, (1) the location, condition, layout and nature of the Project site and surrounding areas, (2) generally prevailing climatic conditions, (3) anticipated labor supply and costs, (4) availability and cost of materials, tools and equipment, and (5) other similar issues. The Owner assumes no responsibility or liability for the physical condition or safety of the Project site or any improvements located on the Project site. The Contractor shall be solely responsible for providing a safe place for the performance of the Work. The Owner shall not be required to make any adjustment in either the Contract Sum or Contract Time in connection with any failure by the Contractor or any Subcontractor to comply with the requirements of this Article.

§ 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 design information contained in the Contract Documents; however, the Contractor shall promptly report to the Program Manager and Architect any errors, inconsistencies or omissions discovered by or made known to the Contractor as a request for information submitted to the Program Manager in such form as the Program Manager and Architect may require and as further required herein. 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.

.1 The exactness of grades, elevations, dimensions, or locations given on any Drawings issued by the Architect, or the work installed by other contractors, is not guaranteed by the Architect or the Owner.

.2 The Contractor shall, therefore, satisfy itself as to the accuracy of all grades, elevations, dimensions, and locations. In all cases of interconnection of its Work with existing or other work, it shall verify at the site all dimensions relating to such existing or other work. Any errors due to the Contractor’s failure to so verify all such grades, elevations, dimensions, or locations shall be promptly rectified by the Contractor without any additional cost to the Owner.

§ 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 or other requirements of public authorities unless such laws, statutes, ordinances building codes, orders, rules or regulations bear upon the performance of the Work, but the Contractor shall promptly report to the Program Manager and Architect any nonconformity discovered by or made known to the Contractor as a request for information as further required herein and submitted

to Program Manager in such form as the Program Manager and Architect may require. If the Contractor performs Work knowing it to be contrary to laws, statutes, ordinances, building codes, orders, rules or regulations, without such notice, the Contractor shall assume full responsibility for the Work and shall bear the attributable costs.

§ 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 or other requirements of public authorities.

§ 3.2.5 Except as to any reported errors, inconsistencies or omissions and to concealed or unknown conditions defined herein, by executing the Agreement, the Contractor agrees that the Contract Documents are sufficiently complete and detailed for the Contractor to perform the Work required.

§ 3.3 Supervision and Construction Procedures

§ 3.3.1 The Contractor shall supervise and direct the Work, using the Contractor's best skill, quality control/quality assurance and attention. The Contractor shall be solely responsible for, and have control over, construction means, methods, techniques, sequences and procedures and for coordinating all portions of the Work under the Contract. If the Contract Documents give specific instructions concerning construction means, methods, techniques, sequences or procedures, the Contractor shall evaluate the jobsite safety thereof and, 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, the Program Manager, and the Architect and shall not proceed with that portion of the Work without further written instructions from the Architect, through the Program Manager.

§ 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 any entity or other persons performing portions of the Work.

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

§ 3.4 Labor and Materials

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

§ 3.4.2 Except in the case of minor changes in the Work 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, in consultation with the Program Manager, and in accordance with the requirements of the Contract Documents and pursuant to a resulting Change Order or Construction Change Directive. Any such request for substitution must be submitted with all information required by the Contract Documents and with sufficient detail as required by the Owner, Program Manager, and/or Architect. Substitutions may be rejected without explanation and will be considered only under one or more of the following conditions: (i) the proposal is required for compliance with interpretation of code requirements then existing, (ii) specified products are unavailable through no fault of the contractor; (iii) subsequent information discloses the inability of specified products to perform properly or to fit in the designated space; (iv) the manufacturer/fabricator refuses to certify or guarantee the performance of the specified product as required; and (v) when, in the judgment of the Owner or the Architect, a substitution would be substantially in the Owner's best interest, in terms of cost, time, or other considerations. Whether or not any proposed substitution is accepted by the Owner or the Architect in consultation with the Program Manager, the Contractor shall reimburse the Owner for any fees charged by the Architect, the Program Manager, and other consultants for evaluating each proposed substitute.

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

§ 3.5 Warranty

§ 3.5.1 The Contractor warrants to the Owner, Program Manager, 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 with 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, including substitutions not properly approved and authorized, shall 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 Program Manager or Architect, the Contractor shall furnish satisfactory evidence as to the kind and quality of materials and equipment.

§ 3.5.2 The Contractor agrees to assign to the Owner, no later than at the time of final completion of the Work, any and all manufacturer's warranties relating to materials, labor and equipment used and/or installed in the Work and further agrees to perform the Work in such manner so as to preserve any and all such manufacturer's warranties. These manufacturer's warranties shall commence on the date of substantial completion.

§ 3.6 Taxes

The Contractor shall pay sales, consumer, use, business license and similar taxes for the Work or portions thereof 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 and all other permits as listed in Division 1 of the Contract Documents, Division 1, Section 014126. Unless otherwise provided in the Contract Documents, all connection charges, assessments, or inspection fees as may be imposed by any municipal agency or utility company are included in the Contract Sum and shall be the Contractor's responsibility. All water and sewer tap and impact fees will be paid by the Owner.

§ 3.7.2 The Contractor shall comply with and give notices required by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders and all other requirements of public authorities applicable to performance of the Work. The Contractor shall procure and obtain all bonds required of the Owner or the contractor by the municipality in which the Project is located or by any other public or private body with jurisdiction over the Project, which bonds are identified in Division 1 of the Contract Documents. In connection with such bonds, the Contractor shall assist in the preparation of all applications, supply all necessary backup material, and furnish the surety with any required personal undertakings. The Contractor shall also obtain and pay all charges for all approvals for street and sidewalk closings, parking meter removal, and other similar matters as may be necessary or appropriate from time to time for the 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 or other requirements 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, Program Manager, and the Architect before conditions are disturbed and in no event later than 21 days after first observance of the conditions. The Architect and Program Manager will promptly investigate such conditions and, if the Architect, in consultation with the Program Manager, 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, in consultation with the Program Manager, 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, Program Manager, and Contractor in writing, stating the reasons. If the Owner or Contractor disputes the Architect's determination or recommendation, either party may proceed as provided in Article 15. No adjustment in the Contract Time or Contract Sum shall be permitted, however, in connection with a concealed or unknown condition that does not differ materially from those conditions disclosed or that reasonably should have been disclosed by the Contractor's prior inspections, tests, review, and preconstruction services for the Project, or inspections, tests, reviews, and preconstruction services that the Contractor had the opportunity to make or should have performed in connection with the Project.

§ 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 via the Program Manager, both verbally and in writing. Upon receipt of such notice, the Owner shall promptly take any action necessary to obtain governmental authorization required to resume the operations. The Contractor shall continue to suspend such operations until otherwise instructed by the Owner but shall continue with all other operations that do not affect those remains or features. Requests for adjustments in the Contract Sum and Contract Time arising from the existence of such remains or features may be made as provided in Article 7 or 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 Allowance amounts are complete and include, without limitation, 1) all materials, equipment, labor, delivery, installation, overhead, and profit (with all markups), and 2) any other cost or expense in connection with, or incidental to, the performance of that portion of the Work to which each allowance applies. This includes, but is not limited to, any and all Allowances and Allowance amounts identified by the Owner in the bid documents;
- .2 Whenever costs are more than or less than allowances, the Contract Sum shall be adjusted accordingly by Change Order. The amount of the Change Order shall reflect (1) the difference between actual costs with all markups and the allowances under Section 3.8.2. .
- .3 allowances shall be a separate line item on the Schedule of Values.

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

§ 3.9 Superintendent and Quality Control Representative

§ 3.9.1 The Contractor shall employ a competent superintendent, quality control representative and necessary assistants who shall be in attendance at the Project site during performance of any and all 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. The superintendent and the quality control representative are two separate positions and cannot be held by a single contractor employee. These are both full time positions. These employees may be responsible for the Contractor's safety program if allowed by the Owner. This daily contractor attendance requirement shall continue through the Punchlist Phase until Final Completion is obtained.

§ 3.9.2 Unless the Superintendent was approved during prequalification, the Contractor, as soon as practicable after award of the Contract, shall furnish in writing to the Owner through the Program Manager, the name and qualifications of a proposed superintendent. The Superintendent must be approved by the Owner through the Program Manager prior to the start of Work on site. The Superintendent shall not be removed from the Project without the Owner's consent. The Owner, through the Program Manager, reserves the right to review the performance and competence of the Contractor's superintendent and the superintendent of the Contractor's major Subcontractors. In the event that the performance of the Contractor's superintendent or the superintendents of the Contractor's major subcontractors is judged to be detrimental to the Project's schedule, sequencing, quality or safety, the Owner, through the Program Manager, may request the superintendent's removal in writing. The Contractor shall, upon receipt of written notice, remove the superintendent from the Project within two weeks of the notice and provide a replacement suitable to the Program Manager and/or Owner. Qualifications of the replacement superintendent shall be submitted to the Owner through the Program Manager for evaluation and approval. During any replacement period, regardless of the cause, if construction is ongoing, a temporary superintendent, suitable to

the Owner and Program Manager must be on site. A written request for such consent must be submitted to the Owner through the Program Manager with details concerning the technical qualifications of the proposed temporary superintendent along with a transition plan for the replacement period.

§ 3.9.3 The Contractor shall not employ a proposed superintendent to whom the Owner, Program Manager 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, within thirty (30) days of the Notice to Proceed, shall prepare and submit for the Owner's and Architect's information and the Program Manager's approval a Contractor's Construction Schedule (Construction Schedule) for the Work. The Construction 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 Contractor's Bid Schedule and the entire Milestone Schedule to the extent required by the Contract Documents, and shall provide for expeditious and practicable execution of the Work. The Construction Schedule must include all Milestone dates included in the Bid Schedule unless otherwise approved by the Owner and/or Program Manager. The Contractor shall cooperate with the Program Manager in scheduling and performing the Contractor's Work to avoid conflict with, and as to cause no delay in, the work or activities of other Contractors or the construction or operations of the Owner's own forces. Any schedule submitted by the Contractor that purports to complete the project in less time than that included in the Contract Time will not be the basis for any Claim for acceleration or otherwise.

§ 3.10.1.1 The Construction Schedule shall be in a detailed precedence-style critical path method ("CPM") suitable to the Owner and as detailed by the Contract Documents. It shall (i) provide a graphic representation of all activities and events that will occur during performance of the Work; (ii) identify each phase of construction and occupancy; and (iii) set forth dates that are critical in ensuring the timely and orderly completion of the Work in accordance with the requirements of the Contract Documents, including, but not limited to, the Milestone Dates included in the Contractor's Bid Schedule. The Project Schedule must be approved by the Owner, through the Program Manager, prior to processing of any Pay Applications. If not accepted as submitted, the Construction Schedule shall be promptly revised by the Contractor in accordance with the recommendations of the Program Manager and resubmitted for acceptance. Once approved, the schedule may not be modified unless (i) consent of the Program Manager is given, or (ii) the Contract Time is modified by Change Order. The Contractor shall monitor the progress of the Work for conformance with the requirements of the Construction Schedule and shall promptly advise the Program Manager of any delays or potential delays. The accepted Construction Schedule shall be updated to reflect actual conditions ("progress reports") as required by the Contract Documents or as requested by the Program Manager. Updated progress reports must be submitted with each Pay Application. The Program Manager shall inform the Owner should the Contractor fall behind in the schedule by two (2) weeks. If any progress report indicates delays to the Project or if notified of the need for recovery by the Program Manager, the Contractor shall immediately take actions to correct the delay, including overtime, weekend or holiday work, or additional labor, all at no cost to the Owner, and submit a written recovery statement to the Program Manager describing the cause for slippage and the actions in progress and planned by the Contractor to recover the Schedule. In no event shall any progress report constitute an adjustment in the Contract Time, any Milestone Date, or the Contract Sum unless any such adjustment is agreed to in writing by the Owner by issuance of a Change Order.

§ 3.10.1.2 If, at any time, the Owner determines that the performance of the Work has not progressed or reached the level of completion required by the Contract Documents, the Owner shall have the right to order the Contractor to take corrective measures necessary to expedite the progress of construction, including, without limitation, (i) working additional shifts or overtime, (ii) supplying additional manpower, equipment, and facilities, and (iii) other similar measures (collectively known as "Extraordinary Measures"). Such Extraordinary Measures shall continue until the progress of the Work complies with the stage of completion required by the Contract Documents. The Owner's right to require Extraordinary Measures is solely for the purpose of ensuring the contractor's compliance with the Construction Schedule.

- .1** The Contractor shall not be entitled to an adjustment in the Contract Sum in connection with Extraordinary Measures required by the Owner.
- .2** The Owner may exercise these rights as frequently as the Owner deems necessary to ensure that the Contractor's performance of the Work will comply with the Contract Documents.

.3 Extraordinary Measures may apply to all or a portion of the Work and may require the Contractor to require Extraordinary Measures be taken by its Subcontractors and Sub-subcontractors.

.4 In lieu of requiring Extraordinary Measures and solely at the discretion of the Owner, the Owner may have any of all of the Work performed by its forces or others, or may supplement the forces of the Contractor to insure that the Work is completed in a timely manner. If the Owner has any or all of the Work performed by its forces or others or supplements the Contractor's forces, a deductive Change Order will be issued for the value of the Work performed plus any costs related to that Work for services performed by the Architect, the Program Manager, their consultants, or other professionals (including, but not limited to attorneys' fees and costs).

§ 3.10.2 The Contractor shall prepare a Submittal Schedule, promptly after being awarded the Contract and thereafter update it as necessary to maintain a current Submittal Schedule, and shall submit the schedule(s) for the Program Manager's and Architect's approval. The Architect and Program Manager'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 Program Manager and 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 participate with other Contractors, the Program Manager and Owner in reviewing and coordinating all schedules for incorporation into the Milestone Schedule that is prepared by the Program Manager. The Contractor shall make revisions to the Construction Schedule and Submittal Schedule as deemed necessary by the Program Manager to conform to the Milestone Schedule.

§ 3.10.4 The Contractor shall perform the Work in general accordance with the most recent Construction Schedule submitted and approved by the Owner, Program Manager and Architect.

§ 3.11 Documents and Samples at the Site

§ 3.11.1 The Contractor shall maintain at the site for the use of the Architect, Program Manger and Owner, one hard 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 hard copy of approved Shop Drawings, Product Data, Samples and similar required submittals. These documents shall be delivered to the Program Manager for submittal to the Owner upon completion of the Work as a record of the Work as constructed.

§ 3.11.2 The Contractor shall affix to the drawings and specifications which are maintained at the site as record drawings, addendum items and changes to the Work as follows: cut apart addenda, change orders, construction change directives or minor changes so that each separate item may be affixed to the corresponding drawing or specifications page as close to the reference item as possible.

§ 3.12 Shop Drawings, Product Data and Samples; Closeout Submittals

§ 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 and Program Manager is subject to the limitations of Sections 4.2.9 through 4.2.11. Informational submittals upon which the Program Manager and Architect are 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 Program Manager or Architect without action.

§ 3.12.5 The Contractor shall review for compliance with the Contract Documents, approve and submit to the Program Manager Shop Drawings, Product Data, Samples and similar submittals required by the Contract Documents in accordance with the Submittal Schedule approved by the Program Manager and 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 other Contractors or the Owner's own forces. Such approval will be noted on the submittal data by the Contractor prior to the data being submitted. Submittals which are not marked as reviewed for compliance with the Contract Documents and approved by the Contractor may be returned by the Program Manager and/or Architect without action. The Contractor shall cooperate with the Program Manager in the coordination of the Contractor's Shop Drawings, Product Data, Samples and similar submittals with related documents submitted by other Contractors. All submittals shall be submitted electronically.

§ 3.12.6 By submitting Shop Drawings, Product Data, Samples and similar submittals, the Contractor represents to the Owner, Program Manager, and Architect, that the Contractor has (1) reviewed and approved them, (2) determined and verified materials, field measurements and field construction criteria related thereto, 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 reviewed and approved by the Architect. Any Work performed prior to such approval is at the sole risk of the Contractor; no progress payments will be made for such work. Further, any Work performed which does not comply with the contract documents and approved submittals may be rejected and monies may be deducted from progress payments for those nonconforming items of Work.

§ 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 Program Manager and 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 Program Manager and Architect on previous submittals. In the absence of such written notice, the Architect's approval of a resubmission shall not apply to such revisions.

§ 3.12.10 The Contractor shall not be required to provide professional services that constitute the practice of architecture or engineering unless such services are specifically required by the Contract Documents for a portion of the Work or unless the Contractor needs to provide such services in order to carry out the Contractor's responsibilities for construction means, methods, techniques, sequences and procedures. The Contractor shall not be required to provide professional services in violation of applicable law. If professional design services or certifications by a design professional related to systems, materials or equipment are specifically required of the Contractor by the Contract Documents, the Owner and the Architect will specify all performance and design criteria that such services must satisfy. The Contractor shall cause such services or certifications to be provided by a properly licensed design professional, whose signature and seal shall appear on all drawings, calculations, specifications, certifications, Shop Drawings and other submittals prepared by such professional and who shall comply with reasonable requirements of the Owner regarding qualifications and insurance. 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. 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.

§ 3.12.11 Closeout Submittals.

§ 3.12.11.1 Closeout submittals are critical to the successful commissioning of the project and must be submitted pursuant to the requirements of the technical specifications and concurrently with other submittals required by each specification section. Failure to submit closeout documents concurrently with other submittals required may result in the rejection of that submittal and/or reduction in progress payments for the specified materials. Closeout items such as warranties requiring execution at project completion should be included in draft form with the initial submittal. Refer to Division 1 of the contract documents for closeout submittal requirements.

§ 3.12.11.2 If closeout documents are not timely submitted and the Owner determines that they are impacting operations of the school, the Owner may elect to procure closeout submittals directly from the appropriate subcontractor, supplier or other vendor with all related costs deducted from the Contract Sum by change order.

§ 3.13 Use of Site

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

§ 3.13.2 The Contractor shall coordinate the Contractor's operations with, and secure the approval of, the Program Manager before using any portion of the site.

3.13.3 Only materials and equipment that are to be used directly in the Work shall be brought to and stored on the Project site by the Contractor. After equipment is no longer required for the Work, it shall be promptly removed from the Project site. Protection of construction materials and equipment stored at the Project site from weather, theft, damage and all other adversity is solely the Contractor's responsibility.

3.13.4 Unless required by the Contract Documents, the Contractor and any entity the Contractor is responsible for shall not erect any sign on the Project site without the Owner's prior written consent, which may be withheld in the Owner's sole discretion.

3.13.5 Contractor shall ensure that the Work, at all times, is performed in a manner that affords reasonable access, both vehicular and pedestrian, to the site of the Work and all adjacent areas. The Work shall be performed, to the fullest extent reasonably possible, in such a manner that public areas adjacent to the site of the Work shall be free from all debris, building materials, and equipment. Without limitation of any other provision of the Contract Documents, Contractor shall use its best efforts to minimize any interference with the occupancy or beneficial use of any areas or buildings adjacent to the site of the Work or the premises including in the event of partial occupancy.

3.13.6 The Contractor shall not permit any workers to use any existing facilities at the Project site, including, without limitation, lavatories, toilets, entrances and parking areas other than those designated by the Owner or on the Contract Drawings. Without limitation of any other provision of the Contract Documents, the Contractor shall use its best efforts to comply with all rules and regulations promulgated by the Owner in connection with the use and occupancy of the Project site, as amended from time to time. The Contractor shall immediately notify the Owner in writing if during the performance of the Work the Contractor finds compliance with any portion of such rules and regulations to be impracticable. The Contractor's notice shall set forth the problems of such compliance and suggest alternatives under which the same results intended by the rules and regulations can be achieved. The Owner may in such a circumstance, in the Owner's sole discretion, adopt such suggestions, develop new alternatives or require compliance with the existing requirements of the rules and regulations. The Contractor shall comply with all insurance requirements applicable to use and occupancy of the Project site.

§ 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. See specific requirements in the technical specifications. 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's own forces or of other 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's own forces or by other Contractors except with written consent of the Program Manager and/or Owner.

§ 3.15 Cleaning Up

§ 3.15.1 The Contractor shall clean the site daily and keep the premises and surrounding area free from accumulation of waste materials or rubbish caused by operations under the Contract. Site cleanup should include maintenance of grass and vegetation on site and cleanup of any debris or other materials on sites located adjacent to the premises. Cleanup requirements are further detailed by Specification Section 014700 Cleaning. If cleanup is not satisfactory, the Owner may have cleaning performed and charge the Contractor for all related costs after giving the Contractor written notice and 24 hours to properly clean the site. 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, or Program Manager with the Owner's approval, may cause the work to be done and the Owner shall be entitled to reimbursement from the Contractor for all related costs which may be deducted from the Contract Sum by Change Order.

§ 3.16 Access to Work

The Contractor shall provide the Owner, Program Manager, Architect and third party testing firms 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, Program Manager 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, Architect, or Program Manager. 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 through the Program Manager.

§ 3.18 Indemnification

§ 3.18.1 To the fullest extent permitted by law, the Contractor shall indemnify and hold harmless the Owner, Program Manager, Architect, their consultants, and agents and employees of any of them from and against claims, damages, losses and expenses, including but not limited to attorneys' fees, and related costs 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) including loss of use therefrom, to the extent caused by the negligent acts or omissions of the Contractor, a Subcontractor, anyone directly or indirectly employed by them or anyone for whose acts they may be liable, regardless of whether or not such claim, damage, loss or expense is caused in part by a party indemnified hereunder. In light of such, by signing this Agreement, the Contractor expressly agrees that it is solely responsible for safety on the project site and otherwise related to the Project. Further, Contractor expressly agrees to reimburse the Owner, Program Manager and/or Architect for any and all reasonable attorney's fees and costs related to the investigation, handling, response to, and defense of any claims addressed herein. If the Contractor fails to timely reimburse the Owner, Program Manager and/or Owner for same, Contractor also expressly agrees to reimburse each of them for any costs expended to collect these fees and costs. 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 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.

§ 3.18.3 The Contractor's indemnity obligations under this Agreement shall also specifically include, without limitation, all fines, penalties, damages, liability, costs, expenses (including without limitation, reasonable attorneys'

fees and dispute resolution and/or court costs) and punitive damages (if any) arising out of, or in connection with, any (i) violation of or failure to comply with any law, statute, ordinance, rule, regulation, code or requirement of a public authority that bears upon the performance of the Work by the Contractor, a Subcontractor, or any person or entity for whom either is responsible, (ii) means, methods, procedures, techniques, or sequences of execution or performance of the Work, (iii) failure to secure and pay for permits, fees, approvals, licenses, and inspections as required under the Contract Documents or any violation of any permit or other approval of a public authority applicable to the Work by the Contractor, a Subcontractor, or any person or entity for whom either is responsible, and/or (iv) claims made by a Subcontractor, Sub-subcontractor, material supplier, or other party for payment under its agreement with the Contractor, including, but not limited to claims under the Labor and Material Payment Bond provided as required by this Agreement, claims for quantum meruit, claims for unjust enrichment, or any other claims otherwise related to nonpayment of that entity.

§ 3.18.4 The Contractor shall indemnify and hold harmless all of the Indemnities (hereby defined as the Owner, Program Manager, Architect, and consultants, officers, agents, board members, representatives and employees of any of them) from and against any costs and expenses (including reasonable attorneys' fees and dispute resolution and/or court costs) incurred by any of the Indemnitees in enforcing any of the Contractor's defense, indemnity and hold-harmless obligations under this Contract.

§ 3.18.4 HOLD HARMLESS The Contractor agrees to protect, defend, indemnify and hold the Owner, its Officers, employees and agents free and harmless from and against any and all losses, penalties, damage, settlements, costs, charges, professional fees, attorneys' fees, dispute resolution and/or court costs or other expenses or liabilities of every kind and character arising out of or relating to any and all claims, liens, demands, obligations, actions, proceedings or causes of action of every kind in connection with or arising out of this agreement and/or the performance hereof that are due to the negligence of the contractor, its officers, employees or agents. The Contractor further agrees to investigate, handle, respond to, provide a defense for, and defend the same at its sole expense and agrees to bear all costs and expenses related thereto. Further, the Contractor expressly agrees to indemnify, investigate, handle, respond to, provide a defense for, and defend any and all claims for payment, including claims against the Labor and Material Payment Bond or for quantum meruit or unjust enrichment, or other similar claims by any Subcontractor or supplier of any tier at its sole expense and agrees to bear all costs and expenses related thereto. Upon receipt of notice of a lien claim or other claim for payment, the Owner shall notify the Contractor and the Contractor shall immediately defend and indemnify the Owner for same.

ARTICLE 4 ARCHITECT AND PROGRAM MANAGER

§ 4.1 General

§ 4.1.1 The Owner has retained 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. Any reference in the Contract Documents to the Architect's taking action or rendering a decision within a reasonable time or with reasonable promptness is understood to mean no more than fifteen (15) working days, unless expressly indicated as otherwise.

§ 4.1.2 The Owner shall retain a Program Manager lawfully licensed as required in the jurisdiction where the Project is located. That person or entity is identified as the Program Manager in the Agreement and is referred to throughout the Contract Documents as if singular in number.

§ 4.1.3 Duties, responsibilities and limitations of authority of the Program Manager and Architect as set forth in the Contract Documents shall not be restricted, modified or extended except as provided in the Owner/Architect Agreement or the Owner/Program Manager Agreement, as applies.

§ 4.1.4 If the employment of the Program Manager or Architect is terminated, the Owner shall employ a successor Program Manager or Architect whose status under the Contract Documents shall be that of the Program Manager or Architect, respectively. Nothing herein shall prevent the Owner from assuming the duties of the Program Manager.

§ 4.2 Administration of the Contract

§ 4.2.1 The Program Manager and Architect will provide administration of the Contract as described in the Contract Documents. The Program Manager and 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 familiar with the progress and quality of the portion of the Work completed, and to determine 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. On the basis of the site visits, the Architect will keep the Owner and Program manager reasonably informed about the progress and quality of the portion of the Work completed, and report to the Owner and Program Manager (1) known deviations from the Contract Documents and from the most recent Milestone Schedule prepared by the Program Manager, and (2) defects and deficiencies observed in the Work.

§ 4.2.3 The Program Manager shall provide one or more representatives who may be in attendance at the Project site whenever the Work is being performed. The Program Manager will determine in general if the Work observed is being performed in accordance with the Contract Documents, will keep the Owner reasonably informed of the progress of the Work, and will report to the Owner and Architect (1) known deviations from the Contract Documents and the most recent Construction Schedule, and (2) defects and deficiencies observed in the Work.

§ 4.2.4 Neither the Owner, Program Manager nor the Architect will have control over, or charge of, 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, and none of them will be responsible for the Contractor's failure to perform the Work in accordance with the requirements of the Contract Documents. Neither the Owner, Program Manager nor the Architect will have control over or charge of or be responsible for acts or omissions of the Contractor, Subcontractors, or their agents or employees, or of any other persons or entities performing portions of the Work.

§ 4.2.6 **Communications Facilitating Contract Administration.** Except as otherwise provided in the Contract Documents or when direct communications have been specially authorized, the Owner, Architect and Contractor shall endeavor to communicate with each other through the Program Manager. 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 the Owner's own forces shall be through the Program Manager.

§ 4.2.7 The Architect will certify all Applications for Payment by the Contractor and the Program Manager will indicate his concurrence with same, in accordance with the provisions of Article 9.

§ 4.2.8 The Architect and Program Manager (with concurrence of the Architect) have authority to reject Work that does not conform to the Contract Documents. The Program Manager shall determine in general whether the Work of the Contractor is being performed in accordance with the requirements of the Contract Documents and notify the Owner, Contractor and Architect of defects and deficiencies in the Work. Whenever the Program Manager considers it necessary or advisable, the Program Manager will have authority to require additional inspection or testing of the Work in accordance with Sections 13.5.2 and 13.5.3, upon written authorization of the Owner, whether or not such Work is fabricated, installed or completed. The foregoing authority of the Program Manager will be subject to the provisions of Sections 4.2.18 through 4.2.20 inclusive, with respect to interpretations and decisions of the Architect.

§ 4.2.9 The Program Manager will receive all submittals from the Contractor such as Shop Drawings, Product Data and Samples and transmit them to the Architect for review. The Program Manager's actions will be taken in accordance with the approved Submittal Schedule, or, in the absence of an approved Submittal Schedule, with reasonable promptness while allowing sufficient time to permit adequate review by the Architect.

§ 4.2.10 The Architect will review and approve or take other appropriate action upon the Contractor's submittals such as Shop Drawings, Product Data and Samples for the 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 approved Submittal Schedule or, in the absence of an approved Submittal Schedule, with reasonable promptness. The Architect shall return submittals within fifteen (15) calendar days or sooner. Upon the Architect's completed review, the Architect shall transmit its submittal review to the Program Manager.

§ 4.2.11 Review of the Contractor's submittals by the Architect is not conducted for the purpose of determining the accuracy and completeness of other details such as dimensions and quantities, or for substantiating instructions for installation or performance of equipment or systems, all of which remain the responsibility of the Contractor as required by the Contract Documents. The Architect's review of the Contractor's submittals shall not relieve the

Contractor of the obligations under Sections 3.3, 3.5 and 3.12. The Architect's review shall not constitute approval of safety precautions or of any construction means, methods, techniques, sequences or procedures. The Architect's approval of a specific item shall not indicate approval of an assembly of which the item is a component.

§ 4.2.12 The Program Manager, with assistance of the Architect, will prepare Change Orders and Construction Change Directives.

§ 4.2.13 The Program Manager and the Architect will take appropriate action on Change Orders or Construction Change Directives in accordance with Article 7 and the Architect will have authority to order minor changes in the Work as provided in Section 7.4. The Architect, in consultation with the Program Manager, will investigate and make determinations and recommendations regarding concealed and unknown conditions as provided in Section 3.7.4.

§ 4.2.14 Inspection of the Work, punchlist procedures and closeout requirements and procedures are as required herein and in further detail as required by the Contract Documents.

§ 4.2.15 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.

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

§ 4.2.17 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 so rendered in good faith.

§ 4.2.18 The Architect's decisions on matters relating to aesthetic effect in connection with the administration of the Contract and after consultation with the Owner will be final if consistent with the intent expressed in the Contract Documents.

§ 4.2.19 The Program Manager will receive and review Requests for Information (RFI's) from the Contractor, and forward each RFI to the Architect, with the Program Manager's recommendation, if appropriate. The Architect will review and respond in writing to the Program Manager to RFI's about the Contract Documents. The Program Manager's recommendation and the Architect's response to each request 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 RFI's.

§ 4.2.20 The Contractor will identify each RFI as requiring a review time of one (1), three (3) or five (5) days depending on its potential impact on the construction schedule. The Architect will ensure that RFI's are reviewed and returned within the review times identified by the Contractor unless deemed unreasonable by the Program Manager and will ensure that this requirement is included in the contract of all of its consultants.

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 other Contractors or subcontractors of other Contractors.

§ 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 Within thirty (30) days of the execution of the Agreement, the Contractor shall furnish in writing to the Program Manager for review by the Owner, Program Manager and Architect (i) the name, trade and subcontract amount for each Subcontractor and (ii) the names of all persons or entities proposed as manufacturers of the products identified in the Specifications (including those who are to furnish materials or equipment fabricated to a special design), and, where applicable, the name of the installing Subcontractor. The Program Manager may reply within 14 days to the Contractor in writing stating whether the Owner, the Program Manager or the Architect has reasonable objection to any such proposed person or entity. Failure of the Program Manager, Owner, or Architect to reply within the 14-day period shall constitute notice of no reasonable objection. This submission is also required to verify the list of Subcontractors to work on the Project with the listed Subcontractors provided with the Contractor's bid documents, if applicable.

§ 5.2.2 The Contractor shall not contract with a proposed person or entity to whom the Owner, Program Manager 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, Program Manager or Architect has reasonable objection to a person or entity proposed by the Contractor, the Contractor shall propose another to whom the Owner, Program Manager or Architect has no reasonable objection. If the proposed but rejected Subcontractor was 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, Program Manager or Architect makes reasonable objection to such substitution.

§ 5.3 Subcontractual Relations

By appropriate written agreement, the Contractor shall require each Subcontractor, to the extent of the Work to be performed by the Subcontractor, to be bound to the Contractor by terms of the Contract Documents, and to assume toward the Contractor all the obligations and responsibilities, including responsibility for safety of the Subcontractor's Work, which the Contractor, by these Documents, assumes toward the Owner, Program Manager and Architect. Each subcontract agreement shall preserve and protect the rights of the Owner, Program Manager 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. All subcontracts shall be in writing and shall expressly provide that the Owner is an intended third-party beneficiary of such subcontract.

§ 5.4 Contingent Assignment of Subcontracts

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

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

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

§ 5.4.2 If the Work in connection with a subcontract has been suspended for more than thirty (30) days after termination of the contract by the Owner and the Owner accepts assignment of such subcontract, the Subcontractor's compensation may be equitably adjusted for any increase in direct costs incurred by such Subcontractor as a result of the suspension. The Subcontractor must submit such documentation as required by the Owner and/or Program Manager to justify such equitable adjustment. In no event will such an adjustment include extended home office overhead or lost profit.

§ 5.4.3 Each subcontract shall expressly provide that the Owner shall only be responsible to the Subcontractor for those obligations of the Contractor that accrue subsequent to the Owner's exercise of any rights under this conditional assignment.

ARTICLE 6 CONSTRUCTION BY OWNER OR BY OTHER CONTRACTORS

§ 6.1 Owner's Right to Perform Construction with Own Forces and to Award Other Contracts

§ 6.1.1 The Owner reserves the right to perform construction or operations related to the Project with the Owner's own forces, which include persons or entities under separate contracts not administered by the Program Manager, and to award other 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 the Owner performs construction or operations with the Owner's own forces including persons or entities under separate contracts not administered by the Program Manager, the Owner shall provide for coordination of such forces with the Work of the Contractor, who shall cooperate with them.

§ 6.1.3 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.

§ 6.1.4 The Contractor accepts assignment of, and liability for, all purchase orders and other agreements for procurement of materials and equipment that are identified as part of the Contract Documents. The Contractor shall be responsible for such pre-purchased items, if any, as if the Contractor were the original purchaser. The Contract Sum includes, without limitation, all costs and expenses in connection with delivery, storage, insurance, installation, and testing of items covered in any assigned purchase orders or agreements. All warranty and correction of the Work obligations under the Contract Documents shall also apply to any pre-purchased items, unless the Contract Documents specifically provide otherwise.

§ 6.2 Mutual Responsibility

§ 6.2.1 The Contractor shall afford the Owner's own forces, Program Manager and other 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 on proper execution or results of construction or operations by the Owner's own forces or other Contractors, the Contractor shall, prior to proceeding with that portion of the Work, promptly report to the Program Manager and Architect apparent discrepancies or defects in such other construction that would render it unsuitable for such proper execution and results. Failure of the Contractor to so report shall constitute an acknowledgment that the Owner's own forces or other 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, including costs that are payable to a separate contractor because of the Contractor's delays, improperly timed activities 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, separate contractors, or other Contractors as provided in Section 10.2.5.

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

§ 6.3 Owner's Right to Clean Up

If a dispute arises among the Contractor, other 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 Program Manager 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, Program Manager, Architect and Contractor; a Construction Change Directive requires agreement by the Owner, Program Manager 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. Except as permitted in Article 7.3, a change in the Contract Sum or the Contract Time shall be accomplished only by Change Order. Accordingly, no course of conduct or dealings between the parties, nor express or implied acceptance of alterations or additions to the Work and no claim that the Owner has been unjustly enriched by any alteration or addition to the Work, whether or not there is, in fact, any unjust enrichment of the Work, shall be the basis of any claim for an increase in any amounts due under the Contract Documents or for a change in any time period provided for in the Contract Documents.

§ 7.1.4 The Owner may at any time during the course of performance of the Work direct the Program Manager to request from the Contractor additional bids and/or quotes from Subcontractors, including subcontractors currently not performing work on the project, for changes in the Work to be performed by way of Change Order, Construction Change Directive, or order for a minor change in the Work pursuant to the provisions of Article 7.2, 7.3 and 7.4. The Contractor shall present the requested information to the Program Manager for review. If the Owner determines it to be in the Owner's best interest for the changes in the work to be performed by a subcontractor other than a subcontractor currently working on the project, the Owner shall give written notice to the Contractor, which indicates the subcontractor to be used and the scope of work intended to be performed. The Contractor shall then issue a separate subcontract for that portion of the Work pursuant to the terms contained in this Agreement. The Owner shall not require the Contractor to subcontract with a proposed person or entity to whom it has made reasonable and timely objection.

§ 7.1.5 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, whether accomplished by Change Order or Construction Change Directive, shall be actual net cost as confirmed by the Program Manager and 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.

§ 7.2 Change Orders

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

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

§ 7.2.2 Agreement on any Change Order shall constitute a final settlement of all matters relating to the change in the Work that is the subject of the Change Order, including but not limited to, all direct and indirect costs associated with such change, any impact such change may have on the unchanged Work, and any and all adjustments to the Contract Sum and the Contract Time. If Change Order increases the Contract Sum, the Contractor shall include the

Work covered by such Change Orders in Applications for Payment as if such Work were originally part of the Contract Documents.

§ 7.3 Construction Change Directives

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

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

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

- .1 Mutual acceptance of a lump sum properly itemized and supported by sufficient substantiating data to permit evaluation;
- .2 Unit prices stated in the Contract Documents or subsequently agreed upon;
- .3 Cost to be determined in a manner agreed upon by the parties;
- .4 As provided in Section 7.3.7; or
- .5 In the case of omitted work, the Owner shall have the right to withhold from payments due or to become due to the Contractor an amount that, in the Owner's opinion, is equal to the value of such Work until such time as its value is determined by agreement.

§ 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, whether resulting in an addition or deletion to the contract.

§ 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 Program Manager and Architect of the Contractor's agreement or disagreement with the method, if any, provided in the Construction Change Directive for determining the proposed adjustment in the Contract Sum or Contract Time.

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

§ 7.3.7 If the Contractor does not respond promptly or disagrees with the method for adjustment in the Contract Sum, the Program Manager 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, the Contractor shall keep and present, in such form as the Program Manager may prescribe, an itemized accounting together with appropriate supporting data. Unless otherwise provided in the Contract Documents, costs for the purposes of this Section 7.3.7 shall be limited to the following:

- .1 Costs of labor, including social security, old age and unemployment insurance, fringe benefits required by agreement or custom, and workers compensation insurance;
- .2 Costs of materials, supplies and equipment, including cost of transportation, whether incorporated or consumed;
- .3 Rental costs of machinery and equipment, exclusive of hand tools, whether rented from the Contractor or others;
- .4 Costs of premiums for all bonds and insurance, permit fees, business license 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 Pending final determination of the total cost of a Construction Change Directive to the Owner, amounts not in dispute may be included in Applications for Payment accompanied by a Change Order indicating the parties' agreement of such costs.

§ 7.3.9 When the Owner and Contractor agree with a determination made by the Program Manager and 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 Program Manager shall 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 issued through the Program Manager and shall be binding on the Owner and Contractor.

7.5 Overhead and Profit

In Article 7, for Change Orders or Constructive Change Directives, the allowance for overhead and profit combined, included in the total cost to the Owner, shall be based on the following schedule:

7.5.1 For the Contractor, for any work performed by the Contractor's own forces, 15 percent of the cost.

7.5.2 For the Contractor, for work performed by his Subcontractor, 7 percent of the amount due the Subcontractor.

7.5.3 For each Subcontractor or Sub-subcontractor involved, for any work performed by that subcontractor's own forces, 15 percent of the cost.

7.5.4 For each Subcontractor, for work performed by his Sub-subcontractor, 7 percent of the amount due the Sub-subcontractor.

7.5.5 For purposes of Article 7.5, cost shall be limited to the following: Cost of materials, including sales tax and cost of delivery; cost of labor, including Social Security, Old Age and Unemployment Insurance (labor cost may include a pro rata share of foreman's time, but only when an extension of Contract Time is granted on account of the change); Worker's Compensation Insurance; Rental Value of power tools and equipment.

7.5.6 For purposes of Article 7.5, overhead shall include the following: Bond premiums, supervision, superintendence, wages of timekeepers, watchmen, and clerks, small tools, incidentals, general office expense (home and field) and all other expenses not included in Cost.

7.5.7 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 too. The Contractor shall provide all reasonable documentation as required by the Owner, Program Manager, or Architect.

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 Notice to Proceed or as otherwise prescribed herein.

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

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

§ 8.2 Progress and Completion

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

§ 8.2.2 The Contractor shall not 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 or prior to submission of all required insurance certificates to the Program Manager. 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.

§ 8.2.4 Failure by the Contractor to commence actual physical work on the Project within seven (7) days from the date of commencement, as established in the Notice to Proceed or otherwise, will entitle the Owner to consider the Contractor in substantial breach of its obligations under this Contract. In this event, the Owner may withdraw the Notice to Proceed and terminate the Contract in accordance with the Contract Documents.

§ 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, Owner's own forces, Program Manager, Architect, other Contractors or an employee of any of them, 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 other causes that the Architect, based on the recommendation of the Program Manager, determines may justify delay, then the Contract Time shall be extended by Change Order to the extent such delay will prevent the Contractor from achieving Substantial Completion within the Contract Time and if the performance of the Work is not, was not, or would not have been delayed by any other cause for which the Contractor is not entitled to an extension in the Contract Time under the Contract Documents. The Contractor further acknowledges and agrees that adjustments in the Contract Time will be permitted for a delay only to the extent such delay (i) is not caused, or could not have been anticipated, by the Contractor, (ii) could not be limited or avoided by the Contractor's timely notice to the Owner of the delay or reasonable likelihood that a delay will occur, and (iii) is of a duration not less than one (1) day.

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

§ 8.3.3.1 Notwithstanding anything to the contrary in the Contract Documents, the Contractor's sole remedy for any (i) delay in the commencement, prosecution, or completion of the Work, (ii) hindrance, interference, suspension or obstruction in the performance of the Work, (iii) loss of productivity, or (iv) other similar claims (items i through iv herein collectively referred to as "Delays"), whether or not such Delays are foreseeable, shall be an extension of time in which to complete the Work if permitted under Section 8.3.1 and, to the extent permitted under this Section, an adjustment in the Contract Sum. In no event shall the Contractor be entitled to any other compensation or recovery of any damages under or pursuant to this Section in connection with any Delay, including, without limitation, consequential damages, lost opportunity costs, impact damages, or other similar remuneration.

§ 8.3.3.2 The Contractor shall be permitted an adjustment in the Contract Sum, in accordance with the provisions herein, only if the delays, either individually or taken in the aggregate, cause the Contract Time to be increased by more than seven (7) days. Any adjustment in the Contract Sum under or pursuant to this section shall be limited to the increase, if any, of direct costs incurred by the Contractor in performing the Work as a result of that portion of any Delay or Delays that cause the Contract Time to be increased in excess of that seven (7) day period. Direct costs for purposes of this Section do not include overhead and profit.

§ 8.3.4 If the Contractor submits a schedule or progress report indicating, or otherwise expressing an intention to achieve completion of the Work prior to any completion date required by the Contract Documents or expiration of the Contract Time, no liability of the Owner to the Contractor for any failure of the Contractor to so complete the Work shall be created or implied regardless of the cause of or reason for the Contractor's failure to do so.

ARTICLE 9 PAYMENTS AND COMPLETION

§ 9.1 Contract Sum

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

§ 9.2 Schedule of Values

Within ten (10) days of execution of this Agreement, the Contractor shall submit to the Program Manager, before the first Application for Payment, a Schedule of Values allocating the entire Contract Sum to the various portions of the Work prepared in such form and supported by such data to substantiate its accuracy as the Program Manager and Architect may require. This Schedule of Values, unless objected to by the Program Manager or Architect and after approval by the Program Manager, shall be used as a basis for reviewing the Contractor's Applications for Payment. The Schedule of Values must include a line item for punchlists at a minimum of 3% of the Contract Sum and a line item for closeout documents at a minimum of 3% of the Contract Sum. This in no way limits withholding for outstanding punchlists and/or closeout documents to 3% each if the Architect and/or Program Manager determine that the value of remaining items exceed 3% each.

§ 9.3 Applications for Payment

§ 9.3.1 On the date established for each progress payment, the Contractor shall submit to the Program Manager an itemized Application for Payment prepared in accordance with the Schedule of Values for completed portions of the Work. Such application shall be notarized and supported by such data substantiating the Contractor's right to payment as the Owner, Program Manager or Architect may require, such as copies of requisitions from Subcontractors and material suppliers, and shall reflect retainage as provided for in the Contract Documents. The form of Application for Payment shall be AIA Document G702, current edition, supported by AIA G703, current edition. Applications for Payment shall be submitted electronically via OpCenter, if so approved and/or required by the Program Manager. If OpCenter is used to transmit such documents, photocopies and/or electronic copies of signature pages are acceptable as originals, and any grouping of counterparts that contain executed signature pages from all required parties may be used as an original.

§ 9.3.1.1 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.

§ 9.3.1.2 Each Application for Payment shall be accompanied by the following, all in form and substance satisfactory to the Program Manager and/or the Owner:

.1 A current sworn statement from the Contractor setting forth all Subcontractors and material suppliers with whom the Contractor has subcontracted for any Work for which payment is requested in the Application for Payment, together with a current, duly executed waiver of lien from the Contractor establishing a waiver of lien upon receipt of the payment requested by the Contractor in the current Application for Payment, AIA document G706.

.2 Commencing with the second Application for Payment submitted by the Contractor, duly executed so-called "after-the-fact" waivers of material suppliers' liens from all Subcontractors, material suppliers and, when appropriate or requested, lower tier subcontractors, establishing receipt of payment or satisfaction of payment of all amounts requested on behalf of such entities and disbursed prior to submittal by the Contractor of the current Application for Payment, plus sworn statements from all Subcontractors, material suppliers, and where appropriate or requested, lower tier subcontractors, covering all amounts requested in the current Application for Payment upon receipt of payment; and

.3 Such other waivers, consent of surety, information, documentation and materials as the Program Manager may require.

§ 9.3.1.3 If, at any time, there shall be evidence of a lien or claim for which, if established, the Owner might become liable, and that is chargeable to the Contractor, or if the Contractor shall incur any liability to the Owner, or the Owner shall have any claim or demand against the Contractor of any kind or for any reason, whether or not reduced to judgment or award, the Owner shall have the right to retain out of any payment due, or to become due under this Agreement or any other agreement between the Owner and the Contractor, an amount sufficient to indemnify the Owner against such lien or claim, or to fully satisfy such liability, claim or demand. The Owner shall also be entitled to charge against or deduct from any such payment all costs of defense or collection which respect thereto, including reasonable attorneys' fees. Should any claim or lien develop after all payments are made hereunder, the Contractor shall refund to the Owner within ten (10) days of demand therefor all monies that the latter may be compelled to pay in discharging such claims or liens and all costs, including reasonable attorneys' fees and related costs incurred in collecting said monies from the Contractor.

§ 9.3.2 Solely at the discretion of the Owner, payments may be made on account of materials and equipment delivered and suitably stored at the site for subsequent incorporation in the Work. If approved in advance by the Owner, payment may similarly be made for materials and equipment suitably stored off the site at a location agreed upon in writing. Payment for materials and equipment stored on or off the site shall be conditioned upon compliance by the Contractor with procedures satisfactory to the Owner to establish the Owner's title to such materials and equipment or otherwise protect the Owner's interest, and shall include the costs of applicable insurance and proper storage and transportation to the site for such materials and equipment stored off the site, all at the Contractor's cost. The Contractor shall also comply with the following specific requirements:

9.3.2.1 The aggregate cost of materials stored off-site shall not exceed fifteen thousand dollars (\$15,000) at any time without the written approval of the Owner or Program Manager.

9.3.2.2 Title to such materials shall be vested in the Owner, as evidenced by documentation satisfactory in form and substance to the Owner, including, without limitation, recorded financing statements, UCC filings and UCC searches.

9.3.2.3 With each Application for Payment, the Contractor shall submit to the Owner a written list identifying each location where materials are stored off the Project site and the value of materials at each location. The Contractor shall procure insurance satisfactory to the Owner for materials stored off the Project site in an amount not less than their total value and provide acceptable documentation of same.

9.3.2.4 The consent of any surety shall be obtained to the extent required and proof of such provided to the Owner prior to payment for any materials stored off the Project site.

9.3.2.5 Representatives of the Owner, the Program Manager and/or the Architect shall have the right to make inspections of the storage areas at any time.

9.3.2.6 Such materials shall be protected from diversion, destruction, theft and damage to the satisfaction of the Owner and Program Manager, specifically marked for use on the Project and segregated from other materials at the storage facility.

§ 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/or equipment relating to the Work.

§ 9.4 Certificates for Payment

§ 9.4.1 Pay applications will be processed pursuant to Article 5.1.3 of the AIA A132 (2009) Standard Form of Agreement between Owner and Contractor, Program Manager as Advisor Edition, as Amended. If the Architect determines that it should withhold certification in whole or in part as provided in Article 9.5.1 of the A232 General Conditions, as amended, and/or the Program Manager determines that there is reason to reduce the payment due from that submitted by the Contractor, they will notify each other as well as the Owner and the Contractor as to the reasons therefore.

§ 9.4.2 The Architect's issuance of a Certificate for Payment shall be based upon the Architect's evaluation of the Work, review of the draft pay application with the Contractor and the Program Manager, and information provided as part of the Application for Payment. The Architect's certification will constitute a representation that, to the best of the Architect's knowledge, information and belief, the Work has progressed to the point indicated, that the quality of the Work is in accordance with the Contract Documents, and that the Contractor is entitled to payment in the amount certified.

§ 9.4.3 The Program Manager's concurrence that payment is due shall be based upon the Program Manager's evaluation of the Work, review of the draft pay application with the Architect and the Contractor, and the information provided as part of the Application for Payment. The Program Manager's concurrence will constitute a representation that, to the best of the Program Manager's knowledge, information and belief, the Work has progressed to the point indicated and the quality of the Work is in accordance with the Contract Documents. The

concurrence will also constitute a recommendation to the Architect and Owner that the Contractor be paid the amount certified by the Architect.

§ 9.4.4 The representations made pursuant to Sections 9.4.2 and 9.4.3 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 Program Manager or Architect.

§ 9.4.5 The issuance of a separate Certificate for Payment will not be a representation that the Program Manager and Architect have (1) made on-site inspections to check the quality or quantity of the Work, (2) reviewed the Contractor's construction means, methods, techniques, sequences or procedures, and/or (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.

§ 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. Similarly, the Program Manager may determine that there is reason to reduce the payment due from the draft previously submitted by the Contractor and/or withdraw its concurrence. If the Architect is unable to certify payment or the Program Manager is unable to provide its concurrence in the amount of the Application for Payment, the parties will notify each other as well as the Contractor and Owner as provided in Section 9.4.1. If the Contractor, Program Manager and Architect cannot agree on a revised amount, the Architect will promptly issue a Certificate for Payment or a Project 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 or subsequent observations, 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 the acts and omissions described in Section 3.3.2 because of

- .1 defective Work not remedied including Work performed in violation of approved submittals;
- .2 third party claims filed or reasonable evidence indicating probable filing of such claims unless security or other documentation 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 or property owner;
- .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;
- .7 repeated failure to carry out the Work in accordance with the Contract Documents,
- .8 failure of the Contractor to produce manufacturer's certificates, warranties, other closeout documentation required or verification of inspections by OSF, SFM, DHEC, OCRM, SCDOT, IBC Chapter 1 & 17 and any others required by the contract or by entities having jurisdiction over the Project, or
- .9 an incorrectly filled out Application for Payment.

Similarly, the Program Manager may reduce or negate its recommendation for payment to the Owner for the reasons listed above.

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

§ 9.6 Progress Payments

§ 9.6.1 After the Architect has issued a Certificate for Payment or Project 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 Program Manager.

§ 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 General Contractor shall not withhold retention against its subcontractors exceeding that withheld by the Owner attributable to each Subcontractor's progress payment. 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 Program Manager will, on request, furnish to a Subcontractor, if practicable and pursuant to any SC FOIA request, information regarding percentages of completion or amounts applied for by the Contractor and action taken thereon by the Owner, Program Manager and Architect 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, Program Manager 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 Retainage of three and one half percent (3.5%) will be held until Final Payment is made.

§ 9.6.8 If the Owner is entitled to reimbursement or payment from the Contractor under or pursuant to the Contract Documents, such payment shall be made promptly upon demand by the Owner. Notwithstanding anything contained in the Contract documents to the contrary, if the Contractor fails to promptly make any payment due the Owner, or if the Owner incurs any costs and expenses to cure any default of the Contractor or to correct defective Work, the Owner shall have an absolute right to offset such amount against the Contract Sum or any other agreement between the Owner and the Contractor, and may, in the Owner's sole discretion, elect either to (i) deduct an amount equal to that which the Owner is entitled from any payment then or thereafter due the Contractor from the Owner, or (ii) issue a written notice to the Contractor reducing the Contract Sum by an amount equal to that which the Owner is entitled.

§ 9.7 Failure of Payment

If the Program Manager and Architect do not issue a Certificate for Payment, through no fault of the Contractor, within fourteen days after the Program Manager's 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 Program Manager and Architect or awarded by binding dispute resolution, then the Contractor may, upon seven additional days' written notice to the Owner, Program Manager 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.

§ 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 the Owner can occupy or utilize the Work for its intended use, provided, however, that as a condition precedent to Substantial Completion, the Owner has received all certificates of occupancy and any other permits, approvals, licenses and other documents from any governmental authority having jurisdiction thereof necessary for the beneficial occupancy of the Project as well as meeting the requirements of any specification section regarding contract closeout and substantial completion.

§ 9.8.2 See the Agreement and the Specification Sections regarding contract closeout as well as other specification sections that provide additional detail concerning preliminary and prefinal punchlists, commissioning, certification

and inspection procedures and requirements and address closeout documentation, liquidated damages, punchlist liquidated damages and final payment.

§ 9.8.3 When the Contractor considers the Work substantially complete, the Contractor shall notify the Program Manager, and the Contractor and Program Manager shall jointly 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 the list does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents. When the Architect, assisted by the Program Manager, determines that the Work or designated portion thereof is substantially complete, the Architect will prepare, and the Program Manager and Architect shall execute 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.

§ 9.8.4 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 remaining funds less retainage and an adjustment for Work that is incomplete or not in accordance with the requirements of the Contract Documents. This will include a reduction in payment for all outstanding closeout documents and other related closeout items.

§ 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 and Program Manager shall jointly prepare and submit a list to the Architect as provided under Section 9.8.3. 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 after consultation with the Program Manager.

§ 9.9.2 Immediately prior to such partial occupancy or use, the Owner, Program Manager, 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 completion of the Work, the Contractor shall forward to the Program Manager a written notice that the Work is ready for final inspection and acceptance and shall also forward to the Program Manager a final Contractor's Application for Payment. Upon receipt, the Program Manager will evaluate the completion of Work of the Contractor and then forward the notice and Application, with the Program Manager's recommendations, to the Architect who will promptly make a final inspection. When the Architect, finds the Work acceptable under the Contract Documents and the Contract fully performed, the Architect will promptly issue a final Certificate for Payment stating that to the best of its knowledge, information and belief, and on the basis of its 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 and the Program Manager's concurrence with same 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 through the Program Manager (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, including insurance required to remain in effect for one year after final payment, and will not be canceled or allowed to expire until at least 30 days' prior written notice has been given to the Owner, (3) a written statement that the Contractor knows of no substantial reason that the insurance will not be renewable to cover the period required by the Contract Documents, (4) consent of surety, if any, to final payment (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, and (6) unless previously submitted and approved, all closeout documents must be submitted and approved including, but not limited to, warranties, guaranties, record drawings, operations and maintenance manuals, spare parts, etc. as required by the Contract Documents. Further, all start-up, training, and commissioning must be completed to the satisfaction of the Owner, Program Manager and the Architect. Retention will not be released until satisfaction of all items contained in this paragraph.

§ 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 Program Manager and Architect so confirm, the Owner may, upon application by the Contractor and certification by the Program Manager and Architect, and without terminating the Contract, make payment of the balance due for that portion of the Work fully completed and accepted.

§ 9.10.4 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 submission of the final Application for Payment.

§ 9.10.5 Liquidated damages shall be imposed if the Contract Date (computed from the Date of Commencement by adding the Contract Time) is not met as adjusted by Change Order. Punchlist liquidated damages shall be imposed if the punchlist is not 100% complete within thirty (30) days of the date of Substantial Completion.

§ 9.10.6 In addition to the requirements herein, the requirements of Section 017700, 017823, 017836, 017839, 019113 and all other terms of the Contract Documents concerning closeout must be met for final completion and final payment.

§ 9.10.7 The Contractor acknowledges that after the date of Substantial Completion, access to the Project must be scheduled around the school's schedule; accordingly work may be restricted to weekends and after school hours. Time to complete remaining items of Work, correct defective items of work, or otherwise complete the Work on site will not be extended due to restrictions on access to the Project.

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, including a Student Safety Plan that must be prepared for any Project that will be performed on a campus where there are students on the campus during construction. The Student Safety Plan will outline all actions that the Contractor shall require all parties to perform to protect the safety of all students, staff and visitors to the campus. This is in addition to, and separate from, the Contractor's standard safety plan detailed herein. The Contractor shall submit the Contractor's written safety program to the Program Manager for review and coordination with the safety programs of other Contractors. The Contractor shall also submit its Student Safety Plan, if applicable to the Program Manager who shall obtain the concurrence and written approval of each Student Safety Plan by the school principal, as well as the Owner's program manager, risk manager, and school safety manager prior to the start of construction. The original, approved copy of the Student Safety Plan will be kept in the official contract file by the Program Manager.

The Program Manager shall review the safety programs developed by each of the Contractors solely to ensure that each Contractor has an appropriate safety program in place. The Program Manager's responsibilities for review and coordination of safety programs, including any Student Safety Plans, shall not extend to direct control over or charge of the acts or omissions of the Contractors, Subcontractors, agents or employees of the Contractors or Subcontractors, or any other persons performing portions of the Work and not directly employed by the Program

Manager. Nothing in this Agreement shall make the Program Manager responsible for the adequacy or enforcement of any Contractor's safety procedures, which will remain solely each Contractor's responsibility.

§ 10.2 Safety of Persons and Property

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

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

§ 10.2.2 The Contractor shall comply with and give notices required by applicable laws, statutes, ordinances, codes, rules and regulations and lawful orders or other requirements 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 erecting construction fencing, posting danger signs and other warnings against hazards, promulgating safety regulations and notifying owners and users of adjacent sites and utilities. The Contractor shall also be responsible, at the Contractor's sole cost and expense, for all measures necessary to protect any property and improvements adjacent to the Project. Any damage to such property or improvements shall be promptly repaired by the Contractor. Without limiting the indemnity provisions elsewhere in the Contract Documents, the Contractor shall indemnify and hold harmless the Owner from and against any and all claims, actions or damages resulting from damage to such property or improvements.

§ 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. When use or storage of explosives or other hazardous materials or equipment or unusual construction methods are necessary, the Contractor shall give the Owner and Program Manager reasonable advance written notice.

§ 10.2.5 The Contractor shall promptly remedy damage and loss (other than damage or loss insured under property insurance required by the Contract Documents) to property referred to in Sections 10.2.1.2 and 10.2.1.3 caused in whole or in part by the Contractor, a Subcontractor, a Sub-subcontractor, or anyone directly or indirectly employed by any of them, or by anyone for whose acts they may be liable and for which the Contractor is responsible under Sections 10.2.1.2 or 10.2.1.3, except damage or loss attributable to acts or omissions of the Owner, Program Manager or Architect or anyone directly or indirectly employed by any of them, or by anyone for whose acts any 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 Program Manager, and subject to their approval.

§ 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 When weather conditions dictate, or when all or a portion of the Work is suspended for any reason, or when the Contractor is notified to do so in writing by the Owner, the Contractor shall securely fasten down all covering and protect the Work, as necessary, from injury by any cause.

§ 10.2.9 Injury or Damage to Person or Property

The Contractor shall immediately notify the Program Manager of any accidents causing death or personal injury. Further, the Contractor shall promptly notify the Program Manager, in writing, of all accidents arising out of or in connection with the Work that causes death, personal injury, or property damage, giving full details and statements of any witnesses.

§ 10.3 Hazardous Materials

§ 10.3.1 If reasonable precautions will be inadequate to prevent foreseeable bodily injury or death to persons or serious loss to real or personal property resulting from concealed and undisclosed hazardous material or substance (as defined by CERCLA) existing on site, including, but not limited to asbestos or polychlorinated biphenyls (PCB) encountered on the site by the Contractor, the Contractor shall, upon recognizing the condition, immediately stop Work in the affected area and promptly report the condition to the Owner, Program Manager and Architect by telephone and in writing. In addition, the Contractor shall (1) take reasonable precautions to prevent or contain the movement, spread, or disturbance of such materials and to protect persons and property; (2) comply with the Federal Hazard Communications Standards and other applicable environmental laws; (3) indemnify the Owner from claims, damages, losses, costs, expenses and liabilities arising out of or resulting from the presence, uncovering or release of suspected or confirmed hazardous materials to the extent caused by the negligence of, or failure to comply with, the terms and conditions of the Contract Documents by the Contractor or anyone for whom the Contractor is responsible; and (4) properly perform services in connection with decontamination of construction equipment and disposal of contaminated debris or samples.

§ 10.3.2 The Owner shall be responsible for obtaining the services of a licensed laboratory to verify a 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 verify that it has been rendered harmless. Unless otherwise required by the Contract Documents, the Owner shall employ qualified 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 Work in the affected area shall be resumed immediately following the occurrence of any one of the following events: (1) the Owner causes remedial work to be performed that results in the absence of the materials or substance such as asbestos or PCB or; (2) the Owner and the Contractor, by written agreement, decide to resume performance of the Work; or (3) the Work may safely and lawfully proceed, as determined by an appropriate governmental authority or as evidence by a written report to both the Owner and the Contractor which is prepared by an environmental engineer reasonably satisfactory to both the Owner and the Contractor. The Contract time shall be extended appropriately and the Contract Amount increased in the amount of the Contractor's reasonable additional costs of shut-down and start-up, which adjustments shall be accomplished as provided in Article 7.

§ 10.3.3 The Owner shall not be responsible for hazardous materials and substances brought to the site by the Contractor unless such materials or substances were required by the Contract Documents.

§ 10.4 Emergencies

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

ARTICLE 11 INSURANCE AND BONDS

§ 11.1 Contractor's Liability Insurance

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

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

- 8 Claims involving contractual liability insurance applicable to the Contractor's obligations under Section 3.18.

§ 11.1.2 The insurance required by Section 11.1.1 shall be written for not less than limits of liability specified herein or required by law, whichever coverage is greater. Coverages shall be written on an occurrence 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 must be signed by a duly authorized representative of each insurance company, showing compliance with the insurance requirements set forth herein and shall be submitted to the Program Manager for transmittal to the Owner upon execution of this Agreement and thereafter upon renewal, modification or replacement of each required policy of insurance. No work on site may commence until receipt of all insurance certificates required herein that are acceptable 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. When requested by the Owner, the Contractor shall furnish copies of Certificates of Insurance for each subcontractor, which shall comply with all requirements herein.

Further, the Contractor shall immediately provide written notification to the Program Manager of the reduction, cancellation or expiration of any insurance required herein. The Contractor shall provide such written notice immediately upon notice of the reduction, modification, cancellation, or expiration of the insurance, or when it is first aware that the reduction, modification, cancellation or expiration is threatened or otherwise may occur, whichever is first.

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

§ 11.1.5 In no event shall any failure of the owner to receive certified copies or certificates of policies required herein or to demand receipt of such certified copies or certificates prior to the Contractor's commencing the Work be construed as a waiver by the Owner of the Contractor's obligations to obtain insurance as required herein. The obligation to procure and maintain any insurance required by this Agreement is a separate responsibility of the contractor and independent of the duty to furnish a certified copy or certificate of such insurance policies, or evidence of the modification, cancellation or expiration of any of the policies.

§ 11.1.6 The Contractor shall cause each Subcontractor to (i) procure insurance meeting the requirements herein, and (ii) name the Indemnitees as additional insureds under the Subcontractor's comprehensive general liability policy, all satisfactory to the Owner. The additional insured endorsement shall state that coverage is afforded the additional insureds with respect to claims arising out of operations performed by or on behalf of the Contractor. If the additional insureds have other insurance that is applicable to the loss, such other insurance shall be on an excess or contingent basis. The amount of the insured's liability policy shall not be reduced by the existence of such other 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, Program Manager, Architect, 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 the Architect’s, Contractor’s, and Program Manager’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 affect insurance that will protect the interests of the Program Manager, Architect, 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 **The Owner is responsible for providing the Builder’s Risk Policy.**

§ 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.

§ 11.4 **Performance Bond and Payment Bond**

§ 11.4.1 The Contractor shall furnish a Performance Bond and a Labor and Materials Payment Bond meeting all statutory requirements of the State of South Carolina in form and substance satisfactory to the Owner, and, without limitation, complying at a minimum with the following specific requirements:

§ 11.4.1.1 Except as otherwise required by statute, the form and substance of such bonds shall be satisfactory to the Owner in the Owner’s sole judgment.

§ 11.4.1.2 Bonds shall be executed by a reasonable surety licensed in South Carolina with a Best’s rating of no less than “A” and shall remain in effect for a period not less than two (2) years following the date of Substantial Completion or the time required to resolve any items of incomplete Work and the payment of any disputed amounts, whichever time period is longer.

§ 11.4.1.3 The Performance Bond and the Labor and Materials Payment Bond shall each be in an amount equal to the Contract Sum.

§ 11.4.1.4 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 his power of attorney indicating the monetary limit of such power.

§ 11.4.1.5 Every Bond must display the Surety’s bond number. A rider including the following provisions shall be attached to each bond. In the event that the rider is not attached, the following provisions are hereby incorporated by reference within such bonds:

- (1) The surety hereby agrees that it consents to and waives notice of any addition, alteration, omission, change, or other modification of the Contract Documents. An addition, alteration, change, extension of time, or other modification of the Contract Documents, or a forbearance on the part of either the Owner or the Contractor to the other, shall not release the Surety of its obligations hereunder, and notice of the Surety of such matters is hereby waived.

(2) The Surety further agrees that in event of any default by the Owner in the performance of the Owner's obligations to the Contractor under the Contract, the Contractor or the Surety shall cause written notice of such default (specifying said default in detail) to be given to the Owner, and the Owner shall have thirty (30) days from the time after receipt of such notice within which to cure such default, or such additional reasonable period of time as may be required if the nature of such default is such that it cannot be cured within thirty (30) days. Such Notice of Default shall be sent by certified or registered U.S. Mail, return receipt requested, postage prepaid, to the Owner with a certified copy to the Program Manager.

(3) The Surety agrees it is obligated under the bonds to any successor, grantee or assignee of the Owner.

§ 11.4.1.6 Additional Performance and Payment Bonds may be required by the Owner, in the Owner's sole discretion, from any Subcontractor. The Owner shall pay for any premiums charged for obtaining required Subcontractor Bonds by executing a Change Order that shall increase the Contract Sum in an amount equal to such premiums. All such bonds shall be in form and substance satisfactory to the Owner in the Owner's sole judgment.

§ 11.4.1.7 The costs of all bonds furnished hereunder shall be included in the Contract Sum.

§ 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. The Owner shall comply with any and all requirements of SC FOIA concerning such requests directed to the Owner.

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 Program Manager's or Architect's request or to requirements specifically expressed in the Contract Documents, it must, if requested in writing by either, be uncovered for their observation 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 which the Program Manager or Architect has not specifically requested to observe prior to its being covered, the Program Manager or 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 one of the other Contractors in which event the Owner shall be responsible for payment of such costs.

§ 12.2 Correction of Work

§ 12.2.1 Before or After Substantial Completion

The Contractor shall promptly correct Work rejected by the Program Manager or 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 Program Manager's and Architect's services and expenses as well as any other professional fees (including, but not limited to attorneys' fees and costs) made necessary thereby, shall be at the Contractor's expense. If, prior to the date of Substantial Completion, the Contractor, a Subcontractor or anyone for whom either is responsible uses or damages any portion of the Work, including, without limitation, mechanical, electrical, plumbing and other building systems, machinery, equipment or other mechanical device, the Contractor shall cause such item to be restored to "like new" condition at no expense to the Owner. In addition, the Contractor shall promptly remedy damage and loss arising in conjunction with the Project caused in whole or in part by the Contractor, a Subcontractor, or anyone directly or indirectly employed by any of them, or anyone from whose acts they may be liable and for which the Contractor is responsible.

§ 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 within ten (10) days (or sooner if required by conditions) 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. If the Contractor fails to correct nonconforming Work within the ten (10) day period after receipt of notice from the Owner, Program Manager, or Architect, the Owner may correct it in accordance with Section 2.4.

§ 12.2.2.2 The one-year period 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 Upon completion of any Work under or pursuant to this Article 12, the one (1) year correction period in connection with the Work requiring correction shall be renewed and recommence. The obligations under Article 12 shall cover any repairs and replacement to any part of the Work or other property caused by the defective Work.

§ 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 or other Contractors caused by the Contractor's correction or removal of Work that is not in accordance with the requirements of the Contract Documents.

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

§ 12.3 Acceptance of Nonconforming Work

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

ARTICLE 13 MISCELLANEOUS PROVISIONS

§ 13.1 Governing Law

The Contract shall be governed by the laws of the State of South Carolina.

§ 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. The Contractor shall not assign the Contract as a whole without written consent of the Owner. If the Contractor attempts to make such an assignment without such consent, it shall nevertheless remain legally responsible for all obligations under the Contract.

§ 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 current business address indicated herein. Any change in address of a party must be made by written change order.

§ 13.4 Rights and Remedies

§ 13.4.1 Except as expressly provided in the contract Documents, 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, Program Manager, Architect or Contractor shall constitute a waiver of a right or duty afforded them under the Contract, nor shall such action or failure to act constitute approval of or acquiescence in a breach thereunder, except as may be specifically agreed 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 or other requirements 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 Program Manager timely notice of when and where tests and inspections are to be made so that the Program Manager, Owner and 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 Program Manager, 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 Program Manager 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 Program Manager of when and where tests and inspections are to be made so that the Program Manager, Owner and Architect may be present for such procedures. Such costs except as provided in Section 13.5.3, shall be at the Owner's expense.

§ 13.5.3 If such procedures for testing, inspection or approval under Sections 13.5.1 and 13.5.2 reveal failure of the portions of the Work to comply with requirements established by the Contract Documents, all costs made necessary by such failure including those of repeated procedures and compensation for the Program Manager's and Architect's services and expenses shall be at the Contractor's expense. The Contractor also agrees that the cost of testing services required for the convenience of the Contractor in his scheduling and performance of the Work, and the cost of testing services related to remedial operations performed to correct deficiencies in the Work, shall be borne by the Contractor. Materials subject to testing shall be inspected by a testing agency selected by the Contractor and satisfactory to the Owner and Program Manager. The Contractor shall pay the costs of all tests conducted pursuant to laws, ordinances, rules, regulations or orders of any public authority having jurisdiction.

§ 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 Program Manager for transmittal to the Architect.

§ 13.5.5 If the Program Manager, Owner or Architect is to observe tests, inspections or approvals required by the Contract Documents, the Program Manager, Owner or 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 Wherever possible, each provision of this Agreement shall be interpreted in a manner as to be effective and valid under applicable law. If, however, any provision of this Agreement, or portion thereof, is prohibited by law or found invalid under any law, only such provision or portion thereof shall be ineffective, without in any manner invalidating or affecting the remaining provisions of this Agreement or valid portions of such provision, which are hereby deemed severable. To the extent permitted and possible, the invalid or unenforceable term shall be deemed replaced by a term that is valid and enforceable and that comes closest to expressing the intention of such invalid or unenforceable term.

§ 13.7 Each party hereto agrees to do all acts and things and to make, execute, and deliver such written instruments as shall from time to time be reasonably required to carry out the terms and provisions of the Contract Documents.

§ 13.8 The provisions of the Contract Documents shall not be changed, amended, waived or otherwise modified in any respect except by a writing signed by the Owner. No person is authorized on behalf of the Owner to orally change, amend, waive or otherwise modify the terms of the Contract Documents or any of the Contractor's duties or obligations under or arising out of the Contract Documents. Any change, waiver, approval, or consent granted to the Contractor shall be limited to the specific matters stated in the writing signed by the Owner, and shall not relieve the

Contractor of any other duties and obligations under the Contract Document. No “constructive” changes shall be allowed.

ARTICLE 14 TERMINATION OR SUSPENSION OF THE CONTRACT

§ 14.1 Termination by the Contractor

If the Owner fails to make payment of undisputed amounts due within a period of thirty (30) days after receipt of the pay application, the Contractor must provide a written notice to the Owner that payment is due. If the Owner fails to make payment after a seven day period after receipt of that notice and such failure is not due to a disagreement over monies due, then the Contractor may, upon seven additional days’ written notice to the Owner, terminate the Contract and recover from the Owner payment for Work executed, including reasonable overhead and profit, and valid costs incurred by reason of such termination.

§ 14.2 Termination by the Owner for Cause

§ 14.2.1 The Owner may terminate the Contract if the Contractor

- .1 refuses or fails to supply enough properly skilled workers or proper materials;
- .2 fails to make payment to Subcontractors for materials or labor in accordance with the respective agreements between the Contractor and the Subcontractors and the requirements herein;
- .3 disregards applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders or other requirements of a public authority;
- .4 otherwise is guilty of substantial breach of a provision of the Contract Documents;
- .5 breaches any warranty made by the Contractor under or pursuant to the Contract Documents;
- .6 fails to furnish the Owner with assurances satisfactory to the Owner evidencing the Contractor’s ability to complete the Work in compliance with all the requirements of the Contract Documents; or
- .7 fails after commencement of the Work to proceed continuously with the construction and completion of the Work except as permitted under the Contract Documents.

§ 14.2.2 When any of the above reasons exist, the Owner, after consultation with the Program Manager, and upon certification by the Architect that sufficient cause exists to justify such action, may without prejudice to any other rights or remedies of the Owner and after giving the Contractor and the Contractor’s surety, if any, seven days’ written notice, terminate employment of the Contractor and may, subject to any prior rights of the surety:

- .1 Exclude the Contractor from the site and take possession of all materials, equipment, tools, and construction equipment and machinery thereon owned by the Contractor;
- .2 Accept assignment of subcontracts pursuant to Section 5.4; and
- .3 Finish the Work by whatever reasonable method the Owner may deem expedient. After completion of the Work and 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, regardless of the method of completion.

§ 14.2.4 If the unpaid balance of the Contract Sum is less than all costs of finishing the Work, including compensation for the Architect’s and Program Manager’s service and expenses, as well as those of any other professional (including, but not limited to attorney’s fees and court or dispute resolution costs) made necessary thereby, the Contractor shall pay the difference to the Owner. This obligation for payment shall survive termination of the Contract. If the unpaid balance of the Contract Sum is greater than all costs of finishing the Work, including compensation for the services and expenses of the Architect and Program Manager as well as those of other professionals (including, but not limited to attorney’s fees and court or dispute resolution costs) made necessary thereby, the Contractor shall receive payment for Work properly performed by the Contractor for which payment was not made previously; any excess amounts shall be retained by the Owner.

§ 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.

§ 14.4 Termination by the Owner for Convenience

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

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

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

§ 14.4.3 In case of such termination for the Owner's convenience, the Contractor shall be entitled to receive payment for Work executed, and actual costs incurred by reason of such termination, along with reasonable overhead and profit on the Work executed. The Contractor hereby waives and forfeits all other claims for payment and damages, including, without limitation, anticipated profits. The Owner shall be credited for (i) payments previously made to the Contractor for the terminated portion of the Work, (ii) claims that the Owner has against the Contractor under the contract, and (iii) the value of the materials, supplies, equipment, or other items that are to be disposed of by the Contractor that are part of the Contract Sum. All obligations of the Contractor under the Contract with respect to completed Work, including but not limited to all warranties, guarantees and indemnities shall apply to all Work completed or substantially completed by the Contractor prior to a convenience termination by the Owner. Notwithstanding the above, any convenience termination by the Owner or payments to the Contractor shall be without prejudice to any claims or legal remedies that the Owner may have against the Contractor for any cause.

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. A claim must be made by written notice as detailed herein.

§ 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 Architect with a copy sent to the Program Manager provided, however, that the claimant shall use its best efforts to furnish the Program Manager, Architect and the other party, as expeditiously as possible, with notice of any Claim, including, without limitation, those in connection with concealed or unknown conditions, once such Claim is recognized, and shall cooperate with the Program Manager, Architect and the party against whom the Claim is made in any effort to mitigate the alleged or potential damages, delay, or other adverse consequences arising out of the condition that is the cause of the Claim. Claims by either party must be initiated within twenty-one (21) days after occurrence of the event giving rise to such Claim or within twenty-one (21) days after the claimant first recognizes the condition giving rise to the Claim, whichever is later. If the event causing the claim is ongoing, a Claim may also be reserved in writing within the time limits set forth herein. Any notice of claim or reservation of Claim must clearly identify the alleged cause and the nature of the Claim and include data and information then available to the claimant that will facilitate prompt verification and evaluation of the Claim. The Architect will not commence its investigation for a decision until receipt of complete information documenting the claim including the additional time or money sought by the claimant.

§ 15.1.3 Continuing Contract Performance. Pending final resolution of a Claim, except as otherwise agreed in writing, the Contractor shall proceed diligently with performance of the Contract. Unless a DRB review is initiated, the Program Manager will prepare Change Orders in accordance with the decisions of the Architect and payment shall be made pursuant to the terms of this Agreement.

§ 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 10.3. If the Contractor believes additional cost is involved for reasons including but not limited to (1) a written interpretation from the Architect, (2) an order by the Owner to stop the Work where the Contractor was not at fault, (3) a written order for a minor change in the Work issued by the Architect, (4) failure of payment by the Owner, (5) termination of the Contract by the Owner, (6) Owner's suspension or (7) other reasonable grounds, a Claim shall be filed in accordance with the procedure established herein.

§ 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 any cost, if applicable and allowed pursuant to the terms of the Contract Documents, and of probable effect of delay on progress of the critical path 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. Completion time will not be extended for normal adverse weather. The time for completion as stated in the Contract Documents includes due allowance for adverse weather days which will be defined as days that rainfall for the Charleston, SC station and the rain begins to fall prior to 3:00 pm on-site that day. Structural steel activities will include adverse weather days defined as any day rain falls prior to 3:00 pm or days in which excessive wind is present. For the purpose of this agreement, the Contractor agrees that normal adverse weather will be defined and that he will anticipate to lose working days to weather in accordance with the following table:

January – 8 days	July – 9 days
February – 7 days	August 9 days
March – 7 days	September – 7 days
April – 6 days	October – 5 days
May – 6 days	November – 5 days
June – 8 days	December – 6 days

Each time that the Contractor is affected by inclement weather, he must submit notice within forty-eight (48) hours of the occurrence and must document how the contract critical path schedule was actually impacted and delayed. If the actual total number of accumulated working days lost to adverse weather from the start of Work until the building is enclosed exceeds the expected total number of lost working days for the same period (based on the table above), the time for Substantial Completion will be extended by the number of calendar days that the actual number of lost working days exceeds the expected number of lost working days. No extension will be made for days of adverse weather occurring after the building is enclosed. No changes in the Contract Sum will be authorized because of adjustment of Contract Time due to weather.

§ 15.1.6 Claims for Consequential Damages. Notwithstanding any other provision of the Contract Documents, but subject to a duty of good faith and fair dealing (S.C. Code Ann §11-35-30), the Contractor and Owner waive Claims against each other for consequential damages arising out of or relating to this Contract. This mutual waiver includes:

- .1 damages incurred by the Owner for rental expenses, for losses of use, income, profit, financing, business and reputation, and for loss of management or employee productivity or of the services of such persons; and
- .2 damages incurred by the Contractor as determined by the Eichleay formula or otherwise, including those for principal office expenses including the compensation of personnel stationed there, rent, utilities and office equipment, for losses of financing, business and reputation, and for loss of profit.

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.

§ 15.1.7 Waiver of Claims Against the Architect and Program Manager.

Notwithstanding any other provision of the Contract Documents, but subject to a duty of good faith and fair dealing, the Contractor waives all claims against both the Program Manager and Architect and any other design professional who provided design and/or program or construction management services to the Owner, either directly or as independent contractors or consultants to the Architect and/or Program Manager, for Consequential Damages arising out of or relating to this Contract. Consequential Damages are damages incurred by the Contractor for principal office expenses and overhead, (including, but not limited to, the compensation of personnel stationed there, rent, utilities, and office equipment), for losses of financing, business and reputation, and for lost profits.

§ 15.1.8 Waiver of Claims: Final Payment.

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

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

§ 15.2 Decision of the Architect

§ 15.2.1 Claims shall be referred to the Architect for a decision which shall be required as a condition precedent to litigation of a Claim between the Contractor and Owner as to all such matters arising prior to the date final payment is due.

§ 15.2.2 The Architect 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 Architect is unable to resolve the Claim if the Architect lacks sufficient information to evaluate the merits of the Claim or if the Architect concludes that, in the Architect's sole discretion, it would be inappropriate for the Architect to resolve the Claim.

§ 15.2.3 In evaluating Claims, the Architect 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 Architect in rendering a decision. The Architect may request the Owner to authorize retention of such persons at the Owner's expense.

§ 15.2.4 If the Architect 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 Architect when the response or supporting data will be furnished or (3) advise the Architect that no supporting data will be furnished. Upon receipt of the response or supporting data, if any, the Architect will either reject or approve the Claim in whole or in part.

§ 15.2.5 The Architect will render a decision approving or rejecting the Claim, or indicating that the Architect is unable to resolve the Claim. This decision shall (1) be in writing; (2) state the reasons therefor; and (3) notify the parties and the Program Manager of any recommended change in the Contract Sum or Contract Time or both.

§ 15.3 Dispute Resolution Board

§ 15.3.1 **Purpose:** The purpose of the Dispute Resolution Board (DRB) is to provide a fair and equitable resolution to claims under the contract preventing delays to the construction schedule and negative financial impacts to the project.

§ 15.3.2 **Membership:** The DRB shall be comprised of three (3) members who will attend all Monthly Executive Briefings. The three members shall include one selected by the Contractor, one selected by the Owner, and the third selected by agreement of the Owner and Contractor. The member selected by agreement of the Owner and Contractor shall serve as the Chairman. DRB members shall be part of the Monthly Executive Briefings and kept up to date by the Project Team on all aspects of the project in an Executive Team briefing format. The Contractor shall be responsible for any cost or stipend due the member that they appoint. The Owner shall include an Allowance in the Contract for the cost of the member it appoints and the neutral party chosen by the Contractor and the Owner. The appointments to the DRB shall be made within thirty (30) calendar days of the Notice to Proceed and shall cease at Substantial Completion of the last completed project phase, unless outstanding claims exist at that time.

§ 15.3.3 **Function:** If the Owner or Contractor disagrees with the decision of the Architect on a claim, either party may request that the matter be reviewed by the DRB. The review of claims by the DRB after the Architect's decision has been made is an express condition precedent to filing a claim in the Court of Common Pleas. The DRB shall hear the facts, review relevant documents presented, and make a formal written recommendation to the parties in an effort to reach resolution. The DRB recommendation shall be non-binding. Either party may seek further relief by filing a claim in the Court of Common Pleas for Charleston County, South Carolina. Any claim filed in the Court of Common Pleas prior to completion of the DRB review shall be stayed until completion of the DRB review unless such a review is waived by both the Owner and the Contractor in writing.

§ 15.3.4 **Submission and Decisions:** To request a DRB review, the requesting party shall submit a written request briefly describing the dispute to the Chairman of the DRB. A copy of the request shall be forwarded concurrently to the other party and the Program Manager. This request shall be made within fourteen (14) calendar days after issuance of the Architect's decision on a Claim. The Chairman shall convene a meeting of the DRB to hear the

issue within seven (7) calendar days of the request for review. Any written documentation supporting a party's position should be submitted during the review; it will not be accepted by the DRB prior to or after the review. The DRB shall make a written recommendation to the Contractor, Owner, Program Manager and Architect with copies to the Executive Team and Project Team within seven (7) calendar days of the review date.

§ 15.3.5 Actions Taken Based on Review Recommendations The DRB recommendation is a non-binding attempt to help resolve project disagreements prior to the use of traditional dispute resolution methods and is an express condition precedent required prior to filing a claim in the Court of Common Pleas for Charleston County, South Carolina, unless waived by both the Owner and the Contractor in writing.



§ 16 Schedule of Insurance

§16.1 In accordance with Section 11.1, the Contractor (or Subcontractor, or anyone directly or indirectly employed by any of them) will provide and maintain, as a minimum or greater, if required by law, the following types and amounts of insurance:

§16.1.1 Commercial General Liability: Contractor must provide Commercial General Liability insurance using the 1993 ISO Occurrence For (CG 00 01 10/93) or an equivalent form. The Commercial General Liability insurance must include coverage for premises-operations, independent contractors, products-completed operations, personal injury and contractual liability. The contractual liability must include the tort liability of another assumed in a business contract. The Contractor or his agent shall verify that there is no endorsement or modification of the CGL limiting the scope of coverage for liability arising from explosion, collapse or underground property damage. This insurance shall be maintained throughout the duration of the project and for a minimum of one year after final payment as provided for in Article 9.10.2. Limits shall be as follows:

Each Occurrence Limit	
Bodily Injury/Property Damage Liability	\$1,000,000
Personal Injury Liability	\$1,000,000
General Aggregate Limit	\$2,000,000
Products/Completed Operations Aggregate Limit	\$2,000,000

§16.1.2 The General Aggregate Limit is to be written on a “per project” basis using contractor’s per project endorsement Amendment-Designated Construction Project(s) General Aggregate Limit (CG2503). The Project/Completed Operations Aggregate Limit must be at least \$2,000,000 or written confirmation provided that the Commercial Umbrella coverage includes liability coverage for damage to the insured’s completed work equivalent to that provided under the CG 00 01 10/93 coverage form.

§16.1.3 The Owner, Program Manager and Architect are to be named as an additional insured in the Contractor’s policy with respect to this project using the ISO Additional Insured-Owners, Contractors endorsement (CG 20 10) or a substitute providing equivalent coverage. Verification of additional insured status shall be furnished to the Program Manager by providing a copy of the endorsement with the Certificate of Insurance.

§16.1.4 This insurance will apply as primary insurance with respect to any other insurance or self-insurance the Owner may have or elect to carry with respect to this Project.

§16.1.5 Comprehensive Automobile Liability Insurance: Contractor must provide and maintain business auto liability insurance for all owned, non-owned and hired vehicles on ISO form CA 00 01 12/90 or equivalent coverage form with the following limits:

Combined Single Limit	\$1,000,000 per accident (or equivalent “split limits” satisfying Umbrella Excess Liability requirements).
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If necessary, the policy shall be indorsed to provide contractual liability coverage equivalent to that provided in the 1990 and later editions of the ISO CA 00 01 form.

§16.1.6 Workers Compensation: Contractor shall provide and maintain workers compensation and employers liability insurance providing coverage in South Carolina. Limits and coverage shall be as follows:

Workers Compensation Insurance	SC statutory benefits
Employers Liability Insurance	\$500,000 each accident
	\$1,000,000 policy limit
	\$500,000 each employee

If the project involves work which may be subject to the US Longshore and Harborworkers Act (USL&HW), or which may involve watercraft, Contractor will attach the respective endorsements to provide this coverage. USL&HW (WC 00 01 06 A) and Maritime Coverage (WC 00 02 01 A).

§16.1.7 Umbrella Excess Liability: Contractor shall provide umbrella excess liability insurance on an “occurrence” basis providing “following form” coverage for the underlying coverages outlined above with the following limits:

Excess Liability (Umbrella Form)

General Aggregate	\$5,000,000
Each Occurrence	\$5,000,000

§16.1.8 The Owner is responsible for providing the Builder's Risk Policy. The General Contractor is responsible for a Supplemental Policy to cover CCSD's \$100,000 deductible, on all perils. Contractor shall submit proof of such insurance prior to the start of work on site.

§16.1.9 The Contractor shall provide an accurate summary of the policy(s) coverages, exclusions, conditions, and endorsements upon execution of this Agreement. Copies of the actual policies must be submitted to the Owner prior to the commencement of Work on-site but not later than within thirty (30) days of the execution of this Agreement.

§16.1.10 If the Owner is damaged by the failure of the Contractor to maintain insurance as required in this Agreement, then the Contractor will bear all reasonable costs properly attributed to that failure.

ARTICLE 17 MISCELLANEOUS TERMS AND REQUIREMENTS

§ 17.1 DRUG FREE WORK PLACE ACT – Effective January 1, 1991, Title 44 Code of Laws of South Carolina 1976, relating to health, was amended by adding Chapter 107, Contractor shall certify to the School District that it acknowledges and complies with the law (Drug Free Work Place Act). This certification is required to be attached to this Agreement.

§ 17.2 The Table of Articles should include Article 16 Table of Insurance and Article 17 Miscellaneous Terms and Requirements. Amendments to this document have rendered the Index incomplete and inaccurate.



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SCHOOL BUILDING NO. 0734
SECTION 012100**

ALLOWANCES

PART I - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including AIA Documents A132 and A232, as amended, General and Supplementary conditions and other Division-1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section specifies administrative procedural requirements governing handling and processing allowances.
 - 1. Selected materials and equipment, and in some cases, their allowances. Allowances have been established in lieu of additional requirements and to defer selection of actual materials and equipment to a later date when additional information is available for evaluation. Additional requirements, if necessary, will be issued by Change Order.
- B. Types of allowances required include the following:

1. General Contingency Allowance	\$ 450,000.00
2. Dispute Resolution Board Allowance	\$ 10,000.00
3. Fire Alarm System Allowance	\$ 286,000.00
4. Intrusion Detection System Allowance	\$ 40,000.00
5. Energy Management System Allowance	\$1,050,000.00
6. Security Access Hardware Allowance	\$ 175,000.00
7. Door Hardware Punch Allowance	\$ 21,000.00
8. Fencing and Gates Allowance	\$ 375,000.00
- C. Procedures for submitting and handling Change Orders are included in Section 0012600 "Contract Modification Procedures" and Article 7 of the AIA A232 General Conditions of the Contract for Construction.
- D. Inclusion of unit prices is explained in Section 012200 "Unit Prices".

1.3 SELECTION AND PURCHASE

- A. At earliest feasible date after Contract award, advise Program Manager of date when final selection and purchase of each product or system described by allowance must be completed in order to avoid delay in performance of Work.
 - 1. When requested by Program Manager, obtain proposals for each allowance for use in making final selections; include recommendations that are relevant to performance of Work.
 - 2. Purchase products and systems as selected from designated supplier.
- B. Costs Included in Allowances:

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Allowance amounts are complete and include, without limitation, 1) all materials, equipment, labor, delivery, installation, overhead, and profit (with all markups), and 2) any other cost or expense in connection with, or incidental to, the performance of that portion of the Work to which each allowance applies. This includes, but is not limited to, any and all Allowances and Allowance amounts identified by the Owner in the bid documents

- D. Program Manager (in consultation with the Architect) Responsibilities:
1. Consult with Contractor in consideration and selection of products, suppliers and installers.
 2. Select products in consultation with Owner and transmit to Contractor.
 3. Prepare Change Order, if an increase or decrease in price exists from the listed allowance amount.
- E. Contractor Responsibilities:
1. Assist Program Manager in selection of products, suppliers and installers.
 2. Obtain proposals from suppliers and installers and offer recommendations.
 3. On notification of selection by Program Manager, execute purchase agreement with designated supplier and installer.
 4. Arrange for and process shop drawings, product data, and samples. Arrange for delivery.
 5. Promptly inspect products upon delivery for completeness, damage, and defects. Submit claims for transportation damage.

1.4 SUBMITTALS

- A. Submit proposals for purchase of products or systems included in allowances, in form specified for Submittals.
- B. Submit invoices or delivery slips to indicate actual quantities of materials delivered to site for use in fulfillment of each allowance.

1.5 UNUSED MATERIALS

- A. Return unused materials to manufacturer or supplier for credit to Owner, after installation has been completed and accepted.
- B. When not economically feasible to return unused material for credit and when requested by Program Manager, prepare unused material for Owner's storage, and deliver to Owner's storage space as directed. Otherwise, disposal of excess material is Contractor's responsibility.

PART 2 - PRODUCTS (Not Applicable)

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ALLOWANCES

PART 3 - EXECUTION

3.1 INSPECTION

A. Inspect product covered by allowance promptly upon delivery for damage or defects.

3.2 PREPARATION

A. Coordinate materials and installation for each allowance with related construction to ensure that each allowance item is completely integrated and interfaced with related construction activities.

3.3 SCHEDULE OF ALLOWANCES

1. General Contingency Allowance	\$ 450,000.00
2. Dispute Resolution Board Allowance	\$ 10,000.00
3. Fire Alarm System Allowance	\$ 286,000.00
4. Intrusion Detection System Allowance	\$ 40,000.00
5. Energy Management System Allowance	\$1,050,000.00
6. Security Access Hardware Allowance	\$ 175,000.00
7. Door Hardware Punch Allowance	\$ 21,000.00
8. Fencing and Gates Allowance	\$ 375,000.00

END OF SECTION

**MALCOLM C. HURSEY MONTESSORI SCHOOL
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SECTION 012200**

UNIT PRICES

PART I - GENERAL

1.01 SECTION INCLUDES

A. This Section specifies administrative and procedural requirements for unit prices.

1.02 RELATED DOCUMENTS

A. AIA Documents A132 and A232, as amended, Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, and the Technical Specification Divisions 2 through 48 apply to this Section.

1.03 GENERAL DESCRIPTION

A. A unit price is an amount proposed by Bidders and stated on the Bid Form as a price per unit of measurement for materials or services that will be added to or deducted from the Contract Sum by Change Order in the event the estimated quantities or Work required by the Contract Documents are increased or decreased.

B. The unit prices shall include all labor, materials, bailing, shoring, removal, overhead, profit, insurance, etc., to cover the finished work of the kinds called for.

C. Refer to individual Specification Sections for construction activities requiring the establishment of unit prices. Methods of measurement and payment for unit prices are specified in those Sections and as listed on the Form of Proposal.

1. The Owner reserves the right to reject the Contractor's measurement of work-in-place that involves the use of established unit prices, and to have this Work measured by an independent surveyor at the Owner's expense.

PART II – REQUIRED UNIT PRICES

2.01 DESCRIPTION

ITEM	UNIT	COST
Concrete Paving (4" Sidewalks)	SF	_____
Sod, In Place	SF	_____
Hydro Seeding	SY	_____
Imported Top Soil	CY	_____
Concrete Curb & Gutter	LF	_____

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UNIT PRICES

Over-excavate footings by 1-foot and install #57 stone	LF	_____
Unsuitable Soils, Remove, Replace Compact-in-place	CY	_____
Structural fill material using approved offsite borrow	CY	_____
6'-0" Black Vinyl Chain Link Fencing	LF	_____
EARTH EXCAVATION:		
Earth Excavation, Machine	CY	_____
Earth Excavation, Hand	CY	_____
Earth Excavation, Trench	CY	_____
EARTH BACKFILL USING APPROVED OFFSITE BORROW:		
Earth Backfill, Machine	CY	_____
Earth Backfill, Hand	CY	_____
Earth Backfill, Trench	CY	_____

END OF SECTION

**MALCOLM C. HURSEY MONTESSORI SCHOOL
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SECTION 012300**

ALTERNATES

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Description of alternates.
- B. Procedures for pricing alternates.

1.02 RELATED DOCUMENTS

- A. Documents affecting work of this Section include, but are not necessarily limited to, AIA Documents A132 and A232, as amended, General Conditions, Supplementary Conditions, and all applicable Sections in Division 1 of these Specifications.
- B. Document 002113 - Instructions to Bidders: Instructions for preparation of pricing for alternatives.

1.03 ACCEPTANCE OF ALTERNATES

- A. Alternates quoted on Bid Forms will be reviewed and accepted or rejected at Owner's option. Accepted alternates will be identified in the Owner-Contractor Agreement. The Owner may accept any and all Alternates in any order or combination and will determine the low bidder on the basis of the sum of the Base Bid and the Alternate(s) accepted.
- B. Coordinate related work and modify surrounding work to integrate the Work of each alternate.

1.04 PROCEDURES

- A. Provide alternative bids to be added to or deducted from the amount of the Base Bid if the corresponding change in scope is accepted by the Owner.
- B. Include within the alternative bid prices all costs, including materials, submittals, installation, overhead, profit and fees to provide a complete, operable and finished system.
- C. Show the proposed alternative amounts opposite their proper description of the Bid Form.
- D. Refer to Plans and Subparagraph 1.05 of this specification for a description of alternates.

1.05 SCHEDULE OF ALTERNATES

- A. Alternate No. 1: Indicate pricing to add alternate glazing at interior doors and windows as follows:

Alternate 1A: Indicate pricing to add Laminated glazing in lieu of tempered glazing.

Alternate 1B: Indicate pricing to add Windborne-Debris-Impact Resistant glazing in lieu of tempered glazing.

Alternate 1C: Indicated pricing to add Bullet-Resistant Glazing (Level 1) in lieu of tempered glazing.

**ALTERNATES
012300**

**MALCOLM C. HURSEY MONTESSORI SCHOOL
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ALTERNATES

- B. Alternate No. 2: Indicate pricing to provide thin set epoxy terrazzo flooring in Lobby 100 with integral cove base. Epoxy terrazzo to match Sherwin Williams Colors, Matrix: 50% China White, 50% Crystal Glass.
- C. Alternate No. 3: Indicate pricing to add all work associated with the Emergency Responder Radio Repeater and Bi-Directional Antenna system as indicated on plans and in specifications.

END OF SECTION 012300

**MALCOLM C. HURSEY MONTESSORI SCHOOL
SCHOOL BUILDING NO. 0734
SECTION 012600**

CONTRACT MODIFICATION PROCEDURES

PART 1 - GENERAL

1.1 DESCRIPTION

- A. NO EXTRA WORK SHALL BE PERFORMED WITHOUT FIRST RECEIVING WRITTEN APPROVAL FROM THE PROGRAM MANAGER.
- B. Work included: Make such changes in the Work, in the Contract Sum, in the Contract Time of Completion, to any combination thereof, as are described in written Construction Change Directives or written Change Orders signed by the Owner, the Program Manager and the Architect and issued after execution of the Contract, in accordance with provisions of this Section.
- C. Related Work:
 - 1. Documents affecting work of this Section include, but are not necessarily limited to, AIA Documents A132 and A232, as amended, General Conditions, Supplementary Conditions, and Sections in Division 1 of these Specifications.
 - 2. Changes in the Work are described further in Article 7 and other articles of the General Conditions.

1.2 QUALITY ASSURANCE

- A. Include within the Contractor's quality assurance program such measures as are needed to assure familiarity of the Contractor's staff and employees with these procedures for processing Change Order data.

1.3 SUBMITTALS

- A. Make submittals directly to the Program Manager.
- B. Submit the number of copies called for under the various items listed in this Section along with appropriate back-up materials.

1.4 PROCESSING CHANGES INITIATED BY THE OWNER

- A. Should the Owner contemplate making a change in the Work or a change in the Contract Time of Completion, the Program Manager will issue a Proposed Change Order request or a Construction Change Directive to the Contractor.
 - 1. Proposed Change Order requests will describe the contemplated change and will request that the Contractor provide a detailed price and estimate of time that it seeks in the event the change is authorized by the Owner.
 - 2. Construction Change Directives will be dated and will be numbered in sequence.
 - 3. The Construction Change Directives will describe the contemplated change, and will carry one of the following instructions to the Contractor:

CONTRACT MODIFICATION PROCEDURES

012600

**MALCOLM C. HURSEY MONTESSORI SCHOOL
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CONTRACT MODIFICATION PROCEDURES

- a. Make the described change in the Work at no change in the Contract Sum and no change in the Contract Time of Completion in accordance with Paragraph 7.3 of the General Conditions.
 - b. Make the described change in the Work, and provide for a credit or cost to be determined in accordance with Paragraph 7.3.7 of the General Conditions.
- B. If the Contractor has been directed by the Program Manager to make the described change in the Work at no change in the Contract Sum and no change in the Contract Time of Completion, but the Contractor wishes to make a claim for one or both of such changes, the Contractor shall proceed with the change and shall notify the Program Manager as provided for under Article 15.1 of the General Conditions.
- C. If the Contractor has been directed by the Program Manager to make the described change subject to later determination of cost or credit in accordance with Paragraph 7.3 of the General Conditions, the Contractor shall:
- 1. Take such measures as needed to make the change;
 - 2. Consult with the Program Manager and/or Architect and reach agreement on the most appropriate method for determining credit or cost for the change.
- D. If the Contractor has been directed by the Program Manager to promptly advise him as to credit or cost proposed for the described change, the Contractor shall:
- 1. Analyze the described change and its impact on costs and time;
 - 2. Secure the required information and forward it to the Program Manager for review;
 - 3. Meet with the Program Manager and/or Architect as required to explain costs and, when appropriate, determine other acceptable ways to achieve the desired objective;
 - 4. Alert pertinent personnel and subcontractors as to the impending change and, to the maximum extent possible, avoid such work as would increase the Owner's cost for making the change, advising the Program Manager in writing when avoidance no longer is practicable.

1.5 PROCESSING CHANGES INITIATED BY THE CONTRACTOR

If the Contractor recommends a change in the Work, he shall submit a Proposed Change Order with detailed cost and time information as detailed below.

1.6 PROCESSING CHANGE ORDERS

CONTRACT MODIFICATION PROCEDURES

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CONTRACT MODIFICATION PROCEDURES

CONTRACTOR'S ACTIONS

- A. Make written reply to the Program Manager in response to each Proposed Change Order request or Construction Change Directive.
 - 1. State proposed change in the Contract Sum, if any.
 - 2. State proposed change in the Contract Time of Completion, if any.
 - 3. Clearly describe other changes in the Work required by the proposed change or desirable therewith, if any.
 - 4. Include full backup data such as, subcontractor's letter of proposal or similar information.
 - 5. Submit this response in a single copy.

PROGRAM MANAGER'S ACTIONS

- A. When cost or credit for the change has been agreed upon by the Owner and the Contractor, or the Owner has directed that cost or credit be determined in accordance with provisions of Paragraph 7.3 of the General Conditions, the Program Manager will issue a Change Order or Constructive Change Directive to the Contractor.
- B. Change Orders will be dated and will be numbered in sequence.
- C. The Change Order will describe the change or changes, will refer to the Construction Change Directive(s) involved, and will be signed by the Contractor, Owner, the Program Manager and the Architect.
- D. The Program Manager will issue four copies of each Change Order to the Contractor.
 - 1. The Contractor promptly shall sign all four copies and return all four (4) copies to the Program Manager for the Architect's signature.
 - 2. The Program Manager will sign and forward the four copies to the Architect for his signature.
 - 3. The Architect will sign all four copies and return four copies to the Construction Manager for the Owner's signature.
 - 4. The Owner will sign all four copies, retain one copy for his file and return the remaining three copies to the Program Manager who will them forward fully executed copies to the Contractor, Architect and the Office of School Facilities.
- E. Should the Contractor disagree with the stipulated change in Contract Sum, or change in Contract Time of Completion, or both:

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1. The Contractor promptly shall return four copies of the Change Order, unsigned by him, to the Program Manager with a letter signed by the Contractor describing the reason(s) for the Contractor's disagreement.
2. The Contractor's disagreement with the Change Order shall not in any way relieve the Contractor of his responsibility to proceed with the change as ordered under pertinent provisions of the Contract Documents.

END OF SECTION

CONTRACT MODIFICATION PROCEDURES

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CONTRACT MODIFICATION PROCEDURES
CHANGE ORDER SUMMARY

Project: _____ Date: _____
Contractor: _____ Change Order #: _____
CO Description: _____

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CONTRACT MODIFICATION PROCEDURES

DESCRIPTION OF WORK	MATERIALS	LABOR	EQUIPMENT	OTHER	SUB
SUBTOTALS					
			SUBTOTAL		
BREAKDOWN:					
TOTAL LABOR COST					
TOTAL MATERIALS COST					
OTHER:	EQUIPMENT RENTAL/DUMP FEES				
OTHER:	SUB COST				
OTHER:					
SUBTOTAL (A)-PRIME COSTS					
ADMINISTRATIVE COSTS					
SALES TAX AT 9%					
PAYROLL TAX, INSURANCE, FRINGES					
OTHER:	SUPERVISION				
OTHER:	PROJECT MANAGER				
SUBTOTAL (B) - ADMINISTRATIVE COSTS					
SUBTOTAL (A) + SUBTOTAL (B)					
TOTAL GENERAL CONTRACTOR COST					
TOTAL SUB COST					
OVERHEAD AND PROFIT AT 15% ON SELF-PERFORMED WORK					
OVERHEAD AND PROFIT 7% ON SUB WORK					
TOTAL CHANGE ORDER COST:					
			GRAND TOTAL		
TIME EXTENSION REQUESTED:					
COMMENTS:					

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PAYMENT PROCEDURES

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Work included: Comply with procedures described in this Section when applying for progress payment and final payment under the Contract.

- B. Related Work:
 - 1. Documents affecting work of this Section include, but are not necessarily limited to, AIA Documents A132 and A232, as amended, General Conditions AIA 232-2018 Article 9, Supplementary Conditions and Sections in Division 1 of these Specifications.
 - 2. The Contract Sum and the schedule for payments are described in the Form of Agreement, AIA A132 as amended.
 - 3. Payments upon Substantial Completion and Completion of the Work are described in the AIA A232, General Conditions, as amended and in Division I of these Specifications, including - General Requirements – 017700 Execution and Closeout Procedures.
 - 4. The Program Manager's and Architect's approval of applications for progress payment and final payment is contingent upon the Program Manager's and Architect's approval of status of Project Record Documents pursuant to the requirements of Section 017839 and the AIA A232 General Conditions, as amended.
 - 5. The Program Manager's and Architect's approval of applications for progress payment is contingent upon receipt of Project Schedule updates, properly cost loaded if required, to be submitted along with each pay application as described in Section 013201 Project Schedule and the AIA A132 and A232, as amended.

1.2 QUALITY ASSURANCE

- A. Prior to approval of payment application Number One, secure the Program Manager's approval of the Project Schedule Section 013201, Submittal Schedule Section 013300 Submittal Procedures, and Schedule of Values Section 012973 of these Specifications.

- B. During progress of the Work, modify the Schedule of Values as approved by the Program Manager to reflect changes in the Contract Sum due to Change Orders or other modifications of the Contract.

- C. Base requests for payment on the approved Schedule of Values.

- D. Payment Application Times: Each progress payment date is as indicated in the Agreement. The period of construction Work covered by each Application or Payment is the period indicated in the Agreement.

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PAYMENT PROCEDURES

- E. Application Preparation: complete every entry on the form, including notarization and execution by person authorized to sign legal documents on behalf of the Contractor. Incomplete applications will be returned without action.

1.3 SUBMITTALS

- A. Formal Submittal: Unless otherwise directed by the Program Manager:
 - 1. After review of the draft payment application by the Contractor, Program Manager and Architect, submit a formal submittal of the request for payment by filling in all appropriate information, by typewriter or neat lettering in ink, on AIA Document G702, "Application and Certificate for Payment", plus Continuation Sheets, AIA Document G703, using data from the Schedule of Values and the accompanying cost loaded schedule, if applicable. Submit other supporting documentation required by the Program Manager as detailed by the AIA A132 and A232 including, but not limited to lien waivers, Consent of Surety, etc.
 - 2. Sign and notarize the Application and Certificate for Payment.
 - 3. Unless instructed by the Program Manager to submit pay applications electronically via CMiC, submit the original of the Application and Certificate for Payment, plus three (3) identical copies of the entire Application including all continuation sheet or sheets, to the Program Manager. All copies shall bear original signatures and original notarizations.
 - 4. The Program Manager will review the formal submittal and, upon agreement, will distribute:
 - a. Three copies to Architect for Approval and Signature.
 - b. After approval of Architect who will retain one copy, the Program Manager will retain one copy and transmit one copy to the Owner.
 - 5. Request for Payment against any change order will not be honored until the change order is signed by all appropriate parties.
- B. Application for Payment at Substantial Completion: Following issuance of the Certificate of Substantial Completion, submit an Application for Payment; this application shall reflect any Certificates of Partial Substantial Completion issued previously for Owner occupancy or designated portions of the Work.

Administrative actions and submittal that shall proceed or coincide with this application include:

- 1. Occupancy permits and similar approvals.
- 2. Warranties (guarantees) and maintenance agreements.
- 3. Test/adjust/balance records.
- 4. Maintenance instructions.
- 5. Start-up performance reports.
- 6. Change-over information related to Owner's occupancy, use operation and maintenance.
- 7. Final cleaning.

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PAYMENT PROCEDURES

8. Application for reduction of retainage and consent of surety.
 9. Advice on shifting insurance coverages and proof of the continuation of required insurance coverage.
 10. Punch list of incomplete Work, recognized as exception to Architect's Certificate of Substantial Completion (area by area).
 11. Change of door locks to Owner's access keys.
 12. Satisfactory completion of training, commissioning, etc.
 13. Any other items requested by the Program Manager including release of liens/claims from subcontractors/suppliers, etc.
- C. Final Payment Application: In conjunction with the requirements of administrative actions and submittals which must precede or coincide with submittal of the final payment Application for Payment include the following:
1. Completion of Project closeout requirements.
 2. Completion of items specified for completion after Substantial Completion.
 3. A final release which indicates no further claims will be submitted against this contract.
 4. Assurance that Work is complete.
 5. Transmittal of required Project Construction Records to Owner including all record documents.
 6. Proof that all taxes, fees and similar obligations have been paid.
 7. All required lien releases/waiver of claims from subcontractors, suppliers and other vendors.
 8. Consent of Surety.

END OF SECTION

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SCHEDULE OF VALUES

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Work included: Provide a detailed breakdown of the agreed Contract Sum showing values allocated to each of the various parts of the Work, as specified herein and in other provisions of the Contract Documents.

- B. Related Work:
 - 1. Documents affecting work of this Section include but are not necessarily limited to AIA A132 and A232, as amended, General Conditions, Supplementary Conditions, and Sections in Division 1 of these Specifications.

 - 2. Schedule of Values is required to be compatible with the continuation sheet, accompanying applications for payment, as described in Section 012900 – Payment Procedures as well as schedule cost loading if required by Section 013201 – Project Schedule.

1.2 QUALITY ASSURANCE

- A. Use required means to assure arithmetical accuracy of the sums described.

- B. When so required by the Program Manager and/or Architect, provide copies of the subcontractor's Schedule of Values or other data acceptable to the Program Manager and/or Architect, substantiating the sums described.

1.3 SUBMITTALS

- A. Format and Content: Use the Project Manual Table of Contents as a guide to establish the format for the Schedule of Values.
 - 1. Identification: Include the following Project identification on the Schedule of Values:
 - a. Project name and location.
 - b. Name of the Architect.
 - c. Project number.
 - d. Contractor's name and address.
 - e. Date of submittal.

 - 2. Arrange the Schedule of Values in a tabular form with separate columns to indicate the following for each item listed for each construction phase:
 - a. Generic name.
 - b. Related Specification Section.
 - c. Name of subcontractor.
 - d. Name of manufacturer or fabricator.

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SCHEDULE OF VALUES

- e. Name of supplier.
 - f. Dollar value.
 - g. Percentage of Contract Sum to the nearest one-hundredth percent, adjusted to total 100 percent.
- 3. Provide a breakdown of the Contract Sum in sufficient detail to facilitate continued evaluation of Applications for Payment and progress reports. Break principal subcontract amounts down into several line items.
 - 4. Round amounts off to the nearest whole dollar; the total shall equal the Contract Sum.
 - 5. For each part of the Work where an Application for Payment may include materials or equipment, purchased or fabricated and stored, but not yet installed, provide separate line items on the Schedule of Values for initial cost of the materials, for each subsequent stage of completion, and for total installed value of that part of the Work.
 - 6. Allowances: Show line item value of each allowance noted in Section 012100 Allowances.
 - 7. Overhead Coordination Drawings: Provide a line item value for Overhead Coordination Drawings.
 - 8. Margins of Cost: Show line items for indirect costs, and margins on actual costs, only to the extent that such items will be listed individually in Applications for Payment. Each item shall be complete including its total cost and proportionate share of general overhead and profit margin.
 - a. Temporary facilities and other major cost items that are not direct cost of actual work-in-place shall be shown as separate line items in the Schedule of Values.
 - 9. Schedule Updating: Update the Schedule of Values when Change Orders or Construction Change Directives result in a change in the Contract Sum.
- B. Prior to first application for payment, submit a proposed schedule of values to the Program Manager.
- 1. Meet with the Program Manager and determine additional data, if any required to be submitted.
 - 2. Secure the Program Manager's approval of the schedule of values prior to submitting first application for payment. NO APPLICATIONS FOR PAYMENT WILL BE PROCESSED PRIOR TO APPROVAL OF THE SCHEDULE OF VALUES, as well as other submittals required by contract to accompany payment applications.
 - 3. AIA Form G703 and "Form A" provided by the Program Manager shall be submitted with all columns and spaces completed.

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SCHEDULE OF VALUES

END OF SECTION

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SECTION 013119**

PROJECT MEETINGS

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Work included: Various project meetings will be conducted throughout the construction period to enable orderly review during progress of the Work, to provide for systematic discussion of problems, to provide for efficient dispute resolution and to coordinate all phases of the Project toward completion in accordance with the Contract Documents.

- B. This Section specifies administrative and procedural requirements for project meetings including, but not limited to:
 - a. Pre-construction conferences.
 - b. Weekly Project meetings.
 - c. Quality Control Meetings.
 - d. Pre-installation conferences.
 - e. Informal jobsite meetings (no minutes required)
 - f. Toolbox safety meetings (no minutes required)
 - g. Executive Meeting.

1.2 QUALITY ASSURANCE

- A. Each person designated by the Contractor to attend and participate in these project meetings must have proper authority to commit the Contractor to actions agreed upon in the project meetings. Any change in personnel by a Contractor will be forwarded in writing to the Program Manager prior to the change.

1.3 SUBMITTALS

- A. Agenda Items: To the maximum extent practicable, advise the Program Manager and Architect/Engineer in writing at least 24 hours in advance of project meetings of agenda items proposed by the Contractor.

- B. Minutes:
 - 1. Unless indicated otherwise, the Program Manager will compile minutes for Pre-construction conference, Weekly Project Meetings and Executive meetings, and will furnish one copy to the Contractor, Architect/Engineer(s) and required copies to the Owner. The Contractor may make and distribute such other copies as appropriate.

 - 2. The Contractor's Quality Control Officer will compile minutes for Quality Control Meetings and Pre-installation Meetings. The QC Officer will furnish one copy to the Program Manager and Architect.

PART 2 - PRODUCTS

(No products are required in this Section)

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PROJECT MEETINGS

PART 3 - EXECUTION

3.1 MEETING SCHEDULE

- A. The preconstruction conference will be held prior to the start of work on site and within 15 working days of the Notice to Proceed.
- B. Informal job site meetings with on-site job superintendents will be held daily or on an as needed basis. Contractor safety meetings will be held on a weekly basis, at a minimum.
- C. Formal project meetings with attendance of the Prime Contractor's office Project Manager and Superintendent will be held weekly.
- D. Pre-installation and other quality control meetings will be held as requested by the Program Manager or Contractor prior to installation of specific items or as required by the contract specifications.
- E. Coordination meetings will be held as requested by the Program Manager or Contractor prior to any project work requiring coordination with the Owner, Contractor, subcontractors, governmental agencies or suppliers of specific items or as required by the contract specifications.
- F. Executive Briefings will be held on a monthly basis.
- G. Dispute Resolution Board meetings shall be held as requested by the parties to the Contract. Members of the DRB will attend all monthly Executive Briefings.
- H. Coordinate as necessary to establish a mutually acceptable schedule for all meetings.

3.2 MEETING LOCATION

- A. The Program Manager will establish meeting location. To the maximum extent practicable, meetings will be held at the job site.

3.3 PRECONSTRUCTION MEETING

- A. A Preconstruction Meeting will be scheduled to be held within 15 working days after the Owner has issued the Notice to Proceed.
 - 1. Provide attendance by authorized representatives of the Prime Contractor and major subcontractors, at the Contractor's discretion.
 - 2. The Program Manager will advise other interested parties, including the Owner, and request their attendance, as necessary.
- B. Minimum Agenda: Data will be distributed and discussed on at least the following items:
 - 1. Organizational arrangement of Prime Contractor's forces and personnel, and identification

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PROJECT MEETINGS

of major subcontractors, material suppliers, Program Manager, and Architect.

2. Channels and procedures for communication.
3. Construction schedule, including sequence of critical work.
4. Contract Documents, including distribution of required copies of original Documents and revisions.
5. Processing of Shop Drawings and other data submitted to the Program Manager for transmittal to Architect for review.
6. Processing of Bulletins, field decisions, CCDs, Change Orders, and Payment Applications.
7. Rules and regulations governing performance of the Work;
8. Procedures for safety and first aid, security, quality control, housekeeping and related matters.
9. Preparation of record drawings.
10. Use of the premises.
11. Office, work and storage areas.
12. Equipment deliveries and priorities.
13. Working hours.
14. Request for Information format.
15. Notification of Defective and Non-Conforming Work format.
16. Rejection of Work format.
17. Inspection Procedures
18. Quality Control
19. CMiC

3.4 PROJECT MEETINGS

A. Attendance:

1. To the maximum extent practicable, assign the same person or persons to represent the Prime Contractor at project meetings throughout progress of the Work.

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PROJECT MEETINGS

2. Conduct progress meetings at the Project site on a weekly basis, or more frequently if necessary. Notify the Program Manager and Architect of scheduled meeting dates. Coordinate dates of meetings with preparation of the payment request.
 3. Attendees: In addition to representatives of the Owner and Architect, each subcontractor, supplier or other entity concerned with current progress or involved in planning, coordination or performance of future activities shall be represented at the meetings by persons familiar with the Project and authorized to conclude matters relating to progress.
- B. Minimum Agenda:
1. Review, revise as necessary, and approve minutes of previous meetings.
 2. Review progress of the Work since last meeting, including status of submittals for approval. Determine where each activity is in relation to the Contractor's Construction Schedule, whether on time or ahead or behind schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Review of Project Superintendent and Quality Control Manager's daily reports since the last Project Meeting.
 3. Identify problems that impede planned progress.
 4. Develop corrective measures and procedures to regain planned schedule.
 5. Complete other current business.
 6. Review Quality and work standards, updated as-built documents, and record documents as required.
 7. Schedule Updating: Revise the "look ahead" construction schedule after each progress meeting where revisions to the schedule have been made or recognized. The Contractor shall issue the revised "look ahead" schedule concurrently with the report of each meeting.
 8. Review the present and future needs of each entity present, including such items as:
 - a. Interface requirements.
 - b. Time.
 - c. Sequences.
 - d. Deliveries
 - e. Off-site fabrication problems.
 - f. Access.
 - g. Site utilization.
 - h. Temporary facilities and services.
 - i. Hours of work.
 - j. Hazards and risks.
 - k. Cleaning and site conditions.

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PROJECT MEETINGS

- l. Change Orders.
 - m. Documentation of information for payment requests.
 - n. Critical submittals.
 - o. Critical RFI's.
 - p. Quality Control
- C. Revisions to minutes:
 - 1. Unless published minutes are challenged in writing prior to the next regularly scheduled progress meeting, they will be accepted as properly stating the activities and decisions of the meeting.
 - 2. Persons challenging published minutes shall reproduce and distribute copies of the challenge to all indicated recipients of the particular set of minutes.
 - 3. Challenge to minutes shall be settled as priority portion of "old business" at the next regularly scheduled meeting.
- D. Reporting: No later than three (3) days after each progress meeting date, the Program Manager will distribute copies of minutes of the meeting to the Contractor, Architect/Engineer(s), and Owner.

3.5 MONTHLY EXECUTIVE BRIEFINGS

- A. Attendance:
 - 1. To the maximum extent practicable, assign the same person or persons to represent the Project Team and Executive Team at the monthly Executive Briefings throughout progress of the Work.
 - 2. Conduct Executive Briefings at the Project site on a monthly basis. The Program Manager will notify the Contractor, the Architect and the staff of the School District of scheduled meeting dates. The purpose of these meetings is for the Executive Team to view the operation and progress of the project. The managers should be concise in presenting facts and keep discussions to a minimum that can be later directed for presentation at weekly project meetings.
 - 3. Attendees: The following shall attend the meetings:
 - The Project Team consisting of:
 - a. the Contractor's Project Manager,
 - b. the Architect's field supervisor, and,
 - c. the Program Manager.
 - The Executive Team consisting of:
 - a. the CCSD Executive Director of Capital Programs
 - b. a principal of the Contractor's firm,

PROJECT MEETINGS

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- c. a principal of the Architectural firm, and a principal of the Program Management firm.

B. Minimum Agenda:

1. Review, revise as necessary, and approve minutes of previous meetings.
1. Review progress of the Work since last meeting with a presentation by the Project Team to the Executive Team, including:

Schedule

- a. Contractor presentation of the Contractor's Construction Schedule, including work accomplished to date and work anticipated in a Primavera two (2) month look ahead. Provide hard copies of the two (2) month look ahead with an exception report that lists activities with less than ten (10) days float to notify the Teams of items that are close to being inserted on the Critical Path.
- b. Contractor, Program Manager and Architect/Engineers to present an overall assessment of schedule progress.

Quality Control

- a. The Contractor's Quality Control Officer shall address significant QC/QA issues in two (2) month look ahead and on work accomplished.
- b. The Program Manager shall address QA issues.
- c. Contractor, Program Manager and Architect/Engineers shall make an overall assessment of the QC/QA effort.

Safety

- a. Contractor Safety Manager shall address significant safety issues in two (2) month look ahead and lost time data on work accomplished.
- b. Program Manager shall address the adequacy of the Safety Program.
- c. Contractor, Program Manager and Architect/Engineers shall make an overall Safety assessment.

Contract Administration

- a. Program Manager and Architect/Engineers shall present the status of RFIs, Submittals, Change Orders, Dispute Review Requests, Claims and Pay Applications. Information shall include open/delinquent items and turnaround times. Web-based management software information shall be used to present data.
- b. Program Manager and Architect/Engineers shall address past due submittals, cost proposals for change orders and any negotiations necessary to finalize change orders.
- c. Contractor to identify areas where Program Manager or Architect/Engineers need to improve turn around on critical items.

Job Site Tour

- a. Contractor shall arrange a job site tour to view progress, to observe the QC/QA functions, to view the safety conditions of the site and observe job site cleanliness.

END OF SECTION

**PROJECT MEETINGS
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PROJECT SCHEDULE

1.0 GENERAL

The Contractor shall prepare, maintain and update a schedule prepared using only, Primavera Project Planner Software by Primavera Systems, Inc. (P6) as a means of project control and decision making for the project. The P6 Schedule shall be prepared in such a manner as to permit the orderly planning, organization and execution, to avoid conflict and ensure the orderly progress of work. The schedule shall be sufficiently detailed to accurately depict all the work required by the Contract. The P6 schedule shall be updated and revised as necessary no less than monthly and shall accurately reflect and report the actual performance and progress of the work in accordance with Section 013201 Project Schedule.

1.1 SUBMITTALS

The following shall be submitted in accordance with the paragraph herein titled "Submittal Procedures," Section 7.0 SCHEDULE SUBMISSION, and as required in Article 3.10 of the General Conditions of the Contract for Construction AIA Document A232 – 2009 as amended, and Division I Sections.

1.1.1 Schedules

- a. P6 Project Schedule (Target Schedule).
- b. Monthly Schedule Updates
- c. Look ahead Schedules as required by the Program Manager

1.2 QUALIFICATIONS

- a. Scheduling Consultant: Engage a consultant to provide planning, evaluation, and reporting using CPM scheduling.
- b. In-House Option: Owner may waive the requirement to retain a consultant if Contactor employs skilled personnel with experience in CPM scheduling and reporting techniques. The Scheduler shall have previously developed, created and maintained at least 5 previous computerized schedules of similar size and complexity of this contract. A resume outlining the qualifications of the Scheduler shall be submitted for acceptance by the Program Manager. If at a later date, the Program Manager, with concurrence of the Owner, notifies the Contractor that the Contractor's Scheduler is objectionable, the Contractor will propose a new Scheduler in writing, meeting the qualification requirements. Payments will not be processed until an acceptable Scheduler is provided.

2.0 EXECUTION

2.1 GENERAL

Pursuant to the requirements of the Contract Documents, a Project schedule as described below shall be prepared. The scheduling of construction shall be the responsibility of the Contractor. Contractor management personnel shall actively participate in its development and maintenance.

Subcontractors and suppliers working on the project should also contribute in developing and maintaining an accurate Project Schedule. The approved Project Schedule shall be used for project management and Coordination, to measure the progress of the work, to aid in evaluating time extensions, and to provide the basis for all progress payments.

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PROJECT SCHEDULE

2.2 BASIS FOR PAYMENT

The schedule shall be the basis for measuring contractor progress. Lack of an approved schedule shall result in the inability of the Program Manager and Architect to evaluate the Contractor's progress for the purpose of payment. The Contractor shall provide the necessary schedule and cost reports for review and agreement of invoice quantities. No progress payments will be made until the schedule and other documents as required have been approved by the Program Manager.

2.2.1 Payment

Each pay application should correlate to the latest schedule update. No pay applications will be processed without the schedule update as well as other required submittals.

3.0 PRELIMINARY MEETING

3.1 PRELIMINARY MEETING

If requested by the Program Manager, participate in a preliminary meeting to discuss the proposed schedule requirements prior to submission of the schedule.

4.0 PROJECT SCHEDULE

4.1 PROJECT SCHEDULE REQUIREMENTS

The Contractor shall provide a detailed Primavera Schedule within thirty (30) calendar days of contract award. The Contractor shall provide a Primavera Schedule that has incorporated all requirements of the specifications. Failure of the Contractor to meet the requirements of this specification shall result in the disapproval of the schedule.

4.2 USE OF CRITICAL PATH METHOD

The Primavera Schedule of network calculation shall be used to generate the Project Schedule. The P6 Schedule will show the order and interdependence of activities and the sequence in which the work is to be accomplished as planned. The basic concept of a P6 schedule is to show how the start of any given activity is dependent on the completion of preceding activities and how its completion restricts or restrains the start of following activities. The following Criteria will be utilized by the Owner's Representative to determine the acceptability of the Project Schedule.

4.2.1 Critical Sequence

The project critical path shall provide a realistic and uninterrupted sequence of activities to achieve project completion in a timely manner as required by the Contract Documents.

4.2.2 Constructability

The project schedule must represent a realistic sequence of construction activities.

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4.3 SCHEDULE REQUIREMENTS

The project schedule shall include an appropriate level of detail. Failure to develop or update the Project schedule or provide data to the Program Manager at the appropriate level of detail, as specified by the Program Manager, shall result in the disapproval of the schedule.

Failure by the Contractor to include any element of work required for performance of the Contract shall not excuse the Contractor from completing the Work within the Contract Time and/or any Contract Milestone Date.

Seasonal weather conditions shall be considered and included in the planning and scheduling of all work influenced by high or low ambient temperatures, wind and/or precipitation to ensure completion of all Work within the Contract Time. Completion time will not be extended for normal adverse weather. The time for completion as stated in the Contract Documents includes due allowance for adverse weather day which will be defined as days that rainfall for the Charleston, SC station and the rain begins to fall prior to 3:00 pm on-site that day. Structural steel activities will include adverse weather days defined as any day rain falls prior to 3:00 pm or days in which excessive wind is present. For the purpose of this agreement, the Contractor agrees that normal adverse weather will be defined and that he will anticipate losing working days to weather in accordance with the following table:

January – 8 days	July – 9 days
February – 7 days	August 9 days
March – 7 days	September – 7 days
April – 6 days	October – 5 days
May – 6 days	November – 5 days
June – 8 days	December – 6 days

4.3.1 Activity Durations

Contractor submission shall use reasonable activity durations. Reasonable durations are those that allow the progress of activities to be accurately determined between payment periods (no more than 5 percent of all non-procurement activities original durations shall be greater than 15 work days).

4.3.2 Submittal and Material Procurement Activities

In addition to construction activities, the P6 schedule shall include the submittal and approval of materials, samples, and shop drawings, the procurement of critical and long lead-time materials and equipment. Schedule submittal activities shall allow sufficient time for material to be procured and installed even if the submittal is unacceptable, and re-submittal is required.

Coordinate transmittals of different types of submittals for related elements of the work so processing will not be delayed by need to review submittals concurrently for coordination.

4.3.3 Owner Activities

Owner and other agency activities shall be shown. These activities include, but are not limited to, approvals, inspections, utility tie-ins, and owner furnished equipment. A minimum of a fifteen (15) calendar day duration

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will be allowed for processing, approval and return of submittal, samples and shop drawings where approval is required.

4.3.4 Administrative Activities

The Contractor shall include a level of activity detail to adhere to required administrative procedures, but not limited to, preparing schedules, safety plans, permits, inspections/surveys, installing and removing temporary facilities/utilities, pre-installation meetings, pour notifications, start-up/testing, Sub Contractor/Project closeout, and training of personnel.

4.3.5 Project Milestones

Project milestones shall be included in the schedule to indicate key project and construction milestones including interim completion, final completion and construction assigned milestones. Phase completion dates, if contained in this contract, must be included as project milestones.

4.3.6 Contract Specifications

The project Schedule shall include a level of activity detail to adhere to contract specifications (i.e. permit, notification, specified sequence of work, cure times, and required test and inspection points.)

4.4 SCHEDULE PROJECT COMPLETION

The schedule interval shall extend from the Notice to Proceed to the Contract Completion date.

4.5 SCHEDULE LOGIC

The schedule logic shall indicate a level of interdependency to indicate how the completion of one activity initiates the start of succeeding activities.

4.5.1 Negative Lags

Lag durations contained in the project schedule shall not have negative value.

4.5.2 Activities Ties

As a minimum, all activities with the exception of the start milestone and final completion milestone must have at a minimum one proceeding relationship tie and one succeeding relationship tie.

4.6 Cost Loading

The schedule shall be cost loaded, and meet the following criteria:

- a. Cost loaded schedule must correlate with the Schedule of Values.
- b. All construction activities shall be cost loaded and represent realistic costs and be consistent throughout the schedule.
- c. Include receipt of material with estimated procurement cost for major items for which payment of material will be requested.

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4.7 ACTIVITY CODING

At a minimum, all activities will be coded to identified activity type, work area, phase, work type and responsibility. The assigned code structure must be incorporated into the schedule along with any other coding that the contractor deems necessary.

4.8 ACTIVITY CALENDARS AND WORK PERIODS

The Project Schedule shall indicate the contractor's intended work schedule.

4.9 SCHEDULE ABBREVIATIONS

The contractor shall clearly explain abbreviations used in the CPM schedule in a legend of symbols either separate or attached to the schedule.

5.0 PROJECT SCHEDULE SUBMISSION AND APPROVAL

5.1 PROJECT SCHEDULE SUBMISSION AND APPROVAL

The Contractor shall provide the submissions as described below. The data disk, program, reports, and network diagrams required for each submission are contained in Section 7.0 SCHEDULE SUBMISSION.

5.2 PROJECT SCHEDULE

The Project Schedule shall be submitted for approval within thirty (30) calendar days after Notice to Proceed. The schedule shall provide reasonable sequence of activities that represent work through the entire project and shall be at a reasonable level of detail. The Contractor and major Subcontractors shall review the CPM schedule prior to final submittal.

5.2.1 Review and Evaluation

The Contractor shall participate in a meeting to discuss, review and evaluate the proposed schedule and reports with the Program Manager. Revisions necessary as a result of this review shall be resubmitted for approval by the Program Manager within seven Calendar days after the Conference. Allow seven days for the Program Manager review.

5.2.2 Approved Schedule

Once the Program Manager approves the schedule, the schedule will then be considered "frozen" and then be classified as the "target schedule." The target schedule will be the baseline to analyze all changes. The approved schedule shall then be the schedule to be used by the Contractor for planning, organizing and directing the work, reporting the progress and requesting payment for work accomplished.

Upon establishment of a Target schedule, the Contractor shall sign on the face of the Construction Schedule documents, which shall then indicate the Contractor's acceptance and approval of the Construction Schedule.

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Acceptance by the Owner of the Contractor's Construction Schedule will be a condition precedent to the making of any progress payments under the Contract. The Owner will notify the Contractor in writing of acceptance of the Construction Schedule.

5.3 SCHEDULE UPDATES

Once the schedule is approved, the monthly schedule update will begin within 30 days.

5.3.1 Pay Application

Schedule updates shall be submitted with each pay application. The pay application will not be approved until an approved schedule update is submitted as well as other required submittals. See Section 2.2: BASIS FOR PAYMENT.

5.3.2 Progress Reporting

The Contractor and the Contractor's Scheduler must, at a minimum, attend monthly progress meetings to report project schedule status and upcoming work status.

6.0 SCHEDULE UPDATES

6.1 SCHEDULE UPDATES

The Contractor shall submit schedule updates every month through project completion. These submissions shall enable the Program Manager to assess Contractor's progress. If the Contractor fails or refuses to furnish the information and project schedule data, which, in the judgment of the Program Manager and/or Architect, is necessary for verifying the Contractor's progress, the Contractor shall be deemed not to have provided adequate information upon which progress payment may be made.

6.2 PROJECT COMPLETION

Project completion and interim completions shall be easily identified and based on early completion date. Calculation on project updates shall be such that if the early finish of the last activity falls after the contract completion date, then the float calculation shall reflect a negative float on the critical path.

6.2.1 Late Completions

If negative float exists and is over 14 calendar days, then a recovery schedule will be prepared to reflect how the contractor intends to recover the lost time per Section 6.5 RECOVERY SCHEDULE. Payment requests may be reduced or withheld until CPM schedule is brought back into compliance with contract requirements.

6.3 OUT OF SEQUENCE PROGRESS

Activities that have posted progress without predecessors being completed (Out-of-Sequence Progress) will be allowed only on a case-by-case approval by the Program Manager. The Program Manager may direct that changes in schedule logic be made to correct any or all out-of-sequence work.

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6.4 SCHEDULE REVISIONS

If a major change in scope of work, sequencing means or methods or some other factor that makes the baseline schedule obsolete occurs, the Contractor shall submit the revised plan for the approval of the Program Manager. If schedule changes are required (i.e. activities added, durations changed, sequences changed) the Program Manager shall be notified in writing stating the schedule revisions and the reasons for change. The Program Manager considers these changes to be of a major nature, the Contractor may be required to revise and resubmit for approval, without additional cost to the Owner. Upon approval, the revised schedule will be considered the new baseline to which future analysis will be performed.

6.5 RECOVERY SCHEDULE

Whenever the Contractor fails to achieve a milestone established in the Contract Schedule, or the Contractor's progress is not commensurate with that required to adhere to the contract time or milestones, the Contractor shall promptly undertake appropriate action at no additional cost to the Owner to recover the CPM Schedule.

6.5.1

The Contractor shall submit with the next application for payment a written recovery statement to the Program Manager describing the cause for slippage and the action planned by the Contractor to recover the Schedule.

6.5.2

The Contractor's failure or neglect to take appropriate recovery action and to submit a written recovery statement shall constitute reasonable evidence that the Contractor is not executing the work, or separate part of the work, with a diligence that will insure its completion within the applicable contract time. The Program Manager shall constitute this as the basis to recommend the withholding an appropriate amount of any payment otherwise due and may recommend that the Owner order the Contractor to take "Extraordinary Measures" which are detailed as follows: In the event the Owner determines that the performance of the Work has not progressed or reached the level of completion required by the Contract Documents, the Owner shall have the right to order the Contractor to take corrective measures necessary to expedite the progress of construction, including, without limitation, (1) working additional shifts or overtime; (2) supplying additional manpower, equipment, and facilities; and (3) other similar measures (referred to collectively as "Extraordinary Measures"). Such Extraordinary Measures shall continue until the progress of the Work complies with the stage of completion required by the Contract Documents. The Owner's right to require Extraordinary Measures is solely for the purpose of ensuring the Contractors compliance with the construction schedule. The Contractor shall not be entitled to an adjustment in the Contract Sum in connection with Extraordinary Measures required by the Owner.

7.0 SCHEDULE SUBMISSION

7.1 SCHEDULE SUBMISSION

The contractor shall submit USB Storage Device, Programs, Reports, Diagrams and Charts with all project schedules and updated schedules in accordance with the submission section requirements. The Contractor shall include on all reports and graphics the Project Title, Contractor Name, Update Number, Revision Number and Date.

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7.2 Electronic Submission

One USB storage device containing the project schedule shall be provided with all schedule submissions.

7.2.1 File Medium

Required data shall be submitted on USB storage device.

7.2.2 File Name

Each File submitted shall have a name related to the project name and version number. The contractor shall develop a naming convention that will ensure that the names of the files submitted are unique and indicate sequence of submittal.

7.3 SCHEDULE REPORTS

7.3.1 Activity Data

The computer-generated schedule reports shall include a tabulation of each activity shown on the detailed network diagram. The format for each activity for the schedule reports listed below shall contain the following information as a minimum:

- a. Activity Numbers
- b. Activity Description
- c. Original duration
- d. Remaining Duration
- e. Early Start Date
- f. Early Finish Date
- g. Percentage Complete
- h. Total float
- i. Responsibility Code
- j. Budget amount of activity, if cost loaded
- k. Contractor's earnings based on portion of activity completed, if cost loaded
- l. Actual Start and Finish dates shall be printed for those activities in progress or completed.

7.3.2 Required Sorts

Provide the following report with each required submission

- a. Total float report listing all uncompleted activities sorted first by total and then by early start.
- b. Cost earned report listing all activities having a budget amount used as the Contractor's monthly invoice sorted first by responsibility code then by activity number, if cost loaded.
- c. Cost earned summary report showing total budget and earned amounts for each responsibility code, if cost loaded.

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7.4 ACTIVITY BAR CHARTS

Bar Chart diagrams shall be submitted to represent the following:

- a. Two-week look ahead Bar Chart sorted by early start.
- b. Bar Chart containing all activities indicating actual progress versus Baseline target schedule sorted by area and early start.
- c. Bar chart summarized by work type to contract completion.

7.5 SCHEDULE NARRATIVE

Submit a detailed progress narrative report describing current and anticipated problem areas and/or delaying factors with their impact together with an explanation of corrective actions taken or proposed.

7.6 SCHEDULE CHANGES

A detailed report shall be provided indicating all proposed schedule revisions and are subject to the Program Manager's approval.

8.0 REQUESTS FOR TIME EXTENSIONS

8.1 REQUESTS FOR TIME EXTENSIONS

In the event the Contractor requests an extension of the contract completion date, he shall furnish such justification, project schedule data and supporting evidence as the Program Manager may deem necessary for a determination as to whether or not the Contractor is entitled to an extension of time under the provisions of the contract.

9.0 OWNERSHIP OF FLOAT

9.1 OWNERSHIP OF FLOAT

Float available in the schedule, at any time, shall not be considered for the exclusive use of either the Owner or the Contractor. Float belongs to the Project and may be utilized by both the Owner and Contractor.

END OF SECTION

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SECTION 013300**

SUBMITTAL PROCEDURES

1.0 GENERAL

- A. The Contractor shall submit for review by the Architect/Engineer, Shop Drawings manufacturer's data, samples, schedules and other submittals required by the Specifications, or that may be requested by the Architect/Engineer, and no work shall be fabricated by the Contractor, except at his own risk, until such review has been completed.

1.1 FORM OF SUBMISSION MATERIALS

A. SHOP DRAWING SCHEDULE

1. Within ten (10) days after date of Notice to Proceed, Contractor shall submit to the Program Manager a Shop Drawing Submittal Schedule, which shall include the following minimum information:
 - a. List all items to be submitted for review referenced to the specific specifications section.
 - b. Name of subcontractor if applicable.
 - c. Supplier and date of purchase order.
 - d. Total fabrication and delivery time from time submittals are returned to the Contractor.
 - e. Scheduled delivery date.
 - f. The Submittal Schedule shall reflect all installation dates. This will require that sufficient lead time be allowed to address an adequate review period, securing necessary approvals, possible revisions and re-submittals, placing orders and securing delivery dates.

(NOTE): No applications for payment will be processed unless the above listed information has been submitted. The initial Shop Drawing Schedule must be approved by the Program Manager prior to the first progress payment. Further this shop drawing schedule must be updated monthly and submitted with the Contractor's monthly application for payment. This is in addition to the requirement for monthly project schedule updates.

B. SHOP DRAWINGS

1. Scale and Measurements: Make Shop Drawings accurately to a scale sufficiently large to show all pertinent aspects of the item and its method of connection to the work.
2. Submit all Shop Drawings electronically in pdf form for review.

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SUBMITTAL PROCEDURES

3. Review comments of the Architect will be shown electronically when it is returned to the Contractor. Upon approval of Shop Drawings the Contractor will submit (2) complete blue-line or blackline drawings with Architect's comments to the Program Manager.
4. In addition, the Contractor is to provide the Program Manager with (2) sets of "Field Use" drawings incorporating all review comments. The Contractor may make and distribute such copies as are required for his purposes.

C. MANUFACTURER'S LITERATURE

1. Where contents of submitted literature from manufacturers include data not pertinent to the submittal, clearly show which portions of the contents are being submitted for review.

D. SAMPLES

1. Provide Sample or Samples identical to the precise article proposed to be provided. Identify as described under "Identification of Submittals" below.
2. Number of Samples required:
 - a. Unless otherwise specified, submit samples in the quantity which is required to be returned, plus two which will be retained by the Architect and Program Manager.
 - b. By prearrangement in specific cases, a single sample may be submitted for review and, when approved, be installed in the Work at a location agreed upon by the Architect.

E. COLORS AND PATTERNS

1. Unless the precise color and pattern is specifically called out in the Contract Documents, and whenever a choice of color or pattern is available in the specified products, submit accurate color and pattern charts to the Architect for selection.

1.2 SUBMISSION PROCEDURE

A. IDENTIFICATION OF SUBMITTALS

1. Multiple submittals on a single transmittal are not acceptable. Accompany each submittal with a letter of transmittal showing all information required for identification and checking.
2. Consecutively number all submittals.
 - a. When material is resubmitted for any reason, transmit with the original number and sequential alphabetic suffix.

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3. On at least the first page of each submittal, and elsewhere as required for positive identification, show the submittal number in which the item was included.
4. Maintain an accurate submittal log for duration of the Work, showing current status of all submittals at all times. Make the submittal log available to the Architect and Program Manager for their review, upon request.

B. GROUPING OF SUBMITTALS

1. Unless otherwise specified, make submittals in groups containing all associated items to assure that information is available for checking each item when it is received.
 - a. Partial submittals will be rejected as not complying with the provisions of the Contract.

C. CHECKING SUBMITTALS PRIOR TO SUBMISSION

1. Prior to each submittal, carefully review and coordinate all aspects of each item being submitted.
2. Verify that each item and the submittal for it conform in all respects with the specified requirements.
3. The drawings submitted shall be marked with the name of the project, numbered consecutively and bear the signed and dated stamp of the approval of that Contractor as evidence that the drawings have been checked by the Contractor. Any drawings submitted without this stamp of approval will not be considered and will be returned to the Contractor for re-submission. If the shop drawings show variation from the requirements of the Contract because of standard shop practice or with reasons, the Contractor shall make specific mention of such variations in his letter of transmittal in order that, if acceptable, suitable action may be taken for proper adjustment; otherwise, that Contractor will not be relieved of the responsibility for executing the work in accordance with the Contract even though such shop drawings have been approved.

D. DELIVERY AND TIMING OF SUBMITTALS

1. All submittals shall be transmitted to the Program Manager for forwarding to the Architect/Engineer for review within sixty (60) days after the Notice to Proceed. Any variance to this shall be noted in the Contractor's Submittal Schedule
2. In scheduling, allow at least fifteen (15) calendar days for review by the Architect following his receipt of the submittal (plus transit time).
3. Make all submittals far enough in advance to schedule dates for installation, to provide

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SUBMITTAL PROCEDURES

time for required reviews, for securing necessary approvals, for revisions for re-submittals, and for placing orders and securing delivery.

E. ARCHITECT'S REVIEW

1. Review by the Architect does not relieve the Contractor from responsibility for errors which may exist in the submitted data.
2. The review of Shop Drawings will be general and shall not be construed as:
 - a. Permitting any departure from the Contract Requirements.
 - b. Relieving the Contractor of the responsibility for any error in details, dimensions or otherwise that may exist.
 - c. Approving departures from additional details or instruction previously furnished by the Architect/Engineer.
3. Revisions:
 - a. Make revisions required by the Architect.
 - b. If the Contractor considers any required revisions to be a change, he shall notify the Program Manager and/or Architect as provided for in the General Conditions.
 - c. Make only those revisions directed or approved by the Architect.
4. If a drawing, as submitted, indicates a departure from the Contract requirements which the Architect/Engineer finds to be in the interest of the Owner and to be minor as not to involve a change in the Contract Price or time for performance, the Architect/Engineer may approve the drawing.

F. FINAL DISTRIBUTION OF SUBMITTALS

1. The Architect will retain one set of reviewed submittals and the Program Manager will retain two sets of reviewed submittals, and return the remaining copies to the Contractor. The Contractor shall be responsible for the distribution of the Shop Drawings and schedules within his own organization and to his Subcontractors.
3. The Contractor shall maintain at the site one record copy of all approved Shop Drawings, Product Data, Samples, and FOR FIELD USE Drawings. These shall be available to the Program Manager, Architect, Third Party Inspectors, and Commissioning Agents. These records shall be delivered to the Program Manager for submittal to the Owner at the end of Work.

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SUBMITTAL PROCEDURES

4. The Contractor will advise the Program Manager of the date that reviewed shop drawings are forwarded to the manufacturers or fabricators. Un-priced copies of purchase orders placed with suppliers or fabricators are to be forwarded to the Program Manager when orders are placed.

END OF SECTION

**CHARLESTON COUNTY SCHOOL DISTRICT
HAUT GAP MIDDLE SCHOOL
SECTION 013301**

ELECTRONIC PROJECT MANAGEMENT SYSTEM (EPMS), CMiC

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. This section describes the requirements for the Electronic Project Management System (EPMS), CMiC.

1.2 RELATED DOCUMENTS

- 1.3 AIA A132 (2009) Agreement Between Owner and Contractor, Program Manager as Adviser as amended, and AIA A232 (2009) General Conditions of the Contract for Construction, as amended SCOPE

A. The Owner will implement the internet/web site Electronic Project Management System (EPMS), CMiC for the project. Contractors will be responsible to interface with CMiC and provide information via CMiC. A high-speed internet connection is required. In general, CMiC will receive input, provide viewing and printing of various documents (which may include drawings and technical information) and be a central repository for information to all project team members.

B. The CMiC web site will be provided by Owner. Contractor will be required to obtain necessary licenses and have a high-speed internet connection.

C. CMiC will be designed to inform team members regarding new or updated documents. The following plus any other items determined during setup shall be entered and tracked online:

1. Request for Information (RFI)
2. Supplemental Instructions
3. Submittals (shop drawings)
4. Proposed Change Orders (PCO)
5. Change Orders
6. Pay Requests
7. Reports (daily, monthly, etc.)
8. Schedules
9. Special Inspections
10. Closeout procedures (punch list, warranty)

D. Email is expected to be a primary communications tool between Architect and project team members who upload information to CMiC.

1. In an effort to protect proprietary information and prohibit unauthorized use or modifications, levels of access security will be assigned by Program Manager. Prints of drawings and the associated costs for reproduction and distribution by the Architect is not part of the Work.

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SECTION 013301**

ELECTRONIC PROJECT MANAGEMENT SYSTEM (EPMS), CMiC

PART 2 - PRODUCTS - Not Used

PART 3 - EXECUTION

3.1 TRAINING

- A. One training session by CMiC to the team members at the beginning of the EPMS implementation will be provided.

3.2 SUPPORT

- A. Will be available to all project team members.

3.3 OPERATION

- A. Contractor shall maintain a Windows-based computer system including high speed internet access and ability to create/mark-up documents using Adobe Acrobat (pdf) and to scan documents. CMiC shall maintain the EPMS server and back-up the information.

3.4 DURATION

- A. Web site will be active during the construction. Owner will have option to continue to use the web site after the completion of the project.

3.5 ARCHIVE

- A. All files on the web site will be archived at the end of the project. These archives will be made available to the Contractor for download over the internet, at their expense/labor.

END OF SECTION

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SECTION 014100**

REGULATORY REQUIREMENTS

- A. The following requirements of Regulatory Agencies having an interest in this project are hereby made a part of this Contract.
- B. The construction of the project, including the letting of contracts in connection therewith, shall conform to the applicable requirements of State, territorial and local laws and ordinances to the extent that such requirements do not conflict with Federal laws and this subchapter.
- C. South Carolina Sales Tax: All applicable South Carolina sales tax shall be to the account of the Contractor.
- D. Use of chemicals: All chemicals used during the project construction or furnished for project operation, whether herbicide, pesticide, disinfectant, polymer, reactant or of other classification, must show approval of EPA or USDA. Use of all such chemicals and disposal of residues shall be in strict conformance with instructions.
- E. Safety and Health Regulations: The Contractor shall comply with the Department of Labor and Safety and Health Regulations for construction promulgated under the Occupational Safety and Health Act of 1970 (PL-91-596) and under Section 107 of the Contract Work Hours and Safety Standards Act (PL91-54).
- F. Inspection by Agencies: The representatives of the South Carolina Department of Education, South Carolina Fire Marshal, South Carolina Department of Health and Environmental Control, Charleston County and South Carolina Department of Highways and Public Transportation, and, where applicable, municipalities in which a project is located, and any others having jurisdiction over the project shall have access to the work wherever it is, in preparation or in progress, and the Contractor shall provide proper facilities for such access and inspection.
- G. Withholding for Non-Residents shall comply with the following:
 - 1. Attention of non-resident contractors is invited to Part Two, Act No. 855, Acts of the General Assembly of South Carolina 1958.
 - 2. If a non-resident contractor is the successful bidder on this project, he shall be required to post surety bond, or deposit cash or securities with the South Carolina Tax Commission in compliance with the Act. Proof of such coverage shall be filed with the Engineer before work is started.
 - 3. If the Contractor fails to comply with the regulations of the South Carolina Tax Commission, two percent (2%) of each and every payment made to the Contractor shall be retained by the Owner to satisfy such requirements.

END OF SECTION

REGULATORY REQUIREMENTS

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SECTION 014126**

PERMITS AND RIGHTS-OF-WAY

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Work included: This section establishes requirements pertaining to the securement and payment for licenses, building permits, rights-of-way, etc. necessary for the construction of the project.
- B. Work not included: The Owner will obtain and provide to the Contractor, as required, copies of:
 - 1. Encroachment permits, State Highway Department.
 - 2. Encroachment permits, Public Utility.
 - 3. Easements obtained to cross private property.
 - 4. Local Authority Having Jurisdiction Land Disturbance Permit
 - 4. S.C. Department of Health and Environmental Control Permit to Construct.
 - 5. S.C. Office of School Facilities
 - 6. Signage Permit
- C. Related Work:
 - 1. Documents affecting work of this section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division 1 of these specifications.

1.2 SUBMITTALS

- A. Submit to the Program Manager satisfactory evidence that all necessary licenses, building permits, etc. have been secured prior to commencing the work.

PART 2 - PRODUCTS

No products are required for this work.

PART 3 - EXECUTION

3.1 BUSINESS LICENSE

- A. Determine licenses necessary to perform the work at project location.
- B. Obtain all necessary licenses at no additional cost to the Owner.

3.2 BUILDING PERMITS

- A. Contractor shall secure all permits required whether of temporary or permanent nature. Contractor will pay permit fees.

END OF SECTION

PERMITS AND RIGHTS-OF-WAY

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SCHOOL BUILDING NO. 0734
SECTION 014200**

REFERENCES

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Throughout the Project Documents, reference is made to specifications and standards issued by nationally recognized professional and/or trade organizations.
1. Unless otherwise specifically stated, all manufacturer's catalogs, specifications, instructions or other information or literature that are referred to in the specifications shall be considered as the latest edition and/or revision of such publication that is in effect on the date of the Invitation or Advertisement for Bids.
 2. When standard specifications such as the American Society for Testing and Materials, Federal specifications, Department of Commerce (Commercial Standards), American Institute of Steel Construction, or other well-known public or trade associations, are cited as a standard to govern materials and/or workmanship, such specifications or portions thereof as referred to shall be equally as binding and have the full force and effect as though it were copied into these specifications. Such standards as are mentioned are generally recognized by and available to the trades concerned. The Program Manager will, however, upon request of a bidder or Contractor, furnish for inspection a copy of any standard specifications mentioned or direct the bidder or Contractor to an easily available copy. Unless otherwise specifically stated, the standard specifications referred to shall be considered as the latest edition and/or revision of such specifications that is in effect on the date of the Invitation for Bids. In case of any conflicts between standard specifications and the written portion of the Specifications, the specifications as actually written herein will govern.
 3. The referenced standards are generally identified by abbreviating the name of the organization following with the specification/standard number.
 4. Unless specifically indicated otherwise, all references to standards refer to the latest edition available at the time of bidding.

1.2 ABBREVIATIONS

- A. Wherever the following abbreviations are used in these Project Documents, they are to be construed the same as the respective expressions represented:

AASHO	American Association of State Highway Officials
ACI	American Concrete Institute
ACPA	American Concrete Pipe Association
AGA	American Gas Association
AI	Asphalt Institute
AIA	American Institute of Architects
AISC	American Institute of Steel Construction
AISI	American Iron and Steel Institute
ALS	American Lumber Standards

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REFERENCES

ANSI	American National Standards Institute, Inc.
APA	American Plywood Association
ARI	Air Conditioning and Refrigeration Institute
ARMA	Asphalt Roofing Manufacturers Association
ASHRAE	American Society of Heating, Refrigerating and Air Conditioning Engineers
ASME	American Society of Mechanical Engineers
ASPE	American Society of Plumbing Engineers
ASTM	American Society for Testing Materials
AWI	Architectural Woodwork Institute
AWWA	American Water Works Association
AWPA	American Wood Preservers Association
AWS	American Welding Society
BIA	Brick Institute of America
CE	Corps of Engineers
CISPI	Cast Iron Soil Pipe Institute
CRSI	Concrete Reinforcing Steel Institute
CTI	Ceramic Tile Institute of America
DOT	Department of Transportation
EPA	Environmental Protection Agency
FSS	Federal Specifications and Standards, General Services Administration
GA	Gypsum Association
IEEE	Institute of Electrical and Electronics Engineers
MBMA	Metal Building Manufacturer's Association
MCAA	Mechanical Contractors Association of America
MFMA	Marble Flooring Manufacturers Association
MIA	Marble Institute of America
ML/SFA	Metal Lath/Steel Framing Association
NAAMM	National Association of Architectural Metal Manufacturers
NAPA	National Asphalt Pavement Association
NBHA	National Builders Hardware Association
NCMA	National Concrete Masonry Association
NEC	National Electric Code (Now NFPA)
NECA	National Electrical Contractors Association
NEMA	National Electrical Manufacturers Association
NFPA	National Fire Protection Association
NIST	National Institute of Standards and Technology
NPCA	National Paint and Coating Association
NRCA	National Roofing Contractors Association
NTMA	National Terrazzo and Mosaic Association
OSHA	Occupational Safety and Health Administration
PCA	Portland Cement Association
PCI	Prestressed Concrete Institute
SDI	Steel Deck Institute
S.D.I.	Steel Door Institute
SJI	Steel Joist Institute

REFERENCES

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REFERENCES

SMACNA	Sheet Metal and Air Conditioning Contractors National Association
SPIB	Southern Pine Inspection Bureau
SSPC	Steel Structures Painting Council
TCA	Tile Council of America, Inc.
UL	Underwriters Laboratories, Inc.

END OF SECTION

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QUALITY CONTROL

PART 1 – GENERAL

1.1 REQUIREMENTS INCLUDED

- A. Quality control of products and workmanship.
- B. Manufacturer's instructions.
- C. Manufacturer's certificates and field services.
- D. Mockups.

1.2 RELATED REQUIREMENTS

- A. AIA A132 and A232, as amended
- B. Division 00 – Procurement and Contracting Requirements
- C. Division 01 – General Requirements
- D. Section 013201 – Project Schedule
- E. Section 013301 – Electronic Project Management System (EPMS), OpCenter Build
- F. Section 013300 – Submittals Procedures: Submittal of manufacturer's instructions.
- G. Section 014529 – Testing Laboratory Services
- H. Section 014533 – Collective Inspections and Structural Testing
- I. Section 014700 – Cleaning
- J. Section 016600 – Product Storage and Handling Requirements
- K. Section 019113 – General Commissioning Requirements
- L. Individual Specification Sections – Quality requirements and Mock-ups required

1.3 DESCRIPTION / SUBMITTALS

- A. Maintain quality control over supervision, subcontractors, suppliers, manufacturers, products, services, workmanship, handling & storage, inspections, and site conditions to produce Work in accordance with Contract Documents.
- B. The Contractor is required to submit a "Quality Control Plan" for this project in writing for approval from the Program Manager. The QC Plan is required to be submitted and approved prior to the start of work and processing of the first Application for Payment.

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QUALITY CONTROL

The Contractor's QC Plan should include, but not limited to the following:

1. Identify the Contractor's Quality Control Officer and provide qualifications. The Contractor's Quality Control Officer must be on site full time when work is being performed on site.
2. Prepare Daily QC reports addressing the quality aspects of the project work being performed by Subcontractors and the Contractors forces.
3. Develop Logs and Checklist to monitor the detailed quality assurance requirements listed in individual specifications.
4. Review specifications, drawings, shop drawings, and submittals and conduct preconstruction meetings for each activity of work.
5. Evaluate Construction techniques and identify potential problems prior to installation.
6. Develop a method of verification that ongoing work is acceptable.
7. Maintain an adequate inspection system and perform or schedule inspections that will ensure IBC, OSF and Local Codes are contract compliant.
8. Review the OSF Inspections Program Manual's testing requirements and schedule all required tests and inspections.
9. The Contractor shall notify the Program Manager of required inspections and maintain inspection records on site available to the Architect/ Engineer, Program Manager, and Owner.
10. Have Manufacturer provide qualified representative to observe and inspect field conditions, quality of workmanship, test and start-up of equipment, adjustment and balance of equipment as required in individual specification sections.
11. Hold QC Coordination Meetings to show how Subcontractors installations will interface with other Subcontractors and the Contractor's installations. Provide Coordination between the Contractor, Subcontractors, Program Manager, Architect, Engineers, Inspectors and Commissioning Agents. Provide all project team members with reports, verifications and approvals of Quality Control Activities.
12. The Contractor's QC plan shall establish, maintain and document Quality Control to conform to the Contract Documents. The plan should be divided into at least 3 phases:

Preparatory Phase

Prior to the start of a Particular Construction Activity the Contractor's QC Officer must notify the Program Manager two weeks in advance to meet and discuss the following:

1. Contract Documents.

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2. Verify that appropriate submittals and shop drawings have been submitted and approved.
3. Review and establish procedures to ensure that scheduling and provisions have been made to provide required IBC Chapter 1 and 17 Inspections.
4. Examine the work area and verify that any required preliminary work has been completed.
5. Discuss construction methods, tolerances and workmanship and cleanliness standards, and the approach that will be used to provide quality construction by planning ahead and identifying potential problems for each definable feature of work.
6. Review the safety plan and appropriate activity hazard analysis to ensure that applicable safety requirements are met, and that required Material Safety Data Sheets are submitted.
7. Schedule preconstruction meetings with all parties.

Production Phase

The Contractor must notify the Program Manager at least two (2) workdays in advance of starting each initial phase. The Program Manager, the Contractor's Superintendent and QC Officer observes the initial segment of the work activity to verify the work complies with the Contract Documents. The Production Phase must be repeated for each new crew to work on site, or when acceptable levels of specified quality are not being met. Perform the following for each Construction Activity.

1. Establish the quality of workmanship required.
2. Develop and maintain the pre-functional checklist.
3. Resolve conflicts.
4. Ensure that testing is being scheduled and performed by the approved testing company.
5. Check that work activities comply with the Safety Plan.
6. The Contractors QC Officer will document the Production Phase Checklist and include them in Quality Control Reports.

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Follow up Phase (Performed Daily)

The follow up phase is performed on each work activity identified on the Schedule for ongoing work "Daily" until the completion of each activity and documented in Quality Control Reports. The follow up phase checklist should include at least the following.

1. Verify the work is in compliance with Contract Documents.
 2. Maintain the quality of workmanship required.
 3. Verify that testing is being performed.
 4. Identify problems and Verify that rework items are being corrected.
 5. Perform Safety Inspections.
 6. The Contractors QC Officer shall document the Follow up Phase work activities and include them in Quality Control Reports.
- C. Contractor is to assign the duties of quality control (QC) to dedicated Quality Control Officer. The Superintendent cannot act as the Quality Control Officer.

1.4 WORKMANSHIP

- A. Comply with industry standards of the region except when more restrictive tolerances or specified requirements indicate more rigid standards or precise workmanship.
- B. Provide suitably qualified personnel to produce Work of specified quality.
- C. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration and cracking.
- D. Provide finishes to match approved samples.
- E. All items shall be installed in a workmanlike manner in accordance with the best recognized practice in the field concerned. Manufactured items shall be installed in strict accordance with manufacturer's printed directions, specifications and/or recommendations for installation of highest quality. All working parts shall be properly adjusted after installation and left in perfect working order. Unless otherwise indicated, items exposed to weather or subject to flooding or wetting shall be installed so as to shed and not hold water. Items shall in all cases be installed plumb and true and/or in proper relation to surrounding materials.
- F. Unless otherwise specifically specified, all items and parts thereof that is made of steel, iron or other ferrous metal that are not galvanized, plated, or otherwise specified to be factory finished, shall be cleaned and painted with one shop coat of the best quality rust inhibitive metallic primer. After installation, all exposed metal connections and abrasions shall be touched up with the same

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materials as the shop coat and left in good condition for final finishing as required in the technical specifications.

1.5 MANUFACTURER'S INSTRUCTIONS

- A. Require compliance with instructions in full detail, including each step in sequence.
- B. Should instructions conflict with Contract Documents, request clarification from Program Manager before proceeding.

1.6 MANUFACTURER'S CERTIFICATES

- A. When required in individual Specifications section, submit manufacturer's certificate, in duplicate, certifying that products meet or exceed specified requirements, executed by responsible officer.

1.7 MANUFACTURER'S FIELD SERVICES

- A. When required in individual Specifications section, have manufacturer provide qualified representative to observe field conditions, conditions of surfaces and installation, quality of workmanship, start-up of equipment and test, adjust, and balance of equipment, as applicable, and make written report of observations and recommendations to Program Manager.

1.8 MOCKUPS

- A. The Contractor shall build an integrated exterior building mockup as noted on the drawings. Integrated exterior building mockup shall be at a minimum 8'-0" wide x 6'-0" tall or as noted on the drawings.
- B. The integrated exterior mockup shall include exterior systems noted on the drawings. Integrated exterior building mockup shall at a minimum include the exterior wall assembly, air barrier system, flashing systems, exterior cladding, window frame, glazing and coping.
- C. The Contractor shall provide requirements of Governmental Agencies for Scope and Complexity of Mockup Construction.
- D. The Contractor shall provide a schedule of timing of Mockup installations for coordination with Governmental Agencies and Construction activities to insure a seamless work flow.
- E. The Contractor shall notify the Program Manager when the Mockup is ready for inspection by the Architect/Engineer.
- F. Assemble and erect complete, with specified attachment and anchorage devices, flashings, seals and finishes.
- G. Remove mockup and clean up the area when directed by the Program Manager.

END OF SECTION

QUALITY CONTROL

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**COLLECTIVE INSPECTIONS AND STRUCTURAL
TESTING**

1.1 SCOPE

- A. This section includes a listing of special inspections to be performed during the progress of this project. A "Certificate of Occupancy" cannot be issued without documentation that these inspections have been performed and the work is in conformance with the Contract Documents.

1.2 RESPONSIBILITY

- A. It shall be this Owner's responsibility to contract for Special Inspections; however, the Contractor shall be responsible for proper notification when inspection is required in the progress of the work, providing access to facilitate the inspection and making corrections necessary when work is not in compliance with the Contract Documents.

1.3 REPORTS

- A. Copies of inspection reports signed by person performing the inspection or test shall be submitted to Owner's Representative, Architect, Contractor and Building Official. A copy shall also be kept in the job trailer.

1.4 GENERAL REQUIREMENTS

- A. Special Inspections and Structural Testing shall be in accordance with Chapter 1 and Chapter 17 of the 2018 International Building Code.
- B. The program of Special Inspections and Structural Testing is a Quality Assurance Program intended to ensure that the work is performed in accordance with the Contract Documents.
- C. This specification section is intended to inform the Contractor of the Owner's Quality Assurance Program and the extent of the Contractor's responsibilities. This specification section is also intended to notify the Special Inspector, Testing Laboratory and other Agents of the Special Inspector of their requirements and responsibilities.

1.5 SPECIAL INSPECTIONS

- A. Special Inspections shall be performed by a qualified Inspector and/or approved Testing Agency, acceptable to the Building Official.
 - 1. Contractor shall be responsible to notify Inspector in a timely manner when required inspections need to be performed.
 - 2. The Inspection/Testing firm shall be responsible for immediately notifying in writing the Owner and Building Officials of all failed inspections and/or tests. The Architect will be notified by the Owner.

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1.6 SCHEDULE OF INSPECTIONS AND TESTS

- A. Required inspections and tests are described in the "Statement of Special Inspections" attached at the end of this section.

1.7 QUALIFICATIONS

- A. The Testing Laboratory and individual technicians shall be approved by the Building Official.
- B. The Testing Laboratory shall maintain a full-time licensed Professional Engineer (P.E.) on staff who shall certify the test reports. The Engineer shall be responsible for the training of the testing technicians and shall be in responsible charge of the field and laboratory testing operations.
- C. Special inspections shall be performed by inspectors as indicated below:
1. Special inspections of soils may be performed by inspectors with an education and background in geotechnical engineering.
 2. Technicians performing sampling and testing of concrete shall be ACI certified "Concrete Field Testing Technicians - Grade 1".
 3. Inspectors performing inspections of concrete work, such as inspections of concrete placement, batching, reinforcing, curing and protection, shall be ICC certified "Reinforced Concrete Special Inspector".
 4. Inspectors performing inspections of masonry shall be ICC certified "Structural Masonry Special Inspector".
 6. Inspectors performing visual inspections of welding shall be ICC certified "Structural Steel and Welding Special Inspectors". Technicians performing nondestructive testing such as ultrasonic testing, radiographic testing, magnetic particle testing or dye-penetrant testing shall be certified as an ASNT-TC Level II or Level III technicians.
 7. Inspectors performing inspections of spray fireproofing shall be ICC certified "Spray-Applied Fireproofing Inspector".
 8. Technicians performing standard tests described by specific ASTM Standards shall have training in the performance of such tests and must be able to demonstrate, either by oral or written examination, competence for the test to be conducted. They shall be under the supervision of a licensed Professional Engineer and shall not be permitted to independently evaluate test results.

1.8 SUBMITTALS

- A. The Special Inspector and Testing Laboratory shall submit to the Owner and Building Official for review a copy of their qualifications which shall include the names and qualifications of each of the individual inspectors and technicians who will be performing inspections or tests.
- B. The Special Inspector and Testing Laboratory shall disclose any past or present business

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relationship or potential conflict of interest with the Contractor or any of the Subcontractors whose work will be inspected or tested.

1.9 PAYMENT

- A. The Owner shall engage and pay for the services of the Special Inspector, Agents of the Special Inspector and the Testing Laboratory.
- B. If any materials which require Special Inspections are fabricated in a plant which is not located within 100 miles of the project, the Contractor shall be responsible for the travel expenses of the Special Inspector or Testing Laboratory.
 - 1. Expenses shall be adequate to provide same-day round-trip transportation to remote plant.
 - 2. Expenses shall include travel, lodging and meals.
- C. The Contractor shall be responsible for the cost of any retesting or re-inspection of work which fails to comply with the requirements of the Contract Documents.

1.10 CONTRACTOR RESPONSIBILITIES

- A. Contractor's Statement of Responsibility: Each Contractor responsible for the construction of a seismic force resisting system, designated seismic system or components listed in the Seismic Quality Assurance Plan shall submit a "Contractor's Statement of Responsibility", attached at the end of this section, to the Building Official and the Owner prior to the commencement of work. The Contractor's statement of responsibility contains the following:
 - 1. Acknowledgement of awareness of the project's special inspection requirements.
 - 2. Acknowledgement that control will be exercised to obtain conformance with the construction documents approved by the Building Official.
 - 3. Procedures for exercising control within the Contractor's organization, the method and frequency of reporting and the distribution of the reports.
 - 4. Identification and qualifications of the person(s) exercising such control and their positions(s) in the organization.
- B. Fabricator's Certificate of Compliance: Each fabricator completing structural load bearing members and assemblies on the premises of the fabricator's shop that is exempt from in shop special inspections based on qualifications outlined and/or required by the individual material specifications, shall complete a Fabricator's Certificate of Compliance. The Certificate shall be completed at the end of fabrication and certify that all work performed in the shop is in accordance with the construction documents and approved shop drawings.
- C. The Contractor shall cooperate with the Special Inspector and his agents so that the Special Inspections and Testing may be performed without hindrance. The Contractor shall review the

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"Statement of Special Inspections" and shall be responsible for coordinating and scheduling inspections and tests. The Contractor shall notify the Special Inspector or Testing Laboratory at least 48 hours in advance of a required inspection or test. Un-inspected work that required inspection may be rejected solely on that basis.

- D. The Contractor shall provide incidental labor and facilities to provide access to the work to be inspected or tested, to obtain and handle samples at the site or at the source of products to be tested, and to facilitate tests and inspection, storage and curing of test samples.
- E. The Contractor shall keep at the project site the latest set of construction drawings, field sketches, approved and field use shop and erection drawings, and specifications for use by the Inspectors and Testing technicians.
- F. The Special Inspections program shall in no way relieve the Contractor of his obligation to perform work in accordance with the requirements of the Contract Documents or from implementing an effective Quality Control Program. All work that is to be subjected to Special Inspections shall first be reviewed by the Contractor's Quality Control personnel.
- G. The Contractor shall be solely responsible for construction site safety.

1.11 LIMITS ON AUTHORITY

- A. The Special Inspector or Testing Laboratory may not release, revoke, alter or enlarge on the requirements of the Contract Documents.
- B. The Special Inspector or Testing Laboratory will not have control over the Contractor's means and methods of construction.
- C. The Special Inspector or Testing Laboratory shall not be responsible for construction site safety.
- D. The Special Inspector or Testing Laboratory has no authority to stop the work.

1.12 RECORDS AND REPORTS

- A. Detailed daily reports shall be prepared of each inspection and test by the Special Inspector and Testing Laboratory. Reports shall include:
 - 1. Date of test or inspection
 - 2. Name of Inspector or Technician
 - 3. Location of specific areas tested or inspected
 - 4. Description of test or inspection and results
 - 5. Applicable ASTM standard
 - 6. Weather conditions

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7. Engineer's seal and signature
- B. The Special Inspector shall submit interim reports to the Owner and Building Official at the end of each week which includes all inspections and test reports received that week. Copies shall be sent to the Architect and Contractor.
- C. Any discrepancies from the Contract Documents found during a Special Inspection shall be immediately reported to the Contractor and Owner. If the discrepancies are not corrected, the Special Inspector shall notify the Owner and Building Official. Reports shall document all discrepancies identified and the corrective action taken.
- D. The Testing Laboratory shall immediately notify the Owner and Building Official by telephone, fax or email of any test results which fail to comply with the requirements of the Contract Documents.
- E. At the completion of the work requiring Special Inspections, each Inspection Agency and Testing Laboratory shall provide a statement to the Owner and Building Official that all work was completed in substantial conformance with the Contract Documents and that all appropriate inspections and tests were performed.

1.13 FINAL REPORT OF SPECIAL INSPECTIONS

- A. The "Final Report of Special Inspections" shall be completed by the Special Inspector and submitted to the Owner and Building Official prior to the issuance of a "Certificate of Use and Occupancy".
- B. The "Final Report of Special Inspections" will certify that all required inspections have been performed and will itemize any discrepancies that were not corrected or resolved.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

**COLLECTIVE INSPECTIONS AND STRUCTURAL
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SECTION 014529**

TESTING LABORATORY SERVICES

PART 1 - GENERAL

1.1 DESCRIPTION

1.1.1 Work included:

1. Provide testing, inspecting, complete, as described in this section and elsewhere in pertinent section of the project manual.
2. Provide construction of small scale sample of work as may be described in pertinent section of the project manual.
3. Remove and replace defective work.

1.1.2 Related work:

1. Requirements for testing may be described in various Sections of these Specifications and in the AIA A132 and A232, as amended.
2. Where no testing requirements are described, but the Owner decides that testing is required, the Owner may require such testing to be performed under current pertinent standards for testing. Payment for such testing will be made as described in this Section and the Contract Documents.

1.1.3 General:

1. Employment of Testing Laboratory shall in no way relieve the Contractor of his obligation to perform work in accordance with the Contract Documents.

PART 2 - PRODUCTS

PART 2 - PRODUCTS

2.1 PAYMENT FOR TESTING

- 2.1.1 Onsite testing (Chapter One, Chapter Seventeen, Soils, Materials and Erosion Control Inspections) shall be paid for by the Owner.
- 2.1.2 The Owner will pay for all testing and inspection specifically requested by the Architect over and above those described in Subparagraph 1.1.1 above.
- 2.1.3 When initial testing required by the Architect indicates non-compliance with the Contract Documents, subsequent re-testing occasioned by the non-compliance shall be performed by the same testing laboratory and the costs thereof shall be paid by the Contractor.

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TESTING LABORATORY SERVICES

2.1.4 Where test, certificates or approvals by authorities other than the Architect/Engineer are required for an item or material, the Contractor shall have such test performed and/or procure such certifications or approvals and forward four copies of the results of the test certificates or approvals to the Program Manager prior to proceeding with the work involved. Such laboratories and/or authorities as are employed for this purpose shall be competent, with a generally recognized reputation in the field concerned and shall be subject to approval of the Architect. Inspections by South Carolina Department of Education (Office of School Facilities), State Fire Marshall, Local Fire Marshall, City or County Building Inspectors, utility companies or others having jurisdiction over the project shall be obtained by and coordinated by the Contractor as applies to his work. The cost of inspections shall be borne by the contractor for applicable inspections.

2.2 SPECIFIC TESTS AND INSPECTIONS

2.2.1 Inspection and testing required by codes or ordinances, or by a plan approval authority, and which are made by a legally constituted authority, shall be the responsibility of and shall be paid for by the Contractor, unless otherwise provided in the Contract Documents.

2.2.2 Testing shall include, but not be necessarily limited to that described in detail in Part 3 of this Section as well as that included in the technical specifications of the contract.

2.3 CONTRACTOR'S CONVENIENCE TESTING

2.3.1 Inspecting and testing performed exclusively for the Contractor's convenience shall be the sole responsibility of the Contractor.

PART 3 - EXECUTION

3.1 COOPERATION WITH TESTING LABORATORY

3.1.1 Representatives of the testing laboratory shall have access to the Work at all times and at all locations where the Work is in progress. Provide facilities for such access to enable the laboratory to perform its functions properly.

3.2 TAKING SPECIMENS

3.2.1 All specimens and samples for testing, unless otherwise provided in the Contract Documents, shall be taken by the testing personnel. All sampling equipment and personnel will be provided by the testing laboratory. All deliveries of specimens and samples to the testing laboratory will be performed by the testing laboratory.

3.3 WAIVER OF INSPECTION AND/OR TESTING

3.6.1 Specified inspections and/or tests may be waived only by the specific approval of the Office of School Facilities, and such waivers will be expected to result in credit to the Owner equal to normal cost of such inspection and/or test.

END OF SECTION

**TESTING LABORATORY SERVICES
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SECTION 014700**

CLEANING

PART 1 - GENERAL

1.1 DESCRIPTION

1.1.1 Work included: Throughout the construction period, maintain the buildings and site in a standard of cleanliness as described in this section and the Contract Documents. Failure to do so may result in a reduction of the Contract Sum if the Program Manager has the required cleanup performed by others.

1.1.2 Related work:

A. Documents affecting work of this section include but are not necessarily limited to AIA A132 and A232, as amended, General Conditions, Supplemental Conditions, and Sections in Division 1 of these Specifications.

B. In addition to standards described in this section, comply with requirements for cleaning as described in pertinent other sections of these Specifications.

1.2 QUALITY ASSURANCE

1.2.1 Conduct daily cleaning and inspection and more often if necessary, to verify that requirements for cleanliness are being met.

1.2.2 In addition to the standards described in this section, comply with pertinent requirements of governmental agencies having jurisdiction.

PART 2 - PRODUCTS

2.1 CLEANING MATERIALS AND EQUIPMENT

2.1.1 Provide required personnel, equipment and materials needed to maintain the specified standard of cleanliness.

2.2 COMPATIBILITY

2.2.1 Use only the cleaning materials and equipment which are compatible with the surface being cleaned, as recommended by the manufacturer of the material.

PART 3 - EXECUTION

3.1 PROGRESS CLEANING

3.1.1 General

A. Retain stored items in an orderly arrangement allowing maximum access, not impeding traffic or drainage and providing required protection of materials.

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CLEANING

- B. Do not allow accumulation of scrap, debris, waste material and other items not required for construction of this work.
- C. At least once each week and more often if necessary, completely remove all scrap, debris and waste material from the job site. Provide adequate storage for all items waiting removal from the job site, observing requirements for fire protection and protection of the ecology.
- D. Locations on site for stored materials and/or debris must be pre-approved by the Program Manager.
- E. Once concrete floor has been placed in any area, and overhead deck is in place, these areas shall be swept broom clean once per week or more often if necessary. When the building(s) is enclosed, dust control materials shall be used while sweeping to minimize dust accumulation on surfaces to receive finishes, ceiling grid, fixtures, mechanical systems, ductwork etc. The General Contractor shall be solely responsible to assure clean systems and finishes throughout duration of project.

3.1.2 Site

- A. Daily, and more often if necessary, inspect the site and pick up all scrap, debris and waste material. Remove such items to the place designated for their storage.
- B. Weekly, and more often if necessary, inspect all arrangements of materials stored on the site. Restack, tidy, or otherwise service arrangements to meet the requirements of subparagraph 3.1.1A above.
- C. Maintain the site in a neat, safe and orderly condition at all times.

3.1.3 Final Cleaning – Perform final cleaning as detailed in each technical specification, and as follows:

- A. Conduct cleaning and waste removal operations to comply with local laws and ordinances, Federal and local environmental and antipollution regulations.
- B. Employ experienced workers or professional cleaners for final cleaning. Clean each surface or until to condition of clean as defined in Paragraph 3.2.1.
- C. Complete the following cleaning operations before requesting inspection for a Certificate of Substantial Completion for the entire project, or any portion of the project.
 - 1. Clean project site, yard and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter and other foreign substances.
 - 2. Sweep paved areas broom clean. Remove petrochemical spills, stains and other foreign deposits.

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CLEANING

3. Rake grounds that are neither planted nor paved to a smooth, even-textured surface.
4. Remove tools, construction equipment, machinery, and surplus material from project site.
5. 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.
6. Remove debris and surface dust from limited access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics and similar spaces.
7. Sweep concrete floors broom clean in unoccupied spaces.
8. Vacuum carpet and similar soft surfaces, removing debris and excess nap. Shampoo if visible soil or stains remain.
9. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other noticeable, vision-obscuring materials. Replace chipped or broken glass and other damaged transparent materials. Polish mirrors and glass, taking care not to scratch surfaces.
10. Remove labels that are not permanent.
11. Touch up and otherwise repair and restore marred, exposed finishes and surfaces. Replace finishes and surfaces that cannot be satisfactorily repaired or restored or that already show evidence of repair or restoration.
12. Do not paint over "UL" and similar labels, including mechanical and electrical nameplates.
13. Remove grease, dust, dirt, stains, labels, fingerprints, protection and other foreign materials from sight-exposed interior and exterior surfaces and of concealed spaces to ensure performance.
14. HVAC – vacuum clean all ducts, blowers and coils, and replace filters if units have been used during construction. Clean permanent air filters. Clean exposed surfaces of diffusers, registers and grills.
15. Wipe surfaces of mechanical and electrical equipment, elevator equipment, and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.
16. Replace parts subject to unusual operating conditions.

**CLEANING
014700**

**MALCOLM C. HURSEY MONTESSORI SCHOOL
SCHOOL BUILDING NO. 0734
SECTION 014700**

CLEANING

17. Clean plumbing fixtures to a sanitary condition, free of stains, including stains resulting from water exposure.
18. Clean light fixtures, lamps, globes and reflectors to function with full efficiency. Replace burned-out bulbs and those noticeably dimmed by hours of use, and defective and noisy starts in fluorescent and mercury vapor fixtures to comply with requirements for new fixtures.
19. Clean, buff, and/or polish hard surface flooring as required in technical specifications.
20. Pest control – Engage an experienced, licensed exterminator to make a final inspection and rid project of rodents, insects, and other pests. Have the exterminator prepare a report to be submitted to the Program Manager.
21. Comply with all safety standards for cleaning. Do not burn waste materials. Do not bury debris or excess materials on project property. Do not discharge volatile, harmful or dangerous materials into drainage systems. Remove waste materials from the project site and dispose of lawfully.
22. Contractor shall maintain finally cleaned areas until the project is accepted by the Owner.

3.2 FINAL CLEANING

- 3.2.1 "Clean," for the purpose of this Article, and except as may be specifically provided otherwise, shall be interpreted as meaning the level of cleanliness generally provided by skilled cleaners using commercial quality building maintenance equipment and materials.
- 3.2.2 Prior to completion of the work, remove from the job site all tools, surplus materials, equipment, scrap, debris, and waste. Conduct final progress cleaning as described in Article 3.1 above.
- 3.2.3 Schedule final cleaning as approved by the Architect/Engineer to enable the Owner to accept a completely clean work.

END OF SECTION

**MALCOLM C. HURSEY MONTESSORI SCHOOL
SCHOOL BUILDING NO. 0734
SECTION 015000**

TEMPORARY FACILITIES

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. This Section specifies requirements for temporary services and facilities, including utilities, construction and support facilities, security and protection to be provided by the General Contractor.

These temporary utilities shall include, but shall not be limited to, the following: Office trailers, temporary toilet facilities, water, lighting, heat, electricity, fuel, oil, and fuel gas; all for construction use, personnel use, testing and balancing of equipment, code compliance demonstration, final review, and acceptance demonstration. The cost of utilities required for testing of equipment shall be the responsibility of the General Contractor whose subcontractors furnish and install the equipment and the work shall comply with all applicable and state codes, governing agencies and ordinances. Temporary utilities shall be paid for by the Contractor from the Date of Project Commencement until the date of Substantial Completion.

1.02 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, and the Technical Specification Divisions 0 through 48 apply to this Section.

1.03 SUMMARY

- A. Temporary utilities required may include but are not limited to:
1. Water service and distribution.
 2. Temporary electric power and light.
 3. Telephone service.
 4. Sanitary water.
 5. Natural Gas.
- B. Temporary construction and support facilities required may include but are not limited to:
1. Temporary heat & A/C.
 2. Field offices and storage sheds.
 3. Sanitary facilities including drinking water.
 4. Dewatering equipment and drains.
 5. Temporary enclosures (including dust barriers).
 6. Temporary Project identifications signs and bulletin boards.
 7. Waste disposal service.
 8. Rodent and pest control.
 9. Construction aids and miscellaneous services and facilities.
 10. Temporary toilet facilities (portalets).

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- C. Security and protection facilities required may include but are not limited to:
1. Barricades, warning signs.
 2. Sidewalk bridge or enclosure fence for the site.
 3. Environmental protection.
 4. Dust partitions.
 5. Flagmen.

1.04 QUALITY ASSURANCE

- A. Regulations: Comply with industry standards and applicable laws and regulations with authorities having jurisdiction, including but not limited to:
1. Building Code requirements.
 2. Health and safety regulations.
 3. Utility company regulations.
 4. Police, Fire Department and Rescue Squad rules.
 5. Environmental protection regulations.
- B. Standards: Comply with NFPA code 241, "Building Construction and Demolition Operations", ANSI-A10 Series standards for "Safety Requirements for Construction and Demolition", and NECA Electrical Design Library "Temporary Electrical Facilities" and other requirements required by laws and regulations.
1. Electrical Service: Comply with NEMA, NECA, and UL standards and regulations for temporary electric service. Install service in compliance with National Electric Code (NFPA 70).
 2. Temporary Electrical Service: The General Contractor shall provide complete temporary electrical service. This service shall be adequate to operate hand tools and machines requiring 120-volt and/or 230-volt single phase electrical service, and shall run to a point that can be reached by extension cords for 120-volt equipment. Extension cords shall be properly sized for the amperage drawn by the equipment connected thereto. Any additional cost involving electrical service for equipment with voltage requirements in excess of the above shall be the responsibility of the General Contractor.
- C. Inspections: Arrange for authorities having jurisdiction to inspect and test each temporary utility before use. Obtain required certifications and permits.

1.05 PROJECT CONDITIONS

- A. Temporary Utilities: Indicate dates for implementation and termination of each temporary utility on the Project Schedule. At the date of Substantial Completion, change over from use of temporary service to use of the permanent service.

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TEMPORARY FACILITIES

- B. Conditions of Use: Keep temporary services and facilities clean and neat in appearance. Operate in a safe and efficient manner. Take necessary fire prevention measures including, but not limited to, access available for emergency vehicles, provision of proper fire suppression/fire extinguishers, etc.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Water: Provide potable water approved by local health authorities.
- B. Enclosure/Security Fencing: Provide 11-gauge, galvanized 2-inch, chain link fabric fencing 6 feet high with galvanized steel pipe post, 1 ½" I.D. for line posts and 2 ½" I.D. for corner posts.

2.02 EQUIPMENT

- A. Water Hoses: Provide ¾" heavy-duty, abrasion resistant, flexible rubber hoses 100 feet long, with pressure rating greater than the maximum pressure of the water distribution system; provide adjustable shut-off nozzles at hose discharge.
- B. Electrical Outlets: Provide properly configured NEMA polarized outlets to prevent insertion of 110-120 volt plugs into higher voltage outlets. Provide receptacle outlets equipped with ground-fault circuit interrupters, reset button and pilot light, for connection of power tools and equipment.
- C. Lamps and Light Fixtures: Provide general service incandescent lamps of wattage required for adequate illumination. Provide guard cages or tempered glass enclosures, where exposed to breakage. Lamps shall be furnished by Contractor. Current shall be paid for by the Contractor. Any additional cost involving service and current for lighting or equipment with voltage requirements in excess of the above or exceeding one 5 HP (each unit) shall be the responsibility of the Contractor.
 - 1. Task Lighting: Task lighting is defined as the additional lighting needs over and above that which is required as Temporary Lighting. Task lighting required by any trade in order to perform their Contract work shall be furnished by the Contractor or his subcontractor.
- D. Heating & A/C Units: Provide temporary heating units that have been tested and labeled by UL, FM or another recognized trade associations related to the type of fuel being consumed. The contractor shall provide proper temperature when heat is required for adequate protection of the project and the products being stored, installed, cured and dried out. Maintain proper temperatures on a 24-hour day, 7-day week basis. Provide properly adjusted, properly maintained, and properly exhausted portable heaters. Fuel, equipment, and method used for temporary heating by portable heaters shall be satisfactory to the Contractor's insurance company and the insurance company providing builder's risk insurance.

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- E. Temporary Offices: The General Contractor shall provide a minimum of 672 square feet (min. 56' x 12') of office space for the Program Manager. The office shall be equipped with heat and A/C, toilet, plan table, plan rack and holders sufficient to contain all project plans and shop drawings. Layout of the office shall be approved by the Program Manager prior to delivery and will consist of a minimum of two (2) offices, a toilet, and a conference room (sufficient for 20 people). The Contractor shall be responsible for blocking, leveling, tie-down, stairs, and landings; installation of electrical, telephone, potable water and water services (temporary sewer tank to be emptied a minimum of 1 time per week or more often if necessary) to the temporary office. The Contractor shall clean, or have cleaned, the Program Manager's office trailer once per week.

The General Contractor shall provide the following new items for the Program Manager's use: two (2) freestanding office desks with two (2) desk chairs, two (2) 48" book cases, two legal size file cabinets, two (2) conference tables (min. 12' x 3') with 20 chairs. The Contractor shall pay for and/or assume all office lease charges, electrical power, telephone and internet service for two (2) lines (1 phone and 1 hi-speed internet with wireless capabilities) and any monthly water and sewage disposal service charges used by the Program Manager's trailer until the date of "Final Completion." At the completion of the project or as directed by the Program Manager, the office shall be demobilized and removed from the site by the Contractor.

- F. First Aid Supplies: Comply with governing regulations.
- G. Fire Extinguishers: Provide hand-carried, portable UL-rated, extinguishers for temporary offices.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Use qualified personnel for installation of temporary facilities and utilities. Locate facilities and utility connections where they will serve the Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities and utility connections as required.
- B. Provide each facility ready for use when needed to avoid delay. Maintain and modify as required. Do not remove until facilities and/or utility connections are no longer needed, or are replaced by authorized use of completed permanent facilities and utilities pursuant to written direction from the Program Manager.

3.02 TEMPORARY UTILITY INSTALLATION

- A. Tree and Plant Protection: Contractors are hereby reminded and cautioned that care shall be exercised to protect trees and plants which are to remain during the progress of the project as well as those located on adjacent properties. Suitable barriers shall be provided around all trees and plants that are to remain and which are in the construction area and product

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handling area or located on adjacent properties. All damage to such trees and plants shall be repaired; broken limbs properly and neatly pruned and painted with pruning paint. Any trees and plants which are excessively damaged shall be replaced in like, kind, size, and species by the Contractor at no additional cost. All work shall be performed by a recognized and approved nursery and/or arborist.

1. All grading around trees and plants to remain shall be such that the root system shall not be disturbed. Earth shall not be temporarily piled around trees and plants, nor shall earth be graded to the trees and plants above the natural root depth for that particular species.
- B. Maintain Access to Fire Hydrants: Should fire hydrants exist on the project site or adjacent properties, and if these hydrants may be susceptible to damaged caused by the operation of the Contractor, they shall be protected by means approved by the Program Manager and/or governing authority.

3.03 SECURITY AND PROTECTION FACILITIES INSTALLATION

- A. Security Enclosure: The General Contractor and each Subcontractor shall be responsible for security and protection to his equipment and the site-stored and installed products under his jurisdiction, whether paid for by the Owner or not, until the Owner accepts the Project.

END OF SECTION

**MALCOLM C. HURSEY MONTESSORI SCHOOL
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SECTION 016400**

OWNER FURNISHED PRODUCTS

PART 1 GENERAL

1.01 DESCRIPTION

- A. Work Included: Coordinate and, if required, install Owner Furnished Equipment as shown on the drawings, as specified herein, and as needed for a complete and proper installation.
1. Owner Furnished/Contractor Installed (OF/CI) Equipment items and Owner Furnished/Owner Installed (OF/OI) Equipment items will be identified on the drawings or in the specifications.
 2. Connections and interface: All necessary connections and interface with new construction shall be the responsibility of the General Contractor. This includes but is not limited to mechanical, plumbing, and electrical connections, sealing and trim closures.

1.02 QUALITY ASSURANCE

- A. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.

1.03 SUBMITTALS

- A. Product Data: In accordance with the Contractor's Construction Schedule, the Owner shall submit to the Contractor the following:
1. Materials list of items proposed to be provided under this Section.
 2. Manufacturer's specifications, catalog cut sheets, installation and instructions.
 3. Shop drawings indicating assembly and construction interface details.

1.04 COORDINATION - FOR OF/CI EQUIPMENT

- A. Owner's Responsibilities:
1. Have the Program Manager arrange for and deliver Owner reviewed Shop Drawings, Product Data, and Samples to Contractor.
 2. Arrange and pay for Product delivery to site.
 3. On delivery, the Program Manager and Owner will inspect Products jointly with Contractor.
 4. Have Program Manager submit claims for transportation damage and replace damaged, defective, or deficient items.

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OWNER FURNISHED PRODUCTS

5. Have Program Manager arrange for manufacturer's warranties, inspections, and service.
- B. Contractor's Responsibilities:
1. Review Owner reviewed Shop Drawings, Product Data, and Samples.
 2. Receive and unload Products at site; inspect for completeness or damage, jointly with Program Manager.
 3. Handle, store, install and finish Products.
 4. Repair or replace items damaged after receipt.

1.05 COORDINATION FOR OF/OI EQUIPMENT

- A. Owner's Responsibilities:
1. Have the Program Manager arrange for and deliver Owner reviewed Shop Drawings, Product Data and Samples to Contractor.
 2. Arrange and pay for Product delivery to site.
 3. On delivery, the Program Manager and Owner will inspect Products jointly with Contractor.
 4. Have the Program Manager submit claims for transportation damage and replace damaged, defective, or deficient items.
 5. Arrange and pay for Product installation at site.
 6. Have the Program Manager arrange for manufacturer's warranties, inspections, and service.
- B. Contractor's Responsibilities:
1. Review Owner reviewed Shop Drawings, Product Data and Samples to become thoroughly familiar with the work. Establish work schedules and material deliveries.
 2. Receive and unload Products at site, inspect for completeness or damage, jointly with Program Manager.
 3. Coordinate work with Owner's installation Contractor. Provide temporary power, water, etc. to facilitate work.

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OWNER FURNISHED PRODUCTS

4. Provide storage, if necessary, of products prior to installation.
5. Make final connections to permanent utility services, such as power, water, gas, sewer to allow for full functional use.
6. Protect all completed work.
7. Repair or replace items damaged after completion.
8. Coordinate training sessions with Program Manager to train Owner's personnel in the proper operation of the equipment.

PART 2 PRODUCTS

2.01 GENERAL

- A. The following equipment will be furnished by the Owner. This general listing is for rough in information and coordination. See the drawings for the location of the installation.

2.02 EQUIPMENT

- A. Owner Furnished/Contractor Installed (OF/CI)
 1. Appliances
 2. Soap Dispensers
 3. Roof joists and decking as described in the Bar Joist and Roof Deck Package dated October 15, 2021
- B. Owner Furnished. Owner Installed (OF/OI)
 1. Carpet
 2. SVT
 3. Sheet Flooring
 4. Rubber Cove Base
 5. Window Shades
 6. Furniture, Office Equipment and Computer Equipment
 7. Technology wiring and equipment (GC to provide conduits and raceways)
 8. Surveillance System (GC to provide conduits and raceways)
 9. Building Access Control Systems (GC to provide conduits and raceways)
 10. Fire Alarm System (GC to provide conduits and raceways)
 11. Intrusion Detection (GC to provide conduits and raceways)
 12. Audio Visual Systems Equipment (GC to provide conduit, raceway and power)
 13. Platform Lighting (GC to provide conduit, raceway and power)
 14. Site Furnishings

OWNER FURNISHED PRODUCTS

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OWNER FURNISHED PRODUCTS

3.03 SURFACE CONDITIONS

- A. Examine the area and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.

3.04 INSTALLATION

- A. Coordinate as required with other trades to assure proper and adequate provision in the work of those trades for interface with the work of this Section.
- B. For OF/CI equipment, install the work of this Section in strict accordance with the original design, pertinent requirements of governmental agencies having jurisdiction, and the manufacturer's recommended installation procedures as approved, anchoring all components firmly into position for long life under hard use.
- C. For OF/CI and OF/OI equipment, upon completion of installation and hookup to utilities, put each operating component through at least five complete operating cycles, adjusting as needed to secure optimum operation level.
- D. Promptly remove from the job site all cartons and packing material associated with the work of this Section.

3.05 RESPONSIBILITY CHARTS

- A. Refer to the attached charts for representation of areas of responsibility between OF/CI and OF/OI System of Products.

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OWNER FURNISHED PRODUCTS

OWNER FURNISHED/CONTRACTOR INSTALLED (OF/CI) TYPICAL

RESPONSIBILITY CHART

Item	Description	School District	Contractor	Manufacturer	A/E	Program Manager
1	List of Equipment				X	
2	Bidding Negotiations					X
3	Purchase Equipment	X				
4	Produce Equipment Shop Drawings			X		
5	Shop Drawing Approval		X		X	
6	Schedule Equipment Delivery Dates		X			
7	Deliver to Jobsite			X		
8	Unload at Jobsite		X			
9	Inspect at Jobsite	X	X			X
10	Property Insurance	X	X			
11	Installation		X			
12	Equipment Startup		X			
13	Clean-up		X			
14	Protection of Installed Materials		X			
15	Warranty		(Labor) X	(Material) X		

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OWNER FURNISHED PRODUCTS

OWNER FURNISHED/OWNER INSTALLED (OF/OI) TYPICAL

RESPONSIBILITY CHART

Item	Description	School District	Contractor	Manufacturer	A/E	Program Manager
1	List of Equipment	X			X	
2	Bidding Negotiations	X				X
3	Purchase Equipment	X				
4	Produce Equipment Shop Drawings			X		
5	Shop Drawing Approval	X			X	
6	Schedule Equipment Delivery Dates	X	X			X
7	Deliver to Jobsite			X		
8	Unload at Jobsite			X		
9	Inspect at Jobsite	X		X		X
10	Property Insurance	X				
11	Installation	X		X		
12	Equipment Startup	X		X		
13	Clean-up	X		X		
14	Protection of Installed Materials		X			
14	Warranty	(Labor) X		(Material) X		

END OF SECTION

**MALCOLM C. HURSEY MONTESSORI SCHOOL
SCHOOL BUILDING NO. 0734
SECTION 016600**

PRODUCT STORAGE AND HANDLING REQUIREMENTS

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Work included: Protect products scheduled for use in the work by means including, but not necessarily limited to, those described in this Section.
- B. Related work:
 - 1. Documents affecting work of this Section include, but are not necessarily limited to, AIA A132 and A232, as amended, and Sections in Division 1 of these specifications.
 - 2. Additional procedures also may be prescribed in other Sections of these specifications.

1.2 QUALITY ASSURANCE

- A. Include within the Contractor's quality assurance program such procedures as are required to assure full protection of work and materials.

1.3 MANUFACTURERS' RECOMMENDATIONS

- A. Except as otherwise approved by the Architect/Engineer(s), determine and comply with manufacturer's recommendations on product handling, storage and protection.

1.4 PRODUCT DELIVERY

- A. Schedule delivery to minimize long-term storage at the site and to prevent overcrowding of construction spaces.
- B. 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.

1.5 PACKAGING

- A. Deliver products to the job site in their manufacturer's original container, with labels intact and legible.
 - 1. Maintain packaged materials with seals unbroken and labels intact until time of use.
 - 2. Promptly remove damaged material and unsuitable items from the job site and promptly replace with material meeting the specified requirements, at no additional cost to the Owner.
- B. The Architect/Engineer(s) may reject as non-complying such material and products that do not bear identification satisfactory to the Architect/ Engineer as to manufacturer, grade, quality and other pertinent information.

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SCHOOL BUILDING NO. 0734
SECTION 016600**

PRODUCT STORAGE AND HANDLING REQUIREMENTS

1.6 PROTECTION OF MATERIAL AND WORK

- A. General
 - 1. Carefully and properly protect all materials of every description, both before and after being used in the work.
 - 2. Provide any enclosing or special protection from weather deemed necessary by the Architect or Program Manager at no additional cost to the Owner.
- B. Partial payments under the Contract will not relieve the Contractor from responsibility.
 - 1. When materials and work at the site which have been partially paid for are not adequately protected by the Contractor, such materials may be protected by the Owner at the expense of the Contractor and no further partial payment thereon will be made.
- C. Maintain finished surfaces clean, unmarred, and suitably protected until accepted by the Owner.

1.7 STORAGE

- A. Store all items of equipment, component parts, etc. in accordance with the manufacturer's recommendations or as may otherwise be necessary to prevent damage or deterioration of any sort.

1.8 REPAIRS AND REPLACEMENTS

- A. In the event of damage, promptly make replacements and repairs to the approval of the Architect/Engineer and at no additional cost to the Owner.
- B. Additional time required to secure replacements and to make repairs will not be considered by the Architect/Engineer to justify an extension in the contract time of completion.

END OF SECTION

**MALCOLM C. HURSEY MONTESSORI SCHOOL
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SECTION 017123**

FIELD ENGINEERING

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Work included: Provide such field engineering services, including survey and civil engineering, as are required for proper completion of the Work including, but not necessarily limited to:
 - 1. Establishing and maintaining lines and levels;
 - 2. Structural design of shores, forms and similar items provided by the Contractor as part of his means and methods of Construction;
 - 3. Dewatering systems.

- B. Related Work:
 - 1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division 1 of these Specifications.
 - 2. Additional requirements for field engineering also may be described in other Sections of these Specifications.
 - 3. As described in Subparagraph 2.2.2 of the General Conditions, the Owner may furnish survey describing the physical characteristics, legal limitations, utility locations, and legal description of the site.

1.2 QUALITY ASSURANCE

- A. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary craft and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of the Section.
 - 1. Surveyor: Engage a Registered Land Surveyor registered in the State where the project is located, to perform land surveying services required.
 - 2. Engineer: Engage a Professional Engineer of the discipline required, registered in the State in which the project is located, to perform required engineering services.

1.3 SUBMITTALS

- A. Comply with pertinent provisions of Section 013300, Submittal Procedures.

- B. Submit the following to the Program Manager, for review by the Program Manager and Architect.
 - 1. Data demonstrating qualifications of persons proposed to be engaged for field engineering services.

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SECTION 017123**

FIELD ENGINEERING

2. Documentation verifying accuracy of field engineering work.
3. Certification, signed by a registered land surveyor, certifying that elevations and locations of improvements are in conformance with requirements of the Contract Documents. The cost for registered land surveyors shall be included in the Contractors bid.

1.4 PROCEDURES

- A. In addition to procedures directed by Contractor for proper performance of the Contractor's responsibilities:
 1. Locate and protect control points before starting work on the site.
 2. Preserve a minimum of two (2) permanent reference points during progress of the Work and through completion of the Work. Locate permanent reference points on as-built documents.
 3. Do not change or relocate reference points or items of the Work without specific approval from the Architect.
 4. Promptly advise the Program Manager when a reference point is lost or destroyed, or required relocation because of other changes in the Work.
 - a. Upon direction of the Program Manager, require the field engineer to replace reference stakes or markers.
 - b. Locate such replacements according to the original survey control.
 5. Existing utilities and equipment: The existence and location of underground and other utilities and construction indicated as existing are not guaranteed. Before beginning any work, investigate and verify the existence and location of underground utilities and other construction.
 - a. Prior to construction, verify the location and invert elevation at points of connection of sanitary sewer, storm sewer and water service piping.

END OF SECTION

**MALCOLM C. HURSEY MONTESSORI SCHOOL
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SECTION 017700**

CLOSEOUT PROCEDURES

A. DEFICIENCY LISTS

1. During the construction of the Work, the Architect/Engineer shall inspect the work for general conformance to the Contract Documents. Concurrently, the Program Manager will determine in general if the Work observed is being performed in accordance with the Contract Documents and will report to both the Owner and the Architect defects and deficiencies observed in the Work.
2. Should observations or inspections reveal work that is not in conformance with the Contract Documents, and if the nature of the non-conformance warrants, at the sole discretion of the Program Manager and/or Architect/Engineer, a written list of deficiencies will be issued.
3. The "deficiency list" as hereinafter called, shall stipulate the item or items of work that are in non-conformance and shall specify a reasonable time for the deficient work to be brought into conformance with the Contract Documents, but in no event shall this time exceed thirty (30) days.
4. Upon receipt of the deficiency list, the Contractor shall by any and all means at his disposal, endeavor to correct the work within the time stipulated. The Contractor shall notify the Program Manager in writing when the work has been corrected and request inspection.
5. If the inspection reveals the deficiency has been corrected, the item shall be rescinded from the deficiency list.
6. During the period that the deficiency list is in effect, the Program Manager and/or Architect may, at their discretion, reduce progress payments accordingly until the deficiency is corrected.
7. During the course of construction, the Architect/Engineer(s) will perform periodic site visits and inspections. Written comments of the Architect/Engineer(s) pertaining to such visits shall be issued as an Architect/Engineer(s) Field Report. It shall be the responsibility of the Contractor to issue a response to each Field Report within ten (10) days of receipt. Failure to respond in writing within this time period could result in delays of approval of progress payment requests.

B. PUNCH LIST/FINAL INSPECTION

1. When the Contractor determines that his work or portions of his work are sufficiently near completion to warrant a preliminary inspection, he shall prepare a preliminary punch list and submit it along with a written request for a preliminary review to the Program Manager.
2. At a mutually agreeable time, the Program Manager and Contractor shall conduct a preliminary review of the Work for completeness and general conformance to the Contract Documents. At this preliminary review, a punch list of incomplete or non-conformance work shall be prepared by the Contractor.
3. The Program Manager shall establish a reasonable time period for the completion or correction of all items on the preliminary review punch list, but in no event shall this time exceed fourteen (14) days. At the completion of the preliminary review punch list, the Substantial Completion inspection shall be scheduled.

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SECTION 017700**

CLOSEOUT PROCEDURES

4. The Substantial Completion inspection shall be performed by the Architect/Engineer with attendance by the Program Manager and Contractor. The Owner may attend at its discretion. The Contractor shall present to the Architect/Engineer a certification letter that the project is complete along with a written list of any incomplete work, and a reason why the item of work is incomplete and give a date when the work will be complete. Substantial Completion inspection shall NOT be conducted unless the Contractor presents this certification letter and list.
5. At the conclusion of the Substantial Completion inspection the Architect will review the project and determine if the completeness of the work allows Substantial Completion to be established. In addition to an overall state of completeness, other items that must be completed when making this determination include;
 - a. All building systems have passed operable testing and acceptance by the Owner's Commissioning Agent.
 - b. A preliminary copy of the completed TABS report has been submitted for review.
 - c. The Office of School Facilities Inspection has been successfully completed.
 - d. Inspection by the SC Office of the State Fire Marshal has been successfully completed.

Should the amount of incomplete work be such that a Certificate of Substantial Completion cannot be issued, another Substantial Completion inspection shall be required.

7. Once Substantial Completion has been established, the Architect and Program Manager shall issue a Certificate of Substantial Completion and a Substantial Completion punch list.
8. If the Contractor fails to obtain Final Completion with 100% of the Substantial Completion punch list completed with-in 30 days of the date of Substantial Completion, the Owner shall be entitled to liquidated damages as noted in paragraph 3.6.1 of AIA Document A132-2009 Standard Form of Agreement Between Owner and Contractor, and as noted in paragraph 9.10.5 of AIA Document A232-2009 General Conditions of the Contract for Construction. Additionally, at the end this thirty (30) day period the Owner reserves the right to take over the project and expedite the completion of the remaining punch list items at any time with their forces, or by contract, or any other means available, with all cost, including those for additional oversight by the Program Manager and/or Architect, deducted from the remaining contract funds. Substantial Completion punch list liquidated damages will continue until a Final Completion Certificate is obtained regardless of how the punch list is completed.
9. Any work on site after the date of Substantial Completion, including punch list work, must not prevent school operations, and must be coordinated with the Program Manager and the School Principal with adequate notice. In addition, the Contractor's Superintendent must be on site any time work is in progress. By bidding this work, the Contractor acknowledges that he will provide an on-site superintendent at all times work is in progress.

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SECTION 017700**

CLOSEOUT PROCEDURES

10. Upon completion of all Work, including punch list work, the Contractor shall submit a written request that the work is ready for a final inspection and acceptance, as described in Article 9.10 of AIA Document A232-2009 General Conditions of the Contract for Construction.

C. PROJECT CLOSEOUT

1. Final Closeout and Payment

- a. No funds for Punchlist, Closeout, Retainage or Final Payment Application shall be processed for payment until final inspection and final acceptance of all work and closeout documentation has been received, approved and accepted by the Architect and Program Manager. Partial funds may be released for Closeout Documents as they are approved by the Architect.
- b. Contractor shall submit final closeout items within thirty (30) days after Date of Substantial Completion. If closeout documents are not timely submitted and the Owner determines that they are impacting operations of the school, the Owner may elect to procure closeout submittals directly from the appropriate subcontractor, supplier or other vendor with all related costs deducted from the Contract Sum by change order.

2. Closeout Checklist

- a. The Closeout Checklist items must be submitted to the Program Manager and approved by the Architect, see insert.

2. Related Work

- a. Other requirements affecting work of this Section include, but are not necessarily limited to, AIA A132 and A232- 2009 General Conditions, as amended, Division 01 – Section 013300 - Submittal Procedures, 013301 Elect Project Management System (EPMS), OpCenter Build, 017823 Operation & Maintenance Data, and 017836 Warranties/Bonds.

D. RESPONSIBILITY

1. It shall be the Contractor's responsibility to see that all requirements of this Section of the Specifications are executed and completed in a timely manner. The Contractor shall be responsible for any Architect and Program Manager costs due to late submittal of closeout documents or incomplete work, including uncompleted punch list items, beyond thirty (30) days past the date of Substantial Completion.
2. No provisions of this Section of the Specifications shall in any way relieve the Contractor of the completion of his work on time and in accordance with the approved Construction Schedule.

END OF SECTION

PROJECT CLOSE-OUT CHECKLIST

Project: _____ Project Manager’s Signature: _____ Date: _____

<u>TASK DESCRIPTION</u>	<u>COMPLETED</u>	<u>DATE</u>
A. General Requirements		
1. Certificate of Substantial Completion (AIA G704) Executed by Architect, Contractor and Owner	_____	_____
2. Inspection Certificates		
a. Final Inspection Approved by Office of School Facilities – OSF & Local Fire Marshall	_____	_____
3. Regulatory Inspections Sign-Offs (as applicable) Close-Out Permits:		
a. Complete Schedule A-1 through A-5 (See Schedule “A-1 to A-5 Excel Work Sheets)	_____	_____
A-1 Road Boulevard, A-2 DEHEC Sewer, A-3 DEHEC Water, A-4 OCRM Storm Water & A-5 HVAC Start-Ups (TAB)	_____	_____
4. Turnover Close-Out Reports & Documentation (See sample TOC & Warranty TOC)		
a. Owner Instruction and Training with Equipment and Systems	_____	_____
(Memo/List of Attendees & sign in sheet for each session)	_____	_____
b. Chapter 1 & 17 USB Drive	_____	_____
c. Attic Stock Turnover (Transfer to Owner with Typed Inventory Required)	_____	_____
d. Keys & Permanent Hardware Changeover		
(Delivery of Final Main & Cabinet Keys w/Memo of Hardware Changeover Date)	_____	_____
e. Insurance Coverage Change Over	_____	_____
f. Utility Account Change Over		
I. Electric Service	_____	_____
II. Gas Service	_____	_____
III. Water Service	_____	_____
IV. Phone Service	_____	_____
V. Other Service (Security, Cable, SCETV etc.)	_____	_____
B. Record Document Requirements		
1. As-Built Drawings		
(Original red-line hard copy, electronic copy in 2005 CAD version <u>and</u> PDF format on CD)		
a. Site / Civil	_____	_____
b. Architectural	_____	_____
c. Structural	_____	_____
d. Plumbing	_____	_____
e. Fire Protection	_____	_____
f. Mechanical	_____	_____
g. Electrical	_____	_____
h. Security	_____	_____

PROJECT CLOSE-OUT CHECKLIST

Project: _____ Project Manager's Signature: _____ Date: _____

<u>TASK DESCRIPTION</u>	<u>COMPLETED</u>	<u>DATE</u>
i. Other (Kitchen Equipment etc.)	_____	_____
2. Final Finish Schedule (Updated with actual finishes on USB Drive)	_____	_____
3. Operation & Maintenance (O+M) Manuals (Approval cover letter from Architect required)	_____	_____
a. Product & Operations Data	_____	_____
b. Maintenance Information / List of Contractors & Contact info (with Filter Schedule)	_____	_____
c. Product Warranty Certificates & Maintenance Agreements	_____	_____
d. Commissioning Agents Final Report (Binder & USB)	_____	_____
4. Shop Drawings – Complete Set (With Architect's Review Stamp)	_____	_____
C. Record Document Requirements – by Contractor		
1. Contractor's Certification of Completion of Work	_____	_____
2. Affidavit of Release of Liens (AIA G706A)	_____	_____
3. Affidavit of Payment of Debts and Claims (AIA G706)	_____	_____
4. Consent of Surety of Final Payment (AIA G707)	_____	_____
5. Final MBE Documentation	_____	_____
6. Final Request for Payment Certified by Architect	_____	_____
7. Contractors One-Year Warranty (notarized)	_____	_____
8. Subcontractor/Supplier Release of Liens	_____	_____
9. No Asbestos materials used Letter	_____	_____
D. Final Accounting Requirements – by Architect		
1. Cover Letter of Approval of Roof Warranty	_____	_____
2. Cover Letter of Approval for O&M Manuals	_____	_____
3. Certification by Architect of Completed Final Punch List	_____	_____
4. Final Liquidated Damages analysis by Architect	_____	_____
5. AHERA - disclaimer / letter (AIA B141)	_____	_____
6. Record Drawings	_____	_____
(Electronic files based on Contractor As-Builts; <u>see contract documents for quantity</u>)	_____	_____
E. Warranty Period		
1. Pre-Expiration Warranty Inspection	_____	_____
(Inspection 30 days prior to warranty expiration date)	_____	_____

PROJECT CLOSE-OUT CHECKLIST

Project: _____ Project Manager’s Signature: _____ Date: _____

TASK DESCRIPTION

COMPLETED

DATE

“Sample of Project Table of Contents”

SCHOOL NAME

TABLE OF CONTENTS

Section #	Description
01	Contact List (Hard Copy and USB Drive) Project Directory
02	Completion Certificates (Hard Copy and USB Drive) Certificate of Substantial Completion for: Sprinkler Acceptance DHEC Approvals LLR Elevator Acceptance NOT
03	Contractors Affidavit (Hard Copy and USB Drive) G706 – Payment of Debts and Claims G706A – Release of Liens G707 – Consent of Surety to Final Payment
04	Warranties (Hard Copy and USB Drive) Warranty Table of Contents GC Warranty All Sub-Contractors Warranties
05	As-Built Drawings – Red Line to A/E by GC As-Built Drawings - PDF and CAD Files – by A/E (2 hard copies and USB Drive of final drawings) General Civil Landscape Structural Architectural Fire Protection Plumbing Mechanical Electrical Theatrical
06	O&M Manuals (USB Drive)

PROJECT CLOSE-OUT CHECKLIST

Project: _____ Project Manager's Signature: _____ Date: _____

TASK DESCRIPTION

COMPLETED

DATE

- 07 – Thermal and Moisture Protection
- 08 – Openings
- 09 – Finishes
- 10 – Specialties
- 12 – Furnishings
- 13 – Special Construction
- 14 – Conveying Equipment
- 21 – Fire Suppression
- 22 & 23 – Plumbing & HVAC
- 26 – Electrical
- 27 – Communications
- 28 – Electronic Safety and Security
- 31 – Earthwork
- 32 – Exterior Improvements
- 33 – Utilities

07 Punchlist / Post Occupancy Notes (USB Drive)
 Post Occupancy Meeting Notes
 OSF Punchlist
 Commissioning
 Chapter 1 & 17 Inspections

08 Miscellaneous (USB Drive)
 Owner Training
 Photos

“Sample of Warranty TOC”

#	Spec Section	Description	Contractor	Manufacturer	Start Date	Extent	Duration
1	000000	GC Warranty	Smith's Construction				
2	071351	Sheet Waterproofing	Smith's Waterproofing P.O. Box 000 Lexington, SC 29072 Bob Smith 803.000-0000	Carlisle Coatings and Waterproofing	Date of Substantial Completion	Defects, Installation	Defects: 5 yrs Installation: 2 yrs
3	074213	Metal Wall Panels	Smith's Waterproofing P.O. Box 000 Lexington, SC 29072	Fabral	Date of Substantial Completion	Paint finish, Structural defects/failures	Paint Finish: 20 yrs Defects: 1 yr
4	074243	Composite Wall Panels	Smith's Waterproofing P.O. Box 000 Lexington, SC 29072 Bob Smith 803.000-0000	ALPOLIC Materials	Date of Substantial Completion	Paint finish, Structural defects/failures	Paint finish: 20 yrs Defects: 2 yrs

**MALCOLM C. HURSEY MONTESSORI SCHOOL
SCHOOL BUILDING NO. 0734
SECTION 017823**

OPERATIONS AND MAINTENANCE DATA

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Work included: To aid the continued instruction of operating and maintenance personnel, and to provide a positive source of information regarding the products incorporated into the Work, furnish and deliver the data described in this Section and in pertinent other sections of these Specifications.
- B. Related Work:
 - 1. Documents affecting work of this section include, but are not necessarily limited to, AIA A132 and A232- 2009 General Conditions, as amended and Sections in Division 01 of these Specifications.
 - 2. Required contents of submittals also may be amplified in pertinent other Sections of these Specifications.

1.2 QUALITY ASSURANCE

- A. In preparing data required by this Section, use only personnel who are thoroughly trained and experienced in operation and maintenance of the described items, completely familiar with the requirements of this Section, and skilled in technical writing to the extent needed for communicating the essential data.

1.3 SUBMITTALS

- A. Comply with pertinent provisions of AIA A132 and A232- 2009 General Conditions, as amended, Division 01 – Section 013300 - Submittal Procedures and 013301 Elect Project Management System (EPMS), CMiC.
- B. Submit the Operation and Maintenance Manual to the Architect electronically in pdf format with Shop Drawing submittals and within sixty (60) days of the Notice to Proceed.
 - 1. The PDF file is to include a Table of Contents and be bookmarked to each section in the Table of Contents.
 - 2. Refer to Closeout Checklist for additional submission criteria.
- C. Submittals of approved copies of operation and maintenance data will be a prerequisite for approval of payment applications.

PART 2 - PRODUCTS

2.1 INSTRUCTION MANUALS

- A. Where instruction Manuals are required to be submitted under other Sections of these

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OPERATIONS AND MAINTENANCE DATA

Specifications, prepare in accordance with the provision of this Section.

B. Format:

1. Size: 8-1/2" x 11"
2. Paper: White bond, at least 20 lb. weight
3. Text: Neatly written or printed
4. Drawings: 11" in height, preferable; bind in with text; foldout acceptable; larger drawings acceptable but fold to fit within the Manual and provide a drawing pocket inside rear cover or bind in with text.
5. Flysheets: Separate each portion of the Manual with neatly prepared flysheets briefly describing contents of the ensuing portion; flysheets may be in color.
6. Binding: Use heavy-duty plastic or fiber
7. Measurements: Provide all measurements in U.S. standard units such as feet-and-inches, lbs. and cfm; where items may be expected to be measured within ten years in accordance with metric formula, provide additional measurements in the "International System of Units" (SI).

C. Provide front and back covers for each Manual, using durable material approved by the Architect, and clearly identified on or through the cover with at least the following information:

OPERATING AND MAINTENANCE INSTRUCTIONS

- | | |
|---|--------|
| (____ Name and address of Work | _____) |
| (____ Name of Contractor | _____) |
| (____ General subject of this manual | _____) |
| (____ Approval signature of Program Manager | _____) |
| (____ Approval date | _____) |

D. Contents: Include at least the following:

1. Neatly typewritten index near the front of the Manual, giving immediate information as to location within the Manual of all emergency information regarding the installation.
2. Complete instructions regarding the installation and maintenance of all equipment involved including lubrication, disassembly, and reassembly.
3. Complete nomenclature of all parts of all equipment.
4. Complete nomenclature and part number of all other data pertinent to procurement procedures.

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OPERATIONS AND MAINTENANCE DATA

5. Copy of all guarantees and warranties issued.
6. Manufacturer's bulletins, cuts, and descriptive data, where pertinent, clearly indicating the precise items included in this installation and deleting, or otherwise clearly indicating, all manufacturer's data.
7. Such other data as required in pertinent Sections of these Specifications.

PART 3 - EXECUTION

3.1 INSTRUCTION MANUALS

- A. Complete the Manuals in strict accordance with the approved preliminary drafts and the Program Manager's and Architect's review comments.
- B. Any and all other items required by the specific specifications relating to the maintenance and operations of the various components of the work or any and all certificates and testing reports required by the specific specifications shall be incorporated into the maintenance manuals. Items of this nature shall include but are not limited to:
 1. Test and balance reports of HVAC systems.
 2. Test and certification reports of electrical systems such as fire alarm and life safety systems, communications systems, clock systems, etc.
 3. Valve tag lists
 4. Certification of sterilization of potable water systems.

3.2 MAINTENANCE TRAINING

- A. Comply with pertinent provisions of AIA A132 and A232- 2009 General Conditions, as amended and Division 01.
- B. Each Contractor, Subcontractor, and/or Factory Representative shall instruct the Owner in the proper care, maintenance and operation of all systems installed under his Contract. Provide a written letter stating that the Owner has been instructed and list the following:
 1. Date, time and place of instruction
 2. Parties present
 3. Systems and items instructions were given on

END OF SECTION

OPERATION AND MAINTENANCE DATA

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SECTION 017836**

WARRANTIES AND BONDS

PART 1 - GENERAL

1.1 WORK INCLUDES

- A. Compile specified warranties and bonds.
- B. Compile specified service and maintenance contracts.
- C. Co-execute submittals when so specified.
- D. Review submittals to verify compliance with Contract Documents.
- E. Submit to Program Manager for review and transmittal to Owner.
- F. Related Requirements in Other Parts of Project Manual:
 - 1. Bid or Proposal Bonds: Instruction to Bidders.
 - 2. Performance Bond and Labor and Material Payment Bond: General Conditions of the Contract.
 - 3. General Warranty of Construction: General Conditions of the Contract.
- G. Related Requirements Specified in Other Sections:
 - 1. Comply with pertinent provisions of AIA A132 and A232- 2009 General Conditions, as amended, Division 01 – Section 013300 - Submittal Procedures, and Division 01 - Section 017700 – Closeout Procedures.
 - 2. Operations & Maintenance Data: Section 017823 – Operations and Maintenance Data.
 - 3. Warranties and Bonds Required for Specific Products:
 - 4. Provision and Warranties & Bonds, Duration:

1.2 SUBMITTAL REQUIREMENTS

- A. Assemble warranties, bond and service and maintenance contracts, executed by each of respective manufacturers, suppliers, and subcontractors.
- B. Number original signed copies required: Two (2) each.
- C. Table of Contents: Neatly typed, in orderly sequence. Provide complete information for each item.
 - 1. Product or work item.
 - 2. Firm, with name of principal, address and telephone number.

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WARRANTIES AND BONDS

3. Scope.
4. Date of beginning of warranty, bond or service and maintenance contract.
5. Duration of warranty, bond or service and maintenance contract.
6. Provide information for Owner's personnel:
 - a. Proper procedure in case of failure.
 - b. Instances which might affect validity of warranty or bond.
7. Contractor, name or responsible principal, address and telephone number.

1.3 FORM OF SUBMITTAL

- A. Prepare in duplicate packets.
- B. Format:
 1. Size 8-1/2 in. x 11 in., punch sheets for 3-ring binder.
 - a. Fold larger sheets to fit into binders.
 2. Cover: Identify each packet with typed or printed title "WARRANTIES AND BONDS".
List:
 - a. Title of Project
 - b. Name of Contractor
- C. Binders: Commercial quality three-ring, with durable and cleanable plastic covers.
- D. Electronic Submission:
 1. USB Storage Device – Submit two (2) USB storage devices
 2. File Medium - Required data shall be PDF format.

1.4 TIME OF SUBMITTALS

- A. For equipment or component parts of equipment put into service during progress of construction:
 1. Submit "Draft" documents within sixty (60) days of Notice to Proceed for format approval.
 2. Note: Warranty periods for equipment started during construction will not start until substantial completion for the project.

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WARRANTIES AND BONDS

- B. Submit final documents thirty (30) days after Date of Substantial Completion.
- C. For items of work, where acceptance is delayed materially beyond Date of Substantial Completion, provide updated submittal within ten days after acceptance, listing date of acceptance as start of warranty period.

1.5 SUBMITTALS REQUIRED

- A. Submit warranties, bonds, and service and maintenance contracts as specified in respective sections of Specifications.

END OF SECTION

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SECTION 017839**

PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Work included:
 - 1. Throughout progress of the Work, maintain an accurate record of changes in the Contract Documents, as described in Article 3.1 below and in Article 3.11.2 of the AIA A232 -2009 General Conditions of the Contract for Constructed, as amended.
 - 2. Upon completion of the Work, deliver the recorded changes to the Program Manager.
 - 3. Final record survey, performed by a Professional Land Surveyor, of installed underground materials and final grades.

- B. Related work:
 - 1. Documents affecting work of this Section include, but are not necessarily limited to, AIA A132 and A232- 2009 General Conditions, as amended, and Sections in Division 1 of these specifications.
 - 2. Other requirements affecting Project Record Documents may appear in pertinent other Sections of these specifications.

1.2 QUALITY ASSURANCE

- A. Delegate the responsibility for maintenance of Record Documents to one person on the Contractor's staff as approved by the Program Manager.

- B. Accuracy of records:
 - 1. Accuracy of records shall be such that future searches for items shown on the Project Record Documents may rely reasonably on the information provided under this Section of the Work.

1.3 SUBMITTALS

- A. The Program Manager's and Architect/ Engineer's approval of the current status of Project Record Documents will be a prerequisite to the approval of requests for progress payment and request for final payment under the Contract.

- B. Prior to submitting each request for progress payment, secure the Program Manager's approval of the current status of the Project Record Documents.

- C. Prior to submitting the final request for payment, submit the final Project Record Documents to the Program Manager for transmission to the Architect and secure the Architect's written approval.

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PROJECT RECORD DOCUMENTS

1.4 PRODUCT HANDLING

- A. Maintain the job set of Record Documents completely protected from deterioration and from loss and damage until completion of the Work and transfer to the Program Manager.
- B. In the event of loss of recorded data, use means necessary to again secure the data to the Program Manager's approval.
 - 1. Such means shall include, if necessary in the opinion of the Program Manager, removal and replacement of concealing materials.
 - 2. In such case, provide replacements to the standards originally required by the Contract Documents.

PART 2 - PRODUCTS

2.1 JOB SET DOCUMENTS

- A. Promptly following receipt of the Owner's Notice to Proceed, secure from the Program Manager, at no charge to the Contractor:
 - 1. One complete set of all Documents comprising the Contract, including Plans, Specification Manuals, and Shop Drawings Log.
 - 2. Field survey books for use in staking sewer work.

PART 3 - EXECUTION

3.1 MAINTENANCE OF JOB SET

- A. Immediately upon receipt of the job set described in Paragraph 2.1-A above, identify each of the Documents with the title, "RECORD DOCUMENTS - JOB SET".
- B. Preservation:
 - 1. Considering the Contract completion time, the probable number of occasions upon which the job set must be taken out for new entries and for examination, and the conditions under which these activities will be performed, devise a suitable method for protecting the job set to the approval of the Architect.
 - 2. Do not use the job set for any purpose except entry of new data and for review by the Architect.
 - 3. Maintain the job set at the site of Work.
- C. Making entries on Job Set Drawings:

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PROJECT RECORD DOCUMENTS

1. Use erasable colored pencil, preferably red (not ink or indelible pencil) to delineate changes.
 2. Show by station number location of all fittings, manholes, valves, wye locations, etc.
 3. Reference all valves to above ground items deemed to be reasonably safe from being relocated and indicate such references on the drawings.
 4. Show location of electrical conduit, pull boxes, etc.
 5. Show all finish grades.
 6. Note related Change Orders, Construction Change Directives, Supplemental Instructions, and Requests for Information on plan sheets where applicable.
 7. Maintain one complete copy of the Project Manual, including addenda, and one copy of other written construction documents such as Change Orders, Construction Change Directives, and modifications issued in printed form during construction. Mark these documents to show substantial variations in actual work performed in comparison with the text of the Specifications and modifications.
 8. Maintain one copy of each Product Data submittal. Mark these documents to show significant variations in actual Work performed in comparison with information submitted. Include variations in products delivered to the site, and from the manufacturer's installation instructions and recommendations.
- D. Submittals – Submit the following all within thirty (30) days after the Date of Substantial Completion:
1. Submit "marked-up" set of record drawings, project manual, and other construction documents to the Architect.
 2. Make any necessary additions as required by the Architect.
 3. Submit field survey books to the Program Manager.
 4. Submit one complete set of Product Data (Shop Drawing) submittals to the Program Manager. All submittals are to include approval stamp of the Architect.

END OF SECTION

Section 01810 – General Commissioning Requirements

PART 1 GENERAL

1.1 DESCRIPTION

- A. This Section shall delineate the requirements of the Prime Contractors and Installation Sub-Contractors in the execution of the commissioning process.
- B. Commissioning (Cx) is the process of ensuring that all building systems are installed and perform interactively according to the design intent, meet the Owner's operational needs, the installation is adequately documented and the building system Operations and Maintenance staff are adequately trained. It establishes testing and communication protocols to advance the building systems from installation to full dynamic operation and optimization.
- C. The Prime Contractors verify installation, provides scheduling and coordination of commissioning activities with sub-contractors, performs training, starts up equipment, conducts functional performance testing, corrects deficiencies, performs retests, and provides documentation of the effort. Prime Contractors are expected to verify the functional readiness of systems to be tested prior to scheduling and demonstrating the functional operational performance in the presence of the Commissioning Agent (CA).
- D. The CA works with the Prime Contractors and the A/E to direct and oversee the Cx process and witness functional performance testing.

1.2 RELATED SECTIONS

- A. Division 23 – HVAC Construction
- B. Division 21 – Plumbing Construction
- C. Division 22 – Electrical Construction

1.3 SYSTEMS IN COMMISSIONING PROGRAM

- A. HVAC Mechanical Equipment including air-handling units, split system air conditioners and zone temperature control.
- B. Heating Hot Water System.
- C. Steam and Condensate System.
- D. Building Automation System.
- E. Plumbing Distribution System.

- F. Lighting Controls.
- G. Fire Detection System.

1.4 COORDINATION

A. Commissioning Team:

1. Members of the Commissioning Team (CT) shall consist of:
 - a. Commissioning Agent (CA)
 - b. Owner's Representative(s) (OR)
 - c. Design Professional (A/E)
 - d. Prime General Contractor (GC)
 - e. Prime HVAC Contractor (MC)
 - f. Prime Plumbing Contractor (PC)
 - g. Prime Electrical Contractor (EC)
 - h. Test and Balance Sub-Contractor (TAB)
 - i. Controls Sub-Contractor (CC)

B. Installation verification and start-up documentation.

1. The Prime Contractor is responsible for installation in accordance with applicable code, plans, specifications and industry standards and practices. Section 01400 – Quality Control Services includes inspection and testing requirements by the Contractor. The commissioning program utilizes installation verification and start-up checklists for equipment included in the program. The documentation of installation and start-up shall be included in the requirements of the Quality Control Services and all Contractors shall be responsible for completing their sections of these checklists.

C. Functional Performance Testing.

1. Once the installation verification and start-up checks have been completed and all deficiencies identified have been corrected, a functional operational demonstration of the equipment shall be performed. The OR may elect to also witness activities on a case-by-case basis.

D. Training.

1. As specified in Section 01700 and the technical sections of this specification, Prime Contractors are responsible for coordinating and providing training to the building operators. The CA shall work with the Owner's Facility Management Department to define the areas of focus for the training and develop the training plan. It shall be the Prime Contractors' responsibility to prepare the training sessions in accordance with the training plan and execute the training sessions utilizing qualified and experienced instructors and in accordance with the training plan.

E. Meetings.

1. Participate in regularly scheduled commissioning meetings. In order to coordinate the commissioning activities, the CA shall conduct regular commissioning meetings. These would typically follow a project progress meeting.

F. Management:

1. The Owner shall provide the services of the CA. The CA directs and coordinates

commissioning activities and reports to OR. All members of the Commissioning Team work together to fulfill contracted responsibilities and objectives of the Contract Documents.

G. Scheduling:

1. In cooperation with the CA, the Prime Contractors shall integrate commissioning activities into the master construction schedule. This integration of commissioning activities, in general terms, shall be developed early in the project and then refined as the project progresses.
2. Scheduling issues shall be resolved at monthly commissioning meetings. The CA shall provide an initial schedule of primary commissioning events at the commissioning kick-off meeting. As construction progresses, more specific activities and milestones shall be incorporated into the master construction schedule.
3. There shall be at least one commissioning scheduling meeting for all commissioning team members to integrate key commissioning activities (i.e., equipment start-ups and functional testing) with critical construction milestones. Participants shall include both the Contractor Project Managers and the key on-site representatives. This meeting typically occurs about two months prior to equipment start-ups and can take up to a day.
4. Prime Contractors shall provide written timely notice to OR of any changes in date, time, location or anticipated duration of start-up and test activities. For the purpose of this paragraph written notice shall be received by OR a minimum of 72 hours in advance to be considered timely.

1.5 DEFINITIONS

- A. Acceptance Phase: Phase of construction after startup and initial checkout when Functional Performance Testing, O&M documentation review, and facility and user training occurs.
- B. Basis of Design: Documentation of design criteria and decisions made to meet design intent. Describes systems, components, conditions, and methods chosen to define the intent of the Owner. Basis of Design is developed by the Design Professionals.
- C. Commissioning Agent (CA): The consultant who directs and coordinates day-to-day commissioning activities. The CA reports directly to the Owner.
- D. Commissioning Plan: Overall plan that provides structure means of scheduling and coordination for the commissioning process.
- E. Commissioning Team: Owner, Design Professionals, Commissioning Agent, Division Prime Contractors and Division Sub-Contractors.
- F. Contractor: When used separately, refers to the Prime Contractors and/or Sub-Contractors on the project who are responsible for a particular commissioning activity.
- G. Deferred Functional Test: Functional test performed after substantial completion due to conditions that preclude test from being performed in normal sequential order of project delivery.

- H. Deficiency: Condition of a component, piece of equipment, or system that is not in compliance with Contract Documents (That is, does not perform properly or does not comply with design intent.)
- I. Design Professional (A/E): The design team, generally the Architect, HVAC / Mechanical / Piping Engineer and Electrical Engineer.
- J. Factory Testing: Testing of equipment at factory by the Manufacturer.
- K. Functional Performance Test (FPT): Test of dynamic function and operation of equipment and systems. Systems are tested under various modes, such as during low cooling or heating loads, high loads, component failures, unoccupied, varying outside air temperatures, fire alarm, power failure, etc. Systems are run through all specified sequences of operation. Components are verified to be responding in accordance with contract documents. CA develops Functional Performance Test procedures in sequential written form, coordinates, oversees and documents actual testing, which is usually performed by installing contractor or vendor. Functional Performance Tests are executed after installation checklists and startups are complete. FPTs are conducted only after the completed IV documentation has been submitted to the CA.
- L. Functional Performance Test Procedures: Protocols and instructions described in the Commissioning Plan and specifications that describe process required to document the demonstration of functional operational performance.
- M. Installation Verification and Start-Up Checklist (IV): List of items to inspect and elementary component tests that verify proper installation of equipment. The checklists are primarily static inspections and procedures to prepare equipment or system for initial operation (e.g., belt tension, oil levels, labels affixed, gages in place, sensors calibrated, etc.) The IV document shall be developed by the CA. Since this documentation is part of the Project Quality Control Services, the Prime Contractors shall be responsible for compiling this information and submitting completed document to CA.
- N. Prime Contractor: The Contractor responsible for the overall installation and construction of a particular area of construction (e.g., General, HVAC, Plumbing, Electrical). Responsible for coordinating the installation and start-up of equipment, components and systems within their area of responsibility. May include sub-contractors from other trades to complete the installation. Works with the Commissioning Agent in the Commissioning Program.
- O. Seasonal Performance Test: Functional Performance Test executed at the time of year such that system(s) experience conditions closer to design conditions.
- AA. Startup: Initial start or activation of dynamic equipment, including executing installation verification / start-up checklists.

1.6 SUBMITTALS

- A. General: Submit the following in accordance with Conditions of the Contract and Division 01 Specification Sections.
- B. Start-Up Plan.
 - 1. For each piece of equipment or system submit a start-up plan for review by the A/E and the CA. Obtain approval of the plan prior to beginning activities. The plan should include, but not be limited to, the following:
 - a. Start-up schedule
 - b. Names of firms/individuals required to participate
 - c. Manufacturer's start-up documentation
- C. Installation Verification and Start-Up Checklists.
 - 1. As part of the project quality control services, the Contractors shall utilize installation verification and start-up checklists and data forms, developed by the CA, to document the installation and start-up of the various system components and equipment. Contractors shall review these documents and submit manufacturer's start-up documentation, as appropriate, for inclusion in the forms required for installation verification and start-up. Completed forms shall be submitted to the CA.
- D. Start-Up Deficiency Lists.
 - 1. Start-Up Deficiency Lists shall be submitted after the initial equipment start-up to monitor the correction of any deficiencies identified during the start-up. Updates to the list shall be provided on a weekly basis.
- E. The CA shall review other Prime Contractor submittals for criteria as related to commissioning. Review is primarily intended to aid in development of functional testing procedures. The CA notifies OR and A/E of missing items or where issues may exist.

1.7 SEQUENCING AND SCHEDULING

- A. Cx Scheduling: Prime Contractors shall incorporate the commissioning process into the project schedule. Start-Up, TAB, and Functional Performance Testing shall be itemized as applicable for each system/area. CA shall coordinate with the Prime Contractors to establish duration for the tasks.
- B. The satisfactory completion of the functional performance testing of the building systems in the Commissioning Program is a requirement for Substantial Completion of the work. For planning purposes, it is anticipated that the functional performance testing period shall occur during the last month prior to Substantial Completion. All building systems included in the commissioning program shall be ready for functional performance testing including the completion of all prerequisite requirements for testing as stated in the specifications.
- C. Approximately two months prior to the start-up activities, a working session shall be held to review construction and commissioning milestones with the Prime Contractors to ensure that all critical path items are identified and monitored.

PART 2 PRODUCTS

2.1 TEST EQUIPMENT

- A. Prime Contractors shall provide all specialized tools, test equipment, and instruments required to execute startup, checkout, and functional performance testing of equipment under their contract.

PART 3 EXECUTION

3.1 COMMISSIONING PROCEDURE

- A. Sequence of testing: Commissioning shall proceed from lower to higher levels of complexity. For each discrete subsystem or system, testing at the lower level shall be completed prior to starting the next higher level of tests. In general, the order of testing, from lowest to highest is as follows:
 - 1. Static tests (e.g., duct leakage tests, meggar tests). These tests or standard construction testing requirements as part of the Quality Control Services. The Owner's Representative, CA and Prime Contractor may witness the initial static tests to establish the standard for testing and the acceptance criteria. The Contractors shall then be responsible for conducting future tests in accordance with this standard. The Owner's Representative and/or the CA may observe future tests.
 - 2. Component installation verification (e.g., motors, actuators, sensor calibration, etc.) and start-up utilizing checklists developed by the CA.
 - 3. System Balancing
 - 4. System functional performance tests
 - 5. Intersystem functional performance tests
- B. Retesting: Contractor shall repeat, at no additional cost to the Owner, the complete functional test procedure for each test in which acceptable results are not achieved and the failed test is due to the Contractor's action or non-conformance to contract requirements. Repeat tests until acceptable results are achieved.
- C. Correction of deficiencies
 - 1. Contractor shall correct functional performance test deficiencies promptly and coordinate the scheduling of the retest with the CA.

3.2 CONTRACTOR PARTICIPATION IN COMMISSIONING

- A. Provide skilled technicians, and manufacturer representatives as appropriate, to start up systems.
- B. These same technicians shall be made available to assist the CA in completing the commissioning program as it relates to each system and their technical specialty.
- C. Work schedules, time required for testing, etc., shall be coordinated by the Contractor to ensure that all work is completed and ready for functional performance testing two months prior to substantial completion.
- D. Contractor shall ensure that qualified technician(s) are available and present during the agreed-upon schedules and for sufficient duration to complete the necessary tests, adjustment, and problem resolutions.

- E. System problems and discrepancies may require additional technician time, which shall be made available for the subsequent commissioning periods until required system performance is obtained.

3.3 CONTRACTOR RESPONSIBILITIES

- A. Responsibilities of Contractors are provided as follows:
 - 1. Prime Contractors (General, HVAC, Plumbing and Electrical):
 - a. Include requirements for commissioning in each purchase order or subcontract written for systems included in the commissioning program.
 - b. Attend commissioning kick-off meeting and other commissioning team meetings. Assign a primary commissioning representative who shall be responsible for participating in commissioning meetings and other commissioning related activities as appropriate.
 - c. Submit copy of approved submittals with startup, operating and maintenance criteria to CA.
 - d. Facilitate coordination of commissioning activities as directed by CA.
 - e. Incorporate commissioning activities including functional performance testing into master construction schedule. Prime Contractor shall be responsible for maintaining schedule document such that it is an accurate representation of construction progress through the completion of functional performance testing and resolution of all punch list issues.
 - f. Incorporate commissioning milestone events and durations into construction schedule to monitor system installation progress with appropriate contractor.
 - g. Take active role in coordinating completion and documentation of Installation Verification / Start-Up Checklists. Forward completed Installation Verification and Start-Up Checklist to CA at least 5 workdays prior to scheduled FPT.
 - h. Provide CA with required documentation from commissioning activities and submittal request.
 - i. Schedule, coordinate and assist CA in seasonal or deferred testing and deficiency corrections required by specifications.
 - j. Maintain and keep current all information sharing (e.g., deficiency lists, field observation punch lists, etc.) and project scheduling and documentation.
 - k. Coordinate and provide training as required and in accordance with the training plan.
 - 2. Installation Sub-Contractors or Prime Contractor if the Installation Contractor:
 - a. Attend commissioning kick-off meeting and other commissioning team meetings as appropriate.
 - b. Complete commissioning activities as scheduled in master construction schedule.
 - c. Ensure installation work is complete, is in compliance with Contract Documents, and ready for Functional Performance Testing.
 - d. Execute inspections, tests, and Functional Performance Tests as described in contract documents. Operate systems and equipment to demonstrate proper sequences of operation.
 - e. Complete Installation Verification and Start-Up Checklist in cooperation with Prime Contractor and submit with supporting documentation.

- f. Execute seasonal or deferred Functional Performance Testing, as required.
 - g. Coordinate and provide training as required and in accordance with the training plan.
 - h. Perform any other commissioning requirements as specified in the technical divisions of the specifications. Refer to Division 7, 15 and 16 commissioning requirements.
3. Controls Sub-Contractor:
- a. Completely install and thoroughly inspect, startup, test, adjust, calibrate, and document systems and equipment under Building Automation/ Controls specification requirements.
 - b. Attend Cx progress and coordination meetings.
 - c. Prepare and submit required draft forms and systems information.
 - d. Provide trend logs of system operation as requested by CA to demonstrate system operational performance.
 - e. Demonstrate system operation to the CA during the functional performance testing period.
 - f. Provide instrumentation necessary for verification and functional performance testing.
 - g. Manipulate control systems to facilitate verification and functional performance testing.
 - h. Provide onsite programmer knowledgeable of the system to correct deficiencies in control sequences during the commissioning period.
 - i. Coordinate and provide training as required and in accordance with the training plan.
 - j. Perform any other commissioning requirements as specified in the technical divisions of the specifications. Refer to Division 7, 15 and 16 commissioning requirements.
4. Test Adjust Balance (TAB) Sub-Contractor:
- a. Attend Commissioning meetings.
 - b. Assist during the functional performance testing to verify the calibration of control devices.
 - c. Participate in a TAB verification demonstration. The CA shall randomly select 20% of the recorded entries in the TAB report and the TAB Sub-Contractor shall demonstrate to the CA the accuracy of the TAB report.
 - d. Rebalance deficient areas identified during commissioning.
 - e. Perform any other commissioning requirements as specified in the technical divisions of the specifications. Refer to Division 7, 15 and 16 commissioning requirements.

3.4 COMMISSIONING TEAM MEETINGS

- A. Within 60 days following the start of construction, the CA shall plan, schedule, and conduct a commissioning kickoff meeting. Responsibilities of the commissioning team shall be clarified at this meeting.

3.5 INSTALLATION VERIFICATION (IV) AND START-UP CHECKLISTS

- A. Before system start-up begins, the Contractor shall conduct a final installation verification audit by completing the installation verification checklists and pre-start up documentation. These checklists are multi-trade and the primary installing

contractor shall be responsible for coordinating with their sub-contractors to ensure all checks are completed. The Contractor shall be responsible for completion of all work, including change orders and punch list items, to the satisfaction of the Owner's Representative.

- B. If any work is found to be incomplete, inaccessible, incorrect, or non-functional, make note of deficiencies, and correct deficiencies before system start-up work proceeds.
- C. Some equipment manufacturers provide installation verification and start-up checklists with the equipment. Contractor shall ensure the manufacturers' documentation is completed and attached to the documentation provided by the CA.
- D. Completed checklists shall be submitted to the CA for record purposes. The Owner, A/E and Cx Team receive completed IV Checklist. CA shall perform random verification of checklist items and makes recommendation to Owner to proceed with FPT.
- E. CA reserves the right to witness any startup and preliminary equipment testing.
- F. Contractor shall execute startup and provide CA with signed and dated copy of completed start-up. Only individuals having direct knowledge a task was actually performed shall initial or check respective item.
- G. CA reviews report to determine if outstanding items prevent scheduling of Functional Performance Testing.

3.6 SYSTEM START-UP

- A. Develop a start-up plan. The start-up plan shall be developed by the Prime Contractor responsible for the installation of the system in coordination with the sub-contractors, taking into consideration the construction and commissioning milestones that have to be met in order to reach substantial completion.

Commence with system start-up after approval has been given to the start-up plan and the pre-start-up checklist has been completed. The Contractor shall document the start-up activities on the approved start-up forms and list all system and equipment deficiencies noted during start-up. The Contractor shall take corrective action on all system deficiencies noted and demonstrate to the CA, if requested, suitable system operation. Notify CA and A/E of start-up activities' schedule at least 72 hours in advance. CA may physically witness selected start-up procedures. Should the CA witness a start-up procedure, the Contractor shall obtain signature of the CA indicating successful start-up.

3.7 START-UP DEFICIENCY LISTS-ISSUE LOG

- A. The Contractor shall prepare Start-up Deficiency List forms to report deficiencies discovered in conjunction with system start-up. Start-up deficiency forms shall indicate the system being started-up, the location and identification of the deficient equipment/material, date of observation; initials of the observer; observed deficiency;

date of correction; initials of person making the correction; and corrective action taken. The Prime Contractor shall be responsible for incorporating the start-up deficiencies identified by the responsible sub-contractor into a Master Start-up Issue Log.

- B. Prime Contractors shall issue weekly Start-up Deficiency Report updates indicating corrective action and follow-up activities. The Prime Contractor shall advise the CA when all start-up deficiency list items have been corrected on a specific piece of equipment or system component.

3.8 FUNCTIONAL PERFORMANCE TESTING

A. Objectives and Scope:

1. The objective of Functional Performance Testing is to demonstrate each system is operating according to the A/E Basis of Design as defined in the Contract Documents. Functional Performance Testing facilitates bringing systems from a state of substantial completion to full dynamic operation. Additionally, during Functional Performance Testing, areas of deficient performance are identified and corrected the improving operation and functionality of systems.
2. Each system shall be operated through all modes of operation (seasonal, occupied, unoccupied, warm-up, cool-down, part- and full-load, etc.) where there is a specified system response. Verifying each sequence in the specified sequence of operation is required including responses to conditions such as power failure, freeze condition, low oil pressure, no flow, equipment failure, etc.
3. The Contractor that is responsible for the dynamic operation of a system shall demonstrate comprehensive functionality of that system. All Contractors that have contributed to the installation of the same system shall not be required to directly participate in the functional testing activity but shall be required to be immediately available for reconciliation of issues that fall within their scope and responsibility during testing.

A. Participation:

1. CA shall coordinate and witness functional performance tests after successful startup, documentation of systems and equipment installation, and pre-requisite testing (e.g., leakage tests, testing and balancing, etc.) have been completed and documentation forwarded to CA. The CA shall coordinate with the Prime Contractor to ensure that commissioning milestones do not impact construction milestones and to ensure that the

- commissioning activities are completed prior to Substantial Completion. The Contractor shall generally execute test by manipulation of systems or equipment, provision of supporting equipment or materials (lifts, ladders, specialty test equipment, etc.), and on spot remediation of minor identified deficiencies.
2. Provided the installation verification and start-up documentation was properly completed by the Installation Contractor,
- B. **Completeness:** All systems must be completed and ready for FPT. Submission of fully completed installation verification and start-up checklists, including manufacturer's rep start-up forms is a prerequisite to proceeding with functional testing.
 - C. **Test Documentation:** CA shall witness functional testing of systems. CA shall record test results on the forms developed for the testing. Deficiencies shall clearly be indicated when the test is failed. When all related testing is completed successfully, CA shall recommend acceptance of the system or component.
 - D. **Deficiencies and Re-testing:** When deficiencies are identified during testing, depending on their extent or magnitude, they can be corrected during the test and the testing can continue to successful completion without significant delay. More significant deficiencies shall require failure of the test and re-testing. Deficiencies of this magnitude shall result in an action item on the System Functional Performance Test Discrepancy Report. The Prime Contractor shall then subsequently track the resolution of the deficiency via the Discrepancy Report. All tests shall be repeated until successful completion.
 - E. **Opposite Season Testing:** Testing procedures shall be repeated and/or conducted as necessary during appropriate seasons. "Opposite season" testing is primarily for environmental systems and shall be required where scheduling prohibits thorough testing in all modes of operation. The CA shall schedule the opposite season testing during the warranty period to coincide with a design day condition when possible. Typically, trend logs will be reviewed by the CA during the opposite season operation. If a review of these logs generates concerns, then follow-on opposite season testing shall be performed to identify and correct deficiencies.
 - F. **Acceptance Criteria:** Acceptance criteria for construction installation tests (e.g., duct leakage tests, pipe pressure tests, pipe cleaning, electrical acceptance testing, etc.) are very important. The acceptance criteria where applicable shall be specified in the individual technical specification sections. Documentation of the testing is to be provided to the CA prior to FPT.

3.9 TRAINING

- A. **Operations and Maintenance Instruction** requirements are defined in Section 01700 and the technical specification sections. Appropriate training of Owner maintenance staff is a critical component of the commissioning program. In addition to the training specified in other section of this project manual, the following additional activities shall be considered part of the training program and should be prerequisite to the formal system training.
 1. **Observation of system installation:** During site visits by the CA, maintenance

personnel shall be invited to participate to gain a better understanding of how the systems are installed and to confirm that maintenance points are accessible.

2. Observation during functional performance testing: During the functional performance testing, maintenance personnel shall be invited to observe the test procedures to gain a better understanding of the system control sequences and operating parameters.

3.10 DEFERRED TESTING

A. Seasonal Testing:

1. During warranty period, seasonal testing (tests delayed until weather conditions are closer to system's design) on the environmental systems (e.g., air handling units, chilled water system, etc.) shall involve the Installation Contractor's for these systems. CA shall coordinate this activity. Tests shall be executed, documented and deficiencies corrected by appropriate contractor(s), with facilities staff and CA witnessing. CA shall incorporate final updates to O&M manuals as necessary.

3.11 COMPLETION OF DOCUMENTATION

A. Documentation:

1. CA shall witness and document results of FPT using procedural forms developed for that purpose. CA shall include FPT documentation in final Commissioning report as an appendix to the final report.

B. Cost of Retesting:

1. If the cause for retesting is construction related, the cost for Contractor to recheck IV checklist or re execute FPT shall be borne by the Contractor.
2. If the cause of retesting is not construction related (e.g., Design Issue) cost recovery for the Contractor for re-visitation shall be negotiated.
3. Time for CA and Prime Contractor to direct any retesting required because a specific IV checklist or start-up test item reported to have been successfully completed, but determined during Functional Performance Testing to be faulty, may be back charged to Contractor.
4. Contractors shall be held responsible for expenses incurred by owner for retesting due to their state of reported readiness or lack thereof as represented on the IV checklists. Expenses could include, but not be limited to, retesting labor costs, travel expenses, and remobilization for owner and consulting teams.

C. Approval:

1. CA notes each satisfactorily demonstrated function on test form. CA, and Owner provide formal approval of FPT after review.

3.12 FINAL REPORT DETAILS

- #### A.
- Final commissioning report shall include an executive summary, list of participants and roles, brief building description, overview of commissioning process and general description of test and verification methods. Some of the documentation compiled by the CA requires information from the Contractors. The Prime

Contractor shall be responsible for compiling the information and providing this information to the CA. For each piece of commissioned equipment, the report shall contain disposition of CA regarding adequacy of equipment, documentation and training meeting contract documents in the following areas:

1. Equipment meeting equipment specifications
2. Equipment installation
3. Functional performance and efficiency
4. Equipment documentation and design intent, and
5. Operator training.

- B. All outstanding non-compliance items shall be specifically listed. Recommendations for improvement to equipment or operations, future actions, commissioning process changes, etc. shall also be listed. Each non-compliance issue shall be referenced to specific functional test, inspection, trend log, etc. where deficiency is documented. Functional performance and efficiency section for each piece of equipment shall include brief description of verification method used (manual testing, BAS trend logs, data loggers, etc.) and includes observations and conclusions from testing.

END OF SECTION 019100

SECTION 022100 - SUBSURFACE INVESTIGATION

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. A detailed subsurface investigation and related report was performed by Insight Group, LLC as prepared for the Architect. This report is included with the project manual.

1.3 USE OF DATA

- A. This report was obtained for the Architect/Engineer's use in design and is included in the Contract Documents.
- B. The report is available for the bidders' information, but is not a warranty of subsurface conditions. The Owner will not be responsible for interpretations or conclusions drawn from this data by the Contractor.
- C. Bidders should visit the site and acquaint themselves with the existing site conditions.
- D. Prior to bidding, bidders may make their own subsurface investigations to satisfy themselves as to site and subsurface conditions, but such investigations may be performed only under time schedules and arrangements approved in advance by the Engineer and Owner. However, no change in the Contract Sum will be authorized for such additional explorations.

1.4 QUALITY ASSURANCE

- A. A Geotechnical Engineer will be retained by the Owner to observe performance of work in connection with excavating, trenching, filling, backfilling, and grading, and to perform compaction testing throughout the project.
- B. Readjust work performed that does not meet technical or design requirements, but make no deviations from the Contract Documents without specific and written approval from the Architect/Engineer.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION 022100

SECTION 023700 - SEDIMENTATION AND EROSION CONTROL

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. The extent of soil erosion and sedimentation control work is shown on the Drawings and by the requirements of this section.
- B. Soil erosion and sedimentation control measures shall include all temporary and permanent means of protection and trapping soils on the construction site during land disturbing activities to include.
 - 1. Construction of temporary site gravel construction entrance
 - 2. Installation, and subsequent removal, of temporary perimeter silt fencing.
 - 3. Removal of temporary inlet protection.
 - 4. Temporary Grassing and maintenance (watering and mowing) of disturbed areas.
 - 5. Provide: As-built DWG file of the installed storm drainage system to include the underground detention systems.

1.3 REFERENCES

- A. South Carolina Stormwater Management and Sedimentation Control Handbook for Land Disturbance Activities, by SCDHEC.
- B. City of North Charleston Permitting Standards and Procedures Manual, latest edition.
- C. South Carolina Department of Highways and Public Transportation, "Standard Specifications for Highway Construction", latest Edition, hereinafter referred to as SCDOT Specifications.

1.4 SUBMITTALS

- A. Product Data: Provide manufacture's technical product data and installation instructions for soil erosion and sedimentation control materials and products.
- B. Schedule of Operations: Submit schedule of proposed operations, including program for erosion control measures, maintenance of control facilities, and vegetative practices. Show anticipated starting and completion dates for land-disturbing activities, including excavation, filling and rough grading, finish grading, construction of temporary and permanent erosion control measures, and disposition of temporary erosion control measures.

- C. Contractor shall sign “Co-Permittee Agreement” and return to Architect/Engineer before beginning any construction activities.

1.5 PROJECT CONDITIONS

- A. Prior to extensive use of the site, the Contractor shall construct the site gravel construction entrance. The intent of the site gravel construction entrance is to provide for minimal transportation of sediments into the public right-of-way.
- B. Construct and maintain temporary erosion control measures until such time as permanent paving, plantings, and grassing of landscape areas is effective in controlling erosion/sediment from the site. Extent of sedimentation/erosion control construction shall be the responsibility of the Contractor, based on actual site conditions at the project.
- C. Protect and monitor adjacent and downstream properties from siltification resulting from erosion of project graded areas.
- D. The Contractor shall comply with all requirements of the approved permits from City of North Charleston and SCDHEC.

PRODUCTS

1.6 SILT FENCING

- A. General: Provide silt fence specifically manufactured for the application intended and as follows:
- B. Silt Fence Fabric:
 - 1. Available manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work includes but are not limited to the following:
 - a. AMOCO Fabrics and Fibers Co.
 - b. Mirafi Inc.
 - c. Nicolon Corp.
 - d. TNS Advanced Technologies, Inc.
 - 2. Characteristics:
 - a. Type: Woven, polypropylene, geotextile fabric; 30-inch minimum width.
 - b. Apparent Opening Size (AOS): #20 to #40 U.S. Standard Sieve; ASTM D4751.
 - c. Grab Tensile Strength: Minimum 110 lbs.; ASTM D4632.
 - d. Grab Elongation: Maximum 30%; ASTM D4632.
 - e. Bursting Strength: Minimum 275 psi; ASTM D3786.
 - f. Filter Efficiency: Minimum 85%.
 - g. Slurry Flow Rate: Maximum 0.3 gpm/sf; ASTM D4491.

h. Permeability: Maximum 20 gpm/sf; ASTM D4491.

C. Wire Fabric:

1. Support standard strength silt fence fabric with wire fence of the following properties:

- a. Wires: Minimum 14 gauge.
- b. Mesh Spacing: Maximum 6-inches.

D. Posts: Either 1.33-lbs/lf steel, minimum 4-feet in length. Make sure that steel posts have projections to facilitate fastening of the fabric.

- 1. Space posts for silt fence fabric with wire mesh support at a maximum of 8-feet apart. Support posts should be driven securely into the ground to a minimum of 18-inches.
- 2. Space posts for silt fence fabric without wire mesh support to a maximum of 6-feet apart. Support posts should be driven securely into the ground to a minimum of 18-inches.

1.7 OTHER MATERIALS

A. Stone Rip-Rap: Crushed Stone with weight gradation of 20 to 200 lbs. per piece and a median diameter of 8-inches. Meet SCDOT Specifications.

B. Filter Stone: Stone size in accordance with ASTM D448 size No. 1 {1-1/2 to 3-1/2 inch diameter}. Meet SCDOT Specifications.

C. Gravel: #57 Stone per SCDOT Specifications.

D. Filter Fabric: Conform to ASTM E1682 & E1683.

1.8 TEMPORARY GRASSING MATERIALS

A. Grass Seed:

- 1. General: All grass seed shall be free from noxious weeds, grade A recent crop, recleaned and treated with appropriate fungicide at time of mixture. Deliver to site in original sealed containers with dealer's guarantee as to the year grown, percentage of purity, percentage of germination, and the date of the test by which the percentages of purity and germination were determined. All seed sown shall have a date of test within six months of the date of sowing.

B. Fertilizer:

1. Regular Type:

- a. Nitrogen content derived from organic or inorganic sources, bearing manufacturer's statement of analysis.
- b. Minimum requirements: 12%-nitrogen, 4%-phosphoric acid, and 8%-potash.

2. Slow Release Type:

- a. 50% of nitrogen content to be slow-release form, content derived from organic or inorganic sources, bearing manufacturer's statement of analysis.
 - b. Minimum requirements: 10%-nitrogen, 10%-phosphoric acid, and 10%-potash.
3. Commercial Mixed Type:
- a. Nitrogen content derived from organic or inorganic sources, bearing manufacturer's statement of analysis.
 - b. Minimum requirements: 10%-nitrogen, 10%-phosphoric acid, and 10%-potash.
- C. Mulch: Clean, seed-free straw of hay, wheat, rye, oats or barley.
- D. Hydromulch: Wood cellulose fiber containing no germination-inhibiting or growth-inhibiting agents. Characteristics shall be as follows:
1. Percent Moisture Content: 9.0% ($\pm 3.0\%$).
 2. Percent Organic Matter: 99.2% ($\pm 0.8\%$).
 3. Percent Ash Content: 0.8% ($\pm 0.2\%$).
 4. pH: 4.8 (± 0.5).
 5. Water holding capacity: Minimum 40-oz. water/3.5-oz. fiber.
- E. Hydraulically Applied Growth Medium:
1. Minimum Mass / Unit Area: 12 oz/yd² (ASTM D6566).
 2. Minimum Thickness: 0.22 in (ASTM D6525).
 3. Minimum Wet Bond Strength: 9 lb/ft (ASTM D6818).
 4. Minimum Ground Cover: 99% (ASTM D6567).
 5. Minimum Water-Holding Capacity: 1700% (ASTM D7367).
 6. Material Color: Green.
 7. Biodegradability: 100% (ASTM D5338).
 8. Functional Longevity: Approximately 18 months (ASTM D5338).
 9. Vegetation Establishment: >800% (ASTM D7322).
- F. Seeding Recommendations:
1. For Late Winter and Early Spring Seeding:
 - a. Seeding mixture: Rye (grain) seed at 220-lbs./acre and Unhulled Bermuda seed at 80-lbs/acre.
 - 1) Omit Bermuda seed when duration of temporary cover is not to extend beyond June.
 - b. Soil Amendments: Follow recommendations of soil tests or apply 2,000-lbs/acre ground agricultural limestone and 750-lbs/acre 10-10-10 fertilizer.
 - c. Mulch: Apply 4,000-lbs/acre of straw. Anchor straw by tacking with asphalt, netting or a mulch-anchoring tool. A disk with blades set nearly straight can be used as a mulch-anchoring tool.
 - d. Maintenance: Re-fertilize if growth is not fully adequate. Re-seed, re-fertilize, and mulch immediately following erosion or other damage.

2. For Summer Seeding:
 - a. Seeding mixture: Hulled Bermuda seed at 80-lbs./acre.
 - b. Soil Amendments: Follow recommendations of soil tests or apply 2,000-lbs/acre ground agricultural limestone and 750-lbs/acre 10-10-10 fertilizer.
 - c. Mulch: Apply 4,000-lbs/acre of straw. Anchor straw by tacking with asphalt, netting or a mulch-anchoring tool. A disk with blades set nearly straight can be used as a mulch-anchoring tool.
 - d. Maintenance: Re-fertilize if growth is not fully adequate. Re-seed, re-fertilize, and mulch immediately following erosion or other damage.

3. For Fall Seeding;
 - a. Seeding mixture: Rye (grain) seed at 220-lbs/acre.
 - b. Soil Amendments: Follow recommendations of soil tests or apply 2,000-lbs/acre ground agricultural limestone and 1,000-lbs/acre 10-10-10 fertilizer.
 - c. Mulch: Apply 4,000-lbs/acre of straw. Anchor straw by tacking with asphalt, netting or a mulch-anchoring tool. A disk with blades set nearly straight can be used as a mulch-anchoring tool.
 - d. Maintenance: Re-fertilize if growth is not fully adequate. Re-seed, re-fertilize, and mulch immediately following erosion or other damage. Top-dress with 50-lbs/acre of nitrogen in March. If it is necessary to extend temporary coverage beyond June 15, overseed with 80-lbs/acre of Unhulled Bermuda seed in late February or early March. Water as necessary to establish stand of grass. Cut grass as necessary to maintain max 2" height. Do not allow temporary grass to blanket/hamper any permanent grass seed from establishment.

PART 2 - EXECUTION

2.1 GENERAL

- A. All disturbed soil areas, except those to support structures, shall be graded and protected from erosion by grassing or other protection measures. Stormwater conveyance systems shall have sediment barriers installed at all entrances, intersections, changes in direction, discharge points, and other locations as indicated on the drawings.
- B. Schedule grading operations to minimize exposure of graded surfaces prior to installation of permanent construction.
- C. Maintain large graded areas as flat as possible to minimize runoff.

2.2 SEQUENCE OF WORK

- A. The Contractor shall coordinate work with the Construction Manager and shall follow phasing instructions per the Construction Manager.

- B. The intent of the Work of this Section is to provide for the orderly installation of preventative measures to control the migration of sediments and the damage caused by erosion from stormwater events. The Contractor shall be cognizant of the goals to be achieved and shall organize his work to effectively accomplish the goals.

Whenever specified measures, properly constructed and maintained, are not providing the degree of control of sediments and erosion that is deemed satisfactory, the Contractor shall notify the Architect/Engineer and shall propose any additional measures which may be justified.

- C. Inspect all sediment and erosion control devices at least weekly and after each rain event. Repair any damaged portions immediately and remove any new sediment that has entered said device or collection basin. Regrade/regrass any 'washed out' areas. All inspections shall be recorded in the Stormwater Pollution Prevention binder and kept on-site.

2.3 INSTALLATION OF TEMPORARY GRASSING

- A. Verify soil surface is ready to receive temporary grassing. A good seedbed is well-pulverized, loose, and uniform. Where hydro-seeding methods are used, the surface may be left with a more irregular surface or large clods. However, areas must be in mowable condition for performance of required maintenance events.
- B. Apply Temporary Seeding per seeding recommendations listed for the appropriate time of year. Should the initially installed temporary grassing die due to seasonal change, the contractor shall reseed, at no additional cost, using the previously prescribed seasonal temporary grass type. This process may occur several times throughout the entire construction process. The contractor shall refer to the construction schedule to determine the number of times temporary seeding shall occur prior to the installation of permanent grassing as indicated on the construction documents.
1. Liming: Apply lime according to soil test recommendations. If the pH (acidity) of the soil is not known, an application of ground agricultural limestone at the rate of 1 to 1-1/2 tons/acre on coarse-textures soils and 2 to 3 tons/acre on fine-textured soils is usually sufficient. Apply limestone uniformly and incorporate into the top 4 to 6-inches of soil. Soils with a pH of 6 or higher do not need lime additive.
 2. Fertilizer: Base applications rates on soil tests. When these are not possible, apply a 10-10-10 grade fertilizer at 700 to 1,000 lbs/acre. Both fertilizer and lime should be incorporated into the top 4 to 6-inches of soil. If a hydraulic seeder is used, do not mix seed and fertilizer more than 30-minutes before application.
 3. Surface Roughening: If recent tillage operations have resulted in a loose surface condition, additional roughening may not be required except to break up large clods. If rainfall causes the surface to become sealed or crusted, loosen soil just prior to seeding by disking, raking, harrowing, or other suitable methods. Groove or furrow slopes steeper than 3-horizontal to 1-vertical (3:1) on the contour before seeding.
 4. Evenly apply seed using a cyclone seeder (broadcast), drill, cultipacker seeder, or hydro-seeder. Use seeding rates per recommendations given previously in this section. Broadcast seeding and hydro-seeding are appropriate for steep slopes where equipment cannot be driven. Hand broadcasting is not recommended because of the difficulty of achieving uniform distribution.

- a. Small grains should be planted not more than 1-inch deep, and grasses and legumes not more than 1/2-inch deep. Broadcast seed must be covered by raking or chain dragging, and then lightly firmed with a roller or cultipacker. Hydro-seeded mixtures should include wood-fiber (cellulose) mulch.
5. Mulching: The use of an appropriate mulch will help ensure grass establishment under normal conditions and is essential to seeding success under harsh site conditions. Harsh site conditions include:
 - a. Seeding in fall for winter cover (wood-fiber mulches are not acceptable for this use).
 - b. Slopes steeper than 3:1.
 - c. Excessively hot or dry weather.
 - d. Adverse soils (shallow, rocky, or high in clay or sand content).
 - e. Areas receiving concentrated flow.
 6. If the area to be mulched is subject to concentrated water flow, as in a channel, anchor mulch with netting.
 7. Shall supply sufficient water (1.5" per week, typ.), at no additional cost to the owner, to establish required coverage.
 8. Shall Maintain: Regrade (rake) and reseed & mulch areas where seedling emergence is poor, or where erosion occurs, within 7 days. Mow as necessary to maintain 3' maximum height. Protect from traffic as much as possible. Continue maintenance process for each seeding re-installation due to seasonal change.

2.4 INSTALLATION OF SEDIMENT BARRIERS

A. Silt Fencing for Sheet Flow Applications:

1. Install the silt fencing in the locations indicated on the Drawings. Adjust fencing as directed by the Architect/Engineer to allow for proper functioning.
2. Silt fencing sections shall be installed along a constant contour elevation as much as practical. Avoid concentration of flows through fencing caused by installation at varying elevations.
3. Follow the manufacturer's instructions for proper installation procedures of overlapping sections, as well as depth of bury for posts.
4. Install per the following general directions:
 - a. Excavate a 6-inch deep, 8-inch wide trench on the upstream side of the desired fence line location along the entire length of the proposed barrier.
 - b. Unroll the silt fence fabric material (or pre-assembled assembly) and attach to posts, position the posts behind the trench (downhill side), and hammer the posts at least 18-inches in the ground.
 - c. Ensure that the height of the silt fence does not exceed 36-inches above the ground surface. (Higher fences may impound volumes of water sufficient to cause failure of the structure.)
 - d. Lay a minimum 6-inches of the bottom portion of the silt fencing fabric into the bottom of the trench to prevent undermining by stormwater runoff.

- e. Backfill the trench with stone and compact. Compaction is necessary to prevent runoff from eroding the backfill.
- f. Inspect and repair or replace damaged silt fencing promptly. Remove silt fencing when the uphill sloped areas have been permanently stabilized.

B. Gravel Check Dams for Channel Flow Applications:

1. Shall install gravel check dams per the Construction Details on the Drawings and as follows:
 - a. Place the stone to the lines and dimensions shown in the Drawings, on a filter fabric foundation.
 - b. Keep the center stone section at least 9-inches below natural grade level where the dam abuts the channel banks.
 - c. Extend stone at least 1-1/2 feet beyond the ditch banks to keep overflow water from undercutting the dam as it re-enters the channel.
 - d. Set spacing for the dam to assure that the elevation at the top of the lower dam is the same as the toe elevation of the upper dam.
 - e. Protect the channel downstream from the lowest check dam, considering that water will flow over and around the dam.
 - f. Make sure that the channel reach above the most upstream check dam is stable.
 - g. Ensure that channel appurtenances, such as culvert entrances below check dams, are not subject to damage or blocking from displaced stones.
 - h. Inspect check dams and channels for damage after each rain event.
 - i. Anticipate submergence and deposition above the check dam and erosion from high flows around the edges of the check dam. Shall correct all damage immediately. If significant erosion occurs between check dams, install a protective rip-rap liner in that portion of the channel.
 - j. Remove sediment accumulated behind check dams as needed to prevent damage to channel vegetation, allow the channel to drain through the check dam, and prevent large flows from carrying sediment over the check dam. Add stone to dams as needed to maintain design height and cross section. Should dam become 'choked' with sediment, remove and replace sections as necessary to promote designed flow rates.
 - k. Spray herbicide to control any weed growth adjacent to and on intrusion onto check dams.
 - l. Protect dam from sediment buildup or infiltration which impedes flow through. Clean/replace gravel as necessary to maintain this flow and proper functioning of system.

C. Silt Fence Inlet Sediment Barriers:

1. Install per the Construction Details on the Drawings.
2. Provide herbicide weed control adjacent to silt fence and other sediment barriers. Do not allow unsightly appearance of uncontrolled weed growth during construction.

2.5 STORM DRAINAGE SYSTEM

- A. Construct storm drainage system as expediently as possible as a permanent erosion control measure. Surface water may be directed into complete portions of drainage system as soon as practicable.
- B. Maintain temporary sediment barriers around drainage structures until all areas have been permanently stabilized, to prevent washing of sediment into storm drainage system or off site.
- C. Flush drainage lines between drainage structures as required during construction and after establishment of permanent erosion control measures to remove collected debris. Do not allow sediment to buildup in or around any structures. Remove buildup, etc. immediately to allow for proper functioning of system.

2.6 GROUND COVER

- A. Protect exposed soils having a slope of 3:1 or greater with ground cover, except as otherwise specified herein.
- B. Ground cover may consist of any effective erosion prevention treatment such as straw mulch, stone base, plastic sheeting, hydro-seeding, or installation of temporary or permanent grassing or plantings, as indicated on the drawings.
- C. All grassing and planting operations shall include mulching as stabilization, reseeding, watering and mowing until ground cover planting is effective.
- D. Prior to grassing operations, areas must be free of existing groundcover.

2.7 REMOVAL OF TEMPORARY EROSION CONTROL DEVICES

- A. As soon as permanent erosion control devices are established, and SCDHEC (NOT) approval has been received, the Contractor shall remove temporary devices, including, sediment barriers and other devices. This shall include redistributing collected amounts of silt over the project site.
- B. Remove all debris, silt fence, gravel, etc. resulting from temporary erosion control from the project site.
- C. Check and clean adjacent existing drainage structures of material introduced during construction, pull grates and manhole lids to confirm. Confirm all existing systems are free flowing and functioning as designed.

2.8 POLLUTION PREVENTION

- A. The Contractor shall conduct all operations and shall instruct his Sub-Contractors, if any, to conduct their operations in a safe and pollution free manner.

- B. The Contractor shall establish dedicated areas for the parking and servicing of all vehicles. Any petroleum products that are deposited on the ground, for any reason, shall be promptly excavated along with any contaminated soils and disposed of at a permitted disposal site.
- C. No containers, bags, cans, rubbish, litter or other debris of any sort will be allowed to remain on the site. Any debris resulting from the Contractor's operations, shall be removed daily and disposed of off-site.
- D. Concrete washout shall occur only in SCDHEC approved/controlled areas and cleaned out at regular intervals.
- E. Laydown yards shall be organized, secured and neatly maintained providing control of access. Establish and maintain pollution control within said laydown yards. Do not allow adjacent areas to deteriorate in regards to erosion control measures, i.e mowing, weed control or sediment buildup. Continue maintenance on all stormwater and erosion control appurtenances located within and surrounding laydown yard.

END OF SECTION 023700

SECTION 032000 - CONCRETE REINFORCING

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. Steel reinforcement bars.
- 2. Welded-wire reinforcement.

- B. Related Requirements:

- 1. Section 034500 "Precast Architectural Concrete" for reinforcing used in precast architectural concrete.
- 2. Section 321313 "Concrete Paving" for reinforcing related to concrete pavement and walks.
- 3. Section 321316 "Decorative Concrete Paving" for reinforcing related to decorative concrete pavement and walks.

1.3 PREINSTALLATION MEETINGS

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

- 1. Review the following:

- a. Special inspection and testing and inspecting agency procedures for field quality control.
- b. Construction contraction and isolation joints.
- c. Steel-reinforcement installation.

1.4 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.
3. For structural thermal break insulated connection system, indicate general configuration, insulation dimensions, tension bars, compression pads, shear bars, and dimensions.

C. Construction Joint Layout: Indicate proposed construction joints required to build the structure.

1. Location of construction joints is subject to approval of the Architect.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Statements: For testing and inspection agency.

B. Welding certificates.

1. Reinforcement To Be Welded: Welding procedure specification in accordance with AWS D1.4/D1.4M

C. Field quality-control reports.

D. Minutes of preinstallation conference.

1.6 QUALITY ASSURANCE

A. Testing Agency Qualifications: An independent agency, acceptable to authorities having jurisdiction, qualified in accordance with ASTM C1077 and ASTM E329 for testing indicated.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Steel Reinforcement: Deliver, store, and handle steel reinforcement to prevent bending and damage.

1. Store reinforcement to avoid contact with earth.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

2.2 STEEL REINFORCEMENT

A. Reinforcing Bars: ASTM A615/A615M, Grade 60, deformed.

- B. Plain-Steel Welded-Wire Reinforcement: ASTM A1064/A1064M, plain, fabricated from as-drawn steel wire into flat sheets.

2.3 REINFORCEMENT ACCESSORIES

- A. Joint Dowel Bars: ASTM A615/A615M, Grade 60, plain-steel bars, cut true to length with ends square and free of burrs.
- B. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded-wire reinforcement in place.
 - 1. Manufacture bar supports from steel wire, plastic, or precast concrete in accordance with CRSI's "Manual of Standard Practice," of greater compressive strength than concrete and as follows:
 - a. For concrete surfaces exposed to view, where legs of wire bar supports contact forms, use CRSI Class 1 plastic-protected steel wire, all-plastic bar supports, or CRSI Class 2 stainless steel bar supports.

2.4 FABRICATING REINFORCEMENT

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

PART 3 - EXECUTION

3.1 PREPARATION

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

3.2 INSTALLATION OF STEEL REINFORCEMENT

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

- D. Provide concrete coverage in accordance with ACI 318.
- E. Set wire ties with ends directed into concrete, not toward exposed concrete surfaces.
- F. Splices: Lap splices as indicated on Drawings.
 - 1. Bars indicated to be continuous, and all vertical bars shall be lapped not less than 48 bar diameters at splices, or 24 inches, whichever is greater.
 - 2. Stagger splices in accordance with ACI 318.
 - 3. Weld reinforcing bars in accordance with AWS D1.4/D 1.4M, where indicated on Drawings.
- G. Install welded-wire reinforcement in longest practicable lengths.
 - 1. Support welded-wire reinforcement in accordance with CRSI "Manual of Standard Practice."
 - a. For reinforcement less than W4.0 or D4.0, continuous support spacing shall not exceed 12 inches.
 - 2. Lap edges and ends of adjoining sheets at least one wire spacing plus 2 inches for plain wire and 8 inches for deformed wire.
 - 3. Offset laps of adjoining sheet widths to prevent continuous laps in either direction.
 - 4. Lace overlaps with wire.

3.3 JOINTS

- A. Construction Joints: Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by Architect.
 - 1. Place joints perpendicular to main reinforcement.
 - 2. Continue reinforcement across construction joints unless otherwise indicated.
 - 3. Do not continue reinforcement through sides of strip placements of floors and slabs.
- B. Doweled Joints: Install dowel bars and support assemblies at joints where indicated. Lubricate or asphalt coat one-half of dowel length, to prevent concrete bonding to one side of joint.

3.4 INSTALLATION TOLERANCES

- A. Comply with ACI 117.

3.5 FIELD QUALITY CONTROL

- A. Special Inspections: Owner will engage a special inspector and qualified testing and inspecting agency to perform field tests and inspections and prepare test reports.
- B. Inspections:
 - 1. Steel-reinforcement placement.

2. Steel-reinforcement welding.
 - C. Manufacturer's Inspections: Engage manufacturer of structural thermal break insulated connection system to inspect completed installations prior to placement of concrete, and to provide written report that installation complies with manufacturer's written instructions.

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 welded-wire reinforcement.
2. Section 312000 "Earth Moving" for drainage fill under slabs-on-ground.
3. Section 321313 "Concrete Paving" for concrete pavement and walks.
4. Section 321316 "Decorative Concrete Paving" for decorative concrete pavement and walks.

1.2 DEFINITIONS

- ##### A. Cementitious Materials:
- Portland cement alone or in combination with one or more of the following: blended hydraulic cement, fly ash, slag cement, other pozzolans, and silica fume; materials subject to compliance with requirements.

- ##### B. Water/Cement Ratio (w/cm):
- The ratio by weight of water to cementitious materials.

1.3 PREINSTALLATION MEETINGS

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

1. Require representatives of each entity directly concerned with cast-in-place concrete to attend, including the following:
 - a. Contractor's superintendent.
 - b. Independent testing agency responsible for concrete design mixtures.
 - c. Ready-mix concrete manufacturer.
 - d. Concrete Subcontractor.
2. Review the following:
 - a. Special inspection and testing and inspecting agency procedures for field quality control.
 - b. Construction joints, control joints, isolation joints, and joint-filler strips.
 - c. Semirigid joint fillers.
 - d. Vapor-retarder installation.
 - e. Anchor rod and anchorage device installation tolerances.

- f. Cold and hot weather concreting procedures.
- g. Concrete finishes and finishing.
- h. Curing procedures.
- i. Forms and form-removal limitations.
- j. Shoring and reshoring procedures.
- k. Methods for achieving specified floor and slab flatness and levelness.
- l. Floor and slab flatness and levelness measurements.
- m. Concrete repair procedures.
- n. Concrete protection.
- o. Initial curing and field curing of field test cylinders (ASTM C31/C31M.)
- p. Protection of field cured field test cylinders.

1.4 ACTION SUBMITTALS

A. Product Data: For each of the following.

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

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

- 1. Mixture identification.
- 2. Minimum 28-day compressive strength.
- 3. Durability exposure class.
- 4. Maximum w/cm.
- 5. Calculated equilibrium unit weight, for lightweight concrete.
- 6. Slump limit.
- 7. Air content.
- 8. Nominal maximum aggregate size.
- 9. Steel-fiber reinforcement content.
- 10. Synthetic micro-fiber content.
- 11. Indicate amounts of mixing water to be withheld for later addition at Project site if permitted.
- 12. Intended placement method.
- 13. 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. Qualification Data: For the following:

1. Ready-mixed concrete manufacturer.

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

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

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

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

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

E. Field quality-control reports.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: A qualified installer who employs Project personnel qualified as an ACI-certified Flatwork Technician and Finisher and a supervisor who is a certified ACI Flatwork Concrete Finisher/Technician or an ACI Concrete Flatwork Technician .

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

- B. Ready-Mixed Concrete Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C94/C94M requirements for production facilities and equipment.
 - 1. Manufacturer certified in accordance with NRMCA's "Certification of Ready Mixed Concrete Production Facilities."
- C. Laboratory Testing Agency Qualifications: A testing agency qualified in accordance with ASTM C1077 and ASTM E329 for testing indicated and employing an ACI-certified Concrete Quality Control Technical Manager.
 - 1. Personnel performing laboratory tests to be an ACI-certified Concrete Strength Testing Technician and Concrete Laboratory Testing Technician, Grade I. Testing agency laboratory supervisor to be an ACI-certified Concrete Laboratory Testing Technician, Grade II.

1.7 DELIVERY, STORAGE, AND HANDLING

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

1.8 FIELD CONDITIONS

- A. Cold-Weather Placement: Comply with ACI 301 and ACI 306.1 and as follows.
 - 1. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.
 - 2. When average high and low temperature is expected to fall below 40 deg F for three successive days, maintain delivered concrete mixture temperature within the temperature range required by ACI 301.
 - 3. Do not use frozen materials or materials containing ice or snow.
 - 4. Do not place concrete in contact with surfaces less than 35 deg F, other than reinforcing steel.
 - 5. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in mixture designs.
- B. Hot-Weather Placement: Comply with ACI 301 and ACI 305.1, and as follows:
 - 1. Maintain concrete temperature at time of discharge to not exceed 95 deg F.
 - 2. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade uniformly moist without standing water, soft spots, or dry areas.

1.9 WARRANTY

- A. Manufacturer's Warranty: Manufacturer agrees to furnish replacement sheet vapor retarder/termite barrier material and accessories for sheet vapor retarder/ termite barrier and accessories that do not comply with requirements or that fail to resist penetration by termites within specified warranty period.

1. Warranty Period: 10 years from date of Substantial Completion.

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, gray .
2. Fly Ash: ASTM C618, Class C or F.

- 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: 1-1/2 inches nominal.
3. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.

- C. Lightweight Aggregate: ASTM C330/C330M, 3/8-inch nominal maximum aggregate size.

- D. Air-Entraining Admixture: ASTM C260/C260M.

- E. 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. Water-Reducing and -Retarding Admixture: ASTM C494/C494M, Type D.
3. High-Range, Water-Reducing Admixture: ASTM C494/C494M, Type F.
4. High-Range, Water-Reducing and -Retarding Admixture: ASTM C494/C494M, Type G.

- F. Water and Water Used to Make Ice: ASTM C94/C94M, potable

2.3 FIBER REINFORCEMENT

- A. Synthetic Monofilament Micro-Fiber: Monofilament polypropylene micro-fibers engineered and designed for use in concrete, complying with ASTM C1116/C1116M, Type III, 1 to 2-1/4 inches long.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Euclid Chemical Company (The); an RPM company.
 - b. FiberForce; ABC Polymer Industries, LLC.
 - c. GCP Applied Technologies Inc.
 - d. Propex Operating Company, LLC.
 - e. Sika Corporation.
- B. Synthetic Fibrillated Micro-Fiber: Fibrillated polypropylene micro-fibers engineered and designed for use in concrete, complying with ASTM C1116/C1116M, Type III, 1 to 2-1/4 inches long.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Euclid Chemical Company (The); an RPM company.
 - b. FiberForce; ABC Polymer Industries, LLC.
 - c. GCP Applied Technologies Inc.
 - d. Propex Operating Company, LLC.
 - e. Sika Corporation.
- C. Synthetic Macro-Fiber: Synthetic macro-fibers engineered and designed for use in concrete, complying with ASTM C1116/C1116M, Type III, 1 to 2-1/4 inches long.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Euclid Chemical Company (The); an RPM company.
 - b. FiberForce; ABC Polymer Industries, LLC.
 - c. GCP Applied Technologies Inc.
 - d. Propex Operating Company, LLC.
 - e. Sika Corporation.

2.4 VAPOR RETARDERS

- A. Sheet Vapor Retarder, Class A: ASTM E1745, Class A , except with maximum water-vapor permeance of 0.1 perms per ASTM E1745 Section 7.1 ; not less than 15 mils thick. Include manufacturer's recommended adhesive or pressure-sensitive tape.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Barrier One, Inc.
 - b. Barrier-Bac; Intoplast Group.
 - c. Fortifiber Building Systems Group.
 - d. Reef Industries, Inc.

- e. Stego Industries, LLC.
- f. W.R. Meadows, Inc.

2.5 LIQUID FLOOR TREATMENTS

- A. Penetrating Liquid Floor Treatment: Clear, chemically reactive, waterborne solution of inorganic silicate or silicate materials and proprietary components; odorless; that penetrates, hardens, and densifies concrete surfaces.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by the following:
 - a. ChemMasters, Inc.
 - b. ChemTec International.
 - c. Curecrete Distribution Inc.
 - d. Dayton Superior.
 - e. Euclid Chemical Company (The); an RPM company.
 - f. Kaufman Products, Inc.
 - g. Laticrete International, Inc.
 - h. Nox-Crete Products Group.
 - i. SpecChem, LLC.
 - j. US SPEC, Division of US MIX Company.
 - k. V-Seal Concrete Sealers & Specialty Coatings.

2.6 CURING MATERIALS

- A. Evaporation Retarder: Waterborne, monomolecular film forming, manufactured for application to fresh concrete.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by the following:
 - a. ChemMasters, Inc.
 - b. Dayton Superior.
 - c. Euclid Chemical Company (The); an RPM company.
 - d. Kaufman Products, Inc.
 - e. Laticrete International, Inc.
 - f. Nox-Crete Products Group.
 - g. SpecChem, LLC.
- 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. Curing Paper: 8-foot- wide paper, consisting of two layers of fibered kraft paper laminated with double coating of asphalt.

- D. Water: Potable or complying with ASTM C1602/C1602M.
- E. Clear, Waterborne, Membrane-Forming, Dissipating Curing Compound: ASTM C309, Type 1, Class B.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by the following:
 - a. ChemMasters, Inc.
 - b. Dayton Superior.
 - c. Euclid Chemical Company (The); an RPM company.
 - d. Kaufman Products, Inc.
 - e. Laticrete International, Inc.
 - f. Nox-Crete Products Group.
 - g. SpecChem, LLC.
- F. Clear, Waterborne, Membrane-Forming, Curing and Sealing Compound: ASTM C1315, Type 1, Class A.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. ChemMasters, Inc.
 - b. Dayton Superior.
 - c. Euclid Chemical Company (The); an RPM company.
 - d. Kaufman Products, Inc.
 - e. Laticrete International, Inc.
 - f. Nox-Crete Products Group.
 - g. SpecChem, LLC.
 - h. Vexcon Chemicals Inc.
 - i. W.R. Meadows, Inc.

2.7 RELATED MATERIALS

- A. Expansion- and Isolation-Joint-Filler Strips: ASTM D1751, asphalt-saturated cellulosic fiber .
- B. Bonding Agent: ASTM C1059/C1059M, Type II, nonredispersible, acrylic emulsion or styrene butadiene.
- C. Epoxy Bonding Adhesive: ASTM C881, two-component epoxy resin, capable of humid curing and bonding to damp surfaces, of class suitable for application temperature and of grade and class to suit requirements, and as follows:
 - 1. Types IV and V, load bearing, for bonding hardened or freshly mixed concrete to hardened concrete.

2.8 REPAIR MATERIALS

- A. Repair Underlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/8 inch and that can be feathered at edges to match adjacent floor elevations.
1. Cement Binder: ASTM C150/C150M portland cement or hydraulic or blended hydraulic cement, as defined in ASTM C219.
 2. Primer: Product of underlayment manufacturer recommended for substrate, conditions, and application.
 3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch or coarse sand, as recommended by underlayment manufacturer.
 4. Compressive Strength: Not less than 4100 psi at 28 days when tested in accordance with ASTM C109/C109M.
- B. Repair Overlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/4 inch and that can be filled in over a scarified surface to match adjacent floor elevations.
1. Cement Binder: ASTM C150/C150M portland cement or hydraulic or blended hydraulic cement, as defined in ASTM C219.
 2. Primer: Product of topping manufacturer recommended for substrate, conditions, and application.
 3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch or coarse sand as recommended by topping manufacturer.
 4. Compressive Strength: Not less than 5000 psi at 28 days when tested in accordance with ASTM C109/C109M.

2.9 CONCRETE MIXTURES, GENERAL

- A. Prepare design mixtures for each type and strength of concrete, proportioned on the basis of laboratory trial mixture or field test data, or both, in accordance with ACI 301.
1. Use a qualified testing agency for preparing and reporting proposed mixture designs, based on laboratory trial mixtures.
- B. Cementitious Materials: Limit percentage, by weight, of cementitious materials other than portland cement in concrete as follows:
1. Fly Ash or Other Pozzolans: 25 percent by mass.
- C. Admixtures: Use admixtures in accordance with manufacturer's written instructions.
1. Use 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, and concrete with a w/cm below 0.50.

2.10 CONCRETE MIXTURES

- A. Class A : Normal-weight concrete used for footings, grade beams, and tie beams.
1. Exposure Class: ACI 318 F1 .
 2. Minimum Compressive Strength: As indicated at 28 days.
 3. Maximum w/cm: 0.50 .
 4. Slump Limit: 5 inches , plus or minus 1 inch .
 5. Air Content:
 - a. Exposure Class F1: 4.5 percent, plus or minus 1.5 percent at point of delivery for concrete containing 1-1/2-inch nominal maximum aggregate size.
 6. Limit water-soluble, chloride-ion content in hardened concrete to 0.30 percent by weight of cement.
- B. Class B : Normal-weight concrete used for foundation walls.
1. Exposure Class: ACI 318 F1 .
 2. Minimum Compressive Strength: As indicated at 28 days.
 3. Maximum w/cm: 0.45 .
 4. Slump Limit: 5 inches , plus or minus 1 inch .
 5. Air Content:
 - a. Exposure Class F1: 4.5 percent, plus or minus 1.5 percent at point of delivery for concrete containing 1-1/2-inch nominal maximum aggregate size.
 6. Limit water-soluble, chloride-ion content in hardened concrete to 0.30 percent by weight of cement.
- C. Class C : Normal-weight concrete used for interior slabs-on-ground.
1. Exposure Class: ACI 318 F0 .
 2. Minimum Compressive Strength: As indicated at 28 days.
 3. Maximum w/cm: 0.45 .
 4. Minimum Cementitious Materials Content: 540 lb/cu. yd. .
 5. Air Content:
 - a. Do not use an air-entraining admixture or allow total air content to exceed 3 percent for concrete used in trowel-finished floors.
 6. Limit water-soluble, chloride-ion content in hardened concrete to 0.30 percent by weight of cement.
 7. Synthetic Micro-Fiber: Uniformly disperse in concrete mixture at manufacturer's recommended rate, but not less than a rate of 2.4 lb/cu. yd. .
 8. Synthetic Macro-Fiber: Uniformly disperse in concrete mixture at manufacturer's recommended rate, but not less than a rate of 5 lb/cu. yd. .
- D. Class E : Structural lightweight concrete used for interior suspended slabs.
1. Exposure Class: ACI 318 F0 .
 2. Minimum Compressive Strength: As indicated at 28 days.
 3. Calculated Equilibrium Unit Weight: 115 lb/cu. ft. , plus or minus 3 lb/cu. ft. as determined by ASTM C567/C567M.

4. Slump Limit: 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 .
5. Air Content:
 - a. Do not use an air-entraining admixture or allow total air content to exceed 3 percent for concrete used in trowel-finished floors.
6. Limit water-soluble, chloride-ion content in hardened concrete to 0.30 percent by weight of cement.
7. Synthetic Micro-Fiber: Uniformly disperse in concrete mixture at manufacturer's recommended rate, but not less than a rate of 2.4 lb/cu. yd. .
8. Synthetic Macro-Fiber: Uniformly disperse in concrete mixture at manufacturer's recommended rate, but not less than a rate of 5 lb/cu. yd. .

E. Class I : Normal-weight concrete used for interior metal pan stairs and landings:

1. Exposure Class: ACI 318 F0 .
2. Minimum Compressive Strength: As indicated at 28 days.
3. Maximum w/cm: 0.45 .
4. Minimum Cementitious Materials Content: 470 lb/cu. yd..
5. Maximum Size Aggregate: 1/2 inch.
6. Slump Limit: 3 inches, plus 1 inch or minus 2 inches.
7. Air Content: 0 percent, plus or minus 0.5 percent at point of delivery.
8. Limit water-soluble, chloride-ion content in hardened concrete to 0.30 percent by weight of cement.
9. Retarding Admixture: Not allowed.
10. Accelerating Admixture: Not allowed.

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

1. Exposure Class: ACI 318 F2 .
2. Minimum Compressive Strength: As indicated at 28 days.
3. Maximum w/cm: 0.45 .
4. Slump Limit: 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 .
5. Air Content:
 - a. Exposure Classes F2 and F3: 6 percent, plus or minus 1.5 percent at point of delivery for concrete containing 1-inch nominal maximum aggregate size 5.5 percent, plus or minus 1.5 percent at point of delivery for concrete containing 1-1/2-inch nominal maximum aggregate size.
6. Limit water-soluble, chloride-ion content in hardened concrete to 0.30 percent by weight of cement.

2.11 CONCRETE MIXING

- A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete in accordance with ASTM C94/C94M and ASTM C1116/C1116M, and furnish batch ticket information.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verification of Conditions:

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

3.2 PREPARATION

A. Provide reasonable auxiliary services to accommodate field testing and inspections, acceptable to testing agency, including the following:

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

3.3 INSTALLATION OF EMBEDDED ITEMS

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

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

3.4 INSTALLATION OF VAPOR RETARDER

A. Sheet Vapor Retarders: Place, protect, and repair sheet vapor retarder in accordance with ASTM E1643 and manufacturer's written instructions.

1. Install vapor retarder with longest dimension parallel with direction of concrete pour.
2. Face laps away from exposed direction of concrete pour.
3. Lap vapor retarder over footings and grade beams not less than 6 inches, sealing vapor retarder to concrete.

4. Lap joints 6 inches and seal with manufacturer's recommended tape.
 5. Terminate vapor retarder at the top of floor slabs, grade beams, and pile caps, sealing entire perimeter to floor slabs, grade beams, foundation walls, or pile caps.
 6. Seal penetrations in accordance with vapor retarder manufacturer's instructions.
 7. Protect vapor retarder during placement of reinforcement and concrete.
 - a. Repair damaged areas by patching with vapor retarder material, overlapping damages area by 6 inches on all sides, and sealing to vapor retarder.
- B. Bituminous Vapor Retarders: Place, protect, and repair bituminous vapor retarder in accordance with manufacturer's written instructions.

3.5 JOINTS

- A. Construct joints true to line, with faces perpendicular to surface plane of concrete.
- B. Construction Joints: Coordinate with floor slab pattern and concrete placement sequence.
1. Install so strength and appearance of concrete are not impaired, at locations indicated on Drawings or as approved by Architect.
 2. Place joints perpendicular to main reinforcement.
 - a. Continue reinforcement across construction joints unless otherwise indicated.
 - b. Do not continue reinforcement through sides of strip placements of floors and slabs.
 3. Form keyed joints as indicated. Embed keys at least 1-1/2 inches into concrete.
 4. Locate joints for beams, slabs, joists, and girders at third points of spans. Offset joints in girders a minimum distance of twice the beam width from a beam-girder intersection.
 5. Locate horizontal joints in walls and columns at underside of floors, slabs, beams, and girders and at the top of footings or floor slabs.
 6. Space vertical joints in walls as indicated on Drawings . Unless otherwise indicated on Drawings, locate vertical joints beside piers integral with walls, near corners, and in concealed locations where possible.
 7. Use a bonding agent at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.
 8. Use epoxy-bonding adhesive at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.
- C. Control Joints in Slabs-on-Ground: Form weakened-plane control joints, sectioning concrete into areas as indicated. Construct control joints for a depth equal to at least one-fourth of concrete thickness as follows:
1. Sawed Joints: Form control joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch- wide joints into concrete when cutting action does not tear, abrade, or otherwise damage surface and before concrete develops random cracks.
- D. Isolation Joints in Slabs-on-Ground: After removing formwork, install joint-filler strips at slab junctions with vertical surfaces, such as column pedestals, foundation walls, grade beams, and other locations, as indicated.

1. Extend joint-filler strips full width and depth of joint, terminating flush with finished concrete surface unless otherwise indicated on Drawings.
2. Terminate full-width joint-filler strips not less than 1/2 inch or more than 1 inch below finished concrete surface, where joint sealants, specified in Section 079200 "Joint Sealants," are indicated.
3. Install joint-filler strips in lengths as long as practicable. Where more than one length is required, lace or clip sections together.

E. Doweled Joints:

1. Install dowel bars and support assemblies at joints where indicated on Drawings.
2. Lubricate or asphalt coat one-half of dowel bar length to prevent concrete bonding to one side of joint.

F. Dowel Plates: Install dowel plates at joints where indicated on Drawings.

3.6 CONCRETE PLACEMENT

A. Before placing concrete, verify that installation of formwork, reinforcement, embedded items, and vapor retarder is complete and that required inspections are completed.

1. Immediately prior to concrete placement, inspect vapor retarder for damage and deficient installation, and repair defective areas.
2. Provide continuous inspection of vapor retarder during concrete placement and make necessary repairs to damaged areas as Work progresses.

B. Notify Architect and testing and inspection agencies 24 hours prior to commencement of concrete placement.

C. Do not add water to concrete during delivery, at Project site, or during placement unless approved by Architect in writing, but not to exceed the amount indicated on the concrete delivery ticket.

1. Do not add water to concrete after adding high-range water-reducing admixtures to mixture.

D. Before test sampling and placing concrete, water may be added at Project site, subject to limitations of ACI 301, but not to exceed the amount indicated on the concrete delivery ticket.

1. Do not add water to concrete after adding high-range water-reducing admixtures to mixture.

E. Deposit concrete continuously in one layer or in horizontal layers of such thickness that no new concrete is placed on concrete that has hardened enough to cause seams or planes of weakness.

1. If a section cannot be placed continuously, provide construction joints as indicated.
2. Deposit concrete to avoid segregation.
3. Deposit concrete in horizontal layers of depth not to exceed formwork design pressures and in a manner to avoid inclined construction joints.

4. Consolidate placed concrete with mechanical vibrating equipment in accordance with ACI 301.
 - a. Do not use vibrators to transport concrete inside forms.
 - b. Insert and withdraw vibrators vertically at uniformly spaced locations to rapidly penetrate placed layer and at least 6 inches into preceding layer.
 - c. Do not insert vibrators into lower layers of concrete that have begun to lose plasticity.
 - d. At each insertion, limit duration of vibration to time necessary to consolidate concrete, and complete embedment of reinforcement and other embedded items without causing mixture constituents to segregate.

- F. Deposit and consolidate concrete for floors and slabs in a continuous operation, within limits of construction joints, until placement of a panel or section is complete.
 1. Do not place concrete floors and slabs in a checkerboard sequence.
 2. Consolidate concrete during placement operations, so concrete is thoroughly worked around reinforcement and other embedded items and into corners.
 3. Maintain reinforcement in position on chairs during concrete placement.
 4. Screed slab surfaces with a straightedge and strike off to correct elevations.
 5. Level concrete, cut high areas, and fill low areas.
 6. Slope surfaces uniformly to drains where required.
 7. Begin initial floating using bull floats or darbies to form a uniform and open-textured surface plane, before excess bleedwater appears on the surface.
 8. Do not further disturb slab surfaces before starting finishing operations.

3.7 FINISHING FLOORS AND SLABS

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

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

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

- D. Trowel Finish:

1. After applying float finish, apply first troweling and consolidate concrete by hand or power-driven trowel.
 2. Continue troweling passes and restraighthen until surface is free of trowel marks and uniform in texture and appearance.
 3. Grind smooth any surface defects that would telegraph through applied coatings or floor coverings.
 4. Do not add water to concrete surface.
 5. Do not apply hard-troweled finish to concrete, which has a total air content greater than 3 percent.
 6. Apply a trowel finish to surfaces exposed to view or to be covered with resilient flooring, carpet, ceramic or quarry tile set over a cleavage membrane, paint, or another thin-film-finish coating system .
 7. Finish surfaces to the following tolerances, in accordance with ASTM E1155, for a randomly trafficked floor surface:
 - a. Slabs on Ground:
 - 1) Specified overall values of flatness, F_F 35; and of levelness, F_L 25; with minimum local values of flatness, F_F 24; and of levelness, F_L 17.
 - b. Suspended Slabs:
 - 1) Specified overall values of flatness, F_F 35; and of levelness, F_L 20; with minimum local values of flatness, F_F 24; and of levelness, F_L 15.
- E. Trowel and Fine-Broom Finish: Apply a first trowel finish to surfaces where ceramic or quarry tile is to be installed by either thickset or thinset method. While concrete is still plastic, slightly scarify surface with a fine broom perpendicular to main traffic route.
1. Coordinate required final finish with Architect before application.
 2. Comply with flatness and levelness tolerances for trowel-finished floor surfaces.
- F. Broom Finish: Apply a broom finish to exterior concrete platforms, steps, ramps, and locations indicated on Drawings.
1. Immediately after float finishing, slightly roughen trafficked surface by brooming with fiber-bristle broom perpendicular to main traffic route.
 2. Coordinate required final finish with Architect before application.
- G. Slip-Resistive Finish: Before final floating, apply slip-resistive aggregate finish to concrete stair treads, platforms, ramps as indicated on Drawings
1. Apply in accordance with manufacturer's written instructions and as follows:
 - a. Uniformly spread 25 lb/100 sq. ft. of dampened slip-resistive aggregate over surface in one or two applications.
 - b. Tamp aggregate flush with surface, but do not force below surface.
 - c. After broadcasting and tamping, apply float finish.
 - d. After curing, lightly work surface with a steel wire brush or an abrasive stone and water to expose slip-resistive aggregate .

3.8 INSTALLATION OF MISCELLANEOUS CONCRETE ITEMS

A. Filling In:

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

3.9 CONCRETE CURING

- A. Protect freshly placed concrete from premature drying and excessive cold or hot temperatures.
1. Comply with ACI 301 and ACI 306.1 for cold weather protection during curing.
 2. Comply with ACI 301 and ACI 305.1 for hot-weather protection during curing.
 3. Maintain moisture loss no more than 0.2 lb/sq. ft. x h before and during finishing operations.
- B. Curing Formed Surfaces: Comply with ACI 308.1 as follows:
1. Cure formed concrete surfaces, including underside of beams, supported slabs, and other similar surfaces.
 2. Cure concrete containing color pigments in accordance with color pigment manufacturer's instructions.
 3. If forms remain during curing period, moist cure after loosening forms.

4. If removing forms before end of curing period, continue curing for remainder of curing period, as follows:
 - a. Continuous Fogging: Maintain standing water on concrete surface until final setting of concrete.
 - b. Continuous Sprinkling: Maintain concrete surface continuously wet.
 - c. Absorptive Cover: Pre-dampen absorptive material before application; apply additional water to absorptive material to maintain concrete surface continuously wet.
 - d. Water-Retention Sheeting Materials: Cover exposed concrete surfaces with sheeting material, taping, or lapping seams.
 - e. Membrane-Forming Curing Compound: Apply uniformly in continuous operation by power spray or roller in accordance with manufacturer's written instructions.
 - 1) Recoat areas subject to heavy rainfall within three hours after initial application.
 - 2) Maintain continuity of coating and repair damage during curing period.
- C. Curing Unformed Surfaces: Comply with ACI 308.1 as follows:
 1. Begin curing immediately after finishing concrete.
 2. Interior Concrete Floors:
 - a. Floors to Receive Floor Coverings Specified in Other Sections: Contractor has option of the following:
 - 1) Absorptive Cover: As soon as concrete has sufficient set to permit application without marring concrete surface, install prewetted absorptive cover over entire area of floor.
 - a) Lap edges and ends of absorptive cover not less than 12 inches.
 - b) Maintain absorptive cover water saturated, and in place, for duration of curing period, but not less than seven days.
 - 2) Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches, and sealed by waterproof tape or adhesive.
 - a) Immediately repair any holes or tears during curing period, using cover material and waterproof tape.
 - b) Cure for not less than seven days.
 - 3) Ponding or Continuous Sprinkling of Water: Maintain concrete surfaces continuously wet for not less than seven days, utilizing one, or a combination of, the following:
 - a) Water.
 - b) Continuous water-fog spray.
 - b. Floors to Receive Penetrating Liquid Floor Treatments: Contractor has option of the following:
 - 1) Absorptive Cover: As soon as concrete has sufficient set to permit application without marring concrete surface, install prewetted absorptive cover over entire area of floor.
 - a) Lap edges and ends of absorptive cover not less than 12 inches.
 - b) Maintain absorptive cover water saturated, and in place, for duration of curing period, but not less than seven days.
 - 2) Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with

- sides and ends lapped at least 12 inches, and sealed by waterproof tape or adhesive.
- a) Immediately repair any holes or tears during curing period, using cover material and waterproof tape.
 - b) Cure for not less than seven days.
- 3) Ponding or Continuous Sprinkling of Water: Maintain concrete surfaces continuously wet for not less than seven days, utilizing one, or a combination of, the following:
- a) Water.
 - b) Continuous water-fog spray.
- c. Floors to Receive Polished Finish: Contractor has option of the following:
- 1) Absorptive Cover: As soon as concrete has sufficient set to permit application without marring concrete surface, install prewetted absorptive cover over entire area of floor.
 - a) Lap edges and ends of absorptive cover not less than 12 inches.
 - b) Maintain absorptive cover water saturated, and in place, for duration of curing period, but not less than seven days.
 - 2) Ponding or Continuous Sprinkling of Water: Maintain concrete surfaces continuously wet for not less than seven days, utilizing one, or a combination of, the following:
 - a) Water.
 - b) Continuous water-fog spray.
- d. Floors to Receive Chemical Stain:
- 1) As soon as concrete has sufficient set to permit application without marring concrete surface, install curing paper over entire area of floor.
 - 2) Install curing paper square to building lines, without wrinkles, and in a single length without end joints.
 - 3) Butt sides of curing paper tight; do not overlap sides of curing paper.
 - 4) Leave curing paper in place for duration of curing period, but not less than 28 days.
- e. Floors to Receive Urethane Flooring:
- 1) As soon as concrete has sufficient set to permit application without marring concrete surface, install prewetted absorptive cover over entire area of floor.
 - 2) Rewet absorptive cover, and cover immediately with polyethylene moisture-retaining cover with edges lapped 6 inches and sealed in place.
 - 3) Secure polyethylene moisture-retaining cover in place to prohibit air from circulating under polyethylene moisture-retaining cover.
 - 4) Leave absorptive cover and polyethylene moisture-retaining cover in place for duration of curing period, but not less than 28 days.
- f. Floors to Receive Curing Compound:
- 1) Apply uniformly in continuous operation by power spray or roller in accordance with manufacturer's written instructions.
 - 2) Recoat areas subjected to heavy rainfall within three hours after initial application.
 - 3) Maintain continuity of coating, and repair damage during curing period.
 - 4) Removal: After curing period has elapsed, remove curing compound without damaging concrete surfaces by method recommended by curing compound manufacturer unless manufacturer certifies curing compound does not interfere with bonding of floor covering used on Project.
- g. Floors to Receive Curing and Sealing Compound:

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

3.10 TOLERANCES

- A. Conform to ACI 117.

3.11 APPLICATION OF LIQUID FLOOR TREATMENTS

- A. Penetrating Liquid Floor Treatment: Prepare, apply, and finish penetrating liquid floor treatment in accordance with manufacturer's written instructions.
 1. Remove curing compounds, sealers, oil, dirt, laitance, and other contaminants and complete surface repairs.
 2. Do not apply to concrete that is less than 28 days' old.
 3. Apply liquid until surface is saturated, scrubbing into surface until a gel forms; rewet; and repeat brooming or scrubbing.
 4. Rinse with water; remove excess material until surface is dry.
 5. Apply a second coat in a similar manner if surface is rough or porous.

3.12 JOINT FILLING

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

3.13 CONCRETE SURFACE REPAIRS

- A. Defective Concrete:
 1. Repair and patch defective areas when approved by Architect.
 2. Remove and replace concrete that cannot be repaired and patched to Architect's approval.

- B. Patching Mortar: Mix dry-pack patching mortar, consisting of 1 part portland cement to 2-1/2 parts fine aggregate passing a No. 16 sieve, using only enough water for handling and placing.
- C. Repairing Formed Surfaces: Surface defects include color and texture irregularities, cracks, spalls, air bubbles, honeycombs, rock pockets, fins and other projections on the surface, and stains and other discolorations that cannot be removed by cleaning.
1. Immediately after form removal, cut out honeycombs, rock pockets, and voids more than 1/2 inch in any dimension to solid concrete.
 - a. Limit cut depth to 3/4 inch.
 - b. Make edges of cuts perpendicular to concrete surface.
 - c. Clean, dampen with water, and brush-coat holes and voids with bonding agent.
 - d. Fill and compact with patching mortar before bonding agent has dried.
 - e. Fill form-tie voids with patching mortar or cone plugs secured in place with bonding agent.
 2. Repair defects on surfaces exposed to view by blending white portland cement and standard portland cement, so that, when dry, patching mortar matches surrounding color.
 - a. Patch a test area at inconspicuous locations to verify mixture and color match before proceeding with patching.
 - b. Compact mortar in place and strike off slightly higher than surrounding surface.
 3. Repair defects on concealed formed surfaces that will affect concrete's durability and structural performance as determined by Architect.
- D. Repairing Unformed Surfaces:
1. Test unformed surfaces, such as floors and slabs, for finish, and verify surface tolerances specified for each surface.
 - a. Correct low and high areas.
 - b. Test surfaces sloped to drain for trueness of slope and smoothness; use a sloped template.
 2. Repair finished surfaces containing surface defects, including spalls, popouts, honeycombs, rock pockets, crazing, and cracks in excess of 0.01 inch wide or that penetrate to reinforcement or completely through unreinforced sections regardless of width, and other objectionable conditions.
 3. After concrete has cured at least 14 days, correct high areas by grinding.
 4. Correct localized low areas during, or immediately after, completing surface-finishing operations by cutting out low areas and replacing with patching mortar.
 - a. Finish repaired areas to blend into adjacent concrete.
 5. Correct other low areas scheduled to receive floor coverings with a repair underlayment.
 - a. Prepare, mix, and apply repair underlayment and primer in accordance with manufacturer's written instructions to produce a smooth, uniform, plane, and level surface.
 - b. Feather edges to match adjacent floor elevations.
 6. Correct other low areas scheduled to remain exposed with repair topping.
 - a. Cut out low areas to ensure a minimum repair topping depth of 1/4 inch to match adjacent floor elevations.
 - b. Prepare, mix, and apply repair topping and primer in accordance with manufacturer's written instructions to produce a smooth, uniform, plane, and level surface.

7. Repair defective areas, except random cracks and single holes 1 inch or less in diameter, by cutting out and replacing with fresh concrete.
 - a. Remove defective areas with clean, square cuts, and expose steel reinforcement with at least a 3/4-inch clearance all around.
 - b. Dampen concrete surfaces in contact with patching concrete and apply bonding agent.
 - c. Mix patching concrete of same materials and mixture as original concrete, except without coarse aggregate.
 - d. Place, compact, and finish to blend with adjacent finished concrete.
 - e. Cure in same manner as adjacent concrete.
 8. Repair random cracks and single holes 1 inch or less in diameter with patching mortar.
 - a. Groove top of cracks and cut out holes to sound concrete, and clean off dust, dirt, and loose particles.
 - b. Dampen cleaned concrete surfaces and apply bonding agent.
 - c. Place patching mortar before bonding agent has dried.
 - d. Compact patching mortar and finish to match adjacent concrete.
 - e. Keep patched area continuously moist for at least 72 hours.
- E. Perform structural repairs of concrete, subject to Architect's approval, using epoxy adhesive and patching mortar.
- F. Repair materials and installation not specified above may be used, subject to Architect's approval.

3.14 FIELD QUALITY CONTROL

- A. Special Inspections: Owner will engage a special inspector to perform field tests and inspections and prepare testing and inspection reports.
- B. Testing Agency: Owner will engage a qualified testing and inspecting agency to perform tests and inspections and to submit reports.
1. Testing agency to be responsible for providing curing container for composite samples on Site and verifying that field-cured composite samples are cured in accordance with ASTM C31/C31M.
 2. Testing agency to immediately report to Architect, Contractor, and concrete manufacturer any failure of Work to comply with Contract Documents.
 3. Testing agency to report results of tests and inspections, in writing, to Owner, Architect, Contractor, and concrete manufacturer within 48 hours of inspections and tests.
 - a. Test reports to include reporting requirements of ASTM C31/C31M, ASTM C39/C39M, and ACI 301, including the following as applicable to each test and inspection:
 - 1) Project name.
 - 2) Name of testing agency.
 - 3) Names and certification numbers of field and laboratory technicians performing inspections and testing.
 - 4) Name of concrete manufacturer.
 - 5) Date and time of inspection, sampling, and field testing.
 - 6) Date and time of concrete placement.

- 7) Location in Work of concrete represented by samples.
 - 8) Date and time sample was obtained.
 - 9) Truck and batch ticket numbers.
 - 10) Design compressive strength at 28 days.
 - 11) Concrete mixture designation, proportions, and materials.
 - 12) Field test results.
 - 13) Information on storage and curing of samples before testing, including curing method and maximum and minimum temperatures during initial curing period.
 - 14) Type of fracture and compressive break strengths at seven days and 28 days.
- C. Batch Tickets: For each load delivered, submit three copies of batch delivery ticket to testing agency, indicating quantity, mix identification, admixtures, design strength, aggregate size, design air content, design slump at time of batching, and amount of water that can be added at Project site.
- D. Inspections:
1. Headed bolts and studs.
 2. Verification of use of required design mixture.
 3. Concrete placement, including conveying and depositing.
 4. Curing procedures and maintenance of curing temperature.
 5. Verification of concrete strength before removal of shores and forms from beams and slabs.
 6. Batch Plant Inspections: On a random basis, as determined by Architect.
- E. Concrete Tests: Testing of composite samples of fresh concrete obtained in accordance with ASTM C 172/C 172M to be performed in accordance with the following requirements:
1. Testing Frequency: Obtain one composite sample for each day's pour of each concrete mixture exceeding 5 cu. yd., but less than 25 cu. yd., plus one set for each additional 50 cu. yd. or fraction thereof.
 - a. When frequency of testing provides fewer than five compressive-strength tests for each concrete mixture, testing to be conducted from at least five randomly selected batches or from each batch if fewer than five are used.
 2. Slump: ASTM C143/C143M:
 - a. One test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mixture.
 - b. Perform additional tests when concrete consistency appears to change.
 3. Air Content: ASTM C231/C231M pressure method, for normal-weight concrete; ASTM C173/C173M volumetric method, for structural lightweight concrete.
 - a. One test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
 4. Concrete Temperature: ASTM C1064/C1064M:
 - a. One test hourly when air temperature is 40 deg F and below or 80 deg F and above, and one test for each composite sample.
 5. Unit Weight: ASTM C567/C567M fresh unit weight of structural lightweight concrete.
 - a. One test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
 6. Compression Test Specimens: ASTM C31/C31M:

- a. Cast and laboratory cure two sets of three 6-inch by cylinder specimens (2 specimens plus 1 reserve) for each composite sample. 4-inch by 8-inch cylinder sets shall be 4 total, 3 specimens plus 1 reserve.-inch by 8-inch cylinder specimens for each composite sample.
 7. Compressive-Strength Tests: ASTM C39/C39M.
 - a. Test one set of two laboratory-cured specimens at seven days and one set of two specimens at 28 days.
 - b. A compressive-strength test to be the average compressive strength from a set of two specimens obtained from same composite sample and tested at age indicated.
 8. When strength of field-cured cylinders is less than 85 percent of companion laboratory-cured cylinders, Contractor to evaluate operations and provide corrective procedures for protecting and curing in-place concrete.
 9. Strength of each concrete mixture will be satisfactory if every average of any three consecutive compressive-strength tests equals or exceeds specified compressive strength, and no compressive-strength test value falls below specified compressive strength by more than 500 psi if specified compressive strength is 5000 psi, or no compressive strength test value is less than 10 percent of specified compressive strength if specified compressive strength is greater than 5000 psi.
 10. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by Architect but will not be used as sole basis for approval or rejection of concrete.
 11. Additional Tests:
 - a. Testing and inspecting agency to make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by Architect.
 - b. Testing and inspecting agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C42/C42M or by other methods as directed by Architect.
 - 1) Acceptance criteria for concrete strength to be in accordance with ACI 301, Section 1.6.6.3.
 12. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
 13. Correct deficiencies in the Work that test reports and inspections indicate do not comply with the Contract Documents.
- F. Measure floor and slab flatness and levelness in accordance with ASTM E1155 within 48 hours of completion of floor finishing and promptly report test results to Architect.

3.15 PROTECTION

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

7. Protect liquid floor treatment from damage and wear during the remainder of construction period. Use protective methods and materials, including temporary covering, recommended in writing by liquid floor treatments installer.
8. Protect concrete surfaces scheduled to receive surface hardener or polished concrete finish using Floor Slab Protective Covering.

END OF SECTION 033000

SECTION 042000 - UNIT MASONRY

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Clay face brick.
2. Cast Stone Trim Units
3. Mortar and grout.
4. Steel reinforcing bars.
5. Masonry-joint reinforcement.
6. Ties and anchors.
7. Embedded flashing.
8. Miscellaneous masonry accessories.

B. Products Installed but not Furnished under This Section:

1. Steel shelf angles for supporting unit masonry.
2. Cavity wall insulation.

C. Related Requirements:

1. Section 042200 "Concrete Unit Masonry" for materials and installation of masonry backup for brick veneer cavity walls. Requirements in these two sections are complementary.
2. Section 072100 "Thermal Insulation" for cavity wall insulation.

1.2 DEFINITIONS

- A. CMU(s): Concrete masonry unit(s).
- B. Reinforced Masonry: Masonry containing reinforcing steel in grouted cells.

1.3 PREINSTALLATION MEETINGS

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

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: For the following:

1. Masonry Units: Show sizes, profiles, coursing, and locations of special shapes.
2. Fabricated Flashing: Detail corner units, end-dam units, and other special applications.

C. Samples for Verification: For each type and color of the following:

1. Clay face brick, in the form of straps of five or more bricks.
2. Special brick shapes.
3. Colored mortar. Make Samples using same sand and mortar ingredients to be used on Project.
4. Weep holes.
5. Accessories embedded in masonry.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data:

1. For testing agency

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.
2. Cementitious materials. Include name of manufacturer, brand name, and type.
3. Mortar admixtures.
4. Preblended, dry mortar mixes. Include description of type and proportions of ingredients.
5. Grout mixes. Include description of type and proportions of ingredients.
6. Reinforcing bars.
7. Joint reinforcement.
8. 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. Statement of Compressive Strength of Masonry: For each combination of masonry unit type and mortar type, provide statement of average net-area compressive strength of masonry units, mortar type, and resulting net-area compressive strength of masonry determined according to TMS 602/ACI 530.1/ASCE 6.

- E. Cold-Weather and Hot-Weather Procedures: Detailed description of methods, materials, and equipment to be used to comply with requirements.

1.6 QUALITY ASSURANCE

- A. Testing Agency Qualifications: Qualified according to ASTM C1093 for testing indicated.
- B. Masonry Installer for masonry work specified in this Section and in Section 042200: A single, experienced firm, or an approved joint venture, specializing in masonry construction with a minimum five- year record of successful completion of projects of similar scope, capable of providing labor and material and performance bonds for its portion of the Work that are acceptable to the Owner. Installer shall furnish all required materials and equipment and perform the work of this Section with its own regular employees.
 - 1. The masonry supervisor/foreman shall have had at least 5 years of experience with at least 5 projects of similar size and nature; he shall not act as or become a production worker.
 - 2. The lead/crew chief masons shall have had at least 3 years of experience with at least 5 projects of similar size and nature;
 - 3. Installer shall have experienced masonry superintendent and crew chiefs on site supervising the work whenever work is in progress.
 - 4. Contractor's Own Forces: Contractor may utilize own forces for work of this Section when Contractor and Contractor's masonry superintendent and crew chiefs meet the above qualifications.
- C. Compatibility: Provide adhesives, primers, and self-adhering flashing compatible with air-barrier materials specified in Section 072726 "Fluid-Applied Membrane Air Barriers."

1.7 MOCKUPS

- A. Sample Panel Mockups: Build sample panels to verify selections made under Sample submittals and to demonstrate aesthetic effects. Comply with requirements in Section 014000 "Quality Requirements" for mockups.
 - 1. Build sample panels for typical exterior wall in sizes approximately 48 inches long by 48 inches high by full thickness.
 - 2. Build sample panels facing south.
 - 3. Clean one-half of exposed faces of panels with masonry cleaner indicated.
 - 4. Protect approved sample panels from the elements with weather-resistant membrane.
 - 5. Approval of sample panels is for color, texture, and blending of masonry units; relationship of mortar and sealant colors to masonry unit colors; tooling of joints; aesthetic qualities of workmanship; and other material and construction qualities specifically approved by Architect in writing.
 - a. Approval of sample panels does not constitute approval of deviations from the Contract Documents contained in sample panels unless Architect specifically approves such deviations in writing.

- B. Wall Mockups: Build mockups to verify selections made under Sample submittals to set quality standards for materials and execution and to set quality standards for installation.
1. Build mockup as indicated on Drawings.
 - a. Include a sealant-filled joint at least 16 inches long in exterior wall mockup.
 - b. Include lower corner of window opening at upper corner of exterior wall mockup. Make opening approximately 12 inches wide by 16 inches high.
 - c. Include through-wall flashing installed for a 24-inch length in corner of exterior wall mockup approximately 16 inches down from top of mockup, with a 12-inch length of flashing left exposed to view (omit masonry above half of flashing).
 - d. Include air barrier, veneer anchors, flashing, cavity drainage material, and weep holes in exterior masonry-veneer wall mockup.
 2. Protect accepted mockups from the elements with weather-resistant membrane.
 3. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations by Change Order.

1.8 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.

1.9 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/ACI 530.1/ASCE 6.
 - 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/ACI 530.1/ASCE 6.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Source Limitations for Masonry Units: Obtain exposed masonry units of a uniform texture and color, or a uniform blend within the ranges accepted for these characteristics, from single source from single manufacturer for each product required.
- B. Source Limitations for Mortar Materials: Obtain mortar ingredients of a uniform quality, including color for exposed masonry, from single manufacturer for each cementitious component and from single source or producer for each aggregate.

2.2 PERFORMANCE REQUIREMENTS

- A. Seismic Performance: Masonry to withstand the effects of earthquake motions determined in accordance with ASCE/SEI 7.

2.3 UNIT MASONRY, GENERAL

- A. Masonry Standard: Comply with TMS 602/ACI 530.1/ASCE 6, 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 and will be within 20 feet vertically and horizontally of a walking surface.
- C. Fire-Resistance Ratings: Comply with requirements for fire-resistance-rated assembly designs indicated.
 - 1. Where fire-resistance-rated construction is indicated, units shall be listed and labeled by a qualified testing agency acceptable to authorities having jurisdiction.

2.4 CONCRETE MASONRY UNITS

- A. Refer to Section 042200 "Concrete Unit Masonry."
 - 1. .

2.5

2.6 CONCRETE AND MASONRY LINTELS

- A. Refer to Section 042200 "Concrete Unit Masonry."

2.7 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.
 - 3. Provide special shapes for applications requiring brick of size, form, color, and texture on exposed surfaces that cannot be produced by sawing.
 - 4. Provide special shapes for applications where shapes produced by sawing would result in sawed surfaces being exposed to view.
- B. Clay Face Brick: Facing brick complying with ASTM C216.
 - 1. Grade: MW or SW.
 - 2. Type: FBS.

3. Efflorescence: Provide brick that has been tested according to ASTM C67 and is rated "not effloresced."
4. Size (Actual Dimensions): 3-1/2 inches wide by 3-1/2 inches high by 7-5/8 inches long (Utility).
5. Application: Use where brick is exposed unless otherwise indicated.
6. Products: As indicated on Drawings .
7. Substitutions will only be considered prior to Bidding in accordance with "Instructions to Bidders." Prior approvals must demonstrate match to specified brick in size, color and texture as well as compliance with technical specification. Submit the following:
 - a. Product Data.
 - b. Test results.
 - c. Clay face brick, in the form of straps of five or more bricks set with specified colored mortar.

2.8 CAST STONE TRIM UNITS

- A. Cast Stone Units: Comply with ASTM C1364.
 1. Trim units including wall and column caps.
- B. Fabricate units with sharp arris and accurately reproduced details, with indicated texture on all exposed surfaces unless otherwise indicated.
 1. Slope exposed horizontal surfaces 1:12 to drain unless otherwise indicated.
 2. Provide raised fillets at backs of sills and at ends indicated to be built into jambs.
 3. Provide drips on projecting elements unless otherwise indicated.
- C. Fabrication Tolerances:
 1. Variation in Cross Section: Do not vary from indicated dimensions by more than 1/8 inch.
 2. Variation in Length: Do not vary from indicated dimensions by more than 1/360 of the length of unit or 1/8 inch, whichever is greater, but in no case by more than 1/4 inch.
 3. Warp, Bow, and Twist: Not to exceed 1/360 of the length of unit or 1/8 inch, whichever is greater.
 4. Location of Grooves, False Joints, Holes, Anchorages, and Similar Features: Do not vary from indicated position by more than 1/8 inch on formed surfaces of units and 3/8 inch on unformed surfaces.
- D. Cure Units as Follows:
 1. Cure units in enclosed, moist curing room at 95 percent relative humidity and temperature of 100 deg F for 12 hours or 70 deg F for 16 hours.
 2. Keep units damp and continue curing to comply with one of the following:
 - a. No fewer than five days at mean daily temperature of 70 deg F or above.
 - b. No fewer than seven days at mean daily temperature of 50 deg F or above.

- E. Acid etch units after curing to remove cement film from surfaces to be exposed to view.
- F. Colors and Textures: Match Architect's samples.

2.9 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 shall not be more than 0.1 percent when tested according to 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: Not Permitted.
- E. Mortar Cement: ASTM C1329/C1329M.
- 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.
- 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:
 - 2. Formulate blend as required to produce color indicated or, if not indicated, as selected from manufacturer's standard colors.
 - 3. Pigments shall not exceed 10 percent of portland cement by weight.
 - 4. Pigments shall not exceed 5 percent of 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.
- K. Water: Potable.

2.10 REINFORCEMENT

- A. Refer to Section 042200 “Concrete Unit Masonry.”
- B. Masonry-Joint Reinforcement for Multiwythe Masonry:
 - 1. Adjustable (two-piece) type, either ladder or truss design, with one side rod at each face shell of backing wythe and with separate adjustable ties with pintle-and-eye connections having a maximum horizontal play of 1/16 inch and maximum vertical adjustment of 1-1/4 inches. Size ties to extend at least halfway through facing wythe but with at least 5/8-inch cover on outside face. Ties have hooks or clips to engage a continuous horizontal wire in the facing wythe.
- C. Masonry-Joint Reinforcement for Veneers Anchored with Seismic Masonry-Veneer Anchors: Single 0.187-inch-diameter, hot-dip galvanized carbon steel continuous wire.

2.11 TIES AND ANCHORS

- A. Refer to Section 042200 “Concrete Unit Masonry.”
- B. Adjustable Masonry-Veneer Anchors:
 - 1. General: Provide anchors that allow vertical adjustment but resist a 100-lbf load in both tension and compression perpendicular to plane of wall without deforming or developing play in excess of 1/16 inch.
 - 2. Fabricate sheet metal anchor sections and other sheet metal parts from 0.075-inch-thick steel sheet, galvanized after fabrication.
 - 3. Fabricate wire ties from 0.187-inch-diameter, hot-dip galvanized-steel wire unless otherwise indicated.
 - 4. Veneer anchor shall have protective sheath at screws to prevent crushing of rigid insulation and sheathing. Anchors shall be gasketed or taped to ensure continuity of air barrier. Provide one of the following:
 - a. Heckman Building Products; Pos-I-Tie.
 - b. Hohmann & Barnard, Inc.; X-Seal with Vee Byna-Tie.
 - c. Wire Bond; Type III X Screw-on Veneer Anchor.
 - 5. Polymer-Coated, Steel Drill Screws for Steel Studs: ASTM C954 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 according to ASTM B117.

2.12 EMBEDDED FLASHING MATERIALS

- 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.
- B. Flexible Flashing: Use one of the following unless otherwise indicated:
 - 1. Stainless Steel Laminated Flashing: Type 304 stainless steel bonded on one side to a layer of polymeric fabric. Subject to compliance with requirements, provide one of the following:
 - a. Hohmand & Bernard; Mighty-Flash.
 - b. York; Multi-Flash SS.
 - 2. Self-adhering Stainless Steel: Type 304 stainless steel with butyl adhesive and siliconized release liner. Subject to compliance with requirements, provide one of the following:
 - a. Hohmand & Bernard; Mighty-Flash SA.
 - b. York 304 Self Adhering SS.
 - 3. Copper-Fabric Flashing: 5 oz./sq. ft. self-adhesive copper sheet bonded to non-asphaltic film or fabric.
 - a. Hohmand & Bernard; Copper-Flash SA.
 - b. York Multi-flash 500.
- C. Application: Unless otherwise indicated, use the following:
 - 1. Where flashing is indicated to receive counterflashing, use metal flashing. Provide s-lock receiver to receive counterflashing.
 - 2. Where flashing is indicated to be turned down at or beyond the wall face, use metal flashing.
 - 3. Where flashing is fully concealed, use metal flashing or flexible flashing.
- D. Solder and Sealants for Sheet Metal Flashings: As specified in Section 076200 "Sheet Metal Flashing and Trim."
- E. 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.
- F. Termination Bars for Flexible Flashing: Stainless steel bars 1/8 inch by 1 inch.

2.13 MISCELLANEOUS MASONRY ACCESSORIES

- A. Bond-Breaker Strips: Asphalt-saturated felt complying with ASTM D226/D226M, Type I (No. 15 asphalt felt).
- B. Cellular Plastic Weep/Vent: One-piece, flexible extrusion made from UV-resistant polypropylene copolymer, 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. Provide one of the following:
 - a. Advanced Building Products, Inc.; Mortar Maze Weep Vents.
 - b. Mortar Net Solutions; CellVent.
 - c. Wire Bond;
- C. Cavity Drainage Material: Free-draining mesh, made from polymer strands that will not degrade within the wall cavity. Material shall be the full depth of the cavity and extend at least 10 inches above weep holes. Provide one of the following:
 - a. Advanced Building Products, Inc.; Mortar Break.
 - b. Mortar Net Solutions; Mortar Break.
 - c. Wire Bond; Cell Vent.
- D. 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.
- E. Preformed Control-Joint Gaskets: Made from 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.
- A. Vertical Reinforcing Bar Positioners: Custom fabricated wire units designed to fit into mortar bed joints spanning masonry unit cells with loops for holding vertical reinforcing bars in proper location of cells. Units are formed from 0.142-inch steel wire, hot-dip galvanized after fabrication.
 - 1. Provide units with two loops for masonry walls indicated to have a single vertical reinforcing bar at each grout spacing.
 - a. Loop layout shall allow for placement of vertical reinforcing in center of cmu wall thickness unless noted otherwise
 - 2. Provide units with four loops or a pair of units with two loops for masonry walls indicated to have two vertical reinforcing bars at each grout spacing.
 - a. Provide custom fabricated positioners with loop layout to allow for placement of vertical reinforcing as indicated in the contract documents.

2.14 MASONRY CLEANERS

- A. Proprietary Acidic Cleaner: Manufacturer's standard-strength cleaner designed for removing mortar/grout stains, efflorescence, and other new construction stains from new masonry without

discoloring or damaging masonry surfaces. Use product expressly approved for intended use by cleaner manufacturer and manufacturer of masonry units and cast stone units being cleaned.

1. Subject to compliance with requirements, provide products by one of the following:
 - a. Diedrich Technologies, Inc.
 - b. EaCo Chem, Inc.
 - c. Prosoco, Inc.

2.15 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 clay masonry veneer, use mortar cement mortar.
 3. For reinforced cmu masonry, use portland cement-lime or mortar cement mortar unless noted otherwise.
 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 C270, Proportion Specification. Provide the following types of mortar for applications stated unless another type is indicated.
 1. For masonry below grade or in contact with earth, use Type S.
 2. For reinforced cmu masonry, use Type S.
 3. For clay masonry veneer, use Type N.
 4. For mortar parge coats, use Type S or Type N.
- D. Pigmented Mortar: Use colored cement product.
 1. Pigments shall not exceed 10 percent of portland cement by weight.
 2. Pigments shall not exceed 5 percent of mortar cement by weight.
 3. Mix to match Architect's sample.
 4. Application: Use pigmented mortar for exposed mortar joints in brick veneer.
- E. Colored-Aggregate Mortar: Produce required mortar color by using colored aggregates and natural color or white cement as necessary to produce required mortar color.
 1. Mix to match Architect's sample.
 2. Application: Use colored-aggregate mortar for exposed mortar joints in brick veneer.
- F. Grout for Unit Masonry: Comply with ASTM C476.

1. Use grout of type indicated or, if not otherwise indicated, of type (fine or coarse) that will comply with TMS 602/ACI 530.1/ASCE 6 for dimensions of grout spaces and pour height.
2. Proportion grout in accordance with ASTM C476, paragraph 4.2.1.2 for specified 28-day compressive strength indicated, but not less than 3000 psi.
3. Provide grout with a slump of 8 to 11 inches as measured in accordance with ASTM C143/C143M.

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 the Work.
 2. Verify that foundations are within tolerances specified.
 3. Verify that reinforcing dowels are properly placed.
 4. Verify that substrates are free of substances that impair mortar bond.
- 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 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. 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 according to ASTM C67. 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 same bond pattern as existing building.; 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 stepping 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.

3.5 MORTAR BEDDING AND JOINTING

- A. General: Prepare mortar in accordance with current Portland Cement Association publications.
- B. Prepare fresh mortar at the rate it will be used, in order to maintain consistent color and workability. Do not use mortar that has stiffened because of hydration. Discard when not used within the time recommended by mortar manufacturer or PCA publications, whichever is shorter. Retemper mortar carefully to avoid color changes, no more than twice per batch.
- C. Measure mortar materials using cubic foot measuring box or other approved container of known volume, of size appropriate for operation. Use a consistent ratio of water to mortar materials, within the range recommended by the mortar manufacturer's written instructions.
- D. 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.
- E. Set cast-stone trim units in full bed of mortar with full vertical joints. Fill dowel, anchor, and similar holes.
 - 1. Clean soiled surfaces with fiber brush and soap powder and rinse thoroughly with clear water.
 - 2. Allow cleaned surfaces to dry before setting.
 - 3. Wet joint surfaces thoroughly before applying mortar.
 - 4. Rake out mortar joints for pointing with sealant.

- F. Tool exposed joints slightly concave when thumbprint hard, using a jointer larger than joint thickness unless otherwise indicated.
- G. Cut joints flush where indicated to receive waterproofing, cavity wall insulation, air barriers, and block fillers, unless otherwise indicated.
- H. Immediately after placing a course of masonry clean mortar drippings and fins from cells to receive reinforcing. Care shall be taken to collect the loose material and remove it from the cell and not allowing it to collect at the bottom of the cell.

3.6 COMPOSITE MASONRY

- A. Bond wythes of composite masonry together as follows:
 - 1. Masonry-Joint Reinforcement: Installed in horizontal mortar joints.
 - a. Where bed joints of wythes do not align, use adjustable-type (two-piece-type) reinforcement with continuous horizontal wire in facing wythe attached to ties.
- 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.

3.7 CAVITY WALLS

- A. Bond wythes of cavity walls together as follows:
 - 1. Masonry-Joint Reinforcement: Installed in horizontal mortar joints.
 - a. Where one wythe is of clay masonry and the other of concrete masonry, use adjustable-type (two-piece-type) reinforcement-to allow for differential movement regardless of whether bed joints align.
 - 2. 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. Installing Cavity Wall Insulation: 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 ANCHORED MASONRY VENEERS

- A. Anchor masonry veneers to wall framing with seismic masonry-veneer anchors to comply with the following requirements:
 - 1. Fasten screw-attached anchors through sheathing to wall framing with metal fasteners of type indicated. Use two fasteners unless anchor design only uses one fastener.
 - 2. Embed tie sections in masonry joints.
 - 3. Locate anchor sections to allow maximum vertical differential movement of ties up and down.
 - 4. Space anchors as indicated, but not more than 18 inches o.c. vertically and 18 inches o.c. horizontally, with not less than one anchor for each 1.87 sq. ft. of wall area. Install additional anchors within 12 inches of openings and at intervals, not exceeding 18 inches, around perimeter.
- B. Provide not less than 2 inches of airspace between back of masonry veneer and face of insulation.
 - 1. Keep airspace clean of mortar droppings and other materials during construction. Bevel beds away from airspace, to minimize mortar protrusions into airspace. Do not attempt to trowel or remove mortar fins protruding into airspace.

3.9 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 expansion joints in brick as follows:
 - 1. Build flanges of metal expansion strips into masonry. Lap each joint 4 inches in direction of water flow. Seal joints below grade and at junctures with horizontal expansion joints if any.
 - 2. Build flanges of factory-fabricated, expansion-joint units into masonry.
 - 3. Build in compressible joint fillers where indicated.

4. 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."
- C. Provide horizontal, pressure-relieving joints by either leaving an airspace or inserting a compressible filler of width required for installing sealant and backer rod specified in Section 079200 "Joint Sealants," but not less than 3/8 inch.
1. Locate horizontal, pressure-relieving joints beneath shelf angles supporting masonry.
- 3.10 LINTELS
- A. Install steel lintels where indicated.
 - B. Provide minimum bearing of 8 inches at each jamb unless otherwise indicated.
- 3.11 FLASHING AND WEEP HOLES
- A. General: Install embedded flashing and weep holes in masonry at wall bases, window sills, shelf angles, lintels, ledges, other obstructions to downward flow of water in wall, and where indicated. 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 at least 8 inches above cavity drainage material, and 1-1/2 inches into the inner wythe. Form 1/4-inch hook in edge of flashing embedded in inner wythe.
 3. At masonry-veneer walls, extend flashing through veneer, across airspace behind veneer, and up face of sheathing at least 8 inches and at least 8 inches above cavity drainage material. Fasten upper edge of flexible flashing to sheathing through termination bar.
 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. Where ribbed sheet metal flashing is indicated, interlock end joints by overlapping ribs not less than 1-1/2 inches or as recommended by flashing manufacturer, and seal lap with elastomeric sealant complying with requirements in Section 079200 "Joint Sealants" for application indicated.
 6. Cut flexible flashing off flush with face of wall after masonry wall construction is completed.
- B. Install weep holes in exterior wythes and veneers in head joints of first course of masonry immediately above embedded flashing.
1. Use specified weep/cavity vent products to form weep holes.

2. Space weep holes 24 inches o.c. unless otherwise indicated.

C. Place cavity drainage material in cavities and airspace behind veneers to comply with configuration requirements for cavity drainage material in "Miscellaneous Masonry Accessories" Article.

3.12 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections. 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 will be at Contractor's expense.

B. Inspections: Special inspections in accordance with Level B in TMS 402.

1. Begin masonry construction only after inspectors have verified proportions of site-prepared mortar.
2. Place grout only after inspectors have verified compliance of grout spaces and of grades, sizes, and locations of reinforcement.
3. Place grout only after inspectors have verified proportions of site-prepared grout.

C. Testing Prior to Construction: One set of tests.

D. Testing Frequency: One set of tests for each 5000 sq. ft. of wall area or portion thereof.

E. Clay Masonry Unit Test: For each type of unit provided, in accordance with ASTM C67/C67M for compressive strength.

F. Mortar Aggregate Ratio Test (Proportion Specification): For each mix provided, in accordance with ASTM C780.

G. Mortar Test (Property Specification): For each mix provided, in accordance with ASTM C780. Test mortar for mortar air content and compressive strength.

H. Grout Test (Compressive Strength): For each mix provided, in accordance with ASTM C1019.

3.13 PARGING

A. Parge faces of masonry walls, where indicated, to fill joints and provide smooth surface for adhered finish wall coverings. Dampen wall before applying first coat, and scarify first coat to ensure full bond to subsequent coat.

B. Use a steel-trowel finish to produce a smooth, flat, dense surface, free of bug holes and pinholes, with a maximum surface variation of 1/8 inch per foot.

C. Damp-cure parging for at least 24 hours and protect parging until cured.

3.14 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 non masonry 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 concrete masonry by applicable cleaning methods indicated in NCMA TEK 8-4A.
 - 7. Clean masonry with a proprietary acidic masonry cleaner applied according to manufacturer's written instructions.

3.15 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. Waste Disposal as Fill Material: Dispose of clean masonry waste, including excess or soil-contaminated sand, waste mortar, and broken masonry units, by crushing and mixing with fill material as fill is placed.
 - 1. Crush masonry waste to less than 4 inches in each dimension.
 - 2. Mix masonry waste with at least two parts of specified fill material for each part of masonry waste. Fill material is specified in Section 312000 "Earth Moving."
 - 3. Do not dispose of masonry waste as fill within 18 inches of finished grade.
- C. Masonry Waste Recycling: Return broken CMUs not used as fill to manufacturer for recycling.

- D. Excess Masonry Waste: Remove excess clean masonry waste that cannot be used as fill, as described above or recycled, and other masonry waste, and legally dispose of off Owner's property.

END OF SECTION 042000

SECTION 042200 - CONCRETE UNIT MASONRY

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. Concrete masonry units.
2. Mortar and grout.
3. Steel reinforcing bars.
4. Masonry-joint reinforcement.
5. Embedded flashing.
6. Miscellaneous masonry accessories.
7. Masonry-cell fill.

- B. Products Installed but not Furnished under This Section:

1. Cast-stone trim in concrete unit masonry.

- C. Related Requirements:

1. Section 031000 "Concrete Forms and Accessories" for installing dovetail slots for masonry anchors.
2. Section 051200 "Structural Steel Framing" for installing anchor sections of adjustable masonry anchors for connecting to structural steel frame.
3. Section 071900 "Water Repellents" for water repellents applied to unit masonry assemblies.
4. Section 076200 "Sheet Metal Flashing and Trim" for sheet metal flashing and for furnishing manufactured reglets installed in masonry joints.
5. Section 323223 "Segmental Retaining Walls" for dry-laid, concrete unit retaining walls.

1.3 DEFINITIONS

- A. CMU(s): Concrete masonry unit(s).
- B. Reinforced Masonry: Masonry containing reinforcing steel in grouted cells.

1.4 PREINSTALLATION MEETINGS

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

1.5 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: For the following:
 - 1. Masonry Units: Show sizes, profiles, coursing, and locations of special shapes.
 - 2. Reinforcing Steel: Detail bending, lap lengths, and placement of unit masonry reinforcing bars. Comply with ACI 315.
 - 3. Fabricated Flashing: Detail corner units, end-dam units, and other special applications.

1.6 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For testing agency.
- B. Material Certificates: For each type and size of the following:
 - 1. Masonry units.
 - a. Include material test reports substantiating compliance with requirements.
 - b. For masonry units used in structural masonry, include data and calculations establishing average net-area compressive strength of units.
 - 2. Integral water repellent used in CMUs.
 - 3. Cementitious materials. Include name of manufacturer, brand name, and type.
 - 4. Mortar admixtures.
 - 5. Preblended, dry mortar mixes. Include description of type and proportions of ingredients.
 - 6. Grout mixes. Include description of type and proportions of ingredients.
 - 7. Reinforcing bars.
 - 8. Joint reinforcement.
 - 9. 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 according to ASTM C109/C109M for compressive strength, ASTM C1506 for water retention, and ASTM C91/C91M for air content.
 - 2. Include test reports, according to ASTM C1019, for grout mixes required to comply with compressive strength requirement.
- D. Statement of Compressive Strength of Masonry: For each combination of masonry unit type and mortar type, provide statement of average net-area compressive strength of masonry units, mortar type, and resulting net-area compressive strength of masonry determined according to TMS 602/ACI 530.1/ASCE 6.

- E. Cold-Weather and Hot-Weather Procedures: Detailed description of methods, materials, and equipment to be used to comply with requirements.

1.7 QUALITY ASSURANCE

- A. Testing Agency Qualifications: Qualified according to ASTM C1093 for testing indicated.

1.8 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.

1.9 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.
- 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/ACI 530.1/ASCE 6.
 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/ACI 530.1/ASCE 6.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Source Limitations for Masonry Units: Obtain exposed masonry units of a uniform texture and color, or a uniform blend within the ranges accepted for these characteristics, from single source from single manufacturer for each product required.
- B. Source Limitations for Mortar Materials: Obtain mortar ingredients of a uniform quality, including color for exposed masonry, from single manufacturer for each cementitious component and from single source or producer for each aggregate.

2.2 PERFORMANCE REQUIREMENTS

- A. Provide structural unit masonry that develops indicated net-area compressive strengths at 28 days.
 1. Determine net-area compressive strength of masonry from average net-area compressive strengths of masonry units and mortar types (unit-strength method) according to TMS 602/ACI 530.1/ASCE 6.
 2. Determine net-area compressive strength of masonry by testing masonry prisms according to ASTM C1314.

2.3 UNIT MASONRY, GENERAL

- A. Masonry Standard: Comply with TMS 602/ACI 530.1/ASCE 6 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 and will be within 20 feet vertically and horizontally of a walking surface.

- C. Fire-Resistance Ratings: Comply with requirements for fire-resistance-rated assembly designs indicated.
 - 1. Where fire-resistance-rated construction is indicated, units shall be listed and labeled by a qualified testing agency acceptable to authorities having jurisdiction.

2.4 CONCRETE MASONRY UNITS

- A. Shapes: Provide shapes indicated and as follows, with exposed surfaces matching exposed faces of adjacent units unless otherwise indicated.
 - 1. Provide special shapes for lintels, corners, jambs, sashes, movement joints, headers, bonding, and other special conditions.
 - 2. Provide bullnose units for outside corners unless otherwise indicated.
- B. CMUs: ASTM C90.
 - 1. Unit Compressive Strength: Provide units with minimum average net-area compressive strength of 2500 psi.
 - 2. Density Classification: Medium weight unless otherwise indicated.
 - 3. Size (Width): Manufactured to dimensions 3/8 inch less-than-nominal dimensions.

2.5 MASONRY LINTELS

- A. Masonry Lintels: Prefabricated or built-in-place masonry lintels made from bond beam CMUs matching adjacent CMUs in color, texture, and density classification, with reinforcing bars placed as indicated and filled with coarse grout. Cure precast lintels before handling and installing. Temporarily support built-in-place lintels until cured.

2.6 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 shall not be more than 0.1 percent when tested according to 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. Mortar Cement: ASTM C1329/C1329M.
- E. 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 ¼ inch thick, use aggregate graded with 100 percent passing the No. 16 sieve.

F. Aggregate for Grout: ASTM C404.

G. Water: Potable.

2.7 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 steel wire, hot-dip galvanized after fabrication. Provide units designed for number of bars indicated.

C. Masonry-Joint Reinforcement, General: Ladder type complying with 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. Spacing of Cross Rods: Not more than 16 inches o.c.
6. Provide in lengths of not less than 10 feet, with prefabricated corner and tee units.

2.8 TIES AND ANCHORS

A. General: Ties and anchors shall extend at least 1-1/2 inches into masonry but with at least a 5/8-inch cover on outside face.

B. 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 A82/A82M, with ASTM A153/A153M, Class B-2 coating.

C. 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, hot-dip galvanized steel wire.
2. Tie Section: Triangular-shaped wire tie made from 0.187-inch- diameter, hot-dip galvanized steel wire.

D. 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 A153/A153M.

2.9 MISCELLANEOUS MASONRY ACCESSORIES

- A. Compressible Filler: Premolded filler strips complying with ASTM D1056, Grade 2A1; compressible up to 35 percent; of width and thickness indicated; formulated from neoprene.
- B. Preformed Control-Joint Gaskets: Made from styrene-butadiene-rubber compound, complying with ASTM D2000, Designation M2AA-805 or PVC, complying with ASTM D2287, 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 felt complying with ASTM D226/D226M, Type I (No. 15 asphalt felt).

2.10 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. Use portland cement-lime mortar unless otherwise indicated.
 3. For reinforced masonry, use portland cement-lime or mortar cement mortar.
- 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 C270, Proportion Specification. Provide the following types of mortar for applications stated unless another type is indicated.
 1. For masonry below grade or in contact with earth, use Type S (3250 psi).
 2. For reinforced masonry, use Type S (3250 psi).
- D. Grout for Unit Masonry: Comply with ASTM C476.
 1. Use grout of type indicated or, if not otherwise indicated, of type (fine or coarse) that will comply with TMS 602/ACI 530.1/ASCE 6 for dimensions of grout spaces and pour height.
 2. Proportion grout in accordance with ASTM C476, or paragraph 4.2.2 for specified 28-day compressive strength indicated, but not less than 3500 psi.
 3. Provide grout with a slump of 8 to 11 inches as measured according to ASTM C143/C143M.

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 the Work.
 - 2. Verify that foundations are within tolerances specified.
 - 3. Verify that reinforcing dowels are properly placed.
 - 4. Verify that substrates are free of substances that would impair mortar bond.
- B. Before installation, examine rough-in and built-in construction for piping systems to verify actual locations of piping.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION, GENERAL

- A. Build chases and recesses to accommodate items specified in this and other Sections.
- B. Leave openings for equipment to be installed before completing masonry. After installing equipment, complete masonry to match construction immediately adjacent to opening.
- C. 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.

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.

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.

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 stepping 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. Where built-in items are to be embedded in cores of hollow masonry units, place a layer of metal lath, wire mesh, or plastic mesh in the joint below, and rod mortar or grout into core.
- H. Fill cores in hollow CMUs with grout 24 inches under bearing plates, beams, lintels, posts, and similar items unless otherwise indicated.
- I. Build nonload-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 078443 "Joint Firestopping."

3.5 MORTAR BEDDING AND JOINTING

- A. Lay hollow CMUs as follows:
 - 1. Bed face shells in mortar and make head joints of depth equal to bed joints.
 - 2. Bed webs in mortar in all courses of piers, columns, and pilasters.
 - 3. Bed webs in mortar in grouted masonry, including starting course on footings.
 - 4. Fully bed entire units, including areas under cells, at starting course on footings where cells are not grouted.
- B. Lay solid CMUs 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. Set cast-stone trim units in full bed of mortar with full vertical joints. Fill dowel, anchor, and similar holes.
 - 1. Clean soiled surfaces with fiber brush and soap powder and rinse thoroughly with clear water.
 - 2. Wet joint surfaces thoroughly before applying mortar.
 - 3. Rake out mortar joints for pointing with sealant.
- D. Rake out mortar joints at pre-faced CMUs to a uniform depth of 1/4 inch and point with epoxy mortar to comply with epoxy-mortar manufacturer's written instructions.
- E. Tool exposed joints slightly concave when thumbprint hard, using a jointer larger than joint thickness unless otherwise indicated.
- F. Cut joints flush for masonry walls to receive plaster or other direct-applied finishes (other than paint) unless otherwise indicated.
- G. Cut joints flush where indicated to receive waterproofing unless otherwise indicated.

3.6 MASONRY-JOINT REINFORCEMENT

- A. General: Install entire length of longitudinal side rods in mortar with a minimum cover of 5/8 inch on exterior side of walls, 1/2 inch elsewhere. Lap reinforcement a minimum of 6 inches.
 - 1. Space reinforcement not more than 16 inches o.c.
 - 2. Space reinforcement not more than 8 inches o.c. in foundation walls and parapet walls.
 - 3. Provide reinforcement not more than 8 inches above and below wall openings and extending 12 inches beyond openings in addition to continuous reinforcement.
- B. Interrupt joint reinforcement at control and expansion joints unless otherwise indicated.
- C. Provide continuity at wall intersections by using prefabricated T-shaped units.
- D. Provide continuity at corners by using prefabricated L-shaped units.

3.7 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.

3.8 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 using one of the following methods:
 - 1. Install preformed control-joint gaskets designed to fit standard sash block.
 - 2. Install interlocking units designed for control joints. Install bond-breaker strips at joint. Keep head joints free and clear of mortar, or rake out joint for application of sealant.

3.9 LINTELS

- A. Provide 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.
- B. Provide minimum bearing of 8 inches at each jamb unless otherwise indicated.

3.10 REINFORCED UNIT MASONRY

- 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 TMS 602/ACI 530.1/ASCE 6.
- 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 TMS 602/ACI 530.1/ASCE 6 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 .

3.11 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.
- B. Inspections: Special inspections according to Level B in TMS 402/ACI 530/ASCE 5.
 - 1. Begin masonry construction only after inspectors have verified proportions of site-prepared mortar.
 - 2. Place grout only after inspectors have verified compliance of grout spaces and of grades, sizes, and locations of reinforcement.
 - 3. Place grout only after inspectors have verified proportions of site-prepared grout.
- C. Testing Prior to Construction: One set of tests.
- D. Testing Frequency: One set of tests for each 5000 sq. ft. of wall area or portion thereof.
- E. Mortar Aggregate Ratio Test (Proportion Specification): For each mix provided, according to ASTM C780.
- F. Mortar Test (Property Specification): For each mix provided, according to ASTM C780. Test mortar for mortar air content and compressive strength.
- G. Grout Test (Compressive Strength): For each mix provided, according to ASTM C1019.

3.12 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 stone and 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 concrete masonry by applicable cleaning methods indicated in NCMA TEK 8-4A.

3.13 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. Waste Disposal as Fill Material: Dispose of clean masonry waste, including excess or soil-contaminated sand, waste mortar, and broken masonry units, by crushing and mixing with fill material as fill is placed.
 - 1. Crush masonry waste to less than 4 inches in each dimension.
 - 2. Mix masonry waste with at least two parts of specified fill material for each part of masonry waste. Fill material is specified in Section 312000 "Earth Moving."
 - 3. Do not dispose of masonry waste as fill within 18 inches of finished grade.
- C. Masonry Waste Recycling: Return broken CMUs not used as fill to manufacturer for recycling.
- D. Excess Masonry Waste: Remove excess clean masonry waste that cannot be used as fill, as described above or recycled, and other masonry waste, and legally dispose of off Owner's property.

END OF SECTION 042200

SECTION 051200 - STRUCTURAL STEEL FRAMING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Structural steel.
2. Shear stud connectors, shop and field welded.
3. Shrinkage-resistant grout.

B. Related Requirements:

1. Section 051213 "Architecturally Exposed Structural Steel Framing" for additional requirements for architecturally exposed structural steel.
2. Section 053100 "Steel Decking" for field installation of shear stud connectors through deck.
3. Section 055000 "Metal Fabrications" for steel lintels and shelf angles not attached to structural-steel frame miscellaneous steel fabrications and other steel items not defined as structural steel.
4. Section 099113 "Exterior Painting" and Section 099123 "Interior Painting" and Section 099600 "High-Performance Coatings" for painting requirements.

1.2 DEFINITIONS

- A. Structural Steel: Elements of the structural frame indicated on Drawings and as described in ANSI/AISC 303.
- B. Seismic-Load-Resisting System: Elements of structural-steel frame designated as "SLRS" or along grid lines designated as "SLRS" on Drawings, including columns, beams, and braces and their connections.
- C. Heavy Sections: Rolled and built-up sections as follows:
 1. Shapes included in ASTM A6/A6M with flanges thicker than 1-1/2 inches.
 2. Welded built-up members with plates thicker than 2 inches.
 3. Column base plates thicker than 2 inches.
- D. Protected Zone: Structural members or portions of structural members indicated as "protected zone" on Drawings. Connections of structural and nonstructural elements to protected zones are limited.
- E. Demand-Critical Welds: Those welds, the failure of which would result in significant degradation of the strength and stiffness of the seismic-load-resisting system and which are indicated as "demand critical" or "seismic critical" on Drawings.

1.3 COORDINATION

- A. Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint and coating manufacturers' written recommendations to ensure that shop primers and topcoats are compatible with one another.
- B. Coordinate installation of anchorage items to be embedded in or attached to other construction without delaying the Work. Provide setting diagrams, sheet metal templates, instructions, and directions for installation.

1.4 PREINSTALLATION MEETINGS

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

1.5 ACTION SUBMITTALS

A. Product Data:

- 1. Structural-steel materials.
- 2. High-strength, bolt-nut-washer assemblies.
- 3. Shear stud connectors.
- 4. Anchor rods.
- 5. Threaded rods.
- 6. Shop primer.
- 7. Galvanized-steel primer.
- 8. Etching cleaner.
- 9. Galvanized repair paint.
- 10. Shrinkage-resistant grout.

B. Shop Drawings: Show fabrication of structural-steel components.

- 1. Include details of cuts, connections, splices, camber, holes, and other pertinent data.
- 2. Include embedment Drawings.
- 3. Indicate welds by standard AWS symbols, distinguishing between shop and field welds, and show size, length, and type of each weld. Show backing bars that are to be removed and supplemental fillet welds where backing bars are to remain.
- 4. Indicate type, size, and length of bolts, distinguishing between shop and field bolts. Identify pretensioned and slip-critical, high-strength bolted connections.
- 5. Identify members and connections of the seismic-load-resisting system.
- 6. Indicate locations and dimensions of protected zones.
- 7. Identify demand-critical welds.
- 8. Identify members not to be shop primed.

C. Welding Procedure Specifications (WPSs) and Procedure Qualification Records (PQRs): Provide in accordance with AWS D1.1/D1.1M for each welded joint whether prequalified or qualified by testing, including the following:

- 1. Power source (constant current or constant voltage).

2. Electrode manufacturer and trade name, for demand-critical welds.

D. Delegated Design Submittal: For structural-steel connections indicated on Drawings to comply with design loads, include analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.6 INFORMATIONAL SUBMITTALS

A. Qualification Data: For fabricator and professional engineer.

B. Welding certificates.

C. Paint Compatibility Certificates: From manufacturers of topcoats applied over shop primers, certifying that shop primers are compatible with topcoats.

D. Mill test reports for structural-steel materials, including chemical and physical properties.

E. Product Test Reports: For the following:

1. Bolts, nuts, and washers, including mechanical properties and chemical analysis.
2. Direct-tension indicators.
3. Tension-control, high-strength, bolt-nut-washer assemblies.
4. Shear stud connectors.

F. Survey of existing conditions.

G. Source quality-control reports.

H. Field quality-control reports.

1.7 QUALITY ASSURANCE

A. Fabricator Qualifications: A qualified fabricator that participates in the AISC Quality Certification Program and is designated an AISC-Certified Plant, Category BU or is accredited by the IAS Fabricator Inspection Program for Structural Steel (Acceptance Criteria 172).

B. Installer Qualifications: A qualified Installer who participates in the AISC Quality Certification Program and is designated an AISC-Certified Erector, Category CSE.

C. Welding Qualifications: Qualify procedures and personnel in accordance with AWS D1.1/D1.1M.

D. Professional Engineer Qualifications: A professional engineer who is legally authorized to practice in the state of South Carolina and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for projects with structural steel framing that are similar to that indicated for this Project in material, design, and extent.

- E. Erector shall be responsible for providing bolt testing/calibration equipment and performing pre-installation verification testing under the observation of the owner's testing/inspection agency.
- F. Comply with applicable provisions of the following specifications and documents:
 - 1. AISC's "Code of Standard Practice for Steel Buildings and Bridges."
 - 2. AISC's "Load and Resistance Factor Design Specification for Structural Steel Buildings."
 - 3. AISC's "Specification for the Design of Steel Hollow Structural Sections."
 - 4. AISC's "Specification for Load and Resistance Factor Design of Single-Angle Members."
 - 5. RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."
 - 6. AWS D1.1 "Structural Welding Code-Steel."
 - 7. AWS D1.3 "Structural Welding Code-Sheet Steel."

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Store materials to permit easy access for inspection and identification. Keep steel members off ground and spaced by using pallets, dunnage, or other supports and spacers. Protect steel members and packaged materials from corrosion and deterioration.
 - 1. Do not store materials on structure in a manner that might cause distortion, damage, or overload to members or supporting structures. Repair or replace damaged materials or structures as directed.
- B. Store fasteners in a protected place in sealed containers with manufacturer's labels intact.
 - 1. Fasteners may be repackaged provided Owner's testing and inspecting agency observes repackaging and seals containers.
 - 2. Clean and relubricate bolts and nuts that become dry or rusty before use.
 - 3. Comply with manufacturers' written recommendations for cleaning and lubricating ASTM F3125/F3125M, Grade F1852 bolt assemblies and for retesting bolt assemblies after lubrication.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Comply with applicable provisions of the following specifications and documents:
 - 1. ANSI/AISC 303.
 - 2. ANSI/AISC 341.
 - 3. ANSI/AISC 360.
 - 4. RCSC's "Specification for Structural Joints Using High-Strength Bolts."
- B. Connection Design Information:

1. Design connections in accordance with ANSI/AISC 303 by fabricator's qualified professional engineer. Member reinforcement at connections is indicated on Drawings.
 - a. Use Load and Resistance Factor Design; data are given at factored-load level .

C. Moment Connections: Type FR, fully restrained.

D. Construction: Braced frame.

2.2 STRUCTURAL-STEEL MATERIALS

A. W-Shapes: ASTM A992/A992M.

B. Channels, Angles: ASTM A36/A36M.

C. Plate and Bar: ASTM A36/A36M ASTM A572/A572M, Grade 50.

D. Cold-Formed Hollow Structural Sections: ASTM A500/A500M, Grade B structural tubing.

2.3 BOLTS AND CONNECTORS

A. High-Strength A325 Bolts, Nuts, and Washers: ASTM F3125/F3125M, Grade A325, Type 1, heavy-hex steel structural bolts; ASTM A563, Grade DH, heavy-hex carbon-steel nuts; and ASTM F436/F436M, Type 1, hardened carbon-steel washers; all with plain finish.

1. Direct-Tension Indicators: ASTM F959/F959M, Type 325-1, compressible-washer type with plain finish.

B. High-Strength A490 Bolts, Nuts, and Washers: ASTM F3125/F3125M, Grade A490, Type 1, heavy-hex steel structural bolts or Grade F2280 tension-control, bolt-nut-washer assemblies with splined ends; ASTM A563, Grade DH, heavy-hex carbon-steel nuts; and ASTM F436/F436M, Type 1, hardened carbon-steel washers; all with plain finish.

1. Direct-Tension Indicators: ASTM F959/F959M, Type 490-1, compressible-washer type with plain finish.

C. Zinc-Coated High-Strength A325 Bolts, Nuts, and Washers: ASTM F3125/F3125M, Grade A325, Type 1, heavy-hex steel structural bolts; ASTM A563, Grade DH, heavy-hex carbon-steel nuts; and ASTM F436/F436M, Type 1, hardened carbon-steel washers.

1. Finish: Hot-dip zinc coating.
2. Direct-Tension Indicators: ASTM F959/F959M, Type 325-1, compressible-washer type with mechanically deposited zinc coating finish.

D. Tension-Control, High-Strength Bolt-Nut-Washer Assemblies: ASTM F3125/F3125M, Grade F1852, Type 1, heavy-hex head assemblies, consisting of steel structural bolts with splined ends; ASTM A563, Grade DH, heavy-hex carbon-steel nuts; and ASTM F436/F436M, Type 1, hardened carbon-steel washers.

1. Finish: Plain.

E. Shear Stud Connectors: ASTM A108, AISI C-1015 through C-1020, headed-stud type, cold-finished carbon steel; AWS D1.1/D1.1M, Type B.

2.4 RODS

A. Unheaded Anchor Rods: As indicated on the plans ASTM F1554, Grade 55, weldable or as indicated on plans.

1. Configuration: Straight.
2. Nuts: ASTM A563 heavy-hex carbon steel.
3. Plate Washers: ASTM A36/A36M carbon steel.
4. Washers: ASTM F436, Type 1, hardened carbon steel.
5. Finish: Plain.

B. Headed Anchor Rods: ASTM F1554, Grade 55, weldable or as indicated on plans, straight.

1. Nuts: ASTM A563 heavy-hex carbon steel.
2. Plate Washers: ASTM A36/A36M carbon steel.
3. Washers: ASTM F436, Type 1, hardened carbon steel.
4. Finish: Plain.

C. Threaded Rods: ASTM A36/A36M ASTM A193/A193M, Grade B7 .

1. Nuts: ASTM A63 heavy-hex carbon steel.
2. Washers: ASTM F436, Type 1, hardened carbon steel.
3. Finish: Plain.

2.5 PRIMER

A. Steel Primer:

1. Comply with Section 099113 "Exterior Painting" and Section 099123 "Interior Painting."
2. Fabricator's standard lead- and chromate-free, nonasphaltic, rust-inhibiting primer complying with MPI#79 and compatible with topcoat.

B. Galvanized-Steel Primer: MPI#134.

1. Etching Cleaner: MPI#25, for galvanized steel.
2. Galvanizing Repair Paint: MPI#18, MPI#19, or SSPC-Paint 20.

2.6 SHRINKAGE-RESISTANT GROUT

A. Nonmetallic, Shrinkage-Resistant Grout: ASTM C1107/C1107M, factory-packaged, nonmetallic aggregate grout, noncorrosive and nonstaining, mixed with water to consistency suitable for application and a 30-minute working time.

2.7 FABRICATION

- A. Structural Steel: Fabricate and assemble in shop to greatest extent possible. Fabricate in accordance with ANSI/AISC 303 and to ANSI/AISC 360.
 - 1. Camber structural-steel members where indicated.
 - 2. Fabricate beams with rolling camber up.
 - 3. Identify high-strength structural steel in accordance with ASTM A6/A6M and maintain markings until structural-steel framing has been erected.
 - 4. Mark and match-mark materials for field assembly.
 - 5. Complete structural-steel assemblies, including welding of units, before starting shop-priming operations.
- B. Thermal Cutting: Perform thermal cutting by machine to greatest extent possible.
 - 1. Plane thermally cut edges to be welded to comply with requirements in AWS D1.1/D1.1M.
- C. Bolt Holes: Cut, drill, or punch standard bolt holes perpendicular to metal surfaces.
- D. Finishing: Accurately finish ends of columns and other members transmitting bearing loads.
- E. Cleaning: Clean and prepare steel surfaces that are to remain unpainted in accordance with SSPC-SP 2.
- F. Shear Stud Connectors: Prepare steel surfaces as recommended by manufacturer of shear connectors. Weld using automatic end welding of headed-stud shear connectors in accordance with AWS D1.1/D1.1M and manufacturer's written instructions.
- G. Holes: Provide holes required for securing other work to structural steel and for other work to pass through steel members.
 - 1. Cut, drill, or punch holes perpendicular to steel surfaces. Do not thermally cut bolt holes or enlarge holes by burning.
 - 2. Baseplate Holes: Cut, drill, mechanically thermal cut, or punch holes perpendicular to steel surfaces.
 - 3. Weld threaded nuts to framing and other specialty items indicated to receive other work.

2.8 SHOP CONNECTIONS

- A. High-Strength Bolts: Shop install high-strength bolts in accordance with RCSC's "Specification for Structural Joints Using High-Strength Bolts" for type of bolt and type of joint specified.
 - 1. Joint Type: Snug tightened, Pretensioned, or Slip Critical as designed by the deligated design engineer.
- B. Weld Connections: Comply with AWS D1.1/D1.1M and AWS D1.8/D1.8M for tolerances, appearances, welding procedure specifications, weld quality, and methods used in correcting welding work.

1. Assemble and weld built-up sections by methods that maintain true alignment of axes without exceeding tolerances in ANSI/AISC 303 for mill material.

2.9 GALVANIZING

- A. Hot-Dip Galvanized Finish: Apply zinc coating by the hot-dip process to structural steel in accordance with ASTM A123/A123M.

1. Fill vent and drain holes that are exposed in the finished Work unless they function as weep holes, by plugging with zinc solder and filing off smooth.
2. Galvanize lintels attached to structural-steel frame and located in exterior walls. Galvanize all steel elements exposed to the exterior and where indicated on the plans.

2.10 SHOP PRIMING

- A. Shop prime steel surfaces, except the following:

1. Surfaces embedded in concrete or mortar. Extend priming of partially embedded members to a depth of 2 inches.
2. Surfaces to be field welded.
3. Surfaces of high-strength bolted, slip-critical connections.
4. Surfaces to receive sprayed fire-resistive materials (applied fireproofing).
5. Galvanized surfaces unless indicated to be painted.

- B. Surface Preparation of Steel: Clean surfaces to be painted. Remove loose rust and mill scale and spatter, slag, or flux deposits. Prepare surfaces in accordance with the following specifications and standards:

1. SSPC-SP 3.

- C. Surface Preparation of Galvanized Steel: Prepare galvanized-steel surfaces for shop priming by thoroughly cleaning steel of grease, dirt, oil, flux, and other foreign matter, and treating with etching cleaner or in accordance with SSPC-SP 16.

- D. Priming: Immediately after surface preparation, apply primer in accordance with manufacturer's written instructions and at rate recommended by SSPC to provide a minimum dry film thickness of 1.5 mils. Use priming methods that result in full coverage of joints, corners, edges, and exposed surfaces.

1. Stripe paint corners, crevices, bolts, welds, and sharp edges.
2. Apply two coats of shop paint to surfaces that are inaccessible after assembly or erection. Change color of second coat to distinguish it from first.

2.11 SOURCE QUALITY CONTROL

- A. Testing Agency: Owner will engage a qualified testing agency to perform shop tests and inspections.

1. Allow testing agency access to places where structural-steel work is being fabricated or produced to perform tests and inspections.
2. Bolted Connections: Inspect and test shop-bolted connections in accordance with RCSC's "Specification for Structural Joints Using High-Strength Bolts."
3. Welded Connections: Visually inspect shop-welded connections in accordance with AWS D1.1/D1.1M and the following inspection procedures, at testing agency's option:
 - a. Magnetic Particle Inspection: ASTM E709; performed on root pass and on finished weld. Cracks or zones of incomplete fusion or penetration are not accepted.
 - b. Ultrasonic Inspection: ASTM E164.
4. In addition to visual inspection, test and inspect shop-welded shear stud connectors in accordance with requirements in AWS D1.1/D1.1M for stud welding and as follows:
 - a. Perform bend tests if visual inspections reveal either a less-than-continuous 360-degree flash or welding repairs to any shear stud connector.
 - b. Conduct tests in accordance with requirements in AWS D1.1/D1.1M on additional shear stud connectors if weld fracture occurs on shear stud connectors already tested.
5. Prepare test and inspection reports.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify, with certified steel erector present, elevations of concrete- and masonry-bearing surfaces and locations of anchor rods, bearing plates, and other embedments for compliance with requirements.
 1. Prepare a certified survey of existing conditions. Include bearing surfaces, anchor rods, bearing plates, and other embedments showing dimensions, locations, angles, and elevations.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Provide temporary shores, guys, braces, and other supports during erection to keep structural steel secure, plumb, and in alignment against temporary construction loads and loads equal in intensity to design loads. Remove temporary supports when permanent structural steel, connections, and bracing are in place unless otherwise indicated on Drawings.

3.3 ERECTION

- A. Set structural steel accurately in locations and to elevations indicated and in accordance with ANSI/AISC 303 and ANSI/AISC 360.

- B. Baseplates Bearing Plates and Leveling Plates: Clean concrete- and masonry-bearing surfaces of bond-reducing materials, and roughen surfaces prior to setting plates. Clean bottom surface of plates.
1. Set plates for structural members on wedges, shims, or setting nuts as required.
 2. Weld plate washers to top of baseplate.
 3. Snug-tighten anchor rods after supported members have been positioned and plumbed. Do not remove wedges or shims but, if protruding, cut off flush with edge of plate before packing with grout.
 4. Promptly pack shrinkage-resistant grout solidly between bearing surfaces and plates, so no voids remain. Neatly finish exposed surfaces; protect grout and allow to cure. Comply with manufacturer's written installation instructions for grouting.
- C. Maintain erection tolerances of structural steel within ANSI/AISC 303.
- D. Align and adjust various members that form part of complete frame or structure before permanently fastening. Before assembly, clean bearing surfaces and other surfaces that are in permanent contact with members. Perform necessary adjustments to compensate for discrepancies in elevations and alignment.
1. Level and plumb individual members of structure. Slope roof framing members to slopes indicated on Drawings.
 2. Make allowances for difference between temperature at time of erection and mean temperature when structure is completed and in service.
- E. Splice members only where indicated.
- F. Do not use thermal cutting during erection.
- G. Do not enlarge unfair holes in members by burning or using drift pins. Ream holes that must be enlarged to admit bolts.

3.4 FIELD CONNECTIONS

- A. High-Strength Bolts: Install high-strength bolts in accordance with RCSC's "Specification for Structural Joints Using High-Strength Bolts" for bolt and joint type specified.
1. Joint Type: Snug tightened, pretensioned, or slip critical as specified by the connection design engineer.
- B. Weld Connections: Comply with AWS D1.1/D1.1M and AWS D1.8/D1.8M for tolerances, appearances, welding procedure specifications, weld quality, and methods used in correcting welding work.
1. Comply with ANSI/AISC 303 and ANSI/AISC 360 for bearing, alignment, adequacy of temporary connections, and removal of paint on surfaces adjacent to field welds.
 2. Remove backing bars or runoff tabs where indicated, back gouge, and grind steel smooth.
 3. Assemble and weld built-up sections by methods that maintain true alignment of axes without exceeding tolerances in ANSI/AISC 303 for mill material.

- C. Shear Stud Connectors: Prepare steel surfaces as recommended by manufacturer of shear connectors. Weld using end welding of headed-stud shear connectors in accordance with AWS D1.1/D1.1M and manufacturer's written instructions.

3.5 REPAIR

- A. Galvanized Surfaces: Clean areas where galvanizing is damaged or missing, and repair galvanizing to comply with ASTM A780/A780M.
- B. Touchup Painting:
 - 1. Immediately after erection, clean exposed areas where primer is damaged or missing, and paint with the same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.
 - a. Clean and prepare surfaces by SSPC-SP 2 hand-tool cleaning or SSPC-SP 3 power-tool cleaning.

3.6 FIELD QUALITY CONTROL

- A. Special Inspections: Owner will engage a 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.
 - 3. Verify connection materials and inspect high-strength bolted connections.
- B. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.
 - 1. Bolted Connections: Inspect and test bolted connections in accordance with RCSC's "Specification for Structural Joints Using High-Strength Bolts."
 - 2. Welded Connections: Visually inspect field welds in accordance with AWS D1.1/D1.1M.
 - a. In addition to visual inspection, test and inspect field welds in accordance with AWS D1.1/D1.1M and the following inspection procedures, at testing agency's option:
 - 1) Magnetic Particle Inspection: ASTM E709; performed on root pass and on finished weld. Cracks or zones of incomplete fusion or penetration are not accepted.
 - 2) Ultrasonic Inspection: ASTM E164.
 - 3. Shear Stud Connectors: In addition to visual inspection, test and inspect field-welded shear connectors according to requirements in AWS D1.1/D1.1M for stud welding and as follows:
 - a. Perform bend tests if visual inspections reveal either a less-than-continuous 360-degree flash or welding repairs to any shear connector.
 - b. Conduct tests according to requirements in AWS D1.1/D1.1M on additional shear connectors if weld fracture occurs on shear connectors already tested.

END OF SECTION 051200

SECTION 051400 – STRUCTURAL ALUMINUM FRAMING

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. Aluminum framing members.
 - 2. Bracing.
 - 3. Connections.

1.3 ACTION SUBMITTALS

- A. Product Data: For the following:
 - 1. Aluminum framing materials.
- B. Shop Drawings:
 - 1. Complete fabrication and erection plans and procedures giving full information on all aspects of the erection that will affect alignment, plumb and dimensional accuracy of the structure.
 - 2. Connections, including size and spacing of bolts and welds.
 - 3. Indicate profiles, sizes, spacing, and locations of structural members, openings, camber and attachments.
 - 4. Indicate welded connections with AWS welding symbols. Indicate net weld lengths. Include details of welding materials, equipment, sequence and technique to be used.
- C. Delegated-Design Submittal: For aluminum framing.

1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For testing agency.
- A. Welders' Certificates: Documentation certifying welders employed by the Subcontractor meet AWS qualifications.
- B. Manufacturer's Certificate: Submit certification that manufactured products (including bolts, nuts and washers) meet or exceed specified requirements.
- C. Mill Test Reports: Submit mill test reports indicating structural strength, destructive and nondestructive test analysis and chemical analyses from the aluminum used in the Work.

1.5 QUALITY ASSURANCE

- A. Testing Agency Qualifications: Qualified according to ASTM E329 for testing indicated.
- B. Product Tests: Mill certificates or data from a qualified independent testing agency, or in-house testing with calibrated test equipment, indicating aluminum complies with requirements, including base-metal thickness, yield strength, tensile strength, total elongation, and chemical requirements.
- C. Welding Qualifications: Qualify procedures and personnel according to the following:
 - 1. AWS D1.2/D1.2M, "Structural Welding Code - Aluminum."

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Engage a qualified professional engineer, as defined in Section 014000 "Quality Requirements," to design aluminum framing.
- B. Fabricate aluminum members in accordance with Aluminum Design Manual "Specification for Aluminum Structures - Building Load and Resistance Factor Design".
- C. Structural Performance: Provide aluminum framing capable of withstanding design loads within limits and under conditions indicated.
 - 1. Design Loads: As indicated on Drawings.
 - 2. Deflection Limits: Design framing systems to withstand design loads without deflections greater than the following:
 - a. Load-Bearing Wall Framing: Horizontal deflection of 1/240 of the wall height.
 - b. Roof Rafter Framing: Vertical deflection of 1/120 of the horizontally projected span for live loads.
 - 3. Design framing systems to provide for movement of framing members located outside the insulated building envelope without damage or overstressing, sheathing failure, connection failure, undue strain on fasteners and anchors, or other detrimental effects when subject to a maximum ambient temperature change of 120 deg F.

2.2 ALUMINUM FRAMING MATERIALS

- A. Rolled and Extruded Members: Alloy and temper 6016-T6.
- B. Aluminum Tubing: Alloy and temper 6016-T6.
- C. Bolts, Nuts, and Washers:
 - 1. Bolts and Nuts in Structural Connections: alloy 6061-T6.
 - 2. Flat Washers: Alclad 2024-T4.

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- 3. Spring Washers: alloy 7075-T6.
 - D. Rivets in Structural Connections: Alloy 6061-T6.
 - E. Welding Materials:
 - 1. Filler Metals: AWS D1.2.
 - 2. Electrodes and Equipment Settings: As recommended by the filler metal manufacturer for the position, thickness and conditions of use.
 - 3. Furnish written verification that filler metal is appropriate to the materials and welding process
 - F. Sliding Bearing Plates: Teflon coated.
 - G. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout, complying with ASTM C1107/C1107M. Provide grout specifically recommended by manufacturer for interior and exterior applications.

2.3 FABRICATION

- A. Fabricate aluminum members in accordance with the approved Shop Drawings. Where practical, fabricate and assemble in the shop.
- B. Obtain field measurements necessary for fabrication.
- C. Dimensional Tolerances:
 - 1. Overall length of members with both ends milled shall vary by not more than 1/32-inch.
 - 2. Overall length of members without milled ends shall vary by not more than 1/16-inch for lengths less than 30 feet and not more than 1/8-inch for lengths 30 feet and over.
- D. Where structural joints are welded, the detail of the joints, welding technique, weld quality and appearance, and methods for correcting defective welds shall conform to the AWS D1.2.
 - 1. Welding Process: Inert shielded gas or resistance welding process.
- E. Where milling is indicated on the Drawings, machine the contact surfaces true to obtain full and complete contact.

2.4 FABRICATION

- A. Fabricate aluminum members in accordance with the approved Shop Drawings. Where practical, fabricate and assemble in the shop.
- B. Obtain field measurements necessary for fabrication.
- C. Dimensional Tolerances:
 - 1. Overall length of members with both ends milled shall vary by not more than 1/32-inch.
 - 2. Overall length of members without milled ends shall vary by not more than 1/16-inch for lengths less than 30 feet and not more than 1/8-inch for lengths 30 feet and over.

- D. Where structural joints are welded, the detail of the joints, welding technique, weld quality and appearance, and methods for correcting defective welds shall conform to the AWS D1.2.
 - 1. Welding Process: Inert shielded gas or resistance welding process.
- E. Where milling is indicated on the Drawings, machine the contact surfaces true to obtain full and complete contact.
- F. Structural members are selected from generally available rolled sections; however, if the specified sections are not available, provide sections with equivalent physical properties at no additional cost to Owner.

2.5 CONNECTIONS

- A. Design connection components to resist the loads and moments indicated on the Drawings; if the reaction or load is not indicated on the Drawings, design connections as follows:
 - 1. The minimum connection angle length will be half the depth of the beam depth.
 - 2. Horizontal and vertical bracing connections shall have a minimum of two bolts.
- B. Unless otherwise indicated on the Drawings, weld connections , except weld moment connections. Weld in accordance with approved welding procedures.

2.6 ALUMINUM FINISHES

- A. High-Performance Organic Finish: Two-coat fluoropolymer finish complying with AAMA 2605 and containing not less than 70 percent PVDF resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
 - 1. Color and Gloss: As indicated by manufacturer's designations.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Provide temporary supports and internal braces necessary to support structure during erection. Temporary supports and braces shall be adequate for anticipated wind, seismic, equipment and erection loads. Remove temporary shoring after the erection is complete.
- B. Where aluminum will contact dissimilar metals, protect against galvanic action by painting contact surfaces as follows:
 - 1. Where aluminum members are in contact with steel, prime both aluminum and steel members with one coat of paint meeting Federal Specification TT-P-645. Paint aluminum with an additional coat of varnish containing 2 pounds of aluminum pigment per gallon.
 - 2. Where aluminum members are in contact with porous materials, masonry or concrete, apply to the contact surfaces of the aluminum members a heavy coat of alkali resistant bituminous paint.

3.2 EXAMINATION

- A. Verify that field conditions are acceptable and are ready for erection.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.
 - 1. Beginning of installation indicates acceptance of conditions.

3.3 ERECTION

- A. Erect structure to the lines and grades indicated on the Drawings and in accordance with the approved Shop Drawings.
- B. Do not field cut or alter structural members.

3.4 FIELD QUALITY CONTROL

- A. Testing: Owner may engage a qualified independent testing and inspecting agency to perform field tests and inspections and prepare test reports.
- B. Field and shop welds will be subject to testing and inspecting.
- C. Testing agency will report test results promptly and in writing to Contractor and Architect.
- D. Aluminum framing will be considered defective if it does not pass tests and inspections.
- E. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

3.5 PROTECTION

- A. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer, that ensure that aluminum framing is without damage or deterioration at time of Substantial Completion.

END OF SECTION 051400

SECTION 052100 - STEEL JOIST FRAMING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. K-series steel joists.
2. KCS-type K-series steel joists.
3. K-series steel joist substitutes.
4. LH-series long-span steel joists.
5. Steel joist accessories.

B. Related Requirements:

1. Section 033000 "Cast-in-Place Concrete" for installing bearing plates in concrete.
2. Section 042000 "Unit Masonry" for installing bearing plates in unit masonry.
3. Section 051200 "Structural Steel Framing" for field-welded shear connectors.

1.2 DEFINITIONS

- A. SJI's "Specifications": Steel Joist Institute's "Standard Specifications, Load Tables and Weight Tables for Steel Joists and Joist Girders."
- B. Special Joists: Steel joists or joist girders requiring modification by manufacturer to support nonuniform, unequal, or special loading conditions that invalidate load tables in SJI's "Specifications."

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of joist, accessory, and product.

B. Shop Drawings:

1. Include layout, designation, number, type, location, and spacing of joists.
2. Include joining and anchorage details; bracing, bridging, and joist accessories; splice and connection locations and details; and attachments to other construction.
3. Indicate locations and details of bearing plates to be embedded in other construction.

1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For manufacturer.
- B. Welding certificates.

- C. Comprehensive engineering analysis of special joists signed and sealed by the qualified professional engineer responsible for its preparation.

1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications: A manufacturer certified by SJI to manufacture joists complying with applicable standard specifications and load tables in SJI's "Specifications."
 - 1. Manufacturer's responsibilities include providing professional engineering services for designing special joists to comply with performance requirements.
- B. Welding Qualifications: Qualify field-welding procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, and handle joists as recommended in SJI's "Specifications."
- B. Protect joists from corrosion, deformation, and other damage during delivery, storage, and handling.

1.7 SEQUENCING

- A. Deliver steel bearing plates to be built into cast-in-place concrete and masonry construction.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Canam Steel Corporation; Canam Group, Inc.
 - 2. New Millennium Building Systems, LLC.
 - 3. Valley Joist.
 - 4. Vulcraft; Nucor Corporation, Verco Group.

2.2 PERFORMANCE REQUIREMENTS

- A. Structural Performance: Provide special joists and connections capable of withstanding design loads indicated on Drawings.
 - 1. Use ASD; data are given at service-load level.
 - 2. Design special joists to withstand design loads with live-load deflections no greater than the following:

- a. Roof Joists: Vertical deflection of 1/240 of the span.

2.3 STEEL JOISTS

- A. K-Series Steel Joist: Manufactured steel joists of type indicated according to "Standard Specification for Open Web Steel Joists, K-Series" in SJI's "Specifications," with steel-angle top- and bottom-chord members, underslung ends, and parallel top chord.
 1. Joist Type: K-series steel joists and KCS-type K-series steel joists.
 2. K-Series Steel Joist Substitutes: Manufacture according to "Standard Specifications for Open Web Steel Joists, K-Series" in SJI's "Specifications," with steel-angle or -channel members.
 3. Provide holes in chord members for connecting and securing other construction to joists.
 4. Top-Chord Extensions: Extend top chords of joists with SJI's Type S top-chord extensions where indicated on Drawings, complying with SJI's "Specifications."
 5. Extended Ends: Extend bearing ends of joists with SJI's Type R extended ends where indicated on Drawings, complying with SJI's "Specifications."
 6. Camber joists according to SJI's "Specifications."
 7. Equip bearing ends of joists with manufacturer's standard beveled ends or sloped shoes if joist slope exceeds 1/4 inch per 12 inches.
- B. Long-Span Steel Joist: Manufactured steel joists according to "Standard Specification for Longspan Steel Joists, LH-Series and Deep Longspan Steel Joists, DLH-Series" in SJI's "Specifications," with steel-angle top- and bottom-chord members; of joist type and end and top-chord arrangements as follows:
 1. Joist Type: LH-series long-span steel joists.
 2. End Arrangement: Underslung.
 3. Top-Chord Arrangement: Parallel.
 4. Provide holes in chord members for connecting and securing other construction to joists.
 5. Camber long-span steel joists according to SJI's "Specifications."
 6. Equip bearing ends of joists with manufacturer's standard beveled ends or sloped shoes if joist slope exceeds 1/4 inch per 12 inches.

2.4 PRIMERS

- A. Primer:
 1. SSPC-Paint 15, or manufacturer's standard shop primer complying with performance requirements in SSPC-Paint 15.

2.5 STEEL JOIST ACCESSORIES

- A. Bridging:

1. Provide bridging anchors and number of rows of horizontal or diagonal bridging of material, size, and type required by SJI's "Specifications" for type of joist, chord size, spacing, and span. Furnish additional erection bridging if required for stability.
 2. Schematically indicated. Detail and fabricate according to SJI's "Specifications." Furnish additional erection bridging if required for stability.
- B. Fabricate steel bearing plates from ASTM A36/A36M steel with integral anchorages of sizes and thicknesses indicated on Drawings. .
- C. Steel bearing plates with integral anchorages are specified in Section 055000 "Metal Fabrications."
- D. Furnish ceiling extensions, either extended bottom-chord elements or a separate extension unit of enough strength to support ceiling construction.
1. Extend ends to within 1/2 inch of finished wall surface unless otherwise indicated on Drawings.
 2. Finish: Plain, uncoated.
- E. High-Strength Bolts, Nuts, and Washers: ASTM F3125/F3125M, Grade A325, Type 1, heavy-hex steel structural bolts; ASTM A563, Grade DH, heavy-hex carbon-steel nuts; and ASTM F436/F436M, Type 1, hardened carbon-steel washers.
1. Finish: Plain.
- F. Welding Electrodes: Comply with AWS standards.
- G. Furnish miscellaneous accessories including splice plates and bolts required by joist manufacturer to complete joist assembly.

2.6 CLEANING AND SHOP PAINTING

- A. Clean and remove loose scale, heavy rust, and other foreign materials from fabricated joists and accessories by power-tool cleaning, SSPC-SP 3.
- B. Do not prime paint joists and accessories to receive sprayed fire-resistive materials.
- C. Apply one coat of shop primer to joists and joist accessories to be primed to provide a continuous, dry paint film not less than 1 mil thick.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine supporting substrates, embedded bearing plates, and abutting structural framing for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Do not install joists until supporting construction is in place and secured.
- B. Install joists and accessories plumb, square, and true to line; securely fasten to supporting construction according to SJI's "Specifications," joist manufacturer's written instructions, and requirements in this Section.
 - 1. Before installation, splice joists delivered to Project site in more than one piece.
 - 2. Space, adjust, and align joists accurately in location before permanently fastening.
 - 3. Install temporary bracing and erection bridging, connections, and anchors to ensure that joists are stabilized during construction.
- C. Field weld joists to supporting steel bearing plates and framework. Coordinate welding sequence and procedure with placement of joists. Comply with AWS requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.
- D. Install and connect bridging concurrently with joist erection, before construction loads are applied. Anchor ends of bridging lines at top and bottom chords if terminating at walls or beams.

3.3 REPAIRS

- A. Repair damaged galvanized coatings on galvanized items with galvanized repair paint according to ASTM A780/A780M and manufacturer's written instructions.
- B. Touchup Painting:
 - 1. Immediately after installation, clean, prepare, and prime or reprime field connections, rust spots, and abraded surfaces of prime-painted joists, bearing plates, abutting structural steel, and accessories.
 - a. Clean and prepare surfaces by SSPC-SP 2 hand-tool cleaning or SSPC-SP 3 power-tool cleaning.
 - b. Apply a compatible primer of same type as primer used on adjacent surfaces.

3.4 FIELD QUALITY CONTROL

- A. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.
- B. Visually inspect field welds according to AWS D1.1/D1.1M.
- C. Visually inspect bolted connections.
- D. Prepare test and inspection reports.

END OF SECTION 052100

SECTION 053100 - STEEL DECKING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Roof deck.
2. Acoustical roof deck.
3. Composite floor deck.

B. Related Requirements:

1. Section 033000 "Cast-in-Place Concrete" for normal-weight and lightweight structural concrete fill over steel deck.
2. Section 035216 "Lightweight Insulating Concrete" for lightweight insulating concrete fill over steel deck.
3. Section 051200 "Structural Steel Framing" for shop- and field-welded shear connectors.
4. Section 055000 "Metal Fabrications" for framing deck openings with miscellaneous steel shapes.

1.2 ACTION SUBMITTALS

A. Product Data:

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

B. Shop Drawings:

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

1.3 INFORMATIONAL SUBMITTALS

A. Certificates:

1. Welding certificates.
2. Product Certificates: For each type of steel deck.

B. Field Quality-Control Submittals:

1. Field quality-control reports.

C. Qualification Statements: For welding personnel.

1.4 QUALITY ASSURANCE

A. Qualifications:

1. Welding Qualifications: Qualify procedures and personnel in accordance with SDI QA/QC and the following welding codes:
 - a. AWS D1.1/D1.1M.
 - b. AWS D1.3/D1.3M.

1.5 DELIVERY, STORAGE, AND HANDLING

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

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. AISI Specifications: Comply with calculated structural characteristics of steel deck in accordance with AISI S100.
- B. Fire-Resistance Ratings: Comply with ASTM E119; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 1. Indicate design designations from UL's "Fire Resistance Directory" or from listings of another qualified testing agency.

2.2 ROOF DECK

- A. Manufacturers: Subject to compliance with requirements, undefined:
 1. Canam Steel Corporation; Canam Group, Inc.
 2. Epic Metals Corporation.
 3. Marlyn Steel Decks, Inc.
 4. New Millennium Building Systems, LLC.
 5. Nucor Corporation.
 6. Valley Joist.

- B. Roof Deck: Fabricate panels, without top-flange stiffening grooves, to comply with SDI RD and with the following:
1. Galvanized-Steel Sheet: ASTM A653/A653M, Structural Steel (SS), Grade 50, G90 zinc coating.
 2. Galvanized- and Shop-Primed Steel Sheet: ASTM A653/A653M, Structural Steel (SS), Grade 50, G60 zinc coating; cleaned, pretreated, and primed with manufacturer's standard baked-on, rust-inhibitive primer.
 - a. Color: White.
 3. Deck Profile: As indicated.
 4. Profile Depth: As indicated.
 5. Design Uncoated-Steel Thickness: As indicated.
 6. Span Condition: Triple span or more.
 7. Side Laps: Overlapped or interlocking seam at Contractor's option.

2.3 ACOUSTICAL ROOF DECK

- A. Manufacturers: Subject to compliance with requirements, undefined:
1. Canam Steel Corporation; Canam Group, Inc.
 2. Epic Metals Corporation.
 3. Marlyn Steel Decks, Inc.
 4. New Millennium Building Systems, LLC.
 5. Nucor Corporation.
- B. Acoustical Roof Deck: Fabricate panels, without top-flange stiffening grooves, to comply with SDI RD and with the following:
1. Galvanized-Steel Sheet: ASTM A653/A653M, Structural Steel (SS), Grade 50, G90 zinc coating.
 2. Galvanized- and Shop-Primed Steel Sheet: ASTM A653/A653M, Structural Steel (SS), Grade 40, G60 zinc coating; cleaned, pretreated, and primed with manufacturer's standard baked-on, rust-inhibitive primer.
 - a. Color: White.
 3. Deck Profile: As indicated.
 4. Profile Depth: As indicated.
 5. Design Uncoated-Steel Thickness: As indicated.
 6. Span Condition: Triple span or more.
 7. Side Laps: Overlapped or interlocking seam at Contractor's option.
 8. Acoustical Perforations: Deck units with manufacturer's standard perforated vertical webs.
 9. Sound-Absorbing Insulation: Manufacturer's standard premolded roll or strip of glass or mineral fiber.
 - a. Sound-Absorbing Insulation: Manufacturer's standard premolded polyisocyanurate or strip of glass or mineral fiber
 10. Acoustical Performance: NRC 0.75, tested in accordance with ASTM C423.

2.4 COMPOSITE FLOOR DECK

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Canam Steel Corporation; Canam Group, Inc.
 2. Epic Metals Corporation.
 3. Marlyn Steel Decks, Inc.
 4. New Millennium Building Systems, LLC.
 5. Nucor Corporation.
- B. Composite Floor Deck: Fabricate panels, with integrally embossed or raised pattern ribs and interlocking side laps, to comply with SDI C, with the minimum section properties indicated, and with the following:
1. Galvanized-Steel Sheet: ASTM A653/A653M, Structural Steel (SS), Grade 33, G60 zinc coating.
 2. Profile Depth: As indicated.
 3. Design Uncoated-Steel Thickness: As Indicated.
 4. Span Condition: Triple span or more.

2.5 ACCESSORIES

- A. Provide manufacturer's standard accessory materials for deck that comply with requirements indicated.
- B. Mechanical Fasteners: Corrosion-resistant, low-velocity, power-actuated or pneumatically driven carbon-steel fasteners; or self-drilling, self-threading screws.
- C. Side-Lap Fasteners: Corrosion-resistant, hexagonal washer head; self-drilling, carbon-steel screws, No. 10 minimum diameter.
- D. Flexible Closure Strips: Vulcanized, closed-cell, synthetic rubber.
- E. Miscellaneous Sheet Metal Deck Accessories: Steel sheet, minimum yield strength of 33,000 psi, not less than 0.0359-inch design uncoated thickness, of same material and finish as deck; of profile indicated or required for application.
- F. Pour Stops and Girder Fillers: Steel sheet, minimum yield strength of 33,000 psi, of same material and finish as deck, and of thickness and profile recommended by SDI standards for overhang and slab depth.
- G. Column Closures, End Closures, Z-Closures, and Cover Plates: Steel sheet, of same material, finish, and thickness as deck unless otherwise indicated.
- H. Piercing Hanger Tabs: Piercing steel sheet hanger attachment devices for use with floor deck.
- I. Shear Stud Connectors: ASTM A108, AISI C-1015 through C-1020, headed-stud type, cold-finished carbon steel; AWS D1.1/D1.1M, Type B.

- J. Galvanizing Repair Paint: SSPC-Paint 20 or MIL-P-21035B, with dry film containing a minimum of 94 percent zinc dust by weight.
- K. Repair Paint: Manufacturer's standard rust-inhibitive primer of same color as primer.

PART 3 - EXECUTION

3.1 EXAMINATION

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

3.2 INSTALLATION, GENERAL

- A. Install deck panels and accessories in accordance with SDI C, SDI NC, and SDI RD, as applicable; manufacturer's written instructions; and requirements in this Section.
- B. Install temporary shoring before placing deck panels if required to meet deflection limitations.
- C. Locate deck bundles to prevent overloading of supporting members.
- D. Place deck panels on supporting frame and adjust to final position with ends accurately aligned and bearing on supporting frame before being permanently fastened. Do not stretch or contract side-lap interlocks.
- E. Place deck panels flat and square and fasten to supporting frame without warp or deflection.
- F. Cut and neatly fit deck panels and accessories around openings and other work projecting through or adjacent to deck.
- G. Provide additional reinforcement and closure pieces at openings as required for strength, continuity of deck, and support of other work.
- H. Comply with AWS requirements and procedures for manual shielded metal arc welding, appearance and quality of welds, and methods used for correcting welding work.
- I. Locate mechanical fasteners and install in accordance with deck and fastener manufacturer's written instructions.
- J. Shear Stud Connectors: Prepare steel surfaces as recommended by manufacturer of shear connectors. Weld using end welding of headed-stud shear connectors in accordance with AWS D1.1/D1.1M and manufacturer's written instructions.

3.3 INSTALLATION OF ROOF DECK

- A. Fasten roof-deck panels to steel supporting members by arc spot (puddle) welds of the surface diameter indicated or arc seam welds with an equal perimeter that is not less than 1-1/2 inches long, and as follows:
 - 1. Weld Diameter: 5/8 inch, nominal.
 - 2. Weld Spacing: Weld edge and interior ribs of deck units with a minimum of two welds per deck unit at each support. Space welds as indicated.
 - 3. Weld Washers: Install weld washers at each weld location at locations where minimum uncoated steel thickness of deck is less than or equal to 0.028 inch (0.71 mm).
- B. Side-Lap and Perimeter Edge Fastening: Fasten side laps and perimeter edges of panels between supports, at intervals not exceeding the lesser of one-half of the span or 12 inches, and as follows:
 - 1. Mechanically fasten with self-drilling, No. 10 diameter or larger, carbon-steel screws.
 - 2. Fasten with a minimum of 1-1/2-inch- long welds.
- C. End Bearing: Install deck ends over supporting frame with a minimum end bearing of 1-1/2 inches, with end joints as follows:
 - 1. End Joints: Lapped 2 inches minimum or butted at Contractor's option.
- D. Miscellaneous Roof-Deck Accessories: Install ridge and valley plates, finish strips, end closures, and reinforcing channels in accordance with deck manufacturer's written instructions. Weld or mechanically fasten to substrate to provide a complete deck installation.
 - 1. Weld cover plates at changes in direction of roof-deck panels unless otherwise indicated.
- E. Flexible Closure Strips: Install flexible closure strips over partitions, walls, and where indicated. Install with adhesive in accordance with manufacturer's written instructions to ensure complete closure.

3.4 INSTALLATION OF FLOOR DECK

- A. Fasten floor-deck panels to steel supporting members by arc spot (puddle) welds of the surface diameter indicated and as follows:
 - 1. Weld Diameter: 5/8 inch, nominal.
 - 2. Weld Spacing:
 - a. Weld edge ribs of panels at each support. Space additional welds an average of 12 inches apart, but not more than 18 inches apart.
- B. Side-Lap and Perimeter Edge Fastening: Fasten side laps and perimeter edges of panels between supports, at intervals not exceeding the lesser of one-half of the span or 18 inches, and as follows:
 - 1. Mechanically fasten with self-drilling, No. 10 diameter or larger, carbon-steel screws.

2. Fasten with a minimum of 1-1/2-inch- long welds.
- C. End Bearing: Install deck ends over supporting frame with a minimum end bearing of 1-1/2 inches, with end joints as follows:
 1. End Joints: Butted.
- D. Pour Stops and Girder Fillers: Weld steel sheet pour stops and girder fillers to supporting structure in accordance with SDI recommendations unless otherwise indicated.
- E. Floor-Deck Closures: Weld steel sheet column closures, cell closures, and Z-closures to deck, in accordance with SDI recommendations, to provide tight-fitting closures at open ends of ribs and sides of deck.

3.5 REPAIR

- A. Galvanizing Repairs: Prepare and repair damaged galvanized coatings on both surfaces of deck with galvanized repair paint in accordance with ASTM A780/A780M and manufacturer's written instructions.
- B. Repair Painting:
 1. Apply repair paint, of same color as adjacent shop-primed deck, to bottom surfaces of deck exposed to view.
 2. Wire brushing, cleaning, and repair painting of bottom deck surfaces are included in Section 099113 "Exterior Painting" and Section 099123 "Interior Painting."

3.6 FIELD QUALITY CONTROL

- A. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.
- B. Tests and Inspections:
 1. Special inspections and qualification of welding special inspectors for cold-formed steel floor and roof deck in accordance with quality-assurance inspection requirements of SDI QA/QC.
 - a. Field welds will be subject to inspection.
 2. Steel decking will be considered defective if it does not pass tests and inspections.
 3. Shear Stud Connectors: In addition to visual inspection, test and inspect field-welded shear connectors in accordance with requirements in AWS D1.1/D1.1M for stud welding and as follows:
 - a. Perform bend tests if visual inspections reveal either a less-than-continuous 360-degree flash or welding repairs to any shear connector.
 - b. Conduct tests in accordance with requirements in AWS D1.1/D1.1M on additional shear connectors if weld fracture occurs on shear connectors that are already tested.
- C. Prepare test and inspection reports.

END OF SECTION 053100

SECTION 055000 - METAL FABRICATIONS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:

1. Steel framing and supports for countertops.
2. Steel tube reinforcement for low partitions.
3. Steel framing and supports for mechanical and electrical equipment.
4. Steel framing and supports for applications where framing and supports are not specified in other Sections.
5. Steel shapes for supporting elevator door sills.
6. Metal Bollards.
7. Metal ladders.
8. Loose bearing and leveling plates for applications where they are not specified in other Sections.

- B. Products furnished, but not installed, under this Section include the following:

1. Loose steel lintels.

- C. Related Requirements:

1. Section 042000 "Unit Masonry" for installing loose lintels, anchor bolts, and other items built into unit masonry.
2. Section 051200 "Structural Steel Framing" for steel framing, supports, elevator machine beams, hoist beams, and other steel items attached to the structural-steel framing.
3. Section 050520 "Post-Installed Structural Anchors."

1.3 COORDINATION

- A. Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint and coating manufacturers' written instructions to ensure that shop primers and topcoats are compatible with one another.
- B. Coordinate installation of metal fabrications that are anchored to or that receive other work. 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.

1.4 ACTION SUBMITTALS

A. Product Data: For the following:

1. Fasteners.
2. Shop primers.
3. Shrinkage-resisting grout.
4. Manufactured metal ladders.
5. Metal bollards.
6. Metal downspout boots.

B. Shop Drawings: Show fabrication and installation details. Include plans, elevations, sections, and details of metal fabrications and their connections. Show anchorage and accessory items. Provide Shop Drawings for the following:

1. Steel framing and supports for countertops.
2. Steel tube reinforcement for low partitions.
3. Steel framing and supports for mechanical and electrical equipment.
4. Steel framing and supports for applications where framing and supports are not specified in other Sections.
5. Steel shapes for supporting elevator door sills.
6. Metal bollards.
7. Metal ladders.
8. Loose steel lintels.

C. Delegated-Design Submittal: For ladders, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For professional engineer's experience with providing delegated-design engineering services of the kind indicated, including documentation that engineer is licensed in the jurisdiction in which Project is located.

B. Welding certificates.

C. Paint Compatibility Certificates: From manufacturers of topcoats applied over shop primers, certifying that shop primers are compatible with topcoats.

D. Research Reports: For post-installed anchors.

1.6 QUALITY ASSURANCE

A. Welding Qualifications: Qualify procedures and personnel in accordance with the following:

1. AWS D1.1/D1.1M, "Structural Welding Code - Steel."
2. AWS D1.6/D1.6M, "Structural Welding Code - Stainless Steel."

1.7 FIELD CONDITIONS

- A. Field Measurements: Verify actual locations of walls, floor slabs, decks, and other construction contiguous with metal fabrications by field measurements before fabrication.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Engage a qualified professional engineer, as defined in Section 014000 "Quality Requirements," to design ladders.
- B. Structural Performance of Aluminum Ladders: Ladders shall withstand the effects of loads and stresses within limits and under conditions specified in ANSI A14.3.
- C. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes acting on exterior metal fabrications by preventing buckling, opening of joints, overstressing of components, failure of connections, and other detrimental effects.
 1. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.

2.2 METALS

- A. Metal Surfaces, General: Provide materials with smooth, flat surfaces unless otherwise indicated. For metal fabrications exposed to view in the completed Work, provide materials without seam marks, roller marks, rolled trade names, or blemishes.
- B. Steel Plates, Shapes, and Bars: ASTM A36/A36M.
- C. Steel Tubing: ASTM A500/A500M, cold-formed steel tubing.
- D. Steel Pipe: ASTM A53/A53M, Standard Weight (Schedule 40) unless otherwise indicated.
- E. Slotted Channel Framing: Cold-formed metal box channels (struts) complying with MFMA-4.
- F. Aluminum Plate and Sheet: ASTM B209, Alloy 6061-T6.
- G. Aluminum Extrusions: ASTM B221, Alloy 6063-T6.
- H. Aluminum-Alloy Rolled Tread Plate: ASTM B632/B632M, Alloy 6061-T6.
- I. Aluminum Castings: ASTM B26/B26M, Alloy 443.0-F.

2.3 FASTENERS

- A. General: Unless otherwise indicated, provide Type 316 stainless steel fasteners for exterior use and zinc-plated fasteners with coating complying with ASTM B633 or ASTM F1941/F1941M, Class Fe/Zn 5, at exterior walls. Select fasteners for type, grade, and class required.
 - 1. Provide stainless steel fasteners for fastening aluminum or stainless steel.
- B. Steel Bolts and Nuts: Regular hexagon-head bolts, ASTM A307, Grade A; with hex nuts, ASTM A563; and, where indicated, flat washers.
- C. High-Strength Bolts, Nuts, and Washers: ASTM F3125/F3125M, Grade A325, Type 3, heavy-hex steel structural bolts; ASTM A563, Grade DH3, heavy-hex carbon-steel nuts; and where indicated, flat washers.
- D. Stainless Steel Bolts and Nuts: Regular hexagon-head annealed stainless steel bolts, ASTM F593; with hex nuts, ASTM F594; and, where indicated, flat washers; Alloy Group 2.
- E. Anchor Bolts: ASTM F1554, Grade 36, of dimensions indicated; with nuts, ASTM A563; and, where indicated, flat washers.
 - 1. Hot-dip galvanize or provide mechanically deposited, zinc coating where item being fastened is indicated to be galvanized.
- F. Anchors, General: 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 in accordance with ASTM E488/E488M, conducted by a qualified independent testing agency.
- G. Cast-in-Place Anchors in Concrete: Either threaded or wedge type unless otherwise indicated; galvanized ferrous castings, either ASTM A47/A47M malleable iron or ASTM A27/A27M cast steel. Provide bolts, washers, and shims as needed, all hot-dip galvanized per ASTM F2329/F2329M.
- H. Slotted-Channel Inserts: Cold-formed, hot-dip galvanized-steel box channels (struts) complying with MFMA-4, 1-5/8 by 7/8 inches by length indicated with anchor straps or studs not less than 3 inches long at not more than 8 inches o.c. Provide with temporary filler and tee-head bolts, complete with washers and nuts, all zinc-plated to comply with ASTM B633, Class Fe/Zn 5, as needed for fastening to inserts.

2.4 MISCELLANEOUS MATERIALS

- A. Universal Shop Primer: Unless noted otherwise, provide fast-curing, lead- and chromate-free, universal modified-alkyd primer complying with MPI#79 and compatible with topcoat.
 - 1. Use primer containing pigments that make it easily distinguishable from zinc-rich primer.
- B. Shop Primer for Galvanized Steel: Primer formulated for exterior use over zinc-coated metal and compatible with finish paint systems indicated.

- C. Galvanizing Repair Paint: High-zinc-dust-content paint complying with SSPC-Paint 20 and compatible with paints specified to be used over it.
- D. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D1187/D1187M.
- E. Shrinkage-Resistant Grout: Factory-packaged, nonmetallic, nonstaining, noncorrosive, nongaseous grout complying with ASTM C1107/C1107M. Provide grout specifically recommended by manufacturer for interior and exterior applications.
- F. Concrete: Comply with requirements in Section 033000 "Cast-in-Place Concrete" for normal-weight, air-entrained concrete with a minimum 28-day compressive strength of 3000 psi.

2.5 FABRICATION, GENERAL

- A. Shop Assembly: Preassemble items in the shop to greatest extent possible. Disassemble units only as necessary for shipping and handling limitations. Use connections that maintain structural value of joined pieces. Clearly mark units for reassembly and coordinated installation.
- B. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32 inch unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.
- C. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.
- D. Form exposed work with accurate angles and surfaces and straight edges.
- E. Weld corners and seams continuously to comply with the following:
 - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 - 2. Obtain fusion without undercut or overlap.
 - 3. Remove welding flux immediately.
 - 4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing.
- F. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners or welds where possible. Where exposed fasteners are required, use Phillips flat-head (countersunk) fasteners unless otherwise indicated. Locate joints where least conspicuous.
- G. Fabricate seams and other connections that are exposed to weather in a manner to exclude water. Provide weep holes where water may accumulate.
- H. Cut, reinforce, drill, and tap metal fabrications as indicated to receive finish hardware, screws, and similar items.
- I. Provide for anchorage of type indicated; coordinate with supporting structure. Space anchoring devices to secure metal fabrications rigidly in place and to support indicated loads.

- J. Where units are indicated to be cast into concrete or built into masonry, equip with integrally welded steel strap anchors, 1/8 by 1-1/2 inches, with a minimum 6-inch embedment and 2-inch hook, not less than 8 inches from ends and corners of units and 24 inches o.c., unless otherwise indicated.

2.6 MISCELLANEOUS FRAMING AND SUPPORTS

- A. General: Provide steel framing and supports not specified in other Sections as needed to complete the Work.
- B. Fabricate units from steel shapes, plates, and bars of welded construction unless otherwise indicated. Fabricate to sizes, shapes, and profiles indicated and as necessary to receive adjacent construction.
 - 1. Fabricate units from slotted channel framing where indicated.
 - 2. Furnish inserts for units installed after concrete is placed.
- C. Galvanize miscellaneous framing and supports on exterior and elsewhere where indicated.
- D. Prime miscellaneous framing and supports with primer specified in Section 099600 "High-Performance Coatings" where indicated.

2.7 METAL LADDERS

- A. General:
 - 1. Comply with ANSI A14.3, except for elevator pit ladders.
 - 2. For elevator pit ladders, comply with ASME A17.1/CSA B44.
- B. Steel Ladders (Interior):
 - 1. Space siderails 16 inches apart unless otherwise indicated.
 - 2. Siderails: Continuous, C4 x 5.4..
 - 3. Rungs: 3/4-inch-square, steel bars.
 - 4. Fit rungs in centerline of siderails; plug-weld and grind smooth on outer rail faces.
 - 5. Provide nonslip surfaces on top of each rung, either by coating rung with aluminum-oxide granules set in epoxy-resin adhesive or by using a type of manufactured rung filled with aluminum-oxide grout.
 - 6. Support each ladder at top and bottom and not more than 60 inches o.c. with welded or bolted steel brackets.
 - 7. Galvanize ladders, including brackets.
- C. Aluminum Ladders (Exterior):
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Fixfast USA.
 - b. O'Keeffe's Inc.

c. Precision Ladders, LLC.

2. Source Limitations: Obtain aluminum ladders from single source from single manufacturer.
3. Space siderails 16 inches apart unless otherwise indicated.
4. Siderails: Continuous extruded-aluminum channels or tubes, not less than 2-1/2 inches deep, 3/4 inch wide, and 1/8 inch thick.
5. Rungs: Extruded-aluminum tubes, not less than 3/4 inch deep and not less than 1/8 inch thick, with ribbed tread surfaces.
6. Fit rungs in centerline of siderails; fasten by welding or with stainless steel fasteners or brackets and aluminum rivets.
7. Provide platforms as indicated fabricated from pressure-locked aluminum bar grating, supported by extruded-aluminum framing. Limit openings in gratings to no more than 1/2 inch in least dimension.

2.8 METAL BOLLARDS

- A. Fabricate metal bollards from Schedule 40 steel pipe.
- B. Prime steel bollards with zinc-rich primer.

2.9 METAL SHIPS' LADDERS

- A. Provide metal ships' ladders where indicated. Fabricate of open-type construction with channel or plate stringers and pipe and tube railings unless otherwise indicated. Provide brackets and fittings for installation.
 1. Basis of Design: Provide Aluminum Ships Stair by Precision Ladders or comparable products by one of the following:
 - a. Alaco Ladder Company.
 - b. Lapeyre Stair.
 - c. UPNOVR
 2. Tread Width: 20 inches.
 3. Tread Depth: 5-3/16 inches.
 4. Spacing of Treads Evenly spaced, not less than 6-1/2 inches or more than 12 inches, depending on required height of ladder.
 5. Angle: 63 degrees.
 6. Fabricate ladder and railings of mill-finish aluminum.
 7. Fabricate treads from extruded-aluminum plank.
 8. Provide handrails of Schedule 40 aluminum pipe with internal fittings on both sides.
- B. Code Compliance: Ship Ladders shall comply with OSHA 1910.25 and Section 1011.15 of the IBC.

2.10 LOOSE BEARING AND LEVELING PLATES

- A. Provide loose bearing and leveling plates for steel items bearing on masonry or concrete construction. Drill plates to receive anchor bolts and for grouting.
- B. Galvanize bearing and leveling plates in exterior walls.
- C. Prime bearing and leveling plates in interior walls with zinc-rich primer.

2.11 LOOSE STEEL LINTELS

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

2.12 ABRASIVE METAL NOSINGS

- A. Extruded Units: Aluminum, with abrasive filler consisting of aluminum oxide, silicon carbide, or a combination of both, in an epoxy-resin binder. Fabricate units in lengths necessary to accurately fit openings or conditions.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. American Safety Tread.
 - b. Safe-T-Metal.
 - c. Wooster Products Inc.
 - 2. Source Limitations: Obtain units from single source from single manufacturer.
 - 3. Provide ribbed units, with abrasive filler strips projecting 1/16 inch above aluminum extrusion.
 - 4. Nosings:
 - a. Square-back units, 3 inches wide, for casting into concrete steps.
- B. Provide anchors for embedding units in concrete, either integral or applied to units, as standard with manufacturer.
- C. Apply clear lacquer to concealed surfaces of extruded units.

2.13 GENERAL FINISH REQUIREMENTS

- A. Finish metal fabrications after assembly.
- B. Finish exposed surfaces to remove tool and die marks and stretch lines, and to blend into surrounding surface.

2.14 STEEL AND IRON FINISHES

- A. Galvanizing: Hot-dip galvanize items as indicated to comply with ASTM A153/A153M for steel and iron hardware and with ASTM A123/A123M for other steel and iron products.
 - 1. Do not quench or apply post galvanizing treatments that might interfere with paint adhesion.
- B. Preparation for Shop Priming Galvanized Items: After galvanizing, thoroughly clean galvanized surfaces of grease, dirt, oil, flux, and other foreign matter, and treat with metallic phosphate process.
- C. Shop prime iron and steel items not indicated to be galvanized unless they are to be embedded in concrete, sprayed-on fireproofing, or masonry, or unless otherwise indicated.
 - 1. Shop prime with primers specified in Section 099113 "Exterior Painting" and in Section 099123 "Interior Painting" unless zinc-rich primer is indicated.
- D. Preparation for Shop Priming: Prepare surfaces to comply with SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
- E. Shop Priming: Apply shop primer to comply with SSPC-PA 1, "Paint Application Specification No. 1: Shop, Field, and Maintenance Painting of Steel," for shop painting.
 - 1. Stripe paint corners, crevices, bolts, welds, and sharp edges.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installing metal fabrications. Set metal fabrications accurately in location, alignment, and elevation; with edges and surfaces level, plumb, true, and free of rack; and measured from established lines and levels.
- B. Fit exposed connections accurately together to form hairline joints. Weld connections that are not to be left as exposed joints but cannot be shop welded because of shipping size limitations. Do not weld, cut, or abrade surfaces of exterior units that have been hot-dip galvanized after fabrication and are for bolted or screwed field connections.

- C. Field Welding: Comply with the following requirements:
 - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 - 2. Obtain fusion without undercut or overlap.
 - 3. Remove welding flux immediately.
 - 4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.
- D. Fastening to In-Place Construction: Provide anchorage devices and fasteners where metal fabrications are required to be fastened to in-place construction. Provide threaded fasteners for use with concrete and masonry inserts, toggle bolts, through bolts, lag screws, wood screws, and other connectors.
- E. Provide temporary bracing or anchors in formwork for items that are to be built into concrete, masonry, or similar construction.
- F. Corrosion Protection: Coat concealed surfaces of aluminum that come into contact with grout, concrete, masonry, wood, or dissimilar metals with the following:
 - 1. Cast Aluminum: Heavy coat of bituminous paint.
 - 2. Extruded Aluminum: Two coats of clear lacquer.

3.2 INSTALLATION OF MISCELLANEOUS FRAMING AND SUPPORTS

- A. General: Install framing and supports to comply with requirements of items being supported, including manufacturers' written instructions and requirements indicated on Shop Drawings.

3.3 INSTALLATION OF METAL BOLLARDS

- A. Anchor bollards in place with concrete footings. Center and align bollards in holes 3 inches above bottom of excavation. Place concrete and vibrate or tamp for consolidation. Support and brace bollards in position until concrete has cured.
- B. Fill bollards solidly with concrete, mounding top surface to shed water.
 - 1. Do not fill removable bollards with concrete.

3.4 INSTALLATION OF BEARING AND LEVELING PLATES

- A. Clean concrete and masonry bearing surfaces of bond-reducing materials, and roughen to improve bond to surfaces. Clean bottom surface of plates.
- B. Set bearing and leveling plates on wedges, shims, or leveling nuts. After bearing members have been positioned and plumbed, tighten anchor bolts. Do not remove wedges or shims but, if

protruding, cut off flush with edge of bearing plate before packing with shrinkage-resistant grout. Pack grout solidly between bearing surfaces and plates to ensure that no voids remain.

3.5 REPAIRS

A. Touchup Painting:

1. Immediately after erection, clean field welds, bolted connections, and abraded areas. Paint uncoated and abraded areas with same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.
 - a. Apply by brush or spray to provide a minimum 2.0-mil dry film thickness.
2. Cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint are specified in Section 099113 "Exterior Painting" And Section 099123 "Interior Painting."

B. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM A780/A780M.

END OF SECTION 055000

SECTION 055113 - METAL PAN STAIRS

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. Preassembled steel stairs with concrete-filled treads.
- 2. Aluminum railings and guards attached to metal stairs.
- 3. Aluminum handrails attached to walls adjacent to metal stairs.

- B. Related Section include the following:

- 1. Section 055213 exterior and interior pipe and tube railings not attached to steel stairs.

1.3 COORDINATION

- A. Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint and coating manufacturers' written instructions to ensure that shop primers and topcoats are compatible with one another.

- B. Coordinate installation of anchorages for metal stairs, railings, and guards.

- 1. 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.
- 2. Deliver such items to Project site in time for installation.

- C. Schedule installation of railings and guards so wall attachments are made only to completed walls.

- 1. Do not support railings and guards temporarily by any means that do not satisfy structural performance requirements.

1.4 ACTION SUBMITTALS

- A. Product Data: For metal pan stairs and the following:

- 1. Shop primer products.
- 2. Handrail wall brackets.
- 3. Grout.

B. Shop Drawings:

1. Include plans, elevations, sections, details, and attachments to other work.
2. Indicate sizes of metal sections, thickness of metals, profiles, holes, and field joints.
3. Include plan at each level.
4. Indicate locations of anchors, weld plates, and blocking for attachment of wall-mounted handrails.

C. Delegated-Design Submittal: For stairs, railings and guards,, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: Fabricator of products.

B. Welding Qualifications: Qualify procedures and personnel according to the following:

1. AWS D1.1/D1.1M, "Structural Welding Code - Steel."
2. AWS D1.3/D1.3M, "Structural Welding Code - Sheet Steel."
3. AWS D1.2/D1.2M, "Structural Welding Code - Aluminum."

1.6 DELIVERY, STORAGE, AND HANDLING

A. Store materials to permit easy access for inspection and identification.

1. Keep steel members off ground and spaced by using pallets, dunnage, or other supports and spacers.
2. Protect steel members and packaged materials from corrosion and deterioration.
3. Do not store materials on structure in a manner that might cause distortion, damage, or overload to members or supporting structures.
 - a. Repair or replace damaged materials or structures as directed.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Engage a qualified professional engineer, as defined in Section 014000 "Quality Requirements," to design stairs, railings and guards,, including attachment to building construction.
- B. Structural Performance of Stairs: Metal stairs shall withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated:
 1. Uniform Load: 100 lbf/sq. ft..
 2. Concentrated Load: 300 lbf applied on an area of 4 sq. in..

3. Uniform and concentrated loads need not be assumed to act concurrently.
 4. Stair Framing: Capable of withstanding stresses resulting from railing and guard loads in addition to loads specified above.
 5. Limit deflection of treads, platforms, and framing members to $L/360$ or $1/4$ inch, whichever is less.
- C. Structural Performance of Railings and Guards: Railings and guards, including attachment to building construction, shall withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated:
1. Handrails and Top Rails of Guards:
 - a. Uniform load of 50 lbf/ft. applied in any direction.
 - b. Concentrated load of 200 lbf applied in any direction.
 - c. Uniform and concentrated loads need not be assumed to act concurrently.
 2. Infill of Guards:
 - a. Concentrated load of 50 lbf applied horizontally on an area of 1 sq. ft..
 - b. Infill load and other loads need not be assumed to act concurrently.
 3. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes.
 - a. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.
- D. Seismic Performance of Stairs: Metal stairs shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.
1. Component Importance Factor: 1.25.

2.2 MANUFACTURERS

- A. Provide steel-framed stairs and railings engineered and fabricated by structural steel supplier or one of the following:
1. Alfab.
 2. American Stair Corporation.
 3. Pacific Stair.
 4. Summit Steel Fabricators.
- B. Incorporate aluminum railings by one of the following:
1. R & B Wagner, Inc.
 2. J. G. Braun Co.
 3. Superior Aluminum Products.

2.3 METALS

- A. Metal Surfaces: Provide materials with smooth, flat surfaces unless otherwise indicated. For components exposed to view in the completed Work, provide materials without seam marks, roller marks, rolled trade names, or blemishes.
- B. Steel Plates, Shapes, and Bars: ASTM A36/A36M.
- C. Uncoated, Cold-Rolled Steel Sheet: ASTM A1008/A1008M, either commercial steel, Type B, or structural steel, Grade 25, unless another grade is required by design loads; exposed.
- D. Aluminum, General: Provide alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated, and with not less than the strength and durability properties of alloy and temper designated below for each aluminum form required.
- E. Extruded Bars and Tubing: ASTM B221, Alloy 6063-T5/T52.
- F. Extruded Structural Pipe and Round Tubing: ASTM B429/B429M, Alloy 6063-T6.
 - 1. Provide Standard Weight (Schedule 40) pipe unless otherwise indicated.
- G. Drawn Seamless Tubing: ASTM B210, Alloy 6063-T832.
- H. Woven-Wire Mesh: Intermediate-crimp, square pattern, 2- by 4-inch woven-wire mesh, made from 0.162-inch-diameter, aluminum wire complying with ASTM B211, Alloy 6061-T94.
- I. Aluminum Extrusions: ASTM B221, Alloy 6063-T6.
- J. Aluminum Castings: ASTM B26/B26M, Alloy 443.0-F.

2.4 FASTENERS

- A. General: Provide zinc-plated fasteners with coating complying with ASTM B633 or ASTM F1941/F1941M, Class Fe/Zn 12 for exterior use, and Class Fe/Zn 5 where built into exterior walls.
 - 1. Select fasteners for type, grade, and class required.
- B. Fasteners for Anchoring Railings and Guards to Other Construction: Select fasteners of type, grade, and class required to produce connections suitable for anchoring railings and guards to other types of construction indicated and capable of withstanding design loads.
- C. Bolts and Nuts: Regular hexagon-head bolts, ASTM A307, Grade A; with hex nuts, ASTM A563; and, where indicated, flat washers.
- D. Anchor Bolts: ASTM F1554, Grade 36, of dimensions indicated; with nuts, ASTM A563; and, where indicated, flat washers.

1. Provide mechanically deposited or hot-dip, zinc-coated anchor bolts for stairs indicated to be shop primed with zinc-rich primer.
- E. Post-Installed Anchors: Torque-controlled expansion anchors 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 E488/E488M, conducted by a qualified independent testing agency.
 1. Material for Interior Locations: Carbon-steel components zinc plated to comply with ASTM B633 or ASTM F1941/F1941M, Class Fe/Zn 5, unless otherwise indicated.

2.5 MISCELLANEOUS MATERIALS

- A. Handrail Wall Brackets: Cast aluminum, center of rail 2-1/2 inches from face of wall.
- B. Welding Electrodes: Comply with AWS requirements.
- C. Universal Shop Primer: Fast-curing, lead- and chromate-free, universal modified-alkyd primer complying with MPI#79 and compatible with topcoat.
 1. Use primer containing pigments that make it easily distinguishable from zinc-rich primer.
- D. Nonmetallic, Shrinkage-Resistant Grout: ASTM C1107/C1107M, factory-packaged, nonmetallic aggregate grout; recommended by manufacturer for interior and exterior use; noncorrosive and nonstaining; mixed with water to consistency suitable for application and a 30-minute working time.

2.6 FABRICATION, GENERAL

- A. Provide complete stair assemblies, including metal framing, hangers, struts, railings and guards, clips, brackets, bearing plates, and other components necessary to support and anchor stairs and platforms on supporting structure.
 1. Join components by welding unless otherwise indicated.
 2. Use connections that maintain structural value of joined pieces.
- B. Assemble stairs, railings, and guards in shop to greatest extent possible.
 1. Disassemble units only as necessary for shipping and handling limitations.
 2. Clearly mark units for reassembly and coordinated installation.
- C. Cut, drill, and punch metals cleanly and accurately.
 1. Remove burrs and ease edges to a radius of approximately 1/32 inch unless otherwise indicated.
 2. Remove sharp or rough areas on exposed surfaces.

- D. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.
- E. Form exposed work with accurate angles and surfaces and straight edges.
- F. Weld connections to comply with the following:
 - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 - 2. Obtain fusion without undercut or overlap.
 - 3. Remove welding flux immediately.
 - 4. Weld exposed corners and seams continuously unless otherwise indicated.
 - 5. At exposed connections, finish exposed welds to comply with NOMMA's "Voluntary Joint Finish Standards" for Finish # 3 - Partially dressed weld with spatter removed.
- G. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners where possible.
 - 1. Where exposed fasteners are required, use Phillips flat-head (countersunk) screws or bolts unless otherwise indicated.
 - 2. Locate joints where least conspicuous.
 - 3. Fabricate joints that will be exposed to weather in a manner to exclude water.
 - 4. Provide weep holes where water may accumulate internally.

2.7 FABRICATION OF STEEL-FRAMED STAIRS

- A. NAAMM Stair Standard: Comply with NAAMM AMP 510, "Metal Stairs Manual," for Commercial Class for egress stairs.
- B. Stair Framing:
 - 1. Fabricate stringers of steel plates or steel channels.
 - a. Stringer Size: As required to comply with "Performance Requirements" Article.
 - b. Provide closures for exposed ends of channel and rectangular tube stringers.
 - c. Finish: Shop primed.
 - 2. Construct platforms of steel plate or channel headers and miscellaneous framing members as required to comply with "Performance Requirements" Article.
 - a. Provide closures for exposed ends of channel and rectangular tube framing.
 - b. Finish: Shop primed.
 - 3. Weld stringers to headers; weld framing members to stringers and headers.
 - 4. Where masonry walls support metal stairs, provide temporary supporting struts designed for erecting steel stair components before installing masonry.

- C. Metal Pan Stairs: Form risers, subtread pans, and subplatforms to configurations shown from steel sheet of thickness needed to comply with performance requirements, but not less than 0.067 inch.
1. Fabricate treads and landing subplatforms of exterior stairs so finished walking surfaces slope to drain.
 2. Steel Sheet: Uncoated, cold-rolled steel sheet unless otherwise indicated.
 3. Directly weld metal pans to stringers; locate welds on top of subtreads where they will be concealed by concrete fill. Do not weld risers to stringers.
 4. Attach risers and subtreads to stringers with brackets made of steel angles or bars. Weld brackets to stringers and attach metal pans to brackets by welding, riveting, or bolting.
 5. Shape metal pans to include nosing integral with riser.
 6. At Contractor's option, provide stair assemblies with metal pan subtreads filled with reinforced concrete during fabrication.
 7. Provide subplatforms of configuration indicated or, if not indicated, the same as subtreads. Weld subplatforms to platform framing.

2.8 FABRICATION OF STAIR RAILINGS AND GUARDS

- A. Fabricate railings and guards of aluminum pipe or tubes to comply with requirements indicated for design, dimensions, details, finish, and member sizes, including wall thickness of member, post spacings, wall bracket spacing, and anchorage, but not less than that needed to withstand indicated loads.
- B. Welded Connections: Fabricate railings and guards with welded connections.
1. Cope components at connections to provide close fit, or use fittings designed for this purpose.
 2. Weld all around at connections, including at fittings.
 3. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 4. Obtain fusion without undercut or overlap.
 5. Remove flux immediately.
 6. Finish welds to comply with NOMMA's "Voluntary Joint Finish Standards" for Finish #2 - Completely sanded joint, some undercutting and pinholes are okay as shown in NAAMM AMP 521.
- C. Form changes in direction of railings and guards as follows:
1. As detailed.
- D. For changes in direction made by bending, use jigs to produce uniform curvature for each repetitive configuration required. Maintain cross section of member throughout entire bend without buckling, twisting, cracking, or otherwise deforming exposed surfaces of components.
- E. Close exposed ends of railing and guard members with prefabricated end fittings.
- F. Provide wall returns at ends of wall-mounted handrails unless otherwise indicated.

1. Close ends of returns unless clearance between end of rail and wall is 1/4 inch or less.
- G. Connect posts to stair framing by direct welding unless otherwise indicated.
- H. Brackets, Flanges, Fittings, and Anchors: Provide wall brackets, end closures, flanges, miscellaneous fittings, and anchors for interconnecting components and for attaching to other work.
1. Furnish inserts and other anchorage devices for connecting to concrete or masonry work.
 2. For nongalvanized railings and guards, provide nongalvanized ferrous-metal fittings, brackets, fasteners, and sleeves, except galvanize anchors embedded in exterior masonry and concrete construction.
 3. Provide type of bracket with predrilled hole for exposed bolt anchorage and that provides 1-1/2-inch clearance from inside face of handrail to finished wall surface.
- I. Fillers: Provide fillers made from steel plate, or other suitably crush-resistant material, where needed to transfer wall bracket loads through wall finishes to structural supports.
1. Size fillers to suit wall finish thicknesses and to produce adequate bearing area to prevent bracket rotation and overstressing of substrate.

2.9 FINISHES

- A. Finish metal stairs after assembly.
- B. Preparation for Shop Priming: Prepare uncoated, ferrous-metal surfaces to comply with SSPC-SP 3, "Power Tool Cleaning."
- C. Apply shop primer to uncoated surfaces of steel stair components, except those with galvanized finishes and those to be embedded in concrete or masonry unless otherwise indicated. Comply with SSPC-PA 1, "Paint Application Specification No. 1: Shop, Field, and Maintenance Painting of Steel," for shop painting.
- D. Aluminum Railings: Mechanical Finish: AA-M3x; sand top rails, handrails, and intermediate rails in one direction only, parallel to length of railing, with 120- and 320-grit abrasive. After installation, polish railings with No. 0 steel wool immersed in paste wax, then rub to a luster with a soft dry cloth.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify elevations of floors, bearing surfaces and locations of bearing plates, and other embedments for compliance with requirements.
1. For wall-mounted railings, verify locations of concealed reinforcement within gypsum board assemblies.

- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION OF METAL PAN STAIRS

- A. Fastening to In-Place Construction: Provide anchorage devices and fasteners where necessary for securing metal stairs to in-place construction.
 - 1. Include threaded fasteners for concrete and masonry inserts, through-bolts, lag bolts, and other connectors.
- B. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installing metal stairs. Set units accurately in location, alignment, and elevation, measured from established lines and levels and free of rack.
- C. Install metal stairs by welding stair framing to steel structure or to weld plates cast into concrete unless otherwise indicated.
 - 1. Grouted Baseplates: Clean concrete- and masonry-bearing surfaces of bond-reducing materials, and roughen surfaces prior to setting plates.
 - a. Clean bottom surface of plates.
 - b. Set plates for structural members on wedges, shims, or setting nuts.
 - c. Tighten anchor bolts after supported members have been positioned and plumbed.
 - d. Do not remove wedges or shims but, if protruding, cut off flush with edge of plate before packing with grout.
 - e. Promptly pack grout solidly between bearing surfaces and plates so no voids remain.
 - 1) Neatly finish exposed surfaces; protect grout and allow to cure.
 - 2) Comply with manufacturer's written installation instructions for shrinkage-resistant grouts.
- D. Provide temporary bracing or anchors in formwork for items that are to be built into concrete, masonry, or similar construction.
- E. Fit exposed connections accurately together to form hairline joints.
 - 1. Weld connections that are not to be left as exposed joints but cannot be shop welded because of shipping size limitations.
 - 2. Do not weld, cut, or abrade surfaces of exterior units that have been hot-dip galvanized after fabrication and are for bolted or screwed field connections.
 - 3. Comply with requirements for welding in "Fabrication, General" Article.
- F. Place and finish concrete fill for treads and platforms to comply with Section 033000 "Cast-in-Place Concrete."

3.3 INSTALLATION OF RAILINGS AND GUARDS

- A. Adjust railing and guard systems before anchoring to ensure matching alignment at abutting joints with tight, hairline joints.
 - 1. Space posts at spacing indicated or, if not indicated, as required by design loads.
 - 2. Plumb posts in each direction, within a tolerance of 1/16 inch in 3 feet.
 - 3. Align rails and guards so variations from level for horizontal members and variations from parallel with rake of stairs for sloping members do not exceed 1/4 inch in 12 feet.
 - 4. Secure posts, rail ends, and guard ends to building construction as follows:
 - a. Anchor posts to steel by bolting to steel supporting members.
 - b. Anchor handrail and guard ends to concrete and masonry with steel round flanges welded to rail and guard ends and anchored with post-installed anchors and bolts.
- B. Attach handrails to wall with wall brackets.
 - 1. Locate brackets as indicated or, if not indicated, at spacing required to support structural loads.
 - 2. Secure wall brackets to building construction as required to comply with performance requirements.
 - a. For concrete and solid masonry anchorage, use drilled-in expansion shields and hanger or lag bolts.

3.4 REPAIR

- A. Touchup Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.
 - 1. Apply by brush or spray to provide a minimum 2.0-mil dry film thickness.

END OF SECTION 055113

SECTION 055213 - PIPE AND TUBE RAILINGS

1.1 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Engage a qualified professional engineer, as defined in Section 014000 "Quality Requirements," to design railings, including attachment to building construction.
- B. Structural Performance: Railings, including attachment to building construction, shall withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated:
 - 1. Handrails:
 - a. Uniform load of 50 lbf/ ft. applied in any direction.
 - b. Concentrated load of 200 lbf applied in any direction.
 - c. Uniform and concentrated loads need not be assumed to act concurrently.
- C. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes.
 - 1. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.

1.2 METALS, GENERAL

- A. Metal Surfaces, General: Provide materials with smooth surfaces, without seam marks, roller marks, rolled trade names, stains, discolorations, or blemishes.

1.3 ALUMINUM RAILINGS

- A. Subject to compliance with requirements, provide aluminum railings by one of the following:
 - 1. R & B Wagner, Inc.
 - 2. J. G. Braun Co.
 - 3. Superior Aluminum Products.
- B. Source Limitations: Obtain each type of railing from single source from single manufacturer.
- C. Aluminum, General: Provide alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated, and with not less than the strength and durability properties of alloy and temper designated below for each aluminum form required.
- D. Extruded Tubing: ASTM B221, Alloy 6063-T5/T52.
- E. Drawn Seamless Tubing: ASTM B210/B210M, Alloy 6063-T832.
- F. Plate and Sheet: ASTM B209, Alloy 6061-T6.

G. Die and Hand Forgings: ASTM B247, Alloy 6061-T6.

H. Castings: ASTM B26/B26M, Alloy A356.0-T6.

1.4 FASTENERS

A. Fastener Materials:

1. Aluminum Railing Components: Type 304 stainless steel fasteners.
2. Finish exposed fasteners to match appearance, including color and texture, of railings.

B. Fasteners for Anchoring Railings to Other Construction: Select fasteners of type, grade, and class required to produce connections suitable for anchoring railings to other types of construction and capable of withstanding design loads.

C. Post-Installed Anchors: Fastener systems with working capacity greater than or equal to the design load, according to an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC193 or ICC-ES AC308.

1. Material for Interior Locations: Carbon-steel components zinc-plated to comply with ASTM B633 or ASTM F1941/F1941M, Class Fe/Zn 5, unless otherwise indicated.
2. Material for Exterior Locations and Where Stainless Steel Is Indicated: Alloy Group 2 stainless steel bolts, ASTM F593, and nuts, ASTM F594.

1.5 MISCELLANEOUS MATERIALS

A. Welding Rods and Bare Electrodes: Select in accordance with AWS specifications for metal alloy welded.

1. For aluminum railings, provide type and alloy as recommended by producer of metal to be welded and as required for color match, strength, and compatibility in fabricated items.

B. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout, complying with ASTM C1107/C1107M. Provide grout specifically recommended by manufacturer for interior and exterior applications.

C. Anchoring Cement: Factory-packaged, nonshrink, nonstaining, hydraulic-controlled expansion cement formulation for mixing with water at Project site to create pourable anchoring, patching, and grouting compound.

1. Water-Resistant Product: At exterior locations, provide formulation that is resistant to erosion from water exposure without needing protection by a sealer or waterproof coating and that is recommended by manufacturer for exterior use.

1.6 ALUMINUM FINISHES

- A. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are unacceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.
- B. Mechanical Finish: AA-M3x; sand handrails in one direction only, parallel to length of railing, with 120- and 320-grit abrasive. After installation, polish railings with No. 0 steel wool immersed in paste wax, then rub to a luster with a soft dry cloth.

END OF SECTION 055213

SECTION 061050 - MISCELLANEOUS ROUGH 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. Rooftop equipment bases and support curbs.
 - 2. Wood blocking and nailers.
 - 3. 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 or greater size but less than 5 inches nominal size in least dimension.

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. For products receiving a waterborne treatment, include statement that moisture content of treated materials was reduced to levels specified before shipment to Project site.
- B. Sustainable Design Submittals:
 - 1. Product Data: For composite wood, confirming no added urea formaldehyde..

1.5 INFORMATIONAL SUBMITTALS

- A. Evaluation Reports: For the following, from ICC-ES:
 - 1. Preservative-treated wood.

2. Power-driven fasteners.

1.6 DELIVERY, STORAGE, AND HANDLING

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

PART 2 - PRODUCTS

2.1 WOOD PRODUCTS, GENERAL

- A. Lumber: DOC PS 20 and applicable rules of grading agencies indicated. If no grading agency is indicated, provide lumber that complies with the applicable rules of any rules-writing agency certified by the ALSC Board of Review. Provide lumber graded by an agency certified by the ALSC Board of Review to inspect and grade lumber under the rules indicated.
 1. Factory mark each piece of lumber with grade stamp of grading agency.
 2. For exposed lumber indicated to receive a stained or natural finish, mark grade stamp on end or back of each piece or omit grade stamp and provide certificates of grade compliance issued by grading agency.
 3. Dress lumber, S4S, unless otherwise indicated.
- B. Maximum Moisture Content of Lumber: 19 percent unless otherwise indicated.

2.2 WOOD-PRESERVATIVE-TREATED MATERIALS

- A. Preservative Treatment by Pressure Process: AWP A U1; Use Category UC2 for interior construction not in contact with ground, Use Category UC3b for exterior construction not in contact with ground, and Use Category UC4a for items in contact with ground.
 1. Preservative Chemicals: Acceptable to authorities having jurisdiction and containing no arsenic or chromium. Do not use inorganic boron (SBX) for sill plates.
 2. For exposed items indicated to receive a stained or natural finish, chemical formulations shall not require incising, contain colorants, bleed through, or otherwise adversely affect finishes.
- B. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent. Do not use material that is warped or does not comply with requirements for untreated material.
- C. Mark lumber with treatment quality mark of an inspection agency approved by the ALSC Board of Review.
- 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, and similar concealed members in contact with masonry or concrete.

2.3 MISCELLANEOUS LUMBER

- A. General: 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. Cants.
 5. Furring.
 6. Utility shelving.
- B. Dimension Lumber Items: Standard, Stud, or No. 3 grade lumber of any of the following species:
1. Mixed southern pine or southern pine; SPIB.
 2. Spruce-pine-fir; NLGA.
 3. Hem-fir; WCLIB or WWPA.
 4. Spruce-pine-fir (south); NeLMA, WCLIB, or WWPA.
 5. Eastern softwoods; NeLMA.
- C. Concealed Boards: 15 percent maximum moisture content of any of the following species and grades:
1. Mixed southern pine or southern pine, No. 3 grade; SPIB.
 2. Spruce-pine-fir (south) or spruce-pine-fir, Standard or No. 3 Common grade; NeLMA, NLGA, WCLIB, or WWPA.
 3. Eastern softwoods, No. 3 Common grade; NELMA.
- D. 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.
- E. 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.
- F. For furring strips for installing plywood or hardboard paneling, select boards with no knots capable of producing bent-over nails and damage to paneling.

2.4 PLYWOOD BACKING PANELS

- A. Equipment Backing Panels: Plywood, DOC PS 1, Exposure 1, C-D Plugged, in thickness indicated or, if not indicated, not less than 3/4-inch nominal thickness. Plywood shall not contain added urea formaldehyde.

2.5 FASTENERS

- A. General: Provide fasteners of size and type indicated that comply with requirements specified in this article for material and manufacture.
 - 1. Where carpentry is exposed to weather, in ground contact, pressure-preservative treated, or in area of high relative humidity, provide fasteners with hot-dip zinc coating complying with ASTM A153/A153M.
- B. Nails, Brads, and Staples: ASTM F1667.
- C. Screws for Fastening to Metal Framing: ASTM C954, length as recommended by screw manufacturer for material being fastened.
- D. Power-Driven Fasteners: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC70.
- E. Post-Installed Anchors: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC01 or ICC-ES AC193 as appropriate for the substrate.
 - 1. Material: Carbon-steel components, zinc plated to comply with ASTM B633, Class Fe/Zn 5.
 - 2. Material: Stainless steel with bolts and nuts complying with ASTM F593 and ASTM F594, Alloy Group 1 or 2.

2.6 MISCELLANEOUS MATERIALS

- A. Flexible Flashing: Composite, self-adhesive, flashing product consisting of a pliable, 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.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Framing Standard: Comply with AF&PA's WCD 1, "Details for Conventional Wood Frame Construction," unless otherwise indicated.
- B. Set carpentry to required levels and lines, with members plumb, true to line, cut, and fitted. Fit carpentry accurately to other construction. Locate nailers, blocking, and similar supports to comply with requirements for attaching other construction.
- C. Install plywood backing panels by fastening to studs; coordinate locations with utilities requiring backing panels.
- D. Provide blocking and framing as indicated and as required to support facing materials, fixtures, specialty items, and trim.

- E. 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.
- F. Comply with AWPAC 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.
- G. Where wood-preservative-treated lumber is installed adjacent to metal decking, install continuous flexible flashing separator between wood and metal decking.
- H. Securely attach carpentry work to substrate by anchoring and fastening as indicated, complying with the following:
 - 1. Table 2304.9.1, "Fastening Schedule," in ICC's International Building Code.
 - 2. ICC-ES evaluation report for fastener.
- I. 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 NAILER

- A. Install where indicated and where required for 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 items to substrates to support applied loading. Recess bolts and nuts flush with surfaces unless otherwise indicated.
- C. For wood blocking at perimeter of low-slope roof assembly, comply with fastener spacing and other installation requirements of FM Global Loss Prevention Data Sheet 1-49, or the requirements of the roofing manufacturer, whichever is more stringent, based on wind uplift.
 - 1. Use screws, anchors, and/or machine bolts to secure rough carpentry at roof perimeters.

END OF SECTION 061050

SECTION 061053 - MISCELLANEOUS ROUGH CARPENTRY FOR ROOFING

PART 1 - GENERAL

1.1 RELATED REQUIREMENTS

- A. Drawings and general provisions of the contract, including the General and Supplemental Conditions, as well as other Division 01 Specification Sections, apply to this section.

1.2 SUMMARY

- A. Section Includes:

- 1. Wood blocking/nailers are required at all roof perimeter locations and roof penetrations where shown on the details. Thickness of wood blocking/nailers are to match the thickness of the insulation system.

1.3 DEFINITIONS

- A. Lumber: Minimum 2 inches x 6 inches unless otherwise indicated.
- B. Lumber grading agencies, and the abbreviations used to reference them, include the following:
 - 1. NLGA: National Lumber Grades Authority.
 - 2. 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.

1.5 INFORMATIONAL SUBMITTALS

- A. Evaluation Reports: For the following, from ICC-ES:
 - 1. Preservative-treated wood.

PART 2 - PRODUCTS

2.1 WOOD PRODUCTS, GENERAL

- A. Lumber: DOC PS 20 and applicable rules of grading agencies indicated. If no grading agency is indicated, provide lumber that complies with the applicable rules of any rules-writing agency certified by the ALSC Board of Review. Provide lumber graded by an agency certified by the ALSC Board of Review to inspect and grade lumber under the rules indicated.
1. Factory mark each piece of lumber with grade stamp of grading agency.
 2. For exposed lumber indicated to receive a stained or natural finish, mark grade stamp on end or back of each piece.
- B. Maximum Moisture Content of Lumber: 19 percent or less.

2.2 DIMENSION LUMBER FRAMING

- A. Wood Blocking/Nailers:
1. Construction or No. 2 Southern Pine; Southern pine (SPIB).
 2. Pressure Treated, kiln dried, intended for ground contact.
 3. Maximum Moisture Content of Lumber: 19 percent or less.
 4. Minimum 2" x 6" unless approved otherwise.

2.3 UNDERLAYMENT MATERIALS

- A. Self-Adhering, High-Temperature Sheet: Minimum 40 mils thick, consisting of a slip-resistant polyethylene- or polypropylene-film top surface laminated to a layer of butyl- or SBS-modified asphalt adhesive, with release-paper backing; specifically designed to withstand high metal temperatures beneath metal roofing. Provide primer according to written recommendations of underlayment manufacturer.
1. Thermal Stability: ASTM D 1970; stable after testing at 240 deg F or higher.
 2. Low-Temperature Flexibility: ASTM D 1970; passes after testing at minus 20 deg F or lower.

2.4 FASTENERS

- A. General: Provide fasteners of size and type indicated that comply with requirements specified in this article for material and manufacture. Fasteners shall be compatible with the wood treatment used.

1. Where carpentry is exposed to weather, in ground contact, pressure-preservative treated, or in area of high relative humidity, provide fasteners of Type 304 stainless steel.
2. For wood blocking attachment to steel roof deck, use a minimum of #12 stainless steel self-drilling fastener to penetrate metal roof deck a minimum of 1" depth. Install fasteners at a maximum of 12" on center and 6" at corners. One fastener shall be at a maximum of 6" from board end.
3. Provide a self-adhering underlayment between treated wood blocking and any sheet metal products including counterflashing, etc.
4. If other substrate/edge conditions exist, the Contractor shall provide attachment to resist 250 pounds per square linear foot in all directions and increased by 100% at corners.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Set carpentry to required levels and lines, with members plumb, true to line, cut, and fitted. Fit carpentry to other construction; scribe and cope as needed for accurate fit.
- B. Where wood-preservative-treated lumber is installed adjacent to metal decking, install continuous waterproof membrane separator between wood and metal panels.
- C. Framing Standard: Comply with AF&PA's WCD 1, "Details for Conventional Wood Frame Construction," unless otherwise indicated.
- D. Do not splice structural members between supports unless otherwise indicated.
- E. Comply with AWWA M4 for applying field treatment to cut surfaces of preservative-treated lumber.
- F. Securely attach carpentry work to substrate by anchoring and fastening as indicated, complying with the following:
 1. Attach wood nailers to roof edges to meet the requirements of FM Global Property Loss Prevention Data Sheet 1-49, 2.2.4, 2.2.5, 2.2.6 and/or 2.2.7.

END OF SECTION 061053

SECTION 061600 - SHEATHING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:

- 1. Wall sheathing.
- 2. Parapet sheathing.

- B. Related Requirements:

- 1. Section 061053 "Miscellaneous Rough Carpentry" for plywood backing panels.
- 2. Section 072726 "Fluid-Applied Membrane Air Barriers" for joint and penetration treatment.

1.3 PREINSTALLATION MEETINGS

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

- 1. Review air-barrier and water-resistant glass-mat gypsum sheathing requirements and installation, special details, transitions, mockups, air-leakage testing, protection, and work scheduling that covers air-barrier and water-resistant glass-mat gypsum sheathing.

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.

- 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.

PART 2 - PRODUCTS

2.1 WALL SHEATHING

A. Glass-Mat Gypsum Sheathing: ASTM C1177/C1177M.

1. Products: Subject to compliance with requirements, provide one of the following:
 - a. CertainTeed Corporation; GlasRoc.
 - b. CertainTeed Gypsum; CertainTeed GlasRoc Type X Sheathing.
 - c. Georgia-Pacific Gypsum LLC; Dens-Glass Gold.
 - d. National Gypsum Company; Gold Bond® eXP® Sheathing.
 - e. USG Corporation; Securock.
2. Type and Thickness: Type X, 1/2 inch thick.

2.2 PARAPET SHEATHING

A. Glass-Mat Gypsum Sheathing: ASTM C1177/C1177M.

1. Products: Subject to compliance with requirements, provide one of the following:
 - a. CertainTeed Corporation; GlasRoc.
 - b. Georgia-Pacific Gypsum LLC; Dens-Glass Gold.
 - c. National Gypsum Company; Gold Bond® eXP® Sheathing.
 - d. USG Corporation; Securock.
2. Type and Thickness: Type X, 1/2 inch thick.

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

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Do not use materials with defects that impair quality of sheathing or pieces that are too small to use with minimum number of joints or optimum joint arrangement. Arrange joints so that pieces do not span between fewer than three support members.
- B. Cut panels at penetrations, edges, and other obstructions of work; fit tightly against abutting construction unless otherwise indicated.
- C. Securely attach to substrate by fastening as indicated, complying with the following:
 1. Table 2304.9.1, "Fastening Schedule," in the ICC's International Building Code.
 2. ICC-ES evaluation report for fastener.
- D. Coordinate wall and parapet 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.
- E. Do not bridge building expansion joints; cut and space edges of panels to match spacing of structural support elements.
- F. Coordinate sheathing installation with installation of materials installed over sheathing so sheathing is not exposed to precipitation or left exposed at end of the workday when rain is forecast.

3.2 GYPSUM SHEATHING INSTALLATION

- 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.
 2. For sheathing under stucco cladding, panels may be initially tacked in place with screws if overlying self-furring metal lath is screw-attached through sheathing to studs immediately after sheathing is installed.
- 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.

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.
- 2. Interior board paneling.

- B. Related Requirements:

- 1. Section 061053 "Miscellaneous Rough Carpentry" for furring, blocking, and other carpentry work not exposed to view.
- 2. Section 099300 "Staining and Transparent Finishing" for finishing of interior wood trim.
- 3. Section 099647 "Intumescent Painting" for coating of salvaged doors and flooring.

1.3 DEFINITIONS

- A. MDF: Medium-density fiberboard.
- B. PVC: Polyvinyl chloride.

1.4 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.
- B. Sustainable Design Submittals:
 - 1. Product Data: For adhesives, indicating VOC content.
- C. Samples for Verification:
 - 1. For plastic laminate, 8- by 10-inch panel.
 - 2. Foam plastic molding: complete profile, 12 inches long.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Stack flooring and doors 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.

1.6 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, or omit grade stamp and provide certificates of grade compliance issued by grading agency.

2.2 INTERIOR TRIM

- A. Hardwood Lumber Trim for Transparent Finish (Stain or Clear Finish):
 - 1. Species and Grade: Yellow poplar; NHLA Clear.
 - 2. Maximum Moisture Content: 13 percent.
 - 3. Finger Jointing: Not allowed.

4. Gluing for Width: Not allowed.
5. Veneered Material: Not allowed.
6. Face Surface: Surfaced (smooth).
7. Matching: Selected for compatible grain and color.

B. Foam-Plastic Moldings **FWB**: Faux beams, molded product of shapes indicated, with a tough outer skin on exposed surfaces; factory finished. Exposed surfaces shall not be shaped after molding.

1. Basis of Design: Provide Barron Designs, of dimension and finish indicated on Drawings, or approved substitute.
2. Density: Not less than 20 lb/cu. ft..
3. Flame-Spread Index: Not more than 25 when tested according to ASTM E84.
4. Thickness: Not more than 1/2 inch.
5. Width: Not more than 8 inches.
6. Patterns: As indicated by manufacturer's designations.

2.3 PANELING

A. Board Paneling **RWW**: Salvaged wood flooring from original McNair School.

1. Flooring is available without cost to Contractor at storage location. Contact CCSD for access. Contractor is responsible for sorting material and transportation. Select flooring in best condition, compatible in color and finish.

B. Accent Paneling: Salvaged wood doors from original McNair School.

1. Doors are available without cost to Contractor at storage location. Contact CCSD for access. Contractor is responsible for sorting material and transportation. Select doors in the best condition, matching styles and compatible in color and finish.

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. VOC Content: Not to exceed 30 g/L.

C. Multipurpose Construction Adhesive: Formulation, complying with ASTM D3498, that is recommended for indicated use by adhesive manufacturer.

1. VOC Content: Not to exceed 70 g/L.

2.5 FABRICATION

- A. Board Paneling: Clean and lightly sand. It is not the intention to remove all signs of wear and old finish.
- B. Doors: If necessary, replace broken or missing glazing. Remove existing hardware and remove old finish. Clean and re-install.

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.

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. Use concealed shims where necessary for alignment.
 - 2. Scribe and cut interior finish carpentry to fit adjoining work. Refinish and seal cuts as recommended by manufacturer.
 - 3. Where face fastening is unavoidable, countersink fasteners, fill surface flush, and sand unless otherwise indicated.
 - 4. 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.
 - 5. 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 STANDING AND RUNNING 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. Cope at returns, miter at outside corners, and cope at inside corners to produce tight-fitting 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 INSTALLATION OF PANELING

- A. Board Paneling: Install according to manufacturer's written instructions.
 - 1. Install in full lengths without end joints.
 - 2. Stagger end joints in random pattern to uniformly distribute joints on each wall.
 - 3. Select and arrange boards on each wall to minimize noticeable variations in grain character and color between adjacent boards.
 - 4. Install with uniform tight joints between boards.
 - 5. Fasten paneling by blind nailing through tongues.

3.6 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.

3.7 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.

3.8 PROTECTION

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

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

1.2 SUMMARY

- A. Section Includes:

- 1. Plastic-laminate-clad architectural cabinets.
- 2. 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 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.
- 2. Section 123661.16 "Solid Surfacing Countertops."
- 3. Section 123653 "Laboratory Countertops."

1.3 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.

1.4 PREINSTALLATION MEETINGS

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

1.5 ACTION SUBMITTALS

- A. Product Data: For each type of product.

- B. Sustainable Design Submittals:

- 1. Product Data: For adhesives and sealants, indicating VOC content.
- 2. Product Data: For composite wood, confirming no added urea formaldehyde.

C. 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.

D. Samples: For the following:

1. Plastic Laminates: 12 by 12 inches, for each type, color, pattern, and surface finish required.
 - a. Provide one sample applied to core material with specified edge material applied to one edge.
2. Thermoset Decorative Panels: 12 by 12 inches, for each color, pattern, and surface finish.
 - a. Provide edge banding on one edge.
3. Exposed Cabinet Hardware and Accessories: One full-size unit for each type and finish.

1.6 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For manufacturer and Installer.
- B. Product Certificates: For each type of product.
 - A. Manufacturer's Certificate: Stating whether casework has been construction in accordance with *AWI's Tested and Approved Methods and Materials for Casework Construction* or tested in accordance with AWI's Test Methodologies by approved testing facility.
 - B. Test Reports: For cabinets tested in accordance with AWI's Test Methodologies in lieu of prescriptive requirements of *AWI's Tested and Approved Methods and Materials for Casework Construction* submit Proprietary Testing Report and certificate stating cabinets conform to the materials and methods tested.

1.7 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 in-service performance.
- B. Installer Qualifications: Manufacturer of products.

- C. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for materials and execution.
 - 1. Build mockups of typical section of base and wall cabinet as shown on Drawings.
 - 2. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. 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.

1.9 FIELD CONDITIONS

- A. Environmental Limitations: 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.

PART 2 - PRODUCTS

2.1 PLASTIC-LAMINATE-CLAD ARCHITECTURAL CABINETS

- A. Quality Standard: Unless otherwise indicated, comply with the ANSI/AWI 0641 – Architectural Wood Casework Standard, which replaces Section 10 of the 2014 edition of Architectural Woodwork Standards, for grades of architectural cabinets indicated for construction, finishes, installation, and other requirements.
 - 1. The Contract Documents contain requirements that are more stringent than the referenced quality standard. Comply with requirements of Contract Documents in addition to those of the referenced quality standard.
- B. Architectural Woodwork Standards Grade: Custom aesthetic grade and duty level 3.

- C. Type of Construction: Frameless plywood substrate.
- D. Door and Drawer-Front Style: Flush overlay.
- E. High-Pressure Decorative Laminate: NEMA LD 3, grades as indicated or if not indicated, as required by quality standard.
 - 1. Product: Provide product indicated on Finish Legend or comparable products from one of the following:
 - a. Abet Laminati.
 - b. Formica Corporation.
 - c. Panolam Surface Systems (Pionite and Nevamar).
 - d. Wilsonart.
- F. Materials for Exposed Surfaces:
 - 1. Horizontal Surfaces: Plastic Laminate, Grade HGS.
 - 2. Vertical Surfaces: Plastic Laminate, Grade VGS.
 - 3. Vertical Surfaces, accent, where indicated: Ash strip panels.
 - 4. Edges: PVC tape, 0.018-inch minimum thickness, matching laminate in color, pattern, and finish.
 - 5. Pattern Direction: Vertically for doors and fixed panels, horizontally for drawer fronts.
- G. Materials for Semiexposed Surfaces:
 - 1. Surfaces Other Than Drawer Bodies: Thermoset decorative panels.
 - a. Edges of Plastic-Laminate Shelves: PVC tape, 0.018-inch minimum thickness, matching laminate in color, pattern, and finish.
 - b. Edges of Thermoset Decorative Panel Shelves: PVC or polyester edge banding.
 - c. 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.
 - 3. Drawer Bottoms: Hardwood plywood.
- H. Dust Panels: 1/4-inch plywood or tempered hardboard above compartments and drawers unless located directly under tops.
- I. Concealed Backs of Panels with Exposed Plastic-Laminate Surfaces: High-pressure decorative laminate, NEMA LD 3, Grade BKL.
- J. Drawer Construction: Fabricate with exposed fronts fastened to subfront with mounting screws from interior of body.
- K. Colors, Patterns, and Finishes: Provide materials and products that result in colors and textures of exposed laminate surfaces complying with the following requirements:
 - 1. As indicated by laminate manufacturer's designations.

2.2 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: 8 to 13 percent.
- B. Hardwood Lumber Trim for Transparent Finish (Stain or Clear Finish):
 - 1. Species and Grade: Poplar, NHLA Clear. Select for all sapwood.
 - 2. Maximum Moisture Content: 10 percent.
 - 3. Finger Jointing: Not allowed.
 - 4. Gluing for Width: Not allowed.
 - 5. Veneered Material: Not allowed.
 - 6. Face Surface: Surfaced (smooth).
 - 7. Matching: Selected for compatible grain and color.
- C. 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. Products shall contain no added urea-formaldehyde.
 - 1. Softwood Plywood: DOC PS 1.
 - 2. Thermoset Decorative Panels: Particleboard or 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.

2.3 CABINET HARDWARE AND ACCESSORIES

- A. Frameless Concealed Hinges (European Type): ANSI/BHMA A156.9, B01602, 135 degrees of opening, self-closing.
- B. Wire Pulls: Back mounted, solid metal, 4 inches long, 5/16 inch in diameter.
- C. Shelf Rests: ANSI/BHMA A156.9, B04013; two-pin plastic with shelf hold-down clip.
- D. Drawer Slides: ANSI/BHMA A156.9.
 - 1. Type: Full extension.
 - 2. Material: Zinc-plated or Epoxy-coated steel with polymer rollers.
- E. Door Locks: ANSI/BHMA A156.11, E07121.
- F. Drawer Locks: ANSI/BHMA A156.11, E07041.
- G. Door and Drawer Silencers: ANSI/BHMA A156.16, L03011.
- H. Exposed Hardware Finishes: For exposed hardware, provide finish that complies with ANSI/BHMA A156.18 for ANSI/BHMA finish number indicated.

- I. For concealed hardware, provide manufacturer's standard finish that complies with product class requirements in ANSI/BHMA A156.9.

2.4 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: Contact cement.
 1. Adhesive for Bonding Edges: Hot-melt adhesive or adhesive specified above for faces.
 2. VOC Content: Not to exceed 80 g/L.

2.5 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 and duty level 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.

3.3 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

SECTION 064219 - PLASTIC-LAMINATE-FACED WOOD PANELING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:

- 1. Plastic-laminate-faced wood paneling.

- B. Related Requirements:

- 1. Section 061053 "Miscellaneous Rough Carpentry" for wood furring, blocking, shims, and hanging strips required for installing paneling that is concealed within other construction before paneling installation.

1.3 COORDINATION

- A. Coordinate sizes and locations of framing, blocking, furring, reinforcements, and other related units of Work specified in other Sections to ensure that paneling can be installed as indicated.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.

- 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: For plastic-laminate-faced wood paneling.

- 1. Include plans, elevations, sections, and attachment details.
 - 2. Show details full size.
 - 3. Show locations and sizes of furring and blocking, including concealed blocking specified in other Sections.

- C. Samples for Verification: For each type of exposed laminate, 8 by 10 inches.

- 1. Provide one Sample applied to core material and with specified edge material applied to one edge.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer and fabricator.
- B. Product Certificates: For each type of product.
- C. Evaluation Reports: For fire-retardant-treated materials, from ICC-ES.

1.6 QUALITY ASSURANCE

- A. Fabricator Qualifications: Shop that employs skilled workers who custom-fabricate products similar to those required for this Project and whose products have a record of successful in-service performance.
- B. Installer Qualifications: Fabricator of products.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Do not deliver paneling until painting and similar operations that might damage paneling have been completed in installation areas. Store paneling in installation areas or in areas where environmental conditions comply with requirements specified in "Field Conditions" Article.
- B. Store decorative laminate panels flat and allow to acclimatize for period recommended by manufacturer but not less than 24 hours.

1.8 FIELD CONDITIONS

- A. Environmental Limitations without Humidity control: Do not deliver or install paneling until building is enclosed, wet-work is complete, and HVAC system is operating and will maintain temperature and relative humidity at levels planned for building occupants during the remainder of the construction period.
- B. Established Dimensions: Where paneling is indicated to fit to other construction, establish dimensions for areas where woodwork is 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 PANELING, GENERAL

- A. Quality Standard: Unless otherwise indicated, comply with the "Architectural Woodwork Standards" for grades of plastic-laminate-faced wood paneling (decorative laminate surfacing) indicated for construction, finishes, installation, and other requirements.

2.2 PLASTIC-LAMINATE-FACED WOOD PANELING – **PLM-2**

- A. Grade: Premium.
- B. Plastic Laminate: High-pressure decorative laminate complying with NEMA LD 3 and the following requirements:
 - 1. Basis of Design: Subject to compliance with requirements, provide product indicated on Finish Legend or comparable product by one of the following:
 - a. Abet Laminati.
 - b. Formica Corporation.
 - c. Panolam Surface Systems (Pionite and Nevamar).
 - d. Wilsonart.
 - 2. Faces: Grade HGF.
 - 3. Colors, Patterns, and Finishes: As indicated by manufacturer's designations.
- C. Panel Core: Fire-retardant particleboard or fire-retardant MDF.
 - 1. Thickness: 3/4 inch.
 - 2. Core shall not contain added urea formaldehyde.
- D. Exposed Panel Edges: Plastic-laminate matching faces.
- E. Adhesives for Bonding Plastic Laminate: Resorcinol.
- F. VOC Content: Not to exceed 80 g/L. Fire-Retardant-Treated Paneling: Panels shall consist of fire-retardant plastic laminate and fire-retardant particleboard or fire-retardant, medium-density fiberboard (MDF). Panels shall have a flame-spread index of 25 or less and a smoke-developed index of 450 or less per ASTM E84, and be listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction.
- G. Assemble panels by gluing and concealed fastening.

2.3 STAGE SURROUND

- A. High-Pressure Decorative Laminate **DLM-1**: Three dimensional, textured thermoplastic laminate, complying with NEMA LD 3.
 - 1. Fire Resistance: Class A per ASTM E 84.
 - 2. Thickness: 0.032 inch.
 - 3. Built-in overlap at one long edge and one short edge.
 - 4. Pattern: As indicated on Finish Legend.
- B. Product: Provide product indicated on Finish Legend or comparable products from one of the following:

1. ATI Laminates.
2. LaminArt, a Wilsonart Company.
3. Materials Inc.
4. Formica Corporation.
5. Wilsonart.; New Leaf.

C. Exposed Panel Edges: Stainless steel channels, satin finish.

D. Accessories: Provide manufacturer's standard matching trim as required for application.

E. Installation Adhesive: As recommended by manufacturer, but VOC content not to exceed 80 g/L. Available products include the following:

1. Titebond Advanced Polymer.
2. Titebond Fast Grab FRP.
3. Loctite PL Premium.

2.4 MATERIALS

A. Materials, General: Provide materials that comply with requirements of referenced quality standard for each quality grade specified unless otherwise indicated.

B. Wood Moisture Content: 8 to 13 percent.

C. Composite Wood Products: Provide materials that comply with requirements of referenced quality standard for each quality grade specified unless otherwise indicated.

1. MDF: ANSI A208.2, Grade 130.

2.5 FIRE-RETARDANT-TREATED MATERIALS

A. Fire-Retardant-Treated Materials, General: Where fire-retardant-treated materials are indicated, use materials that are acceptable to authorities having jurisdiction and with fire-test-response characteristics specified as determined by testing identical products per test method indicated by a qualified testing agency.

1. Use treated materials that comply with requirements of referenced quality standard. Do not use materials that are warped, discolored, or otherwise defective.
2. Use fire-retardant-treatment formulations that do not bleed through or otherwise adversely affect finishes. Do not use colorants to distinguish treated materials from untreated materials.
3. Identify fire-retardant-treated materials with appropriate classification marking of qualified testing agency in the form of removable paper label or imprint on surfaces that will be concealed from view after installation.

2.6 INSTALLATION 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.
- C. Installation Adhesive: Product recommended by panel fabricator for each substrate for secure anchorage.

2.7 FABRICATION

- A. Complete fabrication, including assembly, 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 paneling fabrication will be complete.
- B. Shop cut openings, to maximum extent possible, to receive hardware, appliances, plumbing fixtures, electrical work, and similar items. Locate openings accurately and use templates or roughing-in diagrams to produce accurately sized and shaped openings. Sand edges of cutouts to remove splinters and burrs.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Before installation, condition paneling to humidity conditions in installation areas.
- B. Before installing paneling, examine shop-fabricated work for completion and complete work as required, including removal of packing and backpriming.

3.2 INSTALLATION

- A. Grade: Install paneling to comply with quality standard grade of paneling to be installed.
- B. Install paneling level, plumb, true in line, and without distortion. Shim as required with concealed shims. Install level and plumb to a tolerance of 1/8 inch in 96 inches. Install with no more than 1/16 inch in 96-inch vertical cup or bow and 1/8 inch in 96-inch horizontal variation from a true plane.
- C. Anchor paneling to supporting substrate with concealed panel-hanger clips. Do not use face fastening unless covered by trim.

3.3 INSTALLATION OF DECORATIVE LAMINATE

- A. Install decorative laminate in accordance with manufacturer's written instructions and approved Shop Drawings in full spread of adhesive.
- B. Install panels sequentially, overlapping edges, matching three dimensional pattern.

3.4 ADJUSTING AND CLEANING

- A. Repair damaged and defective paneling, where possible, to eliminate defects. Where not possible to repair, replace paneling. Adjust for uniform appearance.
- B. Clean paneling on exposed surfaces. Touch up shop-applied finishes to restore damaged or soiled areas.

END OF SECTION 064219

SECTION 066200 – DECORATIVE RESIN FABRICATIONS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Decorative fabrications of polymer resin.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Samples: For decorative resin panels in manufacturer's standard sizes.

1.4 PROJECT CONDITIONS

- A. Environmental Limitations: Do not deliver or install decorative resin fabrications until spaces are enclosed and weathertight and temporary HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during the remainder of the construction period.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Resin panels shall be Greenguard certified for indoor air quality.
- B. Surface-Burning Characteristics: ASTM E84.
 - 1. Flame-Spread Index: 25 or less.
 - 2. Smoke-Developed Index: 450 or less.
- C. Fire-Test-Response Characteristics of Resin Fabrications: As determined by testing plastic glazing by a qualified testing agency acceptable to authorities having jurisdiction.

1. Self-ignition temperature of 650 deg F or higher when tested according to ASTM D1929 on plastic sheets in thicknesses indicated for the Work.
2. Class CC1 per ASTM D635. Burning extent of 1 inch or less when tested at a thickness indicated for the Work.

2.2 DECORATIVE RESIN PARTITIONS

- A. Open louvered partition consisting of a series of translucent resin panels suspended between ceiling and floor with tensioned cables and locked in place with rail.
 1. Basis of Design: Provide 3Form Edge Modular Partition or substitute approved by Architect prior to Bid.

2.3 MATERIAL

- A. Resin panel: Translucent co-polymer resin with decorative and colored interlayer.
 1. Basis of Design: 3Form Ecoresin Varia.
 2. Nominal Thickness: Not less than 0.25 inch.
 3. Surface Finish: Sandstone.
 4. Color and Pattern: As indicated on Drawings.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Install decorative resin fabrications according to manufacturer's written instructions and approved Shop Drawings.

END OF SECTION 066200

SECTION 066400 - PLASTIC PANELING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Plastic sheet paneling.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Sustainable Design Submittals:
 - 1. Product Data: For adhesives and sealants, indicating VOC content.
- C. Samples: For plastic paneling and trim accessories, in manufacturer's standard sizes.

1.4 PROJECT CONDITIONS

- A. Environmental Limitations: Do not deliver or install plastic paneling until spaces are enclosed and weathertight and temporary HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during the remainder of the construction period.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Source Limitations: Obtain plastic paneling and trim accessories from single manufacturer.

2.2 PLASTIC SHEET PANELING

- A. Glass-Fiber-Reinforced Plastic Paneling: Gelcoat-finished, glass-fiber-reinforced plastic panels complying with ASTM D5319. Panels shall be USDA accepted for incidental food contact.

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Project, include, but are not limited to, the following:
 - a. Crane Composites, Inc.
 - b. Glasteel.
 - c. Marlite.
2. Surface-Burning Characteristics: As follows when tested by a qualified testing agency according to ASTM E84. Identify products with appropriate markings of applicable testing agency.
 - a. Flame-Spread Index: 25 or less.
 - b. Smoke-Developed Index: 450 or less.
3. Nominal Thickness: Not less than 0.12 inch.
4. Surface Finish: Smooth.
5. Color: As selected by Architect from manufacturer's full range.

2.3 ACCESSORIES

- A. Trim Accessories: Manufacturer's standard one-piece vinyl extrusions designed to retain and cover edges of panels. Provide division bars, inside corners, outside corners, and caps as needed to conceal edges.
 1. Color: Match panels.
- B. Adhesive: As recommended by plastic paneling manufacturer.
 1. VOC Content: Not to exceed 80 g/L.
- C. Sealant: Mildew-resistant, single-component, neutral-curing silicone sealant recommended by plastic paneling manufacturer and complying with requirements in Section 079200 "Joint Sealants."

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Prepare substrate by sanding high spots and filling low spots as needed to provide flat, even surface for panel installation.
- B. Clean substrates of substances that could impair adhesive bond, including loose paint, oil, grease, dirt, and dust.
- C. Condition panels by unpacking and placing in installation space before installation according to manufacturer's written recommendations.
- D. Lay out paneling before installing. Locate panel joints so that trimmed panels at corners are not less than 12 inches wide.
 - 1. Mark plumb lines on substrate at trim accessory locations for accurate installation.
 - 2. Locate trim accessories to allow clearance at panel edges according to manufacturer's written instructions.

3.3 INSTALLATION

- A. Install plastic paneling according to manufacturer's written instructions.
- B. Install panels in a full spread of adhesive.
- C. Install trim accessories with adhesive. Do not fasten through panels.
- D. Fill grooves in trim accessories with sealant before installing panels, and bed inside corner trim in a bead of sealant.
- E. Maintain uniform space between panels and wall fixtures. Fill space with sealant.
- F. Maintain uniform space between adjacent panels and between panels and floors, ceilings, and fixtures. Fill space with sealant.
- G. Remove excess sealant and smears as paneling is installed. Clean with solvent recommended by sealant manufacturer and then wipe with clean dry cloths until no residue remains.

END OF SECTION 066400

SECTION 071326 - SELF-ADHERING SHEET WATERPROOFING

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. Modified bituminous sheet waterproofing.
 - 2. Blindside Waterproofing.

1.3 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.
 - 1. Review waterproofing requirements including surface preparation, substrate condition and pretreatment, minimum curing period, forecasted weather conditions, special details and sheet flashings, installation procedures, testing and inspection procedures, and protection and repairs.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include construction details, material descriptions, and tested physical and performance properties of waterproofing.
 - 2. Include manufacturer's written instructions for evaluating, preparing, and treating substrate.
- B. Shop Drawings: Show locations and extent of waterproofing and details of substrate joints and cracks, expansion joints, sheet flashings, penetrations, inside and outside corners, tie-ins with adjoining waterproofing, and other termination conditions.
 - 1. Include setting drawings showing layout, sizes, sections, profiles, and joint details of pedestal-supported concrete pavers.
- C. Samples: For each exposed product and for each color and texture specified, including the following products:
 - 1. 8-by-8-inch square of waterproofing and flashing sheet.

2. 4-by-4-inch square of drainage panel.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.
- B. Field quality-control reports.
- C. Sample Warranties: For special warranties.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by waterproofing manufacturer.

1.7 FIELD CONDITIONS

- A. Environmental Limitations: Apply waterproofing within the range of ambient and substrate temperatures recommended in writing by waterproofing manufacturer. Do not apply waterproofing to a damp or wet substrate.
 1. Do not apply waterproofing in snow, rain, fog, or mist.
- B. Maintain adequate ventilation during preparation and application of waterproofing materials.

1.8 WARRANTY

- A. Manufacturer's Warranty:
 1. Waterproofing Warranty: Manufacturer agrees to furnish replacement waterproofing material for waterproofing that does not comply with requirements or that fails to remain watertight within specified warranty period.
 - a. Warranty Period: Three years from date of Substantial Completion.
- B. Installer's Special Warranty: Specified form, signed by Installer, covering Work of this Section, for warranty period of two years.
 1. Warranty includes removing and reinstalling protection board and drainage panels.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Source Limitations for Waterproofing System: Obtain waterproofing materials and molded-sheet drainage panels from single source from single manufacturer.

2.2 MODIFIED BITUMINOUS SHEET WATERPROOFING

- A. Modified Bituminous Sheet Waterproofing: Minimum 60-mil nominal thickness, self-adhering sheet consisting of 56 mils of rubberized asphalt laminated on one side to a 4-mil-thick, polyethylene-film reinforcement, and with release liner on adhesive side; formulated for application with primer or surface conditioner that complies with VOC limits of authorities having jurisdiction.

1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Carlisle Coatings and Waterproofing; MiraDri 860/861.
 - b. GCP Applied Technologies (Formerly WR Grace); Bituthene.
 - c. Polyguard; 650 Membrane.
 - d. W.R. Meadows; Mel-Rol.
2. Physical Properties:
 - a. Tensile Strength, Membrane: 325 psi minimum; ASTM D412, Die C, modified.
 - b. Tensile Strength, Film: 5000psi minimum; ASTM D 882.
 - c. Ultimate Elongation: 300 percent minimum; ASTM D412, Die C, modified.
 - d. Low-Temperature Flexibility: Pass at minus 20 deg F; ASTM D1970/D1970M.
 - e. Crack Cycling: Unaffected after 100 cycles of 1/8-inch movement; ASTM C836/C836M.
 - f. Puncture Resistance: 48lbf minimum; ASTM E154/E154M.
 - g. Water Absorption: 0.1 percent weight-gain maximum after 48-hour immersion at 70 deg F; ASTM D570.
 - h. Water Vapor Permeance: 0.1 perm maximum; ASTM E96/E96M, Water Method.
 - i. Hydrostatic-Head Resistance: 200 feet minimum; ASTM D5385.
3. Sheet Strips: Self-adhering, rubberized-asphalt strips of same material and thickness as sheet waterproofing.

2.3 BLINDSIDE SHEET WATERPROOFING

- A. Blindside Sheet Waterproofing for Horizontal Applications: Uniform, flexible, multilayered-composite sheet membrane that forms a permanent bond with fresh concrete placed against it; complete with accessories and preformed shapes for an unbroken waterproofing assembly; with the following physical properties:

1. Products: Subject to compliance with requirements, provide one of the following:

- a. Carlisle Coatings and Waterproofing; MiraPly.
 - b. GCP Applied Technologies (Formerly WR Grace); Preprufe.
 - c. Polyguard; Underseal Underslab Membrane.
 - d. W.R. Meadows; Precon.
2. Physical Properties:
- a. Thickness: Minimum 70 mils per ASTM D 3767, Method A.
 - b. Tensile Strength, membrane: Minimum 80 psi per ASTM D 4632.
 - c. Tensile Strength, film: Minimum 325 psi per ASTM D 412 or 1500 psi per ASTM D 882.
 - d. Low-Temperature Flexibility: Pass at minus 20 deg F; ASTM D1970/D1970M.
 - e. Peel Adhesion to Concrete: 5 lbf/in. minimum; ASTM D903, modified.
 - f. Lap Adhesion: 5 lbf/in. minimum; ASTM D1876, modified.
 - g. Hydrostatic-Head Resistance: 230 feet; ASTM D5385, modified.
 - h. Puncture Resistance: 200 lbf minimum; ASTM E154/E154M.
 - i. Water Vapor Permeance: 0.1 perm maximum; ASTM E96/E96M, Water Method.
 - j. Ultimate Elongation: 400 percent minimum; ASTM D412, modified.
- B. Mastic, Adhesives, and Detail Tape: Liquid mastic and adhesives, and adhesive tapes recommended by waterproofing manufacturer.

2.4 AUXILIARY MATERIALS

- A. Furnish auxiliary materials recommended by waterproofing manufacturer for intended use and compatible with sheet waterproofing.
1. Furnish liquid-type auxiliary materials that comply with VOC limits of authorities having jurisdiction.
- B. Primer: Liquid primer recommended for substrate by sheet waterproofing material manufacturer.
- C. Surface Conditioner: Liquid, waterborne surface conditioner recommended for substrate by sheet waterproofing material manufacturer.
- D. Liquid Membrane: Elastomeric, two-component liquid, cold fluid applied, of trowel grade or low viscosity.
- E. Substrate Patching Membrane: Low-viscosity, two-component, modified asphalt coating.
- F. Metal Termination Bars: Aluminum bars, approximately 1 by 1/8 inch, predrilled at 9-inch centers.

2.5 MOLDED-SHEET DRAINAGE PANELS

- A. Nonwoven-Geotextile-Faced, Molded-Sheet Drainage Panel with Polymeric Film: Composite subsurface drainage panel acceptable to waterproofing manufacturer and consisting of a

studded, nonbiodegradable, molded-plastic-sheet drainage core; with a nonwoven, needle-punched geotextile facing with an apparent opening size not exceeding No. 70 sieve laminated to one side of the core and a polymeric film bonded to the other side; and with a vertical flow rate through the core of 9 to 21 gpm per ft..

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 waterproofing.
 - 1. Verify that concrete has cured and aged for minimum time period recommended in writing by waterproofing manufacturer.
 - 2. Verify that substrate is visibly dry and within the moisture limits recommended in writing by manufacturer. Test for capillary moisture by plastic sheet method according to ASTM D4263.
 - 3. Verify that compacted subgrade is dry, smooth, sound, and ready to receive waterproofing sheet.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Clean, prepare, and treat substrates according to manufacturer's written instructions. Provide clean, dust-free, and dry substrates for waterproofing application.
- B. Mask off adjoining surfaces not receiving waterproofing to prevent spillage and overspray affecting other construction.
- C. Remove grease, oil, bitumen, form-release agents, paints, curing compounds, and other penetrating contaminants or film-forming coatings from concrete.
- D. Remove fins, ridges, mortar, and other projections.
- E. Fill form tie holes, honeycomb, aggregate pockets, holes, and other voids.
- F. Prepare, fill, prime, and treat joints and cracks in substrates. Remove dust and dirt from joints and cracks according to ASTM D4258.
 - 1. Install sheet strips of width according to manufacturer's written instructions and center over treated construction and contraction joints and cracks exceeding a width of 1/16 inch.
- G. Bridge and cover isolation joints, expansion joints, and discontinuous deck-to-wall and deck-to-deck joints with overlapping sheet strips of widths according to manufacturer's written instructions.

1. Invert and loosely lay first sheet strip over center of joint. Firmly adhere second sheet strip to first and overlap to substrate.
- H. Corners: Prepare, prime, and treat inside and outside corners in accordance with manufacturer's instructions.
1. Install membrane strips centered over vertical inside corners. Install 3/4-inch fillets of liquid membrane on horizontal inside corners and as follows:
 - a. At footing-to-wall intersections, extend liquid membrane in each direction from corner or install membrane strip centered over corner.
 - b. At plaza-deck-to-wall intersections, extend liquid membrane or sheet strips onto deck waterproofing and to finished height of sheet flashing.
- I. Prepare, treat, and seal vertical and horizontal surfaces at terminations and penetrations through waterproofing and at drains and protrusions.

3.3 INSTALLATION OF MODIFIED BITUMINOUS SHEET WATERPROOFING

- A. Install modified bituminous sheets according to waterproofing manufacturer's written instructions.
- B. Apply primer to substrates at required rate and allow it to dry. Limit priming to areas that will be covered by sheet waterproofing in same day. Reprime areas exposed for more than 24 hours.
- C. Apply and firmly adhere sheets over area to receive waterproofing. Accurately align sheets and maintain uniform 2-1/2-inch-minimum lap widths and end laps. Overlap and seal seams, and stagger end laps to ensure watertight installation.
1. When ambient and substrate temperatures range between 25 and 40 deg F, install self-adhering, modified bituminous sheets produced for low-temperature application. Do not use low-temperature sheets if ambient or substrate temperature is higher than 60 deg F.
- D. Apply continuous sheets over already-installed sheet strips, bridging substrate cracks, construction, and contraction joints.
- E. Seal edges of sheet waterproofing terminations with mastic.
- F. Install sheet waterproofing and auxiliary materials to tie into adjacent waterproofing.
- G. Repair tears, voids, and lapped seams in waterproofing not complying with requirements. Slit and flatten fishmouths and blisters. Patch with sheet waterproofing extending 6 inches beyond repaired areas in all directions.
- H. Immediately install protection course with butted joints over waterproofing membrane.
1. Molded-sheet drainage panels may be used in place of a separate protection course to vertical applications when approved by waterproofing manufacturer and installed immediately.

3.4 INSTALLATION OF BLINDSIDE SHEET WATERPROOFING

- A. Install blindside sheet waterproofing according to manufacturer's written instructions.
- B. Horizontal Applications: Install sheet with face against substrate. Accurately align sheets and maintain uniform side and end laps of minimum dimensions required by membrane manufacturer. Overlap and seal seams, and stagger and tape end laps to ensure watertight installation.
- C. Corners: Seal lapped terminations and cut edges of sheet waterproofing at inside and outside corners with detail tape.
- D. Seal penetrations through sheet waterproofing to provide watertight seal with detail tape patches or wraps and a liquid-membrane troweling.
- E. Install sheet waterproofing and auxiliary materials to produce a continuous watertight tie into adjacent waterproofing.
- F. Repair tears, voids, and lapped seams in waterproofing not complying with requirements. Tape perimeter of damaged or nonconforming area extending 6 inches beyond repaired areas in all directions. Apply a patch of sheet waterproofing and firmly secure with detail tape.

3.5 INSTALLATION OF MOLDED-SHEET DRAINAGE PANELS

- A. Place and secure molded-sheet drainage panels, with geotextile facing away from wall according to manufacturer's written instructions. Use adhesive or another method that does not penetrate waterproofing. Lap edges and ends of geotextile to maintain continuity. Protect installed molded-sheet drainage panels during subsequent construction.

3.6 FIELD QUALITY CONTROL

- A. Manufacturer's Field Service: Engage a site representative qualified by waterproofing membrane manufacturer to inspect substrate conditions, surface preparation, membrane application, flashings, protection, and drainage components; and to furnish daily reports to Architect.
- B. Waterproofing will be considered defective if it does not pass tests and inspections.

3.7 PROTECTION, REPAIR, AND CLEANING

- A. Do not permit foot or vehicular traffic on unprotected membrane.
- B. Protect waterproofing from damage and wear during remainder of construction period.
- C. Correct deficiencies in or remove waterproofing that does not comply with requirements; repair substrates, reapply waterproofing, and repair sheet flashings.

- D. Clean spillage and soiling from adjacent construction using cleaning agents and procedures recommended in writing by manufacturer of affected construction.

END OF SECTION 071326

SECTION 072100 - THERMAL INSULATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:

1. Extruded polystyrene foam-plastic board insulation.
2. Glass-fiber blanket insulation.
3. Mineral-wool blanket insulation.
4. Mineral-wool board insulation.
5. Loose-fill insulation.

- B. Related Requirements:

1. Section 772216 "Roof Insulation" for insulation installed with modified bitumen roofing.
2. Section 092900 "Gypsum Board" for sound attenuation blanket used as acoustic insulation.

1.3 ACTION SUBMITTALS

- A. Product Data: For the following:

1. Extruded polystyrene foam-plastic board insulation.
2. Glass-fiber blanket insulation.
3. Mineral-wool blanket insulation.
4. Loose-fill insulation.

1.4 INFORMATIONAL SUBMITTALS

- A. Product Test Reports: For each product, for tests performed by a qualified testing agency.

1. Tested Assembly: For wall assemblies incorporating foam plastic insulation, provide manufacturer's illustration, noting all components included in tested assembly, indicating wall assembly proposed for this project complies with NFPA 285.

- B. Research Reports: For foam-plastic insulation, from ICC-ES.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Protect insulation materials from physical damage and from deterioration due to moisture, soiling, and other sources. Store inside and in a dry location. Comply with manufacturer's written instructions for handling, storing, and protecting during installation.
- B. Protect foam-plastic board insulation as follows:
 - 1. Do not expose to sunlight except to necessary extent for period of installation and concealment.
 - 2. Protect against ignition at all times. Do not deliver foam-plastic board materials to Project site until just before installation time.
 - 3. Quickly complete installation and concealment of foam-plastic board insulation in each area of construction.

PART 2 - PRODUCTS

2.1 EXTRUDED POLYSTYRENE FOAM-PLASTIC BOARD INSULATION

- A. Extruded Polystyrene Board Insulation, Type X: ASTM C578, Type X, 15-psi minimum compressive strength; unfaced.
 - 1. Basis of Design; Provide CavityMate from Dow or comparable product from one of the following:
 - a. DiversiFoam Products.
 - b. Dow Chemical Company.
 - c. MBCI.
 - d. Owens Corning.
 - 2. Flame-Spread Index: Not more than 25 when tested in accordance with ASTM E84.
 - 3. Smoke-Developed Index: Not more than 450 when tested in accordance with ASTM E84.
 - 4. Fire Propagation Characteristics: Passes NFPA 285 testing as part of an approved assembly.
 - 5. Labeling: Provide identification of mark indicating R-value of each piece of insulation 12 inches and wider in width.

2.2 MINERAL-WOOL BOARD INSULATION

- A. Mineral-Wool Board Insulation, Types IA and IB, Unfaced: ASTM C612, Types IA and IB; passing ASTM E136 for combustion characteristics.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Johns Manville; a Berkshire Hathaway company.
 - b. Rockwool International.

c. Thermafiber, Inc.; an Owens Corning company.

2. Nominal Density: 4 lb/cu. ft..
3. Flame-Spread Index: Not more than 15 when tested in accordance with ASTM E84.
4. Smoke-Developed Index: Not more than zero when tested in accordance with ASTM E84.
5. Labeling: Provide identification of mark indicating R-value of each piece of insulation 12 inches and wider in width.

2.3 GLASS-FIBER BLANKET INSULATION

A. Glass-Fiber Blanket Insulation, Unfaced: ASTM C665, Type I; passing ASTM E136 for combustion characteristics.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. CertainTeed Corporation.
 - b. Johns Manville.
 - c. Knauf.
 - d. Owens Corning.
2. Flame-Spread Index: Not more than 25 when tested in accordance with ASTM E84.
3. Smoke-Developed Index: Not more than 50 when tested in accordance with ASTM E84.
4. Labeling: Provide identification of mark indicating R-value of each piece of insulation 12 inches and wider in width.

2.4 ACCESSORIES

A. Insulation for Miscellaneous Voids:

1. Glass-Fiber Insulation: ASTM C764, Type II, loose fill; with maximum flame-spread and smoke-developed indexes of 5, per ASTM E84.
2. Spray Polyurethane Foam Insulation: ASTM C1029, Type II, closed cell, with maximum flame-spread and smoke-developed indexes of 75 and 450, respectively, per ASTM E84.

B. Insulation Supports: Provide one of the following:

1. Steel Wire: Flexible Minimum 14 gauge steel spring wire, mitre cut to provide sharp ends. Available products include the following:
 - a. Simpson Strong-Tie:
2. Galvanized steel strapping with integral prongs, minimum 0.20-inch thick and 3/4-inch wide. Available Products include the following:
 - a. Insul-Hold.
 - b. TigerTeeth.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Clean substrates of substances that are harmful to insulation, including removing projections capable of puncturing insulation or vapor retarders, or that interfere with insulation attachment.

3.2 INSTALLATION, GENERAL

- A. Comply with insulation manufacturer's written instructions applicable to products and applications.
- B. Install insulation that is undamaged, dry, and unsoiled and that has not been left exposed to ice, rain, or snow at any time.
- C. Install insulation with manufacturer's R-value label exposed after insulation is installed.
- D. Extend insulation to envelop entire area to be insulated. Fit tightly around obstructions and fill voids with insulation. Remove projections that interfere with placement.
- E. Provide sizes to fit applications and selected from manufacturer's standard thicknesses, widths, and lengths. Apply single layer of insulation units unless multiple layers are otherwise shown or required to make up total thickness or to achieve R-value.

3.3 INSTALLATION OF CAVITY-WALL INSULATION

- A. Foam-Plastic Board Insulation: Install pads of adhesive spaced approximately 24 inches o.c. both ways on inside face and as recommended by manufacturer.
 - 1. Fit courses of insulation between wall ties and other obstructions, with edges butted tightly in both directions, and with faces flush.
 - 2. Press units firmly against inside substrates.
 - 3. Supplement adhesive attachment of insulation by securing boards with two-piece wall ties designed for this purpose and specified in Section 042000 "Unit Masonry."

3.4 INSTALLATION OF INSULATION IN FRAMED CONSTRUCTION

- A. Blanket Insulation: Install in cavities formed by framing members according to the following requirements:
 - 1. Use insulation widths and lengths that fill the cavities formed by framing members. If more than one length is required to fill the cavities, provide lengths that will produce a snug fit between ends.
 - 2. Place insulation in cavities formed by framing members to produce a friction fit between edges of insulation and adjoining framing members.

3. Maintain 3-inch clearance of insulation around recessed lighting fixtures not rated for or protected from contact with insulation.
 4. For metal-framed wall cavities where cavity heights exceed 96 inches, support unfaced blankets mechanically and support faced blankets by taping flanges of insulation to flanges of metal studs.
- B. Fire blocking in exterior assemblies: Install mineral wool insulation where NFPA 285-compliant assemblies require fire blocking such as floor lines, window and door headers and similar openings.
- C. Miscellaneous Voids: Install insulation in miscellaneous voids and cavity spaces where required to prevent gaps in insulation using the following materials:
1. Glass-Fiber Insulation: Compact to approximately 40 percent of normal maximum volume equaling a density of approximately 2.5 lb/cu. ft..
 2. Spray Polyurethane Insulation: Apply according to manufacturer's written instructions.

3.5 PROTECTION

- A. Protect installed insulation from damage due to harmful weather exposures, physical abuse, and other causes.
- B. Provide temporary coverings or enclosures where insulation is subject to abuse and cannot be concealed and protected by permanent construction immediately after installation.

END OF SECTION 072100

SECTION 072119 - FOAMED-IN-PLACE INSULATION

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Closed-cell spray polyurethane foam insulation.
2. Accessories.

1.2 ACTION SUBMITTALS

- ##### A. Product Data: For each type of product.

1.3 INFORMATIONAL SUBMITTALS

A. Test and Evaluation Reports:

1. Product Test Reports: For each product, for tests performed by qualified testing agency.
2. Research Reports: For spray-applied polyurethane foam-plastic insulation, from ICC-ES showing compliance with requirements.

B. Field Quality-Control Submittals:

1. Field quality-control reports.

C. Qualification Statements: For Installer.

1.4 QUALITY ASSURANCE

- ##### A. Installer Qualifications: An authorized representative who is trained and approved by manufacturer.

PART 2 - PRODUCTS

2.1 CLOSED-CELL SPRAY POLYURETHANE FOAM INSULATION

- ##### A. Closed-Cell Spray Polyurethane Foam: ASTM C1029, Type II, minimum density of 1.5 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, provide products by one of the following:

- a. Carlisle Spray Foam Insulation.
 - b. Gaco; a brand of Firestone Building Products.
 - c. Henry Company.
 - d. Johns Manville; a Berkshire Hathaway company.
 - e. Master Builders Solutions.
 - f. SES Foam LLC.
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 and NFPA 276 testing as part of an approved assembly.

2.2 ACCESSORIES

- A. Primer: Material recommended by insulation manufacturer where required for adhesion of insulation to substrates.
- B. Ignition Barrier: Material providing a 15-minute minimum fire-ignition barrier.
 1. Ignition Barrier Coating: Fire-protective coating formulated for application over polyurethane foam plastics, compatible with insulation, and in compliance with ICC-ES AC377, Appendix X.
 - a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1) Flame Seal Products, Inc.
 - 2) No-Burn, Inc.
 - 3) SES Foam LLC.
 - 4) TPR2 Corporation.
 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: 50 or less.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Verify that substrates are clean, dry, and free of substances that are harmful to insulation.

- B. 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.

3.2 INSTALLATION

- A. Comply with insulation manufacturer's written instructions applicable to products and applications.
- B. Spray insulation to envelop entire area to be insulated and fill voids.
- C. Apply in multiple passes to not exceed maximum thicknesses recommended by manufacturer. Do not spray into rising foam.
- D. Framed Construction: Install into cavities formed by framing members to achieve thickness indicated on Drawings.
- E. Miscellaneous Voids: Apply according to manufacturer's written instructions.
- F. Install ignition barrier material.
 - 1. Do not cover insulation prior to any required spray foam insulation inspections.
- G. Apply barrier coatings in accordance with manufacturer's written instructions and to comply with requirements for listing and labeling for fire-propagation characteristics and surface-burning characteristics specified.
 - 1. Use equipment and techniques best suited for substrate and type of material applied as recommended by coating manufacturer.
 - 2. Apply coatings to prepared surfaces as soon as practical after preparation and before subsequent surface soiling or deterioration.
 - 3. Apply coatings to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Produce sharp lines and color breaks.

3.3 FIELD QUALITY CONTROL

- A. Manufacturer's Field Service: Engage a factory-authorized service representative to test and inspect spray foam insulation installation, including accessories. Report results in writing.

3.4 PROTECTION

- A. Protect installed insulation from damage due to harmful weather exposures, physical abuse, and other causes.

END OF SECTION 072119

SECTION 072726 - FLUID-APPLIED MEMBRANE AIR BARRIERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Vapor-permeable, fluid-applied air barriers.
 - 2. Sheathing joint and penetration treatment.

1.3 DEFINITIONS

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

1.4 PREINSTALLATION MEETINGS

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

1.5 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include manufacturer's written instructions for evaluating, preparing, and treating each substrate; technical data; dry film thickness; and tested physical and performance properties of products.
- B. Shop Drawings: For air-barrier assemblies.

1. Show locations and extent of 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.

1.6 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer. Include list of previous projects with contact information for Owner and Architect.
- B. Product Certificates: From air-barrier manufacturer, certifying compatibility of air barriers and accessory materials with Project materials that connect to or that come in contact with the barrier.
- C. Product Test Reports: For each air-barrier assembly, for tests performed by a qualified testing agency.
- D. Field quality-control reports.

1.7 QUALITY ASSURANCE

- A. Installer Qualifications: An experienced firm that employs installers and supervisors who are trained and approved by manufacturer. Firm shall have had a minimum of five projects similar in material, design, and extent within the previous three years with a record of successful performance.
 1. Installer shall be licensed by ABAA according to ABAA's Quality Assurance Program and shall employ ABAA-certified installers and supervisors on Project.
- B. Mockups: Build mockups to set quality standards for materials and execution and for preconstruction testing.
 1. Build integrated mockups of exterior wall assembly as indicated on Drawings or designate a portion of the exterior wall assembly incorporating backup wall construction, external cladding, window, storefront, door frame and sill, insulation, ties and other penetrations, and flashing as an in-place mockup to demonstrate surface preparation, crack and joint treatment, application of air barriers, and sealing of gaps, terminations, and penetrations of air-barrier assembly.
 - a. Coordinate construction of mockups to permit inspection and testing of air barrier before external insulation and cladding are installed.
 - b. Include junction with roofing membrane, building corner condition, and foundation wall intersection.
 - c. If Architect determines mockups do not comply with requirements, reconstruct mockups and apply air barrier until mockups are approved.

2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
3. Subject to compliance with requirements, approved in-place mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.8 PRECONSTRUCTION TESTING

- A. Preconstruction Testing Service: Owner may engage a qualified testing agency to perform preconstruction testing on mockups.
- B. Mockup Testing: Air-barrier assemblies shall comply with performance requirements indicated, as evidenced by reports based on mockup testing by a qualified testing agency. Testing shall include, but is not limited to, the following
 1. Adhesion Testing: Mockups will be tested for required air-barrier adhesion to substrate according to ASTM D4541.

1.9 DELIVERY, STORAGE, AND HANDLING

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

1.10 WARRANTY

- A. Materials Warranty: Manufacturer agrees to repair or replace membrane air barrier that fail within specified warranty period.
 1. Failures include, but are not limited to, the following:
 - a. Manufacturing defects.
 2. Materials Warranty Period: 10 years from date of Substantial Completion.
- B. Installer's Warranty: Installer agrees to repair or replace components of membrane air barriers that fail in materials or workmanship within specified warranty period.
 1. Warranty Period: Two years from date of Substantial Completion.

1.11 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 MATERIALS

- A. Source Limitations: Obtain primary air-barrier materials and air-barrier accessories from single source from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

- A. Air-Barrier Performance: Air-barrier assembly and seals with adjacent construction shall be capable of performing as a continuous air barrier and as a liquid-water drainage plane flashed to discharge to the exterior incidental condensation or water penetration. Air-barrier assemblies shall be capable of accommodating substrate movement and of sealing substrate expansion and control joints, construction material changes, penetrations, tie-ins to installed waterproofing, and transitions at perimeter conditions without deterioration and air leakage exceeding specified limits.
- B. 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.

2.3 HIGH-BUILD AIR BARRIERS, VAPOR PERMEABLE

- A. High-Build, Vapor-Permeable Air Barrier: Synthetic polymer membrane with an installed dry film thickness, according to manufacturer's written instructions, of 35 mils or thicker over smooth, void-free substrates.
 1. Synthetic Polymer Type: Subject to compliance with requirements, provide one of the following:
 - a. Carlisle Coatings and Waterproofing; Fire Resist Barritech VP.
 - b. Henry Air Block 31MR
 - c. Tremco; ExoAir 230.
 - d. W. R. Meadows; Air-Shield LMP
 2. Physical and Performance Properties:
 - a. Air Permeance: Maximum 0.004 cfm/sq. ft. of surface area at 1.57-lbf/sq. ft. pressure difference; ASTM E2178.
 - b. Vapor Permeance: Minimum 10 perms; ASTM E96/E96M, Desiccant Method, Procedure A.
 - c. Ultimate Elongation: Minimum 200 percent; ASTM D412, Die C.
 - d. Adhesion to Substrate: Minimum 16 lbf/sq. in. when tested according to ASTM D4541.

- e. Fire Propagation Characteristics: Passes NFPA 285 testing as part of an approved assembly.
- f. UV Resistance: Can be exposed to sunlight 90 days according to manufacturer's written instructions.

2.4 ACCESSORY MATERIALS

- A. Requirement: Provide primers, transition strips, termination strips, joint reinforcing fabric and strips, joint sealants, counterflashing strips, flashing sheets and metal termination bars, termination mastic, substrate patching materials, adhesives, tapes, foam sealants, lap sealants, and other accessory materials that are recommended in writing by air-barrier manufacturer to produce a complete air-barrier assembly and that are compatible with primary air-barrier material and adjacent construction to which they may seal.
- B. Primer: Liquid primer recommended for substrate by air-barrier material manufacturer.
- C. Stainless-Steel Sheet: ASTM A240/A240M, Type 304, 0.0187 inch thick, and Series 300 stainless-steel fasteners.
- D. Preformed Silicone Extrusion: Manufacturer's standard system consisting of cured low-modulus silicone extrusion, sized to fit opening widths, with a single-component, neutral-curing, Class 100/50 (low-modulus) silicone sealant for bonding extrusions to substrates.

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.
 - 4. Verify that masonry joints are flush and completely filled with mortar.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 SURFACE PREPARATION

- A. Clean, prepare, treat, fill, and seal substrate and joints and cracks in substrate according to 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. Seal joints in gypsum sheathing joints according to manufacturer's written instructions.
 - 1. 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.
- E. Remove fins, ridges, mortar, and other projections and fill honeycomb, aggregate pockets, holes, and other voids in concrete with substrate-patching material.
- F. Remove excess mortar from masonry ties, shelf angles, and other obstructions.
- G. At changes in substrate plane, apply sealant or termination mastic beads at sharp corners and edges to form a smooth transition from one plane to another.
- H. Cover gaps in substrate plane and form a smooth transition from one substrate plane to another with stainless-steel sheet mechanically fastened to structural framing to provide continuous support for air barrier.
- I. Bridge control joints and discontinuous wall-to-wall, deck-to-wall, and deck-to-deck joints with air-barrier accessory material that accommodates joint movement according to manufacturer's written instructions and details.

3.3 ACCESSORIES INSTALLATION

- A. Install accessory materials according to air-barrier manufacturer's written instructions and details to form a seal with adjacent construction and ensure continuity of air and water barrier.
 - 1. Coordinate the installation of air barrier with installation of roofing membrane and base flashing to ensure continuity of air barrier with roofing membrane.
 - 2. Install transition strip on roofing membrane or base flashing so that a minimum of 3 inches of coverage is achieved over each substrate.
 - 3. Where recommended by manufacturer for application and substrate apply primer to substrates at required rate and allow it to dry. Limit priming to areas that will be covered by air-barrier material on same day. Reprime areas exposed for more than 24 hours.
- B. Connect and seal exterior wall air-barrier material continuously to roofing-membrane air barrier, concrete below-grade structures, floor-to-floor construction, exterior glazing and window systems, glazed curtain-wall systems, storefront systems, exterior louvers, exterior door framing, and other construction used in exterior wall openings, using accessory materials.
- C. At end of each working day, seal top edge of strips and transition strips to substrate with termination mastic.

- D. Apply joint sealants forming part of air-barrier assembly within manufacturer's recommended application temperature ranges. Consult manufacturer when sealant cannot be applied within these temperature ranges.
- E. Wall Openings: Prime concealed, perimeter frame surfaces of windows, curtain walls, storefronts, and doors. Apply transition strip so that a minimum of 3 inches of coverage is achieved over each substrate. Maintain 3 inches of full contact over firm bearing to perimeter frames, with not less than 1 inch of full contact.
 - 1. Transition Strip: Roll firmly to enhance adhesion.
 - 2. Preformed Silicone Extrusion: Set in full bed of silicone sealant applied to walls, frame, and air-barrier material.
- F. Fill gaps in perimeter frame surfaces of windows, curtain walls, storefronts, and doors, and miscellaneous penetrations of air-barrier material with foam sealant.
- G. Seal strips and transition strips around masonry reinforcing or ties and penetrations with termination mastic.
- H. Seal top of through-wall flashings to air barrier with an additional 6-inch-wide, transition strip.
- I. Seal exposed edges of strips at seams, cuts, penetrations, and terminations not concealed by metal counterflashings or ending in reglets with termination mastic.
- J. Repair punctures, voids, and deficient lapped seams in strips and transition strips. Slit and flatten fishmouths and blisters. Patch with transition strips extending 6 inches beyond repaired areas in strip direction.

3.4 PRIMARY AIR-BARRIER MATERIAL INSTALLATION

- A. Apply air-barrier material to form a seal with strips and transition strips and to achieve a continuous air barrier according to air-barrier manufacturer's written instructions and details. Apply air-barrier material within manufacturer's recommended application temperature ranges.
 - 1. Where recommended by manufacturer for application and substrate, apply primer to substrates at required rate and allow it to dry.
 - 2. Limit priming to areas that will be covered by air-barrier material on same day. Reprime areas exposed for more than 24 hours.
 - 3. Where multiple prime coats are needed to achieve required bond, allow adequate drying time between coats.
- B. High-Build Air Barriers: Apply continuous unbroken air-barrier material to substrates according to the following thickness. Apply air-barrier material in full contact around protrusions such as masonry ties.
 - 1. Vapor-Permeable, High-Build Air Barrier: Total wet film thickness as recommended in writing by manufacturer to comply with performance requirements, but not less than 70 mils on gypsum sheathing and 90 mils on cmu, applied in one or more equal coats.

- C. Do not cover air barrier until it has been tested and inspected by testing agency.
- D. Correct deficiencies in or remove air barrier that does not comply with requirements; repair substrates and reapply air-barrier components.

3.5 FIELD QUALITY CONTROL

- A. Manufacturer's and Installer's Quality Assurance Program: Arrange for manufacturer's technical representative to inspect mockup for surface preparation and observe installation as required to issue warranty. Technical representative shall cooperate and coordinate activities with Owner's testing agency.
- B. Testing Agency: Owner may engage a qualified testing agency to perform tests and inspections.
- C. Inspections: Air-barrier materials, accessories, and installation are subject to inspection for compliance with requirements. Inspections may include the following:
 - 1. Continuity of air-barrier system has been achieved throughout the building envelope with no gaps or holes.
 - 2. Air-barrier dry film thickness.
 - 3. Continuous structural support of air-barrier system has been provided.
 - 4. Masonry and concrete surfaces are smooth, clean, and free of cavities, protrusions, and mortar droppings.
 - 5. Site conditions for application temperature and dryness of substrates have been maintained.
 - 6. Maximum exposure time of materials to UV deterioration has not been exceeded.
 - 7. Surfaces have been primed, if applicable.
 - 8. 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.
 - 9. Termination mastic has been applied on cut edges.
 - 10. Strips and transition strips have been firmly adhered to substrate.
 - 11. Compatible materials have been used.
 - 12. Transitions at changes in direction and structural support at gaps have been provided.
 - 13. Connections between assemblies (air-barrier and sealants) have complied with requirements for cleanliness, surface preparation and priming, structural support, integrity, and continuity of seal.
 - 14. All penetrations have been sealed.
- D. Tests: As determined by testing agency from among the following tests:
 - 1. Adhesion Testing: Air-barrier assemblies will be tested for required adhesion to substrate according to ASTM D4541 for each 600 sq. ft. of installed air barrier or part thereof.
- E. Air barriers will be considered defective if they do not pass tests and inspections.
 - 1. Apply additional air-barrier material, according to manufacturer's written instructions, where inspection results indicate insufficient thickness.

- 2. Remove and replace deficient air-barrier components for retesting as specified above.
- F. Repair damage to air barriers caused by testing; follow manufacturer's written instructions.
- G. Prepare test and inspection reports.

3.6 CLEANING AND PROTECTION

- A. Protect air-barrier system from damage during application and remainder of construction period, according to manufacturer's written instructions.
 - 1. Protect air barrier from exposure to UV light and harmful weather exposure as recommended in writing by manufacturer. If exposed to these conditions for longer than recommended, remove and replace air barrier or install additional, full-thickness, air-barrier application after repairing and preparing the overexposed materials according to air-barrier manufacturer's written instructions.
 - 2. Protect air barrier from contact with incompatible materials and sealants not approved by air-barrier manufacturer.
- B. Protect adjacent building components, under construction and completed, including, but not limited to, roofing, from overspray and stains that would damage material or require cleaning in order for installation to proceed.
- C. Clean spills, stains, and soiling from construction that would be exposed in the completed work using cleaning agents and procedures recommended in writing by manufacturer of affected construction.
- D. Remove masking materials after installation.

END OF SECTION 072726

SECTION 074213.23 - METAL COMPOSITE MATERIAL WALL PANELS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Metal composite material (MCM) panels.

1.2 DEFINITIONS

- ##### A. MCM: Metal composite material; cladding material formed by joining two thin metal skins to polyethylene or fire-retardant core and bonded under precise temperature, pressure, and tension.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1. Meet with Owner, Architect, Owner's insurer if applicable, MCM system Installer, MCM system manufacturer's representative, and installers whose work interfaces with or affects MCM 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 MCM system 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 MCM system.
6. Review governing regulations and requirements for insurance, certificates, and tests and inspections if applicable.
7. Review temporary protection requirements for system assembly during and after installation.
8. Review procedures for repair of panels damaged after installation.
9. Document proceedings, including corrective measures and actions required, and furnish copy of record to each participant.

1.4 ACTION SUBMITTALS

A. Product Data:

1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each type of panel, system, and accessory.

B. Shop Drawings:

1. Include fabrication and installation layouts of MCM system; details of edge conditions, joints, panel profiles, corners, anchorages, attachment assembly, trim, flashings, closures, accessories, and special details.
2. Accessories: Include details of flashing, trim, and anchorage, at a scale of not less than 1-1/2 inches per 12 inches.
3. Provide signed and sealed drawings, by a qualified design professional in Project jurisdiction, of MCM system showing compliance with performance requirements and design criteria identified for this Project.

C. Samples for Verification: For each type of MCM panel required, with factory-applied color finishes.

1. MCM Panel: Two samples, 2 by 3 inches.

D. Delegated Design Submittals: For MCM system, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.5 INFORMATIONAL SUBMITTALS

A. Test and Evaluation Reports:

1. Product Test Reports: For each MCM panel and MCM system, for tests performed by manufacturer and witnessed by a qualified testing agency.
 - a. MCM Panel Manufacturer's Material Test Reports: Certified test reports showing compliance with specific performance or third-party listing documenting compliance in accordance with the IBC.
 - b. Fabricator's MCM System Test Reports: Certified test reports showing system compliance with specific performance or third-party listing documenting compliance in accordance with the IBC.
 - 1) Dry Seal System: Tested to AAMA 501.1.
2. Research Reports: For MCM systems, from ICC-ES showing compliance with requirements.
3. Preconstruction Test Reports: For MCM system.

B. Field Quality-Control Submittals:

1. Field quality-control reports.

C. Qualification Statements: For fabricator and Installer.

D. Delegated design engineer qualifications.

E. Sample warranties.

1.6 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For MCM panels.
- B. Warranty Documentation:
 - 1. Manufacturers' special warranties.
 - 2. Installer's special warranties.

1.7 QUALITY ASSURANCE

- A. Qualifications:
 - 1. Manufacturer: Minimum 5 years' experience.
 - 2. Fabricator: Approved by MCM panel manufacturer.
 - 3. Installer: Fabricator of MCM system.
 - 4. Delegated Design Engineer: 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.
 - 5. Testing Agency: An agency acceptable to authorities having jurisdiction.

1.8 MOCKUPS

- A. Refer to Division 01 for integrated exterior mockups incorporating metal composite panels.

1.9 DELIVERY, STORAGE, AND HANDLING

- A. Deliver components, MCM panels, and other manufactured items so as not to be damaged or deformed. Package MCM panels for protection during transportation and handling.
- B. Unload, store, and erect MCM panels in a manner to prevent bending, warping, twisting, and surface damage.
- C. Stack MCM panels horizontally on platforms or pallets, covered with suitable weathertight and ventilated covering. Store MCM panels to ensure dryness, with positive slope for drainage of water. Do not store MCM panels in contact with other materials that might cause staining, denting, or other surface damage.
- D. Retain strippable protective covering on MCM panels during installation.
- E. Copper Panels: Wear gloves when handling to prevent fingerprints and soiling of surface.

1.10 FIELD CONDITIONS

- A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit assembly of MCM panels to be performed in accordance with manufacturers' written instructions and warranty requirements.

1.11 COORDINATION

- A. Coordinate MCM panel installation with rain drainage work, flashing, trim, construction of soffits, and other adjoining work to provide a leakproof, secure, and noncorrosive installation.

1.12 WARRANTY

- A. Panel Integrity Warranty: Manufacturer agrees to repair or replace components of MCM panels 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: Five years from date of Substantial Completion.
- B. Panel Finish Warranty: Manufacturer agrees to repair finish or replace MCM 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 Hunter units when tested in accordance with ASTM D2244.
 - b. Chalking in excess of a No. 8 rating when tested in accordance with 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.
- C. MCM System Warranty: Fabricator's standard form in which manufacturer agrees to repair or replace components of MCM systems that fail in materials or workmanship within specified warranty period.
 - 1. Warranty Period: Two years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Seismic Performance: No failure or deterioration of the system when laterally racked to 3/4 inch in both directions and repeated for three cycles in accordance with AAMA 501.4. System must pass the static water test as described in ASTM E331 following the seismic racking.
- B. Structural Performance: MCM systems to withstand the effects of the following loads, based on testing in accordance with ASTM E330/E330M:
 - 1. Wind Loads: As indicated on Drawings.
 - 2. Deflection Limits: For wind loads, no greater than 1/240 of the span.
- C. Air Infiltration: Air leakage of not more than 0.06 cfm/sq. ft. when tested in accordance with ASTM E283/E283M at the following test-pressure difference:
 - 1. Test-Pressure Difference: 6.24 lbf/sq. ft..
- D. Water Penetration under Static Pressure: No water penetration when tested in accordance with ASTM E331 at the following test-pressure difference:
 - 1. Test-Pressure Difference: 6.24 lbf/sq. ft..
- E. Water Penetration under Dynamic Pressure: No water penetration when tested in accordance with AAMA 501.1 at the following test pressure:
 - 1. Test Pressure: 15 psf .
- F. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes.
 - 1. Temperature Change: 120 deg F, ambient; 180 deg F (100 deg C), material surfaces.
- G. Fire-Resistance Ratings: Comply with ASTM E119 or UL 263; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 - 1. Indicate design designations from UL's "Fire Resistance Directory" or from listings of another qualified testing agency.
- H. Fire Propagation Characteristics: MCM system passes NFPA 285 testing.

2.2 METAL COMPOSITE MATERIAL (MCM) WALL PANELS

- A. Metal Composite Material (MCM) Wall Panels: Provide MCM panels fabricated from two metal facings bonded to a solid, extruded thermoplastic core.
 - 1. Core: FR.
 - 2. Panel Thickness: 0.157 inch.

3. Bond Strength: 22.5 in-lb/in. when tested for bond integrity in accordance with ASTM D1781.
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Alcoa Architectural Products.
 2. Alpolic Materials, Mitsubishi Chemical Composites.
 3. Alucobond; 3A Composites USA Inc.
 4. Alucoil.
 5. Alucoil North America.
 6. SAF (Southern Aluminum Finishing Company, Inc.)
- C. MCM Panel Materials:
1. Aluminum-Faced Panels: ASTM B209 alloy as standard with manufacturer, temper as required to suit finish and forming operations with 0.020-inch- (0.81-mm-) thick, aluminum sheet facings.
 - a. Exterior Finish: Two-coat fluoropolymer.

2.3 METAL COMPOSITE MATERIAL (MCM) SYSTEM

- A. Dry-Seal Barrier MCM System: Provide factory-formed and -assembled, MCM panels formed into profile for dry-seal barrier system installation. Include attachment assembly components, panel stiffeners, and accessories required for weathertight system.
- B. Attachment Assembly Components: Subgirts and splines formed from extruded aluminum.
1. Basis of Design: Knight Wall System CI.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, MCM system 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 MCM system manufacturer.
 2. Examine wall sheathing to verify that sheathing joints are supported by framing or blocking and that installation is within flatness tolerances required by MCM system manufacturer.

- a. Verify that air- or water-resistive barriers have been installed over sheathing or backing substrate to prevent air infiltration or water penetration.
- B. Examine roughing-in for components and assemblies penetrating MCM system to verify actual locations of penetrations relative to seam locations of MCM panels before installation.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION OF MCM SYSTEM

- A. General: Install MCM system in accordance with system manufacturer's written instructions in orientation, sizes, and locations indicated on Drawings. Install panels perpendicular to supports unless otherwise indicated. Anchor MCM system securely in place, with provisions for thermal and structural movement.
 1. Shim or otherwise plumb substrates receiving MCM system.
 2. Flash and seal MCM system at perimeter of all openings. Fasten with self-tapping screws.
 3. Install screw fasteners in predrilled holes.
 4. Locate and space fastenings in uniform vertical and horizontal alignment.
 5. Install flashing and trim as MCM system work proceeds.
 6. Align bottoms of MCM panels and fasten with blind rivets, bolts, or self-tapping screws. Fasten flashings and trim around openings and similar elements with self-tapping screws.
 7. Provide weathertight escutcheons for all items penetrating system.
 8. Where dissimilar metals contact each other or corrosive substrates, protect against galvanic action with gaskets.
 9. Attach MCM panels to supports at locations, spacings, and with fasteners recommended by manufacturer to meet listed performance requirements.
- B. Attachment Assembly, General: Install attachment assembly required to support MCM panels and to provide a complete weathertight wall system, including tracks, drainage channels, anchor channels, perimeter extrusions, and panel clips.
 1. Install subframing, furring, and other panel support members and anchorages in accordance with ASTM C955.
 2. Install support system at locations, at spacings, and with fasteners recommended by MCM system manufacturer to meet listed performance requirements.
- C. Dry-Seal MCM System: Attach MCM panels by interlocking panel clips into channels.
 1. Seal horizontal and vertical joints between adjacent MCM panels with manufacturer's standard gaskets.
- D. Install panels to allow individual panels to "free float" and be installed and removed without disturbing adjacent panels.
- E. Install accessories with positive anchorage to building and weathertight mounting, and provide for thermal expansion. Coordinate installation with flashings and other components.

1. Install accessory components required for a complete MCM system assembly including trim, copings, corners, seam covers, flashings, sealants, fillers, closure strips, and similar items. Provide types indicated by MCM system manufacturer.
- F. 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 trim to fit substrates and to result in waterproof performance.
 2. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at a maximum of 10 ft. 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).

3.3 INSTALLATION TOLERANCES

- A. Shim and align MCM panels within installed tolerance of 1/4 inch in 20 ft., non-accumulative, on level, plumb, and location lines as indicated, and within 1/8-inch offset of adjoining faces and of alignment of matching profiles.

3.4 FIELD QUALITY CONTROL

- A. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.
- B. Water-Spray Test: After installation, test area of assembly as directed by Architect for water penetration in accordance with AAMA 501.2.
- C. Manufacturer's Field Service: Engage a factory-authorized service representative to test and inspect completed MCM system installation, including accessories.
- D. MCM system will be considered defective if it does not pass test and inspections.
- 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

- A. Remove temporary protective coverings and strippable films as MCM panels are installed unless otherwise indicated in manufacturer's written installation instructions. On completion of installation, clean finished surfaces as recommended by MCM panel manufacturer. Maintain in a clean condition during construction.

- B. After installation, clear weep holes and drainage channels of obstructions, dirt, and sealant.

3.6 PROTECTION

- A. Replace MCM panels that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION 074213.23

SECTION 074293 - SOFFIT PANELS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:

- 1. Metal soffit panels.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.

- 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each type of panel and accessory.

- B. Shop Drawings:

- 1. Include fabrication and installation layouts of metal panels; details of edge conditions, joints, panel profiles, corners, anchorages, attachment system, trim, flashings, closures, and accessories; and special details.
- 2. Accessories: Include details of flashing, trim, and anchorage systems, at a scale of not less than 1-1/2 inches per 12 inches.

- C. Samples: For each type of metal panel indicated with factory-applied color finishes.

- 1. Include similar Samples of trim and accessories involving color selection.
- 2. Metal Panels: 12 inches long by actual panel width. Include fasteners, closures, and other metal panel accessories.

1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.

- B. Product Test Reports: For each product, tests performed by a qualified testing agency.

- C. 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. 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 walls, 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. 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: 6.24 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: 6.24 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 METAL SOFFIT PANELS

- A. Provide metal soffit panels designed to be installed by lapping and interconnecting side edges of adjacent panels and mechanically attaching through panel to supports using concealed fasteners in side laps. Include accessories required for weathertight installation.
- B. Flush-Profile Metal Soffit Panels: Solid panels formed with vertical panel edges and a flat pan between panel edges; with flush joint between panels.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. AEP Span a brand of ASC Profiles LLC, a part of BlueScope.
 - b. ATAS International, Inc.
 - c. Berridge Manufacturing Company.
 - d. CENTRIA, a Nucor Brand.
 - e. Dimensional Metals, Inc.
 - f. Fabral; a brand of OmniMax International.
 - g. Firestone Building Products.
 - h. MBCI; Cornerstone Building Brands.
 - i. McElroy Metal, Inc.
 - j. Merchant & Evans Inc.
 - k. Metal Sales Manufacturing Corporation.
 - l. PAC-CLAD; Petersen Aluminum Corporation; a Carlisle 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: 0.032 inch.
 - b. Surface: Smooth, flat finish.
 - c. Exterior Finish: Two-coat fluoropolymer.
 - d. Color: As indicated by manufacturer's designations.
 - 3. Panel Coverage: 12 inches.
 - 4. Panel Height: 0.875 inch 1.0 inch.

2.3 MISCELLANEOUS MATERIALS

- A. Miscellaneous Metal Subframing and Furring: ASTM C645, cold-formed, metallic-coated steel sheet, ASTM A653/A653M, G90 coating designation or ASTM A792/A792M, Class AZ50 aluminum-zinc-alloy coating designation unless otherwise indicated. Provide manufacturer's standard sections as required for support and alignment of metal panel system.
- B. Panel Accessories: Provide components required for a complete, weathertight panel system including trim, clips, flashings, sealants, gaskets, fillers, closure strips, and similar items. Match material and finish of metal panels unless otherwise indicated.
 - 1. Closure Strips: Closed-cell, expanded, cellular, rubber or crosslinked, polyolefin-foam 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. 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 types 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

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 seal with epoxy seam sealer. Rivet joints for additional strength.
6. Seams for Other 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 soffit 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 for seacoast and severe environments.

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 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 panel manufacturer.
 2. Examine sheathing to verify that sheathing joints are supported by framing or blocking and that installation is within flatness tolerances required by metal panel manufacturer.
 - a. Verify that air- or water-resistive barriers been installed over sheathing or backing substrate to prevent air infiltration or water penetration.

- B. Examine roughing-in for components and systems penetrating metal panels to verify actual locations of penetrations relative to seam locations of metal panels before installation.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Miscellaneous Supports: Install subframing, furring, and other miscellaneous panel support members and anchorages according to ASTM C754 and metal panel manufacturer's written recommendations.
 - 1. Soffit Framing: Wire tie furring channels to supports, as required to comply with requirements for assemblies indicated.

3.3 INSTALLATION

- 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. 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. 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.

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, corners, seam covers, flashings, sealants, gaskets, fillers, closure strips, and similar items. Provide types indicated by metal 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 to 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 waterproof, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with mastic sealant (concealed within joints).

3.4 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 074293

SECTION 075216 - SBS MODIFIED BITUMINOUS MEMBRANE ROOFING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:

1. Two-ply modified bitumen roofing membrane. Roof membrane system shall consist of one (1) plies of smooth surfaced modified bitumen sheets and a granular surfaced modified bitumen cap sheet.
2. Thermal Roof Insulation.
3. See Wind Resistance Design Pressures
4. See Warranty for requirements and wind speed

1.3 DEFINITIONS

- A. Roofing Terminology: Definitions in ASTM D 1079 and glossary of NRCA's "The NRCA Roofing and Waterproofing Manual" apply to work of this Section.

1.4 PREINSTALLATION MEETINGS

- A. Pre-installation Roofing Conference: Conduct conference at Project Site. Mandatory attendance for roofing contractor, material manufacturer's technical representative, all subcontractors, project manager, and project foreman. Manufacturer must have a member at the pre-installation meeting who is trained as a technical advisor (not a sales person).

1.5 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Contractor shall submit letter from manufacturer stating approval to install specified system and receive the specified 20 year warranty.
- C. Shop Drawings: For roofing system. Include plans, sections, details, and attachments to other work, including:
 1. Base flashings and membrane terminations.
 2. Tapered insulation layouts, including slopes and minimum R-values.

3. Insulation attachment patterns for corner, perimeter, and field-of-roof locations.

D. Samples for Verification: For the following products:

1. Cap sheet, of color required.
2. Flashing sheet, of color required.
3. Base sheet, of color required.
4. Walkway pads or rolls, of color required.

1.6 INFORMATIONAL SUBMITTALS

- A. Research/Evaluation Reports: For components of membrane roofing system, from ICC-ES.
- B. Sample Warranties: For manufacturer's special warranties.
- C. Contractor's Three year workmanship warranty.
- D. Letter from the manufacturer along with test data stating that the roof system has been tested to meet or exceed the pressures listed with a Factor of Safety of 2.

1.7 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For roofing system to include in maintenance manuals.

1.8 QUALITY ASSURANCE

- A. Contractor shall be approved by the roofing system manufacturer to install the manufacturer's product and that is eligible to receive the specified manufacturer's warranty.
- B. Manufacturer's technical representative shall be present at jobsite during initial startup and a minimum of once every two weeks during construction. A report shall be generated discussing the findings and any relevant issues. The report shall be submitted to the consultant within 3 days of the observation. NOTE: A technical rep must be on site during one of the first two days of roof installation, NO EXCEPTIONS. All costs for any additional inspections by the manufacturer are the responsibility of the contractor.
- C. A copy of the latest manufacturer's product data and installation guide shall be kept on the roof at all times during installation.

1.9 MATERIAL STORAGE

- A. All materials shall be properly stored in accordance with industry standards and the manufacturer's guidelines.
 1. Use good tarps, free of holes and tears. Secure properly.
 2. Store roll goods on end on pallets. Salvage edge shall be up.
 3. Cover insulation with tarps. Do NOT rely on plastic wrapping!
 4. Insulation shall be stored in accordance with PIMA material storage requirements.

5. Store all materials in a manner to prevent condensation or any other water damage.
6. Do not overload the roof. Limit the amount of materials stored on the roof to the next day's operation at a maximum.

1.10 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace components of roofing system that fail in materials or workmanship within specified warranty period.
 1. Warranty: 20 years Manufacturer's Labor & Material No Dollar Limit Warranty dated the day of Substantial Completion or after.
 - a. A 73 mph wind speed rider shall be included.
 2. Contractor's warranty period: Three years from the date of Substantial Completion.

PART 2 - PRODUCTS

2.1 GENERAL

- A. Source Limitations: Obtain components including: roof insulation, cover board, fasteners, base sheet, cap sheet, adhesives, flashing plies, temporary waterproofing membrane, and sealants from the specified manufacturer in order to obtain a one source warranty for the entire roof system.

2.2 PERFORMANCE REQUIREMENTS

- A. Roof Membrane Assembly: A dimensionally stable roof membrane assembly consisting of 3 plies of a prefabricated, reinforced, homogeneous Styrene-Butadiene-Styrene modified asphalt membrane, secured to a prepared substrate. Both reinforcement mats shall be impregnated and coated on each side with a high quality SBS modified bitumen blend.
- B. Material Compatibility: Roofing materials shall be compatible with one another and adjacent materials under conditions of service and application required, as demonstrated by roofing manufacturer based on testing and field experience.
- C. FM Global Listing: Roofing, base flashings, and component materials shall comply with requirements in FM Global 4450 or FM Global 4470 as part of a roofing system, and shall be listed in FM Global's "RoofNav" for Class 1 or noncombustible construction, as applicable. Identify materials with FM Global markings.
- D. Exterior Fire-Test Exposure: ASTM E 108 or UL 790, Class "A" for application and roof slopes indicated; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

- E. Fire-Resistance Ratings: Comply with fire-resistance-rated assembly designs indicated. Identify products with appropriate markings of applicable testing agency.
- F. Wind Resistance Design: Installed roof assembly shall meet or exceed the following wind uplift pressures. The tested assembly shall include the Factor of Safety of 2 of the pressures listed below.

1st Floor

- 1. Field Prime (1'): **40 PSF**
- 2. Field (1): **61 PSF**
- 3. Perimeter (2): **77 PSF**
- 4. Corner (3): **102 PSF**

2nd Floor

- 1. Field Prime (1'): **46 PSF**
- 2. Field (1): **70 PSF**
- 3. Perimeter (2): **89 PSF**
- 4. Corner (3): **117 PSF**

3rd Floor

- 1. Field Prime (1'): **50 PSF**
- 2. Field (1): **77 PSF**
- 3. Perimeter (2): **97 PSF**
- 4. Corner (3): **128 PSF**

2.3 ROOFING SHEET MATERIALS

- A. Roofing Membrane Base Sheet: ASTM D 6163, Grade S, Type I, SBS-modified asphalt sheet (reinforced with glass fibers) smooth surfaced; minimum 118 mils, suitable for application method specified.
- B. Granule-Surfaced Roofing Cap Sheet: ASTM D 6162 or ASTM D 6164, Grade G, Type I, SBS-modified asphalt sheet (reinforced with glass fibers/polyester and reinforced with polyester); granule surfaced; minimum 150 mils, suitable for application method specified.

2.4 BASE FLASHING SHEET MATERIALS

- A. Same materials as installed in roof system unless Roof Manufacturer's requirements require differing sheets to be provided for the base flashing (ie. Polyester base flashing cap sheet ply).
- B. The base flashing system for the roofing assembly shall be two plies and consist of a smooth surfaced SBS modified bitumen base sheet adhered in hot asphalt and an SBS modified bitumen cap ply, torch or cold applied.

2.5 AUXILIARY ROOFING MATERIALS

- A. General: Auxiliary materials recommended by roofing system manufacturer for intended use and compatible with roofing.
 - 1. Liquid-type auxiliary materials shall comply with VOC limits of authorities having jurisdiction.
- B. Asphalt Primer: ASTM D 41/D 41M.
- C. Asphalt: ASTM D312, Type III or IV, low fuming asphalt.
- D. Asphalt Roofing Cement: ASTM D 4586, asbestos free, of consistency required by roofing system manufacturer for application.
- E. Fasteners: Factory-coated steel fasteners and metal or plastic plates complying with corrosion-resistance provisions in FM Global 4470, designed for fastening roofing components to substrate; tested by manufacturer for required pullout strength, and acceptable to roofing system manufacturer.
- F. Roofing Granules: Ceramic-coated roofing granules, No. 11 screen size with 100 percent passing No. 8 sieve and 98 percent of mass retained on No. 40 sieve, color to match roofing.
- G. Self-Adhering Waterproof Underlayment: Self-adhering, modified bitumen underlayment adhering to ASTM D 1970 to be installed under sheet metal coping system, between wood blocking and steel deck and at all locations shown on the drawings.

2.6 ROOF INSULATION SYSTEM DESCRIPTION

- A. Roof Areas with sloped standard metal roof deck:
 - 1. Base Layer – One layer of 2.0 inch thick polyisocyanurate roof insulation loose laid over steel deck.
 - 2. Second Layer - One layer of 1.5 inch thick polyisocyanurate roof insulation mechanically attached through the base layer to the steel deck.
 - 3. Cover Board – One layer of 1/2 inch thick factory primed, high density wood fiberboard roof insulation cover board fully adhered in hot asphalt to the polyisocyanurate roof insulation.
 - 4. A minimum R-Value of 20 is required.
- B. Roof Areas with non-sloped (flat) standard metal roof deck:
 - 1. Base Layer – One layer of 2.0 inch thick polyisocyanurate roof insulation mechanically attached to the steel deck.
 - 2. Next Layer(s) – 1/4":12" tapered polyisocyanurate insulation adhered in hot asphalt to the base layer of insulation.
 - 3. Cover Board – One layer of 1/2 inch thick factory primed, high density wood fiberboard roof insulation cover board fully adhered in hot asphalt to the polyisocyanurate roof insulation.

4. An average R-Value of 20 is required.
- C. Roof Areas with sloped Versadeck (Dovetail Roof Deck) metal roof deck:
1. Base Layer – One layer of 1/2 inch thick gypsum roof board loose laid over the steel deck. Provide required mineral fiber insulation in low roof deck flutes prior to installation of gypsum roof board.
 2. Second Layer – One layer of 2.0 inch thick polyisocyanurate roof insulation mechanically attached through the base layer to the steel deck.
 3. Third Layer - One layer of 1.5 inch thick polyisocyanurate roof insulation fully adhered in hot asphalt.
 4. Cover Board – One layer of 1/2 inch thick factory primed, high density wood fiberboard roof insulation cover board fully adhered in hot asphalt to the polyisocyanurate roof insulation.
 5. A minimum R-Value of 20 is required.
- D. Polyisocyanurate Board Insulation: ASTM C 1289, Type II, Class 1, Grade 2 felt or glass-fiber mat facer on both major surfaces.
- E. Tapered Insulation: Provide factory-tapered insulation boards fabricated to slope of 1/4 inch per 12 inches at the crickets and 1/2 inch per 12 inches at the back side of the roof drains and upslope side of all penetrations greater than 12" in width. Finished roof slope shall provide a minimum roof slope of 1/4 inch per 12 inches (See Architectural/Structural Plans for Slopes).
- F. See plans and details. Tapered to be made of polyisocyanurate roof insulation.
- G. Cover Board: ASTM C 208, Type II, high density fiberboard roof insulation, 1/2 inch, factory primed.
- H. Gypsum Roof Board Over Roof Deck: ASTM C 1177/C 1177M, glass-mat, water-resistant gypsum substrate, 1/2 inch.
- I. Provide preformed saddles, crickets, tapered edge strips, and other insulation shapes where indicated for sloping to drain. Fabricate to slopes indicated.
- 2.8 INSULATION ACCESSORIES
- J. Insulation Cant Strips: ASTM C 728, perlite insulation board.
- K. Wood Cant Strips: Pressure treated wood nailers (See Specification Section 061053)

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Comply with roofing system manufacturer's written instructions.

- B. If there is a discrepancy between the specifications and the manufacturer's written instructions, the more stringent guideline shall be followed.
- C. Examine deck and other substrates for compliance with requirements affecting performance of roofing system. Ensure inspections of the decking have been performed prior to installation of roofing materials.
- D. Ensure all roof system penetrations are in place and that roof drains are securely clamped to the underside of the deck.
- E. Verify that wood cants, blocking, curbs, and nailers are securely anchored to roof deck at penetrations and terminations and that nailers match thicknesses of insulation.
- F. Clean and remove from substrate sharp projections, dust, debris, moisture, and other substances detrimental to roofing installation.
- G. Prevent materials from entering and clogging roof drainage points.

3.2 ROOFING INSTALLATION

- A. Install roofing system according to roofing system manufacturer's written instructions and applicable recommendations in ARMA/NRCA's "Quality Control Guidelines for the Application of Polymer Modified Bitumen Roofing" and as follows:
 - 1. Deck Type: Metal Roof Deck
 - 2. Deck Type: Versadeck

3.3 ROOF INSULATION INSTALLATION

- A. Install roof insulation in accordance with manufacturer's guidelines and NRCA details.
- B. Polyisocyanurate installation:
 - 1. Provide mineral fiber insulation in required acoustical roof deck locations prior to providing the polyisocyanurate/gypsum roof board.
 - 2. Fasteners shall not be long enough to penetrate the bottom roof deck flute.
 - 3. Stagger all joints a minimum of 6" in both directions.
 - 4. Fit insulation neatly but do not jam in place. Insulation should lay free without gaps. Any gaps or openings greater than or equal to 1/4" shall be filled with similar insulation or replaced with new boards. Cut boards tight to walls, curbs, and penetrations.
 - 5. Provide tapered edge strips at the low side of all tapered insulation boards to transition from 1/2" height to zero.
- C. Gypsum Roof Board installation:
 - 1. Provide mineral fiber insulation in required acoustical roof deck locations prior to providing the gypsum roof board.
 - 2. Provide the edges of gypsum resting on the top roof deck flute bearing surface.

- D. High density fiberboard installation:
 - 1. Install the 1/2 inch high density fiberboard over the polyisocyanurate. Fully adhered in hot asphalt to resist the required wind uplift requirements.
 - 2. Stagger all joints between the layers of insulation a minimum of 6".
 - 3. Cut cover board neatly to follow the contour of the crickets. Prevent "bridging" by scoring and ensuring that the board is lying flat and properly secured.

3.4 GENERAL ROOFING MEMBRANE INSTALLATION

- A. Install roofing system in accordance with roofing system manufacturer's written instructions/recommendations and requirements in this Section.
- B. Coordinate installing roofing system so insulation and other components of the roofing membrane system are not exposed or subjected to precipitation/inclement weather or left uncovered at the end of the workday.
- C. Provide tie-offs at end of each day's work to cover exposed roofing membrane sheets and insulation with a watertight seal.
- D. Complete terminations and base flashings and provide temporary watertight tie-ins to prevent water from entering completed sections of roofing.
- E. Remove temporary tie-ins before beginning work on adjoining roofing.
- F. Provide spray foam in roof deck flutes at the tie in to prevent moisture from entering under the finished/installed roof system.

3.5 HEATING OF ASPHALT

- A. Heat roofing asphalt and apply within plus or minus 25 F of the equiviscous temperature. Do not raise roofing asphalt temperature above equiviscous temperature range more than one hour before time of application. Do not exceed roofing asphalt manufacturer's recommended temperature limits during roofing asphalt heating. Do not heat roofing asphalt within 25 F of flash point. Discard roofing asphalt maintained at a temperature exceeding finished blowing temperature for more than 4 hours.
- B. Prevent roofing asphalt from penetrating substrate joints, entering building, or damaging roofing system components or adjacent building construction.
- C. Kettles shall have a visible, working thermometer or thermostatic controls set to the specified temperature limitations.
- D. Fume recovery kettles are to be utilized with the kettle remaining closed for the duration of the day's work.

3.6 ROOF MEMBRANE INSTALLATION

- A. After the roof insulation has been properly installed, remove any dust and debris from surface.
- B. Base Sheet Installation:
1. Roll out the base sheet and allow to relax as per manufacturer's instructions.
 2. Starting at low points and working upward, embed base sheet in solid mopping of hot roofing asphalt applied at rate of 25 lbs. per square.
 3. Roll membrane into asphalt free of voids, fishmouths, mole runs, etc. Ensure solid embedment of membrane.
 4. Run base sheet up and over the top of cant. Seal to penetrations.
 5. Lap side laps a minimum of 3" an end laps a minimum of 6". Stagger end laps at least 24". Install base sheet so that the laps do not line up with joints in insulation.
 6. Seal all laps and verify solid lap adhesion at the end of each working day. Make repairs as necessary to ensure a watertight assembly.
 7. Cover entire area of work with base sheet each day.
 8. Install night-time cutoffs where necessary to prevent water from migrating under new roof assembly.
- C. Cap Sheet Cold Applied Adhesive Installation:
1. Clean base sheet of any dust, moisture, and debris.
 2. Roll out the cap sheet and allow to relax as per manufacturer's instructions but not less than 2 hours.
 3. Starting at low points and working upward, embed cap sheet in adhesive at the rate of 1.5 gallons per 100 square feet (or required minimum adhesive quantity). Use notched squeegees and ensure a solid bed of adhesive free of lumps and excess.
 4. Roll membrane into adhesive free of voids, fishmouths, mole runs, etc. Ensure solid embedment of membrane.
 5. Lap side laps a minimum of 3" an end laps a minimum of 6". Stagger end laps at ½ of roll length where available but no more than 30" together. Install cap sheet so that the laps do not line up with the laps of the base sheet.
 6. Stagger laps in drain/valley areas to prevent "backwards" laps.
 7. Seal all laps and verify solid lap adhesion at the end of each working day. Make repairs as necessary to ensure a watertight assembly.
 8. Install cap sheet as soon as practical over base sheet but no more than 10 days after base sheet installation.
 9. Check lap integrity each day and repair any loose areas. Embed granules in bleed out at roof membrane laps.
- D. Cap Sheet Torch Applied Adhesive Installation:
1. Clean base sheet of any dust, moisture, and debris. Prime base sheets if necessary for proper adhesion of cap sheet.
 2. Roll out the cap sheet and allow to relax as per manufacturer's instructions but not less than 2 hours.
 3. Starting at low points and working upward, torch the cap sheet to the base sheet.
 4. Roll membrane into adhesive free of voids, fishmouths, mole runs, etc. Ensure solid embedment of membrane.
 5. Lap side laps a minimum of 3" an end laps a minimum of 6". Stagger end laps at ½ of roll length where available but no more than 30" together. Install cap sheet so that the laps do not line up with the laps of the base sheet.

6. Stagger laps in drain/valley areas to prevent “backwards” laps.
7. Seal all laps and verify solid lap adhesion at the end of each working day. Make repairs as necessary to ensure a watertight assembly.
8. Install cap sheet as soon as practical over base sheet but no more than 10 days after base sheet installation.
9. Check lap integrity each day and repair any loose areas. Embed granules in bleed out at roof membrane laps.

3.7 FLASHING AND STRIPPING INSTALLATION

- A. Install base ply of base flashing over cant strips and onto base sheet prior to the installation of the cap sheet. Install cap ply of base flashing after the installation of the cap sheet and secure to substrate a minimum of 8 inches on center. Provide 3 course mastic and fabric over the top termination of the base flashing.
 1. Cut sheets from end of roll for maximum 36” widths. Install free of voids and wrinkles.
 2. Provide base ply and cap ply of base flashing similar to roof membrane installation.
 3. Separate laps between base ply and cap ply. Extend cap ply a minimum of 3” beyond base onto roof surface.
- B. Extend base flashing up walls or parapets a minimum of 12 inches above roofing membrane and 6 inches onto field of roofing membrane.
- C. Mechanically fasten top of base flashing securely at terminations and perimeter of roofing a minimum of 8” on center using appropriate fasteners for substrate material. If in a metal stud area, provide nailing strip (22 gauge sheet metal) for fasteners to engage.
- D. Install roofing cap-sheet stripping where metal flanges and edgings are set on roofing according to roofing system manufacturer's written instructions.
 1. Strip-in lead boots, stainless collars, scupper flanges, and other metal work with two plies of membrane. Prime all metal flanges with asphalt primer (top and bottom flanges) and embed in a liberal layer of adhesive. Install flashing layers as shown on detail drawings.
- E. Roof Drains:
 1. The base layer of insulation shall extend under/through the roof drain. Tapered insulation sump (4’x4’, 4’x6’, and 4’x8’) shall be provided sloping water to roof drain. The differing sump sizes shall be provided based on taper layout indicated.
 2. Set 30 inch by 30 inch 4 lb. lead flashing in bed of asphaltic adhesive on completed base sheet. Prime lead flange (top and bottom) with asphalt primer. Cover metal flashing with roofing base sheet and then cap-sheet stripping, and extend a minimum of 4 inches beyond edge of metal flashing onto field of roofing membrane with each subsequent ply. Clamp roofing membrane, metal flashing, and stripping into roof-drain clamping ring. Follow detail drawings.

3.8 Closeout:

- A. Clean finished roof of all materials, equipment, debris, markings, etc.

ROOFING INSTALLER'S WARRANTY

- A. WHEREAS _____ of _____, herein called the "Roofing Installer," has performed roofing and associated work ("work") on the following project:
1. Owner: Charleston County School District
 2. Address: 75 Calhoun Street, Charleston, SC 29401
 3. Building Name/Type: Malcolm C. Hursey Montessori School
 4. Address: 3910 Verde Avenue, North Charleston, SC 29405
 5. Area of Work: Roof
 6. Acceptance Date: _____.
 7. Warranty Period: Three Years
 8. Expiration Date: _____.
- B. AND WHEREAS Roofing Installer has contracted (either directly with Owner or indirectly as a subcontractor) to warrant said work against leaks and faulty or defective materials and workmanship for designated Warranty Period,
- C. NOW THEREFORE Roofing Installer hereby warrants, subject to terms and conditions herein set forth, that during Warranty Period he will, at his own cost and expense, make or cause to be made such repairs to or replacements of said work as are necessary to correct faulty and defective work and as are necessary to maintain said work in a watertight condition.
- D. This Warranty is made subject to the following terms and conditions:
1. Specifically excluded from this Warranty are damages to work and other parts of the building, and to building contents, caused by:
 - a. lightning;
 - b. peak gust wind speed exceeding 73 mph;
 - c. fire;
 - d. failure of roofing system substrate, including cracking, settlement, excessive deflection, deterioration, and decomposition;
 - e. faulty construction of parapet walls, copings, chimneys, skylights, vents, equipment supports, and other edge conditions and penetrations of the work;
 - f. vapor condensation on bottom of roofing; and
 - g. activity on roofing by others, including construction contractors, maintenance personnel, other persons, and animals, whether authorized or unauthorized by Owner.
 2. When work has been damaged by any of foregoing causes, Warranty shall be null and void until such damage has been repaired by Roofing Installer and until cost and expense thereof have been paid by Owner or by another responsible party so designated.

3. Roofing Installer is responsible for damage to work covered by this Warranty but is not liable for consequential damages to building or building contents resulting from leaks or faults or defects of work.
4. During Warranty Period, if Owner allows alteration of work by anyone other than Roofing Installer, including cutting, patching, and maintenance in connection with penetrations, attachment of other work, and positioning of anything on roof, this Warranty shall become null and void on date of said alterations, but only to the extent said alterations affect work covered by this Warranty. If Owner engages Roofing Installer to perform said alterations, Warranty shall not become null and void unless Roofing Installer, before starting said work, shall have notified Owner in writing, showing reasonable cause for claim, that said alterations would likely damage or deteriorate work, thereby reasonably justifying a limitation or termination of this Warranty.
5. During Warranty Period, if original use of roof is changed and it becomes used for, but was not originally specified for, a promenade, work deck, spray-cooled surface, flooded basin, or other use or service more severe than originally specified, this Warranty shall become null and void on date of said change, but only to the extent said change affects work covered by this Warranty.
6. Owner shall promptly notify Roofing Installer of observed, known, or suspected leaks, defects, or deterioration and shall afford reasonable opportunity for Roofing Installer to inspect work and to examine evidence of such leaks, defects, or deterioration.
7. This Warranty is recognized to be the only warranty of Roofing Installer on said work and shall not operate to restrict or cut off Owner from other remedies and resources lawfully available to Owner in cases of roofing failure. Specifically, this Warranty shall not operate to relieve Roofing Installer of responsibility for performance of original work according to requirements of the Contract Documents, regardless of whether Contract was a contract directly with Owner or a subcontract with Owner's General Contractor.

E. IN WITNESS THEREOF, this instrument has been duly executed this _____ day of _____, _____.

1. Authorized Signature: _____.
2. Name: _____.
3. Title: _____.

END OF SECTION 075216

SECTION 076201 - SHEET METAL FLASHING AND TRIM FOR ROOFING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:

- 1. Sheet Metal Components to be provided are as follows:
 - a. Counterflashings
 - b. Copings
 - c. Cover Plates for scuppers
 - d. Wind Clips
 - e. Area Dividers
 - f. Umbrellas
 - g. Equipment Support Curb Caps
 - h. Downspouts
 - i. Drain Scupper Outside Plates
 - j. Overflow Scupper Outside Plate
 - k. Conductor Head
 - l. Other Sheet Metal Components
- 2. Stainless Steel Components to be provided are as follows:
 - a. Drain Scupper Sleeve
 - b. Overflow Scupper Sleeve
 - c. Pitch Pan

- B. Related Requirements:

- 1. Section 061053 "Miscellaneous Rough Carpentry for Roofing".
- 2. Section 075216 "Styrene-Butadiene-Styrene (SBS) Modified Bituminous Membrane Roofing".

1.3 COORDINATION

- A. Coordinate sheet metal flashing and trim layout and seams with sizes and locations of penetrations to be flashed, and joints and seams in adjacent materials.
- B. Coordinate sheet metal flashing and trim installation with adjoining roofing and wall materials, joints, and seams to provide leak-proof, secure, and noncorrosive installation.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each manufactured product and accessory.
- B. Shop Drawings: For sheet metal flashing and trim.
 - 1. Include identification of material, thickness, weight, and finish for each item and location in Project.
- C. Samples for Initial Selection: For each type of sheet metal and accessory indicated with factory-applied finishes.
- D. Samples for Verification: For each type of exposed finish.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For fabricator.
- B. Product Certificates: For each type of coping and roof edge flashing that is SPRI ES-1 tested.
- C. Sample Warranty: For special warranty.

1.6 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For sheet metal flashing and trim, and its accessories, to include in maintenance manuals.

1.7 QUALITY ASSURANCE

- A. Fabricator Qualifications: Employs skilled workers who custom fabricate sheet metal flashing and trim similar to that required for this Project and whose products have a record of successful in-service performance.
 - 1. For copings and roof edge flashings that are SPRI ES-1 tested, shop shall be listed as able to fabricate required details as tested and approved.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Do not store sheet metal flashing and trim materials in contact with other materials that might cause staining, denting, or other surface damage. Store sheet metal flashing and trim materials away from uncured concrete and masonry.

- B. Protect strippable protective covering on sheet metal flashing and trim from exposure to sunlight and high humidity, except to extent necessary for period of sheet metal flashing and trim installation.

1.9 WARRANTY

- A. Special Warranty on Finishes: Manufacturer agrees to repair finish or replace sheet metal flashing and trim that shows evidence of deterioration of factory-applied finishes within specified warranty period.
 - 1. Exposed Finish: Deterioration includes, but is not limited to, the following:
 - a. Color fading more than 5 Hunter units when tested according to ASTM D 2244.
 - b. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.
 - c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.
 - 2. Finish Warranty Period: 20 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. General: Sheet metal flashing and trim assemblies shall withstand wind loads, structural movement, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Completed sheet metal flashing and trim shall not rattle, leak, or loosen, and shall remain watertight.
- B. Sheet Metal Standard for Flashing and Trim: Comply with NRCA's "The NRCA Roofing Manual" and SMACNA's "Architectural Sheet Metal Manual" requirements for dimensions and profiles shown unless more stringent requirements are indicated.
- C. Sheet Metal Standard for Copper: Comply with CDA's "Copper in Architecture Handbook." Conform to dimensions and profiles shown unless more stringent requirements are indicated.
- D. SPRI Wind Design Standard: Manufacture and install roof edge flashings and copings tested according to ANSI/SPRI ES-1 and capable of resisting the required design pressures.
- E. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes to prevent buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.

2.2 SHEET METALS

- A. General: Protect mechanical and other finishes on exposed surfaces from damage by applying strippable, temporary protective film before shipping.

- B. Aluminum Sheet: ASTM B 209, alloy as standard with manufacturer for finish required, with temper as required to suit forming operations and performance required; with smooth, flat surface. Minimum Thickness 0.040 inches.
1. Exposed Coil-Coated Finish:
 - a. Two-Coat Fluoropolymer: AAMA 620. Fluoropolymer finish containing not less than 70 percent PVDF resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
 2. Color: As selected by Owner from manufacturer's full range.
 3. Concealed Finish: Pretreat with manufacturer's standard white or light-colored acrylic or polyester backer finish, consisting of prime coat and wash coat with minimum total dry film thickness of 0.5 mil.
 - a. Counterflashings
 - b. Copings
 - c. Cover Plates for scuppers
 - d. Wind Clips
 - e. Area Dividers
 - f. Umbrellas
 - g. Equipment Support Curb Caps
 - h. Downspouts
 - i. Drain Scupper Outside Plates
 - j. Overflow Scupper Outside Plate
 - k. Conductor Head
 - l. Other Sheet Metal Components
 - C. Stainless-Steel Sheet: ASTM A 240/A 240M or ASTM A 666, Type 304, dead soft, fully annealed; with smooth, flat surface. Minimum Thickness 24 gauge.
 - a. Drain Scupper Sleeve
 - b. Overflow Scupper Sleeve
 - c. Pitch Pan
 - D. Lead Sheet: ASTM B749-03, heavy duty sheet lead, 4 lbs. /SF.

2.3 UNDERLAYMENT MATERIALS

- A. Self-Adhering, High-Temperature Sheet: Minimum 40 mils thick, consisting of a slip-resistant polyethylene- or polypropylene-film top surface laminated to a layer of butyl- or SBS-modified asphalt adhesive, with release-paper backing; specifically designed to withstand high metal temperatures beneath metal roofing. Provide primer according to written recommendations of underlayment manufacturer.
1. Thermal Stability: ASTM D 1970; stable after testing at 240 deg F or higher.
 2. Low-Temperature Flexibility: ASTM D 1970; passes after testing at minus 20 deg F or lower.

2.4 MISCELLANEOUS MATERIALS

- A. General: Provide materials and types of fasteners, solder, protective coatings, sealants, and other miscellaneous items as required for complete sheet metal flashing and trim installation and as recommended by manufacturer of primary sheet metal unless otherwise indicated.
- B. Fasteners: Wood screws, annular threaded nails, self-tapping screws, self-locking rivets and bolts, and other suitable fasteners designed to withstand design loads and recommended by manufacturer of primary sheet metal.
 - 1. General: Blind fasteners or self-drilling screws, gasketed, with hex-washer head.
 - a. Exposed Fasteners: Heads matching color of sheet metal using plastic caps or factory-applied coating. Provide metal-backed EPDM or PVC sealing washers under heads of exposed fasteners bearing on weather side of metal.
 - b. Blind Fasteners: High-strength aluminum or stainless-steel rivets suitable for metal being fastened.
 - 2. Fasteners for Aluminum Sheet: Aluminum or Series 300 stainless steel.
 - 3. Fasteners for Stainless-Steel Sheet: Series 300 stainless steel.
- C. Sealant Tape: Pressure-sensitive, 100 percent solids, polyisobutylene compound sealant tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape 1/2 inch wide and 1/8 inch thick.
- D. Elastomeric Sealant: ASTM C 920, elastomeric polyurethane polymer sealant; of type, grade, class, and use classifications required to seal joints in sheet metal flashing and trim and remain watertight.
- E. Butyl Sealant: ASTM C 1311, single-component, solvent-release butyl rubber sealant; polyisobutylene plasticized; heavy bodied for hooked-type expansion joints with limited movement.

2.5 FABRICATION, GENERAL

- A. General: Custom fabricate sheet metal flashing and trim to comply with details shown and recommendations in cited sheet metal standard that apply to design, dimensions, geometry, metal thickness, and other characteristics of item required. Fabricate sheet metal flashing and trim in shop to greatest extent possible.
 - 1. Obtain field measurements for accurate fit before shop fabrication.
 - 2. Form sheet metal flashing and trim to fit substrates without excessive oil canning, buckling, and tool marks; true to line, levels, and slopes; and with exposed edges folded back to form hems.
 - 3. Conceal fasteners and expansion provisions where possible. Do not use exposed fasteners on faces exposed to view.
- B. Expansion Provisions: Form metal for thermal expansion of exposed flashing and trim.
 - 1. Form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with butyl sealant concealed within joints.
 - 2. Use lapped joints unless otherwise indicated.
 - 3. Coping shall have one inch high locked standing seams.

- C. Sealant Joints: Where movable, non-expansion-type joints are required, form metal to provide for proper installation of elastomeric sealant according to cited sheet metal standard.
- D. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal. Cleats shall be 1 gauge/increment thicker than sheet metal used.
- E. Fabricate cleats and attachment devices of sizes as recommended by cited sheet metal standard for application, but not less than thickness of metal being secured.
- F. Seams: Fabricate nonmoving seams with flat-lock seams. Form seams and seal with elastomeric sealant unless otherwise recommended by sealant manufacturer for intended use. Rivet joints where necessary for strength.
- G. Seams for Aluminum: Fabricate nonmoving seams with flat-lock seams. Form seams and seal with epoxy seam sealer. Rivet joints where necessary for strength.

2.6 LOW-SLOPE ROOF SHEET METAL FABRICATIONS

- A. Copings: Fabricate in sections not exceeding 10-feet. Use standing seams at all joint locations. Furnish with continuous cleats to support edge of external leg and fabricated from 22 gauge/0.050 inch stock. Miter corners. Fasten inside leg with 1 ½” neoprene gasketed fasteners at 12” on center. External leg shall extend below bottom edge of wood nailer and the top of wall a minimum of 2”.

PART 3 - EXECUTION

3.1 UNDERLAYMENT INSTALLATION

- A. Self-Adhering Sheet Underlayment: Install self-adhering sheet underlayment, wrinkle free. Prime substrate if recommended by underlayment manufacturer. Comply with temperature restrictions of underlayment manufacturer for installation; use primer for installing underlayment at low temperatures. Apply in shingle fashion to shed water, with end laps of not less than 6 inches staggered between courses. Overlap side edges not less than 3-1/2 inches. Roll laps and edges with roller. Cover underlayment within 14 days.

3.2 INSTALLATION, GENERAL

- A. General: Anchor sheet metal flashing and trim and other components of the Work securely in place, with provisions for thermal and structural movement. Use fasteners, solder, protective coatings, separators, sealants, and other miscellaneous items as required to complete sheet metal flashing and trim system.
 - 1. Install sheet metal flashing and trim true to line, levels, and slopes. Provide uniform, neat seams with minimum exposure of solder, welds, and sealant.

2. Install sheet metal flashing and trim to fit substrates and to result in watertight performance. Verify shapes and dimensions of surfaces to be covered before fabricating sheet metal.
 3. Install exposed sheet metal flashing and trim with limited oil canning, and free of buckling and tool marks.
 4. Torch cutting of sheet metal flashing and trim is not permitted.
- B. Metal Protection: Where dissimilar metals contact each other, or where metal contacts pressure-treated wood or other corrosive substrates, protect against galvanic action or corrosion by painting contact surfaces with bituminous coating or by other permanent separation as recommended by sheet metal manufacturer or cited sheet metal standard.
1. Underlayment: Where installing sheet metal flashing and trim directly on wood substrates, install underlayment and cover with slip sheet.
- C. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at maximum of 10 feet with no joints within 24 inches of corner or intersection.
1. Form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with sealant concealed within joints.
 2. Use standing seam expansion joints only.
- D. Fasteners: Use fastener sizes that penetrate wood blocking or sheathing not less than 1-1/4 inches for nails and not less than 1-1/4 inches for wood screws.
- E. Conceal fasteners and expansion provisions where possible in exposed work and locate to minimize possibility of leakage. Cover and seal fasteners and anchors as required for a tight installation.

3.3 ROOF FLASHING INSTALLATION

- A. General: Install sheet metal flashing and trim to comply with performance requirements and cited sheet metal standard. Provide concealed fasteners where possible, and set units true to line, levels, and slopes. Install work with laps, joints, and seams that are permanently watertight and weather resistant.
- B. Roof Edge Flashing: Anchor to resist uplift and outward forces according to recommendations in cited sheet metal standard unless otherwise indicated. Interlock bottom edge of roof edge flashing with continuous cleat anchored to substrate.
- C. Copings: Anchor to resist uplift and outward forces according to recommendations in cited sheet metal standard unless otherwise indicated. Coping joints shall be one inch high, locked, standing seams.
- D. Pipe or Post Counterflashing: Install counterflashing umbrella with close-fitting collar with top edge flared for elastomeric sealant, extending minimum of 3 inches over base flashing. Install stainless-steel draw band and tighten.

- E. Counterflashing: Coordinate installation of counterflashing with installation of base flashing. Insert counterflashing in reglets or receivers and fit tightly to base flashing. Extend counterflashing 4 inches over base flashing. Lap counterflashing joints minimum of 4 inches.
- F. Roof-Penetration Flashing: Coordinate installation of roof-penetration flashing with installation of roofing and other items penetrating roof. Seal with sealant and clamp flashing to pipes that penetrate roof.

3.4 CLEANING AND PROTECTION

- A. Clean exposed metal surfaces of substances that interfere with uniform oxidation and weathering.
- B. Clean off excess sealants.
- C. Remove temporary protective coverings and strippable films as sheet metal flashing and trim are installed unless otherwise indicated in manufacturers written installation instructions.

END OF SECTION 076201

SECTION 077200 - ROOF 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. All roof drain clamping rings and strainers shall be cast iron. All clamping ring drain bolts shall be stainless steel.
2. Roof access hatch shall be Bilco aluminum roof hatch or approved equal. An all-galvanized steel or aluminum roof hatch safety rail system and safety post is also to be provided.
 - a. Electronic access to roof hatch will be covered in another Specification Section.
3. Installation of roof walkways around all curb mounted equipment and at all roof access points.
4. Installation of prefabricated pipe supports for all horizontal pipes, condensate lines, etc.
5. Weighted safety rail system (non-penetrating) to be provided between all curbs, roof hatches, and equipment and roof edge as required by OSHA.

- B. Related Sections:

1. Section 011000 "Summary".
2. Section 075216 "SBS Modified Bituminous Membrane Roofing".
3. Section 076201 "Sheet Metal Flashing and Trim for Roofing".

1.3 PERFORMANCE REQUIREMENTS

- A. General Performance: Roof accessories shall withstand exposure to weather and resist thermally induced movement without failure, rattling, leaking, or fastener disengagement due to defective manufacture, fabrication, installation, or other defects in construction.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of roof accessory indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.
- B. Samples: For each exposed product and for each color and texture specified, prepared on Samples of size to adequately show color.

1.5 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: Roof plans, drawn to scale, and coordinating penetrations and roof-mounted items. Show the following:
 - 1. Location of roof accessories specified in this Section.
 - 2. Method of attaching roof accessories to roof.
- B. Warranty: Sample of special warranty.

1.6 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For roof accessories to include in operation and maintenance manuals.

1.7 COORDINATION

- A. Coordinate layout and installation of roof accessories.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Pipe Supports:
 - 1. Miro Industries Inc., Miro 1.5 Pillow Block Rooftop Pipe Support or approved equal.
- B. Walkway Material: Manufacturer's recommended walkway material installed to allow for positive drainage.
- C. Roof Drain Components: Cast iron clamping rings and cast iron strainers. All clamping ring drain bolts shall be stainless steel. All components and installation procedures shall adhere to the IPC 2018.
- D. Roof Access Hatch: See Architect Drawings for roof hatch size for each specific roof area:
 - 1. The Bilco Company, Model 50TB, aluminum construction, thermally broken roof hatch or approved equal.
 - 2. Galvanized steel (Painted) or aluminum roof hatch safety rail system (Painted) and safety post.
 - 3. Safety railing systems shall be provided where curbs, roof hatches, or equipment are within 10' of the roof edge.
- E. MISCELLANEOUS MATERIALS
- F. General: Provide materials and types of fasteners, protective coatings, sealants, and other miscellaneous items required by manufacturer for a complete installation.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, to verify actual locations, dimensions, and other conditions affecting performance of the Work.
- B. Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and securely anchored.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. General: Install roof accessories according to manufacturer's written instructions.
 - 1. Use fasteners, separators, sealants, and other miscellaneous items as required to complete installation of roof accessories and fit them to substrates.
 - 2. Install roof accessories to resist exposure to weather without failing, rattling, leaking, or loosening of fasteners and seals.
- B. Pipe Support Installation: Install pipe supports so top surfaces are in contact with and provide equally distributed support along length of supported item. Placement shall not exceed 5 feet on center. Pipe supports shall also allow for thermal movement.
- C. Roof Walkway Installation:
 - 1. Verify that locations of access and servicing points for roof-mounted equipment are served by locations of roof walkways.
 - 2. Adhere walkways to roof membrane as necessary to keep walkway material in place and to resist curling. Join sections of the walkway material together using the same method.
 - 3. Install of roof walkways around all curb mounted equipment and at all roof access points.

3.3 REPAIR AND CLEANING

- A. Clean exposed surfaces according to manufacturer's written instructions.
- B. Replace roof accessories that have been damaged or that cannot be successfully repaired by finish touchup or similar minor repair procedures.

END OF SECTION 077200

SECTION 078100 - APPLIED FIRE PROTECTION

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. Sprayed fire-resistive materials.

1.3 DEFINITIONS

- A. SFRM: Sprayed fire-resistive materials.

1.4 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.
 - 1. Review products, design ratings, restrained and unrestrained conditions, densities, thicknesses, bond strengths, and other performance requirements.

1.5 ACTION SUBMITTALS

- A. Product Data: For the following:
 - 1. Sprayed fire-resistive material.
 - 2. Substrate primers.
 - 3. Bonding agent.
 - 4. Metal lath.
 - 5. Reinforcing fabric.
 - 6. Reinforcing mesh.
 - 7. Sealer.
 - 8. Topcoat.
- B. Shop Drawings: Framing plans or schedules, or both, indicating the following:
 - 1. Extent of fire protection for each construction and fire-resistance rating.
 - 2. Applicable fire-resistance design designations of a qualified testing and inspecting agency acceptable to authorities having jurisdiction.

3. Minimum sprayed fire-resistive material thicknesses needed to achieve required fire-resistance rating of each structural component and assembly.
4. Treatment of sprayed fire-resistive material after application.

C. Samples: For each exposed product and for each color and texture specified, 4 inches square in size.

1.6 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer and testing agency.
- B. Product Certificates: For each type of sprayed fire-resistive material.
- C. Evaluation Reports: For sprayed fire-resistive material, from ICC-ES.
- D. Preconstruction Test Reports: For fire protection.
- E. Field quality-control reports.

1.7 QUALITY ASSURANCE

- A. Installer Qualifications: A firm or individual certified, licensed, or otherwise qualified by sprayed fire-resistive material manufacturer as experienced and with sufficient trained staff to install manufacturer's products according to specified requirements.
- B. Mockups: Build mockups to set quality standards for materials and execution and for preconstruction testing.
 1. Build mockup of each type of fire protection and different substrate of a minimum of 100 square feet and in location approved by Architect.
 2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
 3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.8 PRECONSTRUCTION TESTING

- A. Preconstruction Testing Service: Owner will engage a qualified testing agency to perform preconstruction testing on field mockups of fire protection.
 1. Provide test specimens and assemblies representative of proposed materials and construction.
- B. Preconstruction Adhesion and Compatibility Testing: Test for compliance with requirements for specified performance and test methods.

1. Bond Strength: Test for cohesive and adhesive strength according to ASTM E736. Provide bond strength indicated in referenced fire-resistance design, but not less than minimum specified in Part 2.
2. Density: Test for density according to ASTM E605. Provide density indicated in referenced fire-resistance design, but not less than minimum specified in Part 2.
3. Verify that manufacturer, through its own laboratory testing or field experience, attests that primers or coatings are compatible with sprayed fire-resistive material.
4. Schedule sufficient time for testing and analyzing results to prevent delaying the Work.
5. For materials failing tests, obtain sprayed fire-resistive material manufacturer's written instructions for corrective measures including the use of specially formulated bonding agents or primers.

1.9 FIELD CONDITIONS

- A. Environmental Limitations: Do not apply fire protection when ambient or substrate temperature is 44 deg F or lower unless temporary protection and heat are provided to maintain temperature at or above this level for 24 hours before, during, and for 24 hours after product application.
- B. Ventilation: Ventilate building spaces during and after application of fire protection, providing complete air exchanges according to manufacturer's written instructions. Use natural means or, if they are inadequate, forced-air circulation until fire protection dries thoroughly.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Assemblies: Provide fire protection, including auxiliary materials, according to requirements of each fire-resistance design and manufacturer's written instructions.
- B. Source Limitations: Obtain fire protection for each fire-resistance design from single source.
- C. Fire-Resistance Design: Indicated on Drawings, tested according to ASTM E119 or UL 263; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 1. Steel members are to be considered unrestrained unless specifically noted otherwise.
- D. Asbestos: Provide products containing no detectable asbestos.

2.2 SPRAYED FIRE-RESISTIVE MATERIALS

- A. Sprayed Fire-Resistive Material: Manufacturer's standard, factory-mixed, lightweight, dry formulation, complying with indicated fire-resistance design, and mixed with water at Project site to form a slurry or mortar before conveyance and application or conveyed in a dry state and mixed with atomized water at place of application.
 1. Products: Subject to compliance with requirements, provide one of the following:

- a. GCP Applied Technologies (Formerly W.R. Grace); Monokote MK-6.
- b. Isolatek International; Cafco 300.
2. Bond Strength: Minimum 150-lbf/sq. ft. cohesive and adhesive strength based on field testing according to ASTM E736.
3. Density: 15 lbs.
4. Thickness: As required for fire-resistance design indicated, measured according to requirements of fire-resistance design or ASTM E605, whichever is thicker, but not less than 0.375 inch.
5. Combustion Characteristics: ASTM E136.
6. 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: 10 or less.
 - b. Smoke-Developed Index: 10 or less.
7. Corrosion Resistance: No evidence of corrosion according to ASTM E937.
8. Deflection: No cracking, spalling, or delamination according to ASTM E759.
9. Effect of Impact on Bonding: No cracking, spalling, or delamination according to ASTM E760.
10. Finish: Spray-textured finish.

2.3 AUXILIARY MATERIALS

- A. Provide auxiliary materials that are compatible with sprayed fire-resistive material and substrates and are approved by UL or another testing and inspecting agency acceptable to authorities having jurisdiction for use in fire-resistance designs indicated.
- B. Substrate Primers: Primers approved by sprayed fire-resistive material manufacturer and complying with one or both of the following requirements:
 1. Primer and substrate are identical to those tested in required fire-resistance design by UL or another testing and inspecting agency acceptable to authorities having jurisdiction.
 2. Primer's bond strength in required fire-resistance design complies with specified bond strength for sprayed fire-resistive material and with requirements in UL's "Fire Resistance Directory" or in the listings of another qualified testing agency acceptable to authorities having jurisdiction, based on a series of bond tests according to ASTM E736.
- C. Bonding Agent: Product approved by sprayed fire-resistive material manufacturer and complying with requirements in UL's "Fire Resistance Directory" or in the listings of another qualified testing agency acceptable to authorities having jurisdiction.
- D. Metal Lath: Expanded metal lath fabricated from material of weight, configuration, and finish required, according to fire-resistance designs indicated and sprayed fire-resistive material manufacturer's written instructions. Include clips, lathing accessories, corner beads, and other anchorage devices required to attach lath to substrates and to receive sprayed fire-resistive material.
- E. Reinforcing Fabric: Glass- or carbon-fiber fabric of type, weight, and form required to comply with fire-resistance designs indicated; approved and provided by sprayed fire-resistive material manufacturer.

- F. Reinforcing Mesh: Metallic mesh reinforcement of type, weight, and form required to comply with fire-resistance design indicated; approved and provided by sprayed fire-resistive material manufacturer. Include pins and attachment.
- G. Sealer: Transparent-drying, water-dispersible, tinted protective coating recommended in writing by sprayed fire-resistive material manufacturer for each fire-resistance design.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for substrates and other conditions affecting performance of the Work and according to each fire-resistance design.
 - 1. Verify that substrates are free of dirt, oil, grease, release agents, rolling compounds, mill scale, loose scale, incompatible primers, paints, and encapsulants, or other foreign substances capable of impairing bond of fire protection with substrates under conditions of normal use or fire exposure.
 - 2. Verify that objects penetrating fire protection, including clips, hangers, support sleeves, and similar items, are securely attached to substrates.
 - 3. Verify that substrates receiving fire protection are not obstructed by ducts, piping, equipment, or other suspended construction that will interfere with fire protection application.
- B. Verify that concrete work on steel deck is complete before beginning Work.
- C. Verify that roof construction, installation of rooftop HVAC equipment, and other related work are complete before beginning Work.
- D. Conduct tests according to sprayed fire-resistive material manufacturer's written instructions to verify that substrates are free of substances capable of interfering with bond.
- E. Prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.
- F. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Cover other work subject to damage from fallout or overspray of fire protection materials during application.
- B. Clean substrates of substances that could impair bond of fire protection.

- C. Prime substrates where included in fire-resistance design and where recommended in writing by sprayed fire-resistive material manufacturer unless compatible shop primer has been applied and is in satisfactory condition to receive fire protection.
- D. For applications visible on completion of Project, repair substrates to remove surface imperfections that could affect uniformity of texture and thickness in finished surface of fire protection. Remove minor projections and fill voids that would telegraph through fire-resistive products after application.

3.3 APPLICATION

- A. Construct fire protection assemblies that are identical to fire-resistance design indicated and products as specified, tested, and substantiated by test reports; for thickness, primers, sealers, topcoats, finishing, and other materials and procedures affecting fire protection Work.
- B. Comply with sprayed fire-resistive material manufacturer's written instructions for mixing materials, application procedures, and types of equipment used to mix, convey, and apply fire protection; as applicable to particular conditions of installation and as required to achieve fire-resistance ratings indicated.
- C. Coordinate application of fire protection with other construction to minimize need to cut or remove fire protection.
 - 1. Do not begin applying fire protection until clips, hangers, supports, sleeves, and other items penetrating fire protection are in place.
 - 2. Defer installing ducts, piping, and other items that would interfere with applying fire protection until application of fire protection is completed.
- D. Metal Decks:
 - 1. Do not apply fire protection to underside of metal deck substrates until concrete topping, if any, is completed.
 - 2. Do not apply fire protection to underside of metal roof deck until roofing is completed; prohibit roof traffic during application and drying of fire protection.
- E. Install auxiliary materials as required, as detailed, and according to fire-resistance design and sprayed fire-resistive material manufacturer's written instructions for conditions of exposure and intended use. For auxiliary materials, use attachment and anchorage devices of type recommended in writing by sprayed fire-resistive material manufacturer.
- F. Spray apply fire protection to maximum extent possible. After the spraying operation in each area, complete the coverage by trowel application or other placement method recommended in writing by sprayed fire-resistive material manufacturer.
- G. Extend fire protection in full thickness over entire area of each substrate to be protected.
- H. Install body of fire protection in a single course unless otherwise recommended in writing by sprayed fire-resistive material manufacturer.

- I. For applications over encapsulant materials, including lockdown (post-removal) encapsulants, apply fire protection that differs in color from that of encapsulant over which it is applied.
- J. Where sealers are used, apply products that are tinted to differentiate them from fire protection over which they are applied.
- K. Provide a uniform finish complying with description indicated for each type of fire protection material and matching finish approved for required mockups.
- L. Cure fire protection according to sprayed fire-resistive material manufacturer's written instructions.
- M. Do not install enclosing or concealing construction until after fire protection has been applied, inspected, and tested and corrections have been made to deficient applications.
- N. Finishes: Where indicated, apply fire protection to produce the following finishes:
 - 1. Manufacturer's Standard Finishes: Finish according to manufacturer's written instructions for each finish selected.
 - 2. Spray-Textured Finish: Finish left as spray applied with no further treatment.

3.4 FIELD QUALITY CONTROL

- A. Special Inspections: Owner will engage a qualified special inspector to perform the following special inspections:
 - 1. Test and inspect as required by the IBC, as indicated on Schedule of Special Inspections.
- B. Perform the tests and inspections of completed Work in successive stages. Do not proceed with application of fire protection for the next area until test results for previously completed applications of fire protection show compliance with requirements. Tested values must equal or exceed values as specified and as indicated and required for approved fire-resistance design.
- C. Fire protection will be considered defective if it does not pass tests and inspections.
 - 1. Remove and replace fire protection that does not pass tests and inspections, and retest.
 - 2. Apply additional fire protection, per manufacturer's written instructions, where test results indicate insufficient thickness, and retest.
- D. Prepare test and inspection reports.

3.5 CLEANING

- A. Cleaning: Immediately after completing spraying operations in each containable area of Project, remove material overspray and fallout from surfaces of other construction and clean exposed surfaces to remove evidence of soiling.

3.6 PROTECTION

- A. Protect fire protection, according to advice of manufacturer and Installer, from damage resulting from construction operations or other causes, so fire protection is without damage or deterioration at time of Substantial Completion.

3.7 REPAIRS

- A. As installation of other construction proceeds, inspect fire protection and repair damaged areas and fire protection removed due to work of other trades.
- B. Repair fire protection damaged by other work before concealing it with other construction.
- C. Repair fire protection by reapplying it using same method as original installation or using manufacturer's recommended trowel-applied product.

END OF SECTION 078100

SECTION 078413 - PENETRATION FIRESTOPPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:

- 1. Penetration firestopping systems for the following applications:

- a. Penetrations in fire-resistance-rated walls.
 - b. Penetrations in horizontal assemblies.
 - c. Penetrations in smoke barriers and partitions.

- B. Related Requirements:

- 1. Section 078443 "Joint Firestopping" for joints in or between fire-resistance-rated construction and in smoke barriers and partitions.

1.3 PREINSTALLATION MEETINGS

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

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.

- B. Sustainable Design Submittals:

- 1. Product Data: For sealants, indicating VOC content.

- C. Product Schedule: For each penetration firestopping system. Include location, illustration of firestopping system, and design designation of qualified testing and inspecting agency.

- 1. Engineering Judgments: Where Project conditions require modification to a qualified testing and inspecting agency's illustration for a particular penetration firestopping system, submit illustration, with modifications marked, approved by penetration firestopping system manufacturer's fire-protection engineer as an engineering judgment or equivalent fire-resistance-rated assembly. Obtain approval of authorities having jurisdiction prior to submittal.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.
- B. Product Test Reports: For each penetration firestopping system, for tests performed by a qualified testing agency.

1.6 CLOSEOUT SUBMITTALS

- A. Installer Certificates: From Installer indicating that penetration firestopping systems have been installed in compliance with requirements and manufacturer's written instructions.

1.7 QUALITY ASSURANCE

- A. Installer Qualifications: Engage a single firestop specialty contractor to install penetration firestopping and joint firestopping. Firm shall have a minimum of three years' experience with projects of similar scope and extent and is certified, licensed or otherwise qualified as having the necessary training to select and install firestopping in accordance with the manufacturer's recommendations and requirements of qualified testing agency. Firm shall have at least one of the following qualifications:
 - 1. FM 4991 Approved Contractor
 - 2. UL Approved Contractor
 - 3. Hilti Accredited Fire Stop Specialty Contractor
 - 4. or other manufacturer certification of equivalent training as approved by Architect.
- B. A supplier's willingness to sell its firestopping products to the Contractor or to an Installer engaged by the Contractor does not in itself confer qualification on the buyer.

1.8 PROJECT CONDITIONS

- A. Environmental Limitations: Do not install penetration firestopping system when ambient or substrate temperatures are outside limits permitted by penetration firestopping system manufacturers or when substrates are wet because of rain, frost, condensation, or other causes.
- B. Install and cure penetration firestopping materials per manufacturer's written instructions using natural means of ventilations or, where this is inadequate, forced-air circulation.

1.9 COORDINATION

- A. Coordinate construction of openings and penetrating items to ensure that penetration firestopping systems can be installed according to specified firestopping system design.
- B. Coordinate sizing of sleeves, openings, core-drilled holes, or cut openings to accommodate penetration firestopping systems.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Fire-Test-Response Characteristics:

1. Perform penetration firestopping system tests by a qualified testing agency acceptable to authorities having jurisdiction.
2. Test per testing standards referenced in "Penetration Firestopping Systems" Article. Provide rated systems complying with the following requirements:
 - a. Penetration firestopping systems shall bear classification marking of a qualified testing agency.
 - 1) UL in its "Fire Resistance Directory."
 - 2) Intertek Group in its "Directory of Listed Building Products."
 - 3) FM Approval in its "Approval Guide."

2.2 PENETRATION FIRESTOPPING SYSTEMS

- A. Sole Source: Provide penetration firestopping systems and joint firestopping from a single source from a single manufacturer.
- B. Penetration Firestopping Systems: Systems that resist spread of fire, passage of smoke and other gases, and maintain original fire-resistance rating of construction penetrated. Penetration firestopping systems shall be compatible with one another, with the substrates forming openings, and with penetrating items if any.
 1. Subject to compliance with requirements, provide products by one of the following:
 - a. 3M Fire Protection Products.
 - b. Hilti, Inc.
 - c. Specified Technology Inc.
 - d. Tremco, Inc.
- C. Penetrations in Fire-Resistance-Rated Walls: Penetration firestopping systems with ratings determined per ASTM E814 or UL 1479, based on testing at a positive pressure differential of 0.01-inch wg.
 1. F-Rating: Not less than the fire-resistance rating of constructions penetrated.
- D. Penetrations in Horizontal Assemblies: Penetration firestopping systems with ratings determined per ASTM E814 or UL 1479, based on testing at a positive pressure differential of 0.01-inch wg.
 1. F-Rating: At least one hour, but not less than the fire-resistance rating of constructions penetrated.

2. T-Rating: At least one hour, but not less than the fire-resistance rating of constructions penetrated except for floor penetrations within the cavity of a wall.
 3. W-Rating: Provide penetration firestopping systems showing no evidence of water leakage when tested according to UL 1479.
- E. Penetrations in Smoke Barriers and Partitions: Penetration firestopping systems with ratings determined per UL 1479, based on testing at a positive pressure differential of 0.30-inch wg.
1. L-Rating: Not exceeding 5.0 cfm/sq. ft. of penetration opening at and no more than 50-cfm cumulative total for any 100 sq. ft. at both ambient and elevated temperatures.
- F. Exposed Penetration Firestopping Systems: Flame-spread and smoke-developed indexes of less than 25 and 450, respectively, per ASTM E84.
- G. Manufactured Piping Penetration Firestopping System: Penetration firestopping systems with ratings determined per ASTM E814 or UL 1479, based on testing at a positive pressure differential of 0.01-inch wg.
1. F-Rating: At least one hour, but not less than the fire-resistance rating of constructions penetrated.
 2. T-Rating: At least one hour, but not less than the fire-resistance rating of constructions penetrated except for floor penetrations within the cavity of a wall.
 3. W-Rating: Provide penetration firestopping systems showing no evidence of water leakage when tested according to UL 1479.
 4. Sleeve: Molded-PVC plastic, of length to match slab thickness and with integral nailing flange on one end for installation in cast-in-place concrete slabs.
 5. Stack Fitting: ASTM A48/A48M, gray-iron, hubless-pattern wye branch with neoprene O-ring at base and gray-iron plug in thermal-release harness. Include PVC protective cap for plug.
 6. Special Coating: Corrosion resistant on interior of fittings.
- H. Accessories: Provide components for each penetration firestopping system that are needed to install fill materials and to maintain ratings required. Use only those components specified by penetration firestopping system manufacturer and approved by qualified testing and inspecting agency for conditions indicated.
1. Permanent forming/damming/backing materials.
 2. Substrate primers.
 3. Collars.
 4. Steel sleeves.

2.3 FILL MATERIALS

- A. Cast-in-Place Firestop Devices: Factory-assembled devices for use in cast-in-place concrete floors and consisting of an outer sleeve lined with an intumescent strip, a flange attached to one end of the sleeve for fastening to concrete formwork, and a neoprene gasket.
- B. Latex Sealants: Single-component latex formulations that do not re-emulsify after cure during exposure to moisture.

1. VOC Content: Not to exceed 250 g/L.
- C. Firestop Devices: Factory-assembled collars formed from galvanized steel and lined with intumescent material sized to fit specific diameter of penetrant.
- D. Intumescent Composite Sheets: Rigid panels consisting of aluminum-foil-faced intumescent elastomeric sheet bonded to galvanized-steel sheet.
- E. Intumescent Putties: Nonhardening, water-resistant, intumescent putties containing no solvents or inorganic fibers.
- F. Intumescent Wrap Strips: Single-component intumescent elastomeric sheets with aluminum foil on one side.
- G. Mortars: Prepackaged dry mixes consisting of a blend of inorganic binders, hydraulic cement, fillers and lightweight aggregate formulated for mixing with water at Project site to form a nonshrinking, homogeneous mortar.
- H. Pillows/Bags: Reusable heat-expanding pillows/bags consisting of glass-fiber cloth cases filled with a combination of mineral-fiber, water-insoluble expansion agents, and fire-retardant additives. Where exposed, cover openings with steel-reinforcing wire mesh to protect pillows/bags from being easily removed.
- I. Silicone Foams: Multicomponent, silicone-based liquid elastomers that, when mixed, expand and cure in place to produce a flexible, nonshrinking foam.
- J. Silicone Sealants: Single-component, silicone-based, neutral-curing elastomeric sealants.
 1. VOC Content: Not to exceed 250 g/L.

2.4 MIXING

- A. Penetration Firestopping Materials: For those products requiring mixing before application, comply with penetration firestopping system manufacturer's written instructions for accurate proportioning of materials, water (if required), type of mixing equipment, selection of mixer speeds, mixing containers, mixing time, and other items or procedures needed to produce products of uniform quality with optimum performance characteristics for application indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Installer present, for compliance with requirements for opening configurations, penetrating items, substrates, and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Surface Cleaning: Before installing penetration firestopping systems, clean out openings immediately to comply with manufacturer's written instructions and with the following requirements:
 - 1. Remove from surfaces of opening substrates and from penetrating items foreign materials that could interfere with adhesion of penetration firestopping materials.
 - 2. Clean opening substrates and penetrating items to produce clean, sound surfaces capable of developing optimum bond with penetration firestopping materials. Remove loose particles remaining from cleaning operation.
 - 3. Remove laitance and form-release agents from concrete.
- B. Prime substrates where recommended in writing by manufacturer using that manufacturer's recommended products and methods. Confine primers to areas of bond; do not allow spillage and migration onto exposed surfaces.

3.3 INSTALLATION

- A. General: Install penetration firestopping systems to comply with manufacturer's written installation instructions and published drawings for products and applications.
- B. Install forming materials and other accessories of types required to support fill materials during their application and in the position needed to produce cross-sectional shapes and depths required to achieve fire ratings.
 - 1. After installing fill materials and allowing them to fully cure, remove combustible forming materials and other accessories not forming permanent components of firestopping.
- C. Install fill materials by proven techniques to produce the following results:
 - 1. Fill voids and cavities formed by openings, forming materials, accessories and penetrating items to achieve required fire-resistance ratings.
 - 2. Apply materials so they contact and adhere to substrates formed by openings and penetrating items.
 - 3. For fill materials that will remain exposed after completing the Work, finish to produce smooth, uniform surfaces that are flush with adjoining finishes.

3.4 IDENTIFICATION

- A. Wall Identification: Permanently label walls containing penetration firestopping systems with the words "FIRE AND/OR SMOKE BARRIER - PROTECT ALL OPENINGS," using lettering not less than 3 inches high and with minimum 0.375-inch strokes.
 - 1. Locate in accessible concealed floor, floor-ceiling, or attic space at 15 feet from end of wall and at intervals not exceeding 30 feet.

- B. Penetration Identification: Identify each penetration firestopping system with legible metal or plastic labels. Attach labels permanently to surfaces adjacent to and within 6 inches of penetration firestopping system edge so labels are visible to anyone seeking to remove penetrating items or firestopping systems. Use mechanical fasteners or self-adhering-type labels with adhesives capable of permanently bonding labels to surfaces on which labels are placed. Include the following information on labels:
1. The words "Warning - Penetration Firestopping - Do Not Disturb. Notify Building Management of Any Damage."
 2. Contractor's name, address, and phone number.
 3. Designation of applicable testing and inspecting agency.
 4. Date of installation.
 5. Manufacturer's name.
 6. Installer's name.

3.5 FIELD QUALITY CONTROL

- A. Owner will engage a qualified testing agency to perform tests and inspections according to ASTM E2174.
- B. Where deficiencies are found or penetration firestopping system is damaged or removed because of testing, repair or replace penetration firestopping system to comply with requirements.
- C. Proceed with enclosing penetration firestopping systems with other construction only after inspection reports are issued and installations comply with requirements.

3.6 CLEANING AND PROTECTION

- A. Clean off excess fill materials adjacent to openings as the Work progresses by methods and with cleaning materials that are approved in writing by penetration firestopping system manufacturers and that do not damage materials in which openings occur.
- B. Provide final protection and maintain conditions during and after installation that ensure that penetration firestopping systems are without damage or deterioration at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, immediately cut out and remove damaged or deteriorated penetration firestopping material and install new materials to produce systems complying with specified requirements.

END OF SECTION 078413

SECTION 078443 - JOINT FIRESTOPPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:

- 1. Joints in or between fire-resistance-rated constructions.
 - 2. Joints in smoke barriers and partitions.

- B. Related Requirements:

- 1. Section 078413 "Penetration Firestopping" for penetrations in fire-resistance-rated walls, horizontal assemblies, and smoke barriers and partitions and for wall identification.
 - 2. Section 092216 "Non-Structural Metal Framing" for firestop tracks for metal-framed partition heads.

1.3 PREINSTALLATION MEETINGS

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

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.

- B. Product Schedule: For each joint firestopping system. Include location, illustration of firestopping system, and design designation of qualified testing agency.

- 1. Engineering Judgments: Where Project conditions require modification to a qualified testing agency's illustration for a particular joint firestopping system condition, submit illustration, with modifications marked, approved by joint firestopping system manufacturer's fire-protection engineer as an engineering judgment or equivalent fire-resistance-rated assembly.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.

- B. Product Test Reports: For each joint firestopping system, for tests performed by a qualified testing agency.

1.6 CLOSEOUT SUBMITTALS

- A. Installer Certificates: From Installer indicating that joint firestopping systems have been installed in compliance with requirements and manufacturer's written instructions.

1.7 QUALITY ASSURANCE

- A. Installer Qualifications: Engage a single firestop specialty contractor to install penetration firestopping and joint firestopping. Firm shall have a minimum of three years' experience with projects of similar scope and extent and is certified, licensed or otherwise qualified as having the necessary training to select and install firestopping in accordance with the manufacturer's recommendations and requirements of qualified testing agency. Firm shall have at least one of the following qualifications:
 - 1. FM 4991 Approved Contractor
 - 2. UL Approved Contractor
 - 3. Hilti Accredited Fire Stop Specialty Contractor
 - 4. or other manufacturer certification of equivalent training as approved by Architect.
- B. A supplier's willingness to sell its firestopping products to the Contractor or to an Installer engaged by the Contractor does not in itself confer qualification on the buyer.

1.8 PROJECT CONDITIONS

- A. Environmental Limitations: Do not install joint firestopping systems when ambient or substrate temperatures are outside limits permitted by joint firestopping system manufacturers or when substrates are wet due to rain, frost, condensation, or other causes.
- B. Install and cure joint firestopping systems per manufacturer's written instructions using natural means of ventilation or, where this is inadequate, forced-air circulation.

1.9 COORDINATION

- A. Coordinate construction of joints to ensure that joint firestopping systems can be installed according to specified firestopping system design.
- B. Coordinate sizing of joints to accommodate joint firestopping systems.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Fire-Test-Response Characteristics:

1. Perform joint firestopping system tests by a qualified testing agency acceptable to authorities having jurisdiction.
2. Test per testing standards referenced in "Joint Firestopping Systems" Article. Provide rated systems complying with the following requirements:
 - a. Joint firestopping systems shall bear classification marking of a qualified testing agency.
 - 1) UL in its "Fire Resistance Directory."
 - 2) Intertek Group in its "Directory of Listed Building Products."

2.2 JOINT FIRESTOPPING SYSTEMS

- A. Sole Source: Provide penetration firestopping systems and joint firestopping from a single source from a single manufacturer.
- B. Joint Firestopping Systems: Systems that resist spread of fire, passage of smoke and other gases, and maintain original fire-resistance rating of assemblies in or between which joint firestopping systems are installed. Joint firestopping systems shall accommodate building movements without impairing their ability to resist the passage of fire and hot gases.
 1. Subject to compliance with requirements, provide products by one of the following:
 - a. 3M Fire Protection Products.
 - b. Hilti, Inc.
 - c. Specified Technology Inc.
 - d. Tremco, Inc.
- C. Joints in or between Fire-Resistance-Rated Construction: Provide joint firestopping systems with ratings determined per ASTM E1966 or UL 2079.
 1. Fire-Resistance Rating: Equal to or exceeding the fire-resistance rating of the wall, floor, or roof in or between which it is installed.
- D. Joints in Smoke Barriers and Partitions: Provide joint firestopping systems with ratings determined per UL 2079 based on testing at a positive pressure differential of 0.30-inch wg.
 1. L-Rating: Not exceeding 5.0 cfm/ft. of joint at both ambient and elevated temperatures.
- E. Exposed Joint Firestopping Systems: Flame-spread and smoke-developed indexes of less than 25 and 450, respectively, as determined per ASTM E84.
- F. Accessories: Provide components of joint firestopping systems, including primers and forming materials, that are needed to install elastomeric fill materials and to maintain ratings required.

Use only components specified by joint firestopping system manufacturer and approved by the qualified testing agency for conditions indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Installer present, for compliance with requirements for joint configurations, substrates, and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Surface Cleaning: Before installing joint firestopping systems, clean joints immediately to comply with fire-resistive joint system manufacturer's written instructions and the following requirements:
 - 1. Remove from surfaces of joint substrates foreign materials that could interfere with adhesion of elastomeric fill materials or compromise fire-resistive rating.
 - 2. Clean joint substrates to produce clean, sound surfaces capable of developing optimum bond with elastomeric fill materials. Remove loose particles remaining from cleaning operation.
 - 3. Remove laitance and form-release agents from concrete.
- B. Prime substrates where recommended in writing by joint firestopping system manufacturer using that manufacturer's recommended products and methods. Confine primers to areas of bond; do not allow spillage and migration onto exposed surfaces.

3.3 INSTALLATION

- A. General: Install joint firestopping systems to comply with manufacturer's written installation instructions and published drawings for products and applications indicated.
- B. Install forming materials and other accessories of types required to support elastomeric fill materials during their application and in position needed to produce cross-sectional shapes and depths required to achieve fire ratings indicated.
 - 1. After installing elastomeric fill materials and allowing them to fully cure, remove combustible forming materials and other accessories not indicated as permanent components of fire-resistive joint system.
- C. Install elastomeric fill materials for joint firestopping systems by proven techniques to produce the following results:

1. Elastomeric fill voids and cavities formed by joints and forming materials as required to achieve fire-resistance ratings indicated.
2. Apply elastomeric fill materials so they contact and adhere to substrates formed by joints.
3. For elastomeric fill materials that will remain exposed after completing the Work, finish to produce smooth, uniform surfaces that are flush with adjoining finishes.

3.4 IDENTIFICATION

- A. Joint Identification: Identify joint firestopping systems with legible metal or plastic labels. Attach labels permanently to surfaces adjacent to and within 6 inches of joint edge so labels are visible to anyone seeking to remove or joint firestopping system. Use mechanical fasteners or self-adhering-type labels with adhesives capable of permanently bonding labels to surfaces on which labels are placed. Include the following information on labels:
 1. The words "Warning - Joint Firestopping - Do Not Disturb. Notify Building Management of Any Damage."
 2. Contractor's name, address, and phone number.
 3. Designation of applicable testing agency.
 4. Date of installation.
 5. Manufacturer's name.
 6. Installer's name.

3.5 FIELD QUALITY CONTROL

- A. Inspecting Agency: Owner will engage a qualified testing agency to perform tests and inspections according to ASTM E2393.
- B. Where deficiencies are found or joint firestopping systems are damaged or removed due to testing, repair or replace joint firestopping systems so they comply with requirements.
- C. Proceed with enclosing joint firestopping systems with other construction only after inspection reports are issued and installations comply with requirements.

3.6 CLEANING AND PROTECTION

- A. Clean off excess elastomeric fill materials adjacent to joints as the Work progresses by methods and with cleaning materials that are approved in writing by joint firestopping system manufacturers and that do not damage materials in which joints occur.
- B. Provide final protection and maintain conditions during and after installation that ensure joint firestopping systems are without damage or deterioration at time of Substantial Completion. If damage or deterioration occurs despite such protection, cut out and remove damaged or deteriorated joint firestopping systems immediately and install new materials to produce joint firestopping systems complying with specified requirements.

END OF SECTION 078443

SECTION 079200 - JOINT SEALANTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Silicone joint sealants.
 - 2. Nonstaining silicone joint sealants.
 - 3. Urethane joint sealants..
 - 4. Mildew-resistant joint sealants.
 - 5. Butyl joint sealants.
 - 6. Latex joint sealants.
 - 7. Acoustical joint sealants.

1.3 PREINSTALLATION MEETINGS

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

1.4 ACTION SUBMITTALS

- A. Product Data: For each joint-sealant product.
- B. Sustainable Design Submittals:
 - 1. Product Data: For sealants, indicating VOC content.
- C. Samples for Initial Selection: Manufacturer's color charts consisting of strips of cured sealants showing the full range of colors available for each product exposed to view.
- D. Samples for Verification: For each kind 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.
- E. 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.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For qualified testing agency.
- B. Product Test Reports: For each kind of joint sealant, for tests performed by manufacturer and witnessed by a qualified testing agency.
- C. Preconstruction Laboratory Test Schedule: Include the following information for each joint sealant and substrate material to be tested:
 1. Joint-sealant location and designation.
 2. Manufacturer and product name.
 3. Type of substrate material.
 4. Proposed test.
 5. Number of samples required.
- D. Preconstruction Laboratory Test Reports: From sealant manufacturer, indicating the following:
 1. Materials forming joint substrates and joint-sealant backings have been tested for compatibility and adhesion with joint sealants.
 2. Interpretation of test results and written recommendations for primers and substrate preparation are needed for adhesion.
- E. Preconstruction Field-Adhesion-Test Reports: Indicate which sealants and joint preparation methods resulted in optimum adhesion to joint substrates based on testing specified in "Preconstruction Testing" Article.
- F. Field-Adhesion-Test Reports: For each sealant application tested.
- G. Sample Warranties: For special warranties.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: An authorized representative who is trained and approved by manufacturer.
- B. Product Testing: Test joint sealants using a qualified testing agency.
 1. Testing Agency Qualifications: Qualified according to ASTM C1021 to conduct the testing indicated.
- C. Mockups: Install sealant in mockups of assemblies specified in other Sections that are indicated to receive joint sealants specified in this Section. Use materials and installation methods specified in this Section.

1.7 PRECONSTRUCTION TESTING

- A. Preconstruction Laboratory Testing: If joint-sealant manufacturers cannot submit data that are based on previous testing, not older than 24 months, of sealant products for adhesion to, staining of, and compatibility with joint substrates and other materials matching those submitted, submit samples of materials for the testing indicated below:
1. Adhesion Testing: Use ASTM C794 to determine whether priming and other specific joint preparation techniques are required to obtain rapid, optimum adhesion of joint sealants to joint substrates.
 2. Compatibility Testing: Use ASTM C1087 to determine sealant compatibility when in contact with glazing and gasket materials.
 3. Stain Testing: Use ASTM C1248 to determine stain potential of sealant when in contact with masonry substrates.
 4. Submit manufacturer's recommended number of pieces of each type of material, including joint substrates, joint-sealant backings, and miscellaneous materials.
 5. Schedule sufficient time for testing and analyzing results to prevent delaying the Work.
 6. For materials failing tests, obtain joint-sealant manufacturer's written instructions for corrective measures, including use of specially formulated primers.
- B. Preconstruction Field-Adhesion Testing: Before installing sealants, field test their adhesion to Project joint substrates as follows:
1. Locate test joints where indicated on Project or, if not indicated, as directed by Architect.
 2. Conduct field tests for each kind of sealant and joint substrate.
 3. Notify Architect seven days in advance of dates and times when test joints will be erected.
 4. Arrange for tests to take place with joint-sealant manufacturer's technical representative present.
 - a. Test Method: Test joint sealants according to Method A, Field-Applied Sealant Joint Hand Pull Tab, in Appendix X1.1 in ASTM C1193 or Method A, Tail Procedure, in ASTM C1521.
 - 1) For joints with dissimilar substrates, verify adhesion to each substrate separately; extend cut along one side, verifying adhesion to opposite side. Repeat procedure for opposite side.
 5. Report whether sealant failed to adhere to joint substrates or tore cohesively. Include data on pull distance used to test each kind of product and joint substrate. For sealants that fail adhesively, retest until satisfactory adhesion is obtained.
 6. Evaluation of Preconstruction Field-Adhesion-Test Results: Sealants not evidencing adhesive failure from testing, in absence of other indications of noncompliance with requirements, will be considered satisfactory. Do not use sealants that fail to adhere to joint substrates during testing.

1.8 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.

1.9 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 Manufacturer's Warranty: Manufacturer agrees to furnish joint sealants to repair or replace those joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.
 1. Warranty Period: Five years from date of Substantial Completion.
- C. 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 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. VOC Content: Sealants and sealant primers shall comply with the following:
 1. Architectural sealants shall have a VOC content of 250 g/L or less.
 2. Sealants and sealant primers for nonporous substrates shall have a VOC content of 250 g/L or less.
 3. Sealants and sealant primers for porous substrates shall have a VOC content of 775 g/L or less.

- C. Provide acoustical joint-sealant products that effectively reduce airborne sound transmission through perimeter joints and openings in building construction, as demonstrated by testing representative assemblies according to ASTM E90.

2.2 NONSTAINING SILICONE JOINT SEALANTS

- A. Nonstaining Joint Sealants: No staining of substrates when tested according to ASTM C1248.
- B. Silicone, Nonstaining, S, NS, 100/50, NT: Nonstaining, single-component, nonsag, plus 100 percent and minus 50 percent movement capability, nontraffic-use, neutral-curing silicone joint sealant; ASTM C920, Type S, Grade NS, Class 100/50, Use NT.
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Pecora Corporation; Pecora 890FTS/TXTR.
 - b. Sika Corporation; Joint Sealants; Sikasil WS-290.
 - c. Tremco Incorporated; Spectrem 1.
 - d. The Dow Chemical Company; Dow Corning® 790 Silicone Building Sealant.

2.3 URETHANE JOINT SEALANTS

- A. Medium Modulus, Pourable, Traffic Grade, fuel-resistant Urethane
 - 1. Urethane, M, P, 35, T : Subject to compliance with requirements, provide the following:
 - a. Tremco; Vulkem 445SSL.
- B. Low- and Medium Modulus, Non-Sag, Traffic Grade Urethane: Provide one of the following:
 - 1. Urethane, M, NS, 50, T, NT: Multicomponent, nonsag, plus 50 percent and minus 50 percent movement capability, traffic- and nontraffic-use, urethane joint sealant; ASTM C920, Type M, Grade NS, Class 50, Uses T and NT. Products: Subject to compliance with requirements, provide the following:
 - a. Tremco Incorporated; Dymeric 240.
 - 2. Urethane, S, NS, 100/50, T, NT: Single-component, nonsag, plus 100 percent and minus 50 percent movement capability, traffic- and nontraffic-use, urethane joint sealant; ASTM C920, Type S, Grade NS, Class 100/50, Uses T and NT. Products: Subject to compliance with requirements, provide the following:
 - a. Sika; Sikaflex, 15 LM.
 - 3. Urethane, M, NS, 50, T, NT: Multicomponent, nonsag, plus 50 percent and minus 50 percent movement capability, traffic- and nontraffic-use, urethane joint sealant; ASTM C920, Type M, Grade NS, Class 50, Uses T and NT. Products: Subject to compliance with requirements, provide the following:

- a. Tremco Incorporated; Dymeric 240.
- C. Low- and Medium Modulus, Non-sag, Non-Traffic Grade Urethane: Provide one of the following:
1. Urethane, S, NS, 100/50, T, NT: Single-component, nonsag, plus 100 percent and minus 50 percent movement capability, traffic- and nontraffic-use, urethane joint sealant; ASTM C920, Type S, Grade NS, Class 100/50, Uses T and NT. Products: Subject to compliance with requirements, provide the following:
 - a. Sika; Sikaflex, 15 LM.
 2. Urethane, S, NS, 50, NT: Single-component, nonsag, plus 50 percent and minus 50 percent movement capability, traffic- and nontraffic-use, urethane joint sealant; ASTM C920, Type S, Grade NS, Class 50, Uses NT. Products: Subject to compliance with requirements, provide the following:
 - a. Tremco, Dymonic 100.
 3. Urethane, M, NS, 50, T, NT: Multicomponent, nonsag, plus 50 percent and minus 50 percent movement capability, traffic- and nontraffic-use, urethane joint sealant; ASTM C920, Type M, Grade NS, Class 50, Uses T and NT. Products: Subject to compliance with requirements, provide the following:
 - a. Tremco Incorporated; Dymeric 240.
 4. Urethane, M, NS, 50, NT: Multicomponent, nonsag, plus 50 percent and minus 50 percent movement capability nontraffic-use, urethane joint sealant; ASTM C920, Type M, Grade NS, Class 50, Use NT. Products: Subject to compliance with requirements, provide the following:
 - a. Pecora Corporation; Dynatrol II.
- D. Medium Modulus, Pourable Traffic Grade: Provide one of the following:
1. Urethane, M, P, 25, T, NT: Multicomponent, pourable, plus 25 percent and minus 25 percent movement capability, traffic- and nontraffic-use, urethane joint sealant; ASTM C920, Type M, Grade P, Class 25, Uses T and NT. Products: Subject to compliance with requirements, provide one of the following:
 - a. BASF Corporation; MasterSeal SL 2 (Pre-2014: Sonolastic SL2).
 - b. Bostik, Inc; Chem-Calk 555-SL.
 - c. Pecora Corporation; Dynatrol II SG.
 - d. Sherwin-Williams Company (The); Stampede-2SL.
 - e. Sika Corporation Joint Sealants; Sikaflex 2c SL.
 - f. Tremco Incorporated; THC 900/901.

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, single-component, nonsag, plus 25 percent and minus 25 percent movement capability, nontraffic-use, acid-curing silicone joint sealant; ASTM C920, Type S, Grade NS, Class 25, Use NT.
1. Products: Subject to compliance with requirements, provide one of the following:
 - a. GE Construction Sealants; Momentive Performance Materials Inc.; SCS1700 Sanitary.
 - b. Pecora Corporation; Pecora 860.
 - c. The Dow Chemical Company; DOW CORNING® 786 SILICONE SEALANT -.
 - d. Tremco Incorporated; Tremsil 200.

2.5 ACOUSTICAL JOINT SEALANTS

- A. Acoustical Sealant for Exposed and Concealed Joints: Manufacturer's standard nonsag, paintable, nonstaining latex acoustical sealant complying with ASTM C834.
1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Owens Corning; Quiet Zone Acoustic Sealant.
 - b. Pecora; AC-20 FTR.
 - c. St. Gobain Green Glue Noiseproofing Sealant.
 - d. Tremco; Acoustical Curtainwall Sealant.
 - e. USG; sheetrock Brand Acoustical Sealant.
 2. Colors of Exposed Acoustical Joint Sealants: As selected by Architect from manufacturer's full range of colors.

2.6 BUTYL JOINT SEALANTS

- A. Butyl-Rubber-Based Joint Sealants: ASTM C1311.
1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Bostik, Inc; Chem-Calk 300.
 - b. Tremco; Butyl Sealant.
 - c. Pecora Corporation; BC-158.

2.7 LATEX JOINT SEALANTS

- A. Acrylic Latex: Acrylic latex or siliconized acrylic latex, ASTM C834, Type OP, Grade NF.
1. Products: Subject to compliance with requirements, provide one of the following:
 - a. May National Associates, Inc.; a subsidiary of Sika Corporation; Bondaflex 600.
 - b. Pecora Corporation; AC-20.
 - c. Sherwin-Williams Company (The); 850A Siliconized Acrylic Latex Caulk.

- d. Tremco Incorporated; Tremflex 834.

2.8 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.
- B. Cylindrical Sealant Backings: ASTM C1330, Type C (closed-cell material with a surface skin) , 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.

2.9 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.
 3. Remove laitance and form-release agents from concrete.
 4. Clean nonporous joint substrate surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants. Nonporous joint substrates include the following:
 - a. Metal.
 - b. Glass.
 - c. Glazed surfaces of ceramic tile.
- B. Joint Priming: Prime joint substrates where recommended by joint-sealant manufacturer or as indicated by preconstruction joint-sealant-substrate tests or prior experience. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.
- C. Masking Tape: Use masking tape where required to prevent contact of sealant or primer with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

3.3 INSTALLATION OF JOINT SEALANTS

- A. General: Comply with joint-sealant manufacturer's written installation instructions for products and applications indicated, unless more stringent requirements apply.
- B. Sealant Installation Standard: Comply with recommendations in ASTM C1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.
- C. Install sealant backings of kind indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.
 1. Do not leave gaps between ends of sealant backings.
 2. Do not stretch, twist, puncture, or tear sealant backings.
 3. Remove absorbent sealant backings that have become wet before sealant application, and replace them with dry materials.

- D. Install bond-breaker tape behind sealants where sealant backings are not used between sealants and backs of joints.
- E. Install sealants using proven techniques that comply with the following and at the same time backings are installed:
 - 1. Place sealants so they directly contact and fully wet joint substrates.
 - 2. Completely fill recesses in each joint configuration.
 - 3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.
- F. Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants according to requirements specified in subparagraphs below to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.
 - 1. Remove excess sealant from surfaces adjacent to joints.
 - 2. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces.
 - 3. Provide concave joint profile per Figure 8A in ASTM C1193 unless otherwise indicated.

3.4 FIELD QUALITY CONTROL

- A. Field-Adhesion Testing: Field test joint-sealant adhesion to joint substrates as follows:
 - 1. Extent of Testing: Test completed and cured sealant joints as follows:
 - a. Perform 8 tests for the first 1000 feet of joint length for each kind of sealant and joint substrate.
 - b. Perform one test for each 1000 feet of joint length thereafter or one test per each floor per elevation.
 - 2. Test Method: Test joint sealants according to Method A, Field-Applied Sealant Joint Hand Pull Tab, in Appendix X1 in ASTM C1193 or Method A, Tail Procedure, in ASTM C1521.
 - a. For joints with dissimilar substrates, verify adhesion to each substrate separately; extend cut along one side, verifying adhesion to opposite side. Repeat procedure for opposite side.
 - 3. Inspect tested joints and report on the following:
 - a. Whether sealants filled joint cavities and are free of voids.
 - b. Whether sealant dimensions and configurations comply with specified requirements.
 - c. Whether sealants in joints connected to pulled-out portion failed to adhere to joint substrates or tore cohesively. Include data on pull distance used to test each kind of product and joint substrate. Compare these results to determine if adhesion complies with sealant manufacturer's field-adhesion hand-pull test criteria.

4. Record test results in a field-adhesion-test log. Include dates when sealants were installed, names of persons who installed sealants, test dates, test locations, whether joints were primed, adhesion results and percent elongations, sealant material, sealant configuration, and sealant dimensions.
5. Repair sealants pulled from test area by applying new sealants following same procedures used originally to seal joints. Ensure that original sealant surfaces are clean and that new sealant contacts original sealant.

- B. Evaluation of Field-Adhesion-Test Results: Sealants not evidencing adhesive failure from testing or noncompliance with other indicated requirements will be considered satisfactory. Remove sealants that fail to adhere to joint substrates during testing or to comply with other requirements. Retest failed applications until test results prove sealants comply with indicated requirements.

3.5 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.

3.6 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.

3.7 JOINT-SEALANT SCHEDULE

- A. Exterior joints in vertical surfaces and horizontal nontraffic surfaces: Low Modulus, non-staining, non-sag Silicone.
1. Joint Locations:
 - a. Construction joints in cast-in-place concrete.
 - b. Control and expansion joints in unit masonry.
 - c. Joints between metal panels.
 - d. Joints between different materials listed above.
 - e. Perimeter joints between materials listed above and frames of doors, windows, and louvers.
 - f. Control and expansion joints in ceilings and other overhead surfaces.
 - g. Other joints as indicated on Drawings.
 2. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.
- B. Exterior joints in horizontal traffic surfaces: Low- or Medium-Modulus, Non-sag Urethane.

1. Joint Locations:
 - a. Isolation and contraction joints in cast-in-place concrete slabs.
 - b. Other joints as indicated on Drawings.
 2. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.
- C. Interior joints in vertical surfaces and horizontal nontraffic surfaces: Low or medium modulus, Non-sag, Non-Traffic Grade Urethane.
1. Joint Locations:
 - a. Control and expansion joints on exposed interior surfaces of exterior walls.
 - b. Tile control and expansion joints.
 - c. Vertical joints on exposed surfaces of unit masonry.
 - d. Other joints as indicated on Drawings.
 2. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.
- D. Interior joints in horizontal traffic surfaces: Medium modulus pourable Urethane.
1. Joint Locations:
 - a. Isolation joints in cast-in-place concrete slabs.
 - b. Control and expansion joints in tile flooring.
 - c. Other joints as indicated on Drawings.
 2. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.
- E. Interior joints in vertical surfaces and horizontal nontraffic surfaces not subject to significant movement: Acrylic latex.
1. Joint Locations:
 - a. Control joints on exposed interior surfaces of exterior walls.
 - b. Perimeter joints between interior wall surfaces and frames of interior doors windows and elevator entrances.
 - c. Joints between interior wall surfaces and cabinets.
 - d. Other joints as indicated on Drawings.
 2. Joint-Sealant Color: Paintable white.
- F. Interior joints in vertical surfaces and horizontal nontraffic surfaces subject to excess moisture: Mildew-resistant Silicone.
1. Joint Locations:
 - a. Joints between plumbing fixtures and adjoining walls, floors, and counters.
 - b. Tile control and expansion joints in wet areas.
 - c. Other joints as indicated on Drawings.
 2. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.
- G. Joints in sound-rated assemblies: Acoustical Sealant.

1. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.
- H. Concealed mastics: Butyl-rubber based.
1. Joint Locations:
 - a. Aluminum thresholds.
 - b. Sill plates.
 - c. Other joints as indicated on Drawings.

END OF SECTION 079200

SECTION 079513 - EXPANSION JOINT COVER ASSEMBLIES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes exterior and interior expansion joint cover assemblies.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for expansion joint cover assemblies.
- B. Shop Drawings: For each expansion joint cover assembly.
 - 1. Include plans, elevations, sections, details, splices, block-out requirement, attachments to other work, and line diagrams showing entire route of each expansion joint.
 - 2. Where expansion joint cover assemblies change planes, provide isometric or clearly detailed drawing depicting how components interconnect.
- C. Samples: For each expansion joint cover assembly and for each color and texture specified, full width by 6 inches long in size.

PART 2 - PRODUCTS

2.1 ASSEMBLY DESCRIPTION

- A. Furnish units in longest practicable lengths to minimize field splicing.
- B. Include factory-fabricated closure materials and transition pieces, T-joints, corners, curbs, cross-connections, and other accessories as required to provide continuous expansion joint cover assemblies.
- C. Manufacturers: Subject to compliance with requirements, provide basis of design or comparable products by one of the following:
 - 1. Balco.
 - 2. BASF Corp.
 - 3. Construction Specialties.
 - 4. Inpro Corporation.
 - 5. MM System Corporation.

2.2 PERFORMANCE REQUIREMENTS

- A. Seismic Performance: Expansion joint cover assemblies to withstand the effects of earthquake motions determined according to ASCE/SEI 7.
- B. Fire-Resistance Ratings: Not Required.
- C. Expansion Joint Design Criteria: Nominal width, expansion capability as indicated on Drawings.
 - 1. Seismic Movement:
 - a. Joint Movement: As indicated on Drawings.

2.3 EXTERIOR EXPANSION JOINT COVERS

- A. Exterior Elastomeric-Seal Joint Cover **EJ-1**: Assembly consisting of elastomeric seal anchored to surface-mounted frames fixed to sides of joint gap.
 - 1. Basis of Design: Balco FCVS-2.
 - 2. Application: Wall to wall
 - 3. Installation: Recessed.
 - 4. Exposed Metal:
 - a. Aluminum: Mill.
 - 5. Seal: Preformed elastomeric membrane or extrusion.
 - a. Color: As selected by Architect from manufacturer's full range.
- B. Exterior Elastomeric-Seal Joint Cover **EJ-2**: Assembly consisting of elastomeric seal anchored to surface-mounted frames fixed to sides of joint gap.
 - 1. Basis of Design: Balco FCVS-2.
 - 2. Application: Soffit to soffit.
 - 3. Installation: Recessed.
 - 4. Exposed Metal:
 - a. Aluminum: Mill.
 - 5. Seal: Preformed elastomeric membrane or extrusion.
 - a. Color: As selected by Architect from manufacturer's full range.

2.4 INTERIOR EXPANSION JOINT COVERS

- A. Center-Plate Floor Joint Cover **EJ-3**: Assembly consisting of center plate that slides over metal frames fixed to sides of joint gaps.
 - 1. Basis of Design: Balco HDNB-1.5-3.
 - 2. Application: Floor to floor.
 - 3. Installation: No bump.

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4. Load Capacity:
 - a. Uniform Load: 50 lb/sq. ft..
 - b. Concentrated Load: 300 lb.
 - c. Maximum Deflection: 0.0625 inch.
 5. Cover-Plate Design: Plain.
 6. Exposed Metal: Aluminum, mill finished.
- B. Center-Plate Floor Joint Cover **EJ-4**: Assembly consisting of center plate that slides over metal frames fixed to sides of joint gaps.
1. Basis of Design: Balco HDNBL-2.
 2. Application: Floor to wall.
 3. Installation: No bump.
 4. Load Capacity:
 - a. Uniform Load: 50 lb/sq. ft..
 - b. Concentrated Load: 300 lb.
 - c. Maximum Deflection: 0.0625 inch.
 5. Cover-Plate Design: Plain.
 6. Exposed Metal: Aluminum, mill finished.
- C. Metal-Plate Wall Joint Cover **EJ-5**: Metal cover plate fixed on one side of joint gap and free to slide on other.
1. Basis of Design: Balco:6TWFC-1-2
 2. Application: Wall to corner.
 3. Exposed Metal:
 - a. Aluminum: Mill Clear anodic, Class I.
- D. Elastomeric-Seal Acoustical Ceiling Joint Cover **EJ-6**: Elastomeric-seal assembly designed for use in acoustical ceilings.
1. Basis of Design: C-S Group
 2. Application: Wall to ceiling.
 3. Exposed Metal:
 - a. Aluminum: Mill.
 4. Seal: Preformed elastomeric membranes or extrusions.
 - a. Color: As selected by Architect from manufacturer's full range.

2.5 MATERIALS

- A. Aluminum: ASTM B221, Alloy 6063-T5 for extrusions; ASTM B209, Alloy 6061-T6 for sheet and plate.
1. Apply manufacturer's standard protective coating on aluminum surfaces to be placed in contact with cementitious materials.

- B. Elastomeric Seals: Manufacturer's standard preformed elastomeric membranes or extrusions to be installed in metal frames.
- C. Nonmetallic, Shrinkage-Resistant Grout: ASTM C1107/C1107M, factory-packaged, nonmetallic aggregate grout, noncorrosive, nonstaining, mixed with water to consistency suitable for application and a 30-minute working time.

2.6 ALUMINUM FINISHES

- A. Mill finish.
- B. Clear Anodic Finish: AAMA 611, AA-M12C22A41, Class I, 0.018 mm or thicker.

2.7 ACCESSORIES

- A. Manufacturer's standard attachment devices. Include anchors, clips, fasteners, set screws, spacers, and other accessories compatible with material in contact, as indicated or required for complete installations.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine surfaces where expansion joint cover assemblies will be installed for installation tolerances and other conditions affecting performance of the Work.
- B. Notify Architect where discrepancies occur that will affect proper expansion joint cover assembly installation and performance.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Prepare substrates according to expansion joint cover assembly manufacturer's written instructions.
- B. Coordinate and furnish anchorages, setting drawings, and instructions for installing expansion joint cover assemblies. Provide fasteners of metal, type, and size to suit type of construction indicated and to provide for secure attachment of expansion joint cover assemblies.

3.3 INSTALLATION

- A. Comply with manufacturer's written instructions for storing, handling, and installing expansion joint cover assemblies and materials unless more stringent requirements are indicated.

- B. Metal Frames: Perform cutting, drilling, and fitting required to install expansion joint cover assemblies.
 - 1. Repair or grout block out as required for continuous frame support using nonmetallic, shrinkage-resistant grout.
 - 2. Install frames in continuous contact with adjacent surfaces.
 - a. Shimming is not permitted.
 - 3. Install in true alignment and proper relationship to joints and adjoining finished surfaces measured from established lines and levels.
 - 4. Adjust for differences between actual structural gap and nominal design gap due to ambient temperature at time of installation.
 - 5. Cut and fit ends to accommodate thermal expansion and contraction of metal without buckling of frames.
 - 6. Locate anchors at interval recommended by manufacturer, but not less than 3 inches from each end and not more than 24 inches o.c.
- C. Seals: Install elastomeric seals and membranes in frames to comply with manufacturer's written instructions. Install with minimum number of end joints.
 - 1. Provide in continuous lengths for straight sections.
 - 2. Seal transitions. Vulcanize or heat-weld field-spliced joints as recommended by manufacturer.
 - 3. Installation: Mechanically lock seals into frames or adhere to frames with adhesive or pressure-sensitive tape as recommended by manufacturer.
- D. Install with hairline mitered corners where expansion joint cover assemblies change direction or abut other materials.
- E. Terminate exposed ends of expansion joint cover assemblies with field- or factory-fabricated termination devices.

3.4 PROTECTION

- A. Do not remove protective covering until finish work in adjacent areas is complete. When protective covering is removed, clean exposed metal surfaces to comply with manufacturer's written instructions.
- B. Protect the installation from damage by work of other Sections. Where necessary due to heavy construction traffic, remove and properly store cover plates or seals and install temporary protection over expansion joint cover assemblies. Reinstall cover plates or seals prior to Substantial Completion.

END OF SECTION 079513

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. Interior standard steel doors and frames.
- B. Related Requirements:
 - 1. Section 087100 "Door Hardware" for door hardware for hollow-metal doors.

1.3 DEFINITIONS

- A. Minimum Thickness: Minimum thickness of base metal without coatings according to NAAMM-HMMA 803 or ANSI/SDI A250.8.

1.4 COORDINATION

- A. Coordinate anchorage installation for hollow-metal frames. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors. Deliver such items to Project site in time for installation.
- B. Coordinate requirements for installation of door hardware, electrified door hardware, and access control and security systems.

1.5 PREINSTALLATION MEETINGS

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

1.6 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include construction details, material descriptions, core descriptions, fire-resistance ratings, and finishes.

- B. Sustainable Design Submittals:
 - 1. Product Data: For recycled content, indicating postconsumer and preconsumer recycled content and cost.
- C. Shop Drawings: Include the following:
 - 1. Elevations of each door type.
 - 2. Details of doors, including vertical- and horizontal-edge details and metal thicknesses.
 - 3. Frame details for each frame type, including dimensioned profiles and metal thicknesses.
 - 4. Locations of reinforcement and preparations for hardware.
 - 5. Details of each different wall opening condition.
 - 6. Details of electrical raceway and preparation for electrified hardware, access control systems, and security systems.
 - 7. Details of anchorages, joints, field splices, and connections.
 - 8. Details of accessories.
 - 9. Details of moldings, removable stops, and glazing.
- D. 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.

1.7 INFORMATIONAL SUBMITTALS

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

1.8 CLOSEOUT SUBMITTALS

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

1.9 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 products by one of the following:
 - 1. Ceco Door; ASSA ABLOY.
 - 2. Curries Company; ASSA ABLOY.
 - 3. Deansteel Manufacturing Company, Inc.
 - 4. Fleming Door Products Ltd.; Assa Abloy Group Company.
 - 5. Republic Doors and Frames.
 - 6. Steelcraft; an Allegion brand.

2.2 PERFORMANCE REQUIREMENTS

- A. Fire-Rated 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 and temperature-rise limits indicated on Drawings, based on testing at positive pressure according to NFPA 252 or UL 10C.
 - 1. Smoke- and Draft-Control Door Assemblies: Listed and labeled for smoke and draft control by a qualified testing agency acceptable to authorities having jurisdiction, based on testing according to UL 1784 and installed in compliance with NFPA 105.
 - 2. Oversize Fire-Rated Door Assemblies: For units exceeding sizes of tested assemblies, provide certification by a qualified testing agency that doors comply with standard construction requirements for tested and labeled fire-rated door assemblies except for size.
- B. Fire-Rated, Borrowed-Lite Assemblies: Assemblies complying with NFPA 80 and listed and labeled by a qualified testing agency acceptable to authorities having jurisdiction, for fire-protection ratings indicated, based on testing according to NFPA 257 or UL 9.

2.3 INTERIOR STANDARD STEEL DOORS AND FRAMES

- A. Construct hollow-metal doors and frames to comply with standards indicated for materials, fabrication, hardware locations, hardware reinforcement, tolerances, and clearances, and as specified.
- B. Extra-Heavy-Duty Doors and Frames: ANSI/SDI A250.8, Level 3; ANSI/SDI A250.4, Level A.
 - 1. Doors:

- a. Type: As indicated in the Door and Frame Schedule.
 - b. Thickness: 1-3/4 inches.
 - c. Face: Uncoated steel sheet, minimum thickness of 0.053 inch, unless noted otherwise. Provide metallic coated steel sheet where indicated in Door Schedule.
 - d. Edge Construction: Model 2, Seamless.
 - e. Edge Bevel: Bevel lock and hinge edges 1/8 inch in 2 inches.
 - f. Core: Manufacturer's standard.
 - g. Fire-Rated Core: Manufacturer's standard laminated mineral board core for fire-rated doors.
2. Frames:
- a. Materials: Uncoated steel sheet, minimum thickness of 0.053 inch. Provide metallic coated steel sheet where indicated in Door Schedule.
 - b. Sidelite and Transom Frames: Fabricated from same thickness material as adjacent door frame.
 - c. Construction: Face welded.
3. Exposed Finish: Prime.

2.4 BORROWED LITES

- A. Fabricate of uncoated steel sheet, minimum thickness of 0.053 inch.
- B. Construction: Face welded.
- C. Fabricate in one piece except where handling and shipping limitations require multiple sections. Where frames are fabricated in sections due to shipping or handling limitations, provide alignment plates or angles at each joint, fabricated of metal of same or greater thickness as metal as frames.
- D. Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated.

2.5 FRAME ANCHORS

- A. Jamb Anchors:
 1. Type: Anchors of minimum size and type required by applicable door and frame standard, and suitable for performance level indicated.
 2. Quantity: Minimum of three anchors per jamb, with one additional anchor for frames with no floor anchor. Provide one additional anchor for each 24 inches of frame height above 7 feet.
 3. Postinstalled Expansion Anchor: Minimum 3/8-inch-diameter bolts with expansion shields or inserts, with manufacturer's standard pipe spacer.
- B. Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor.

- C. Floor Anchors for Concrete Slabs with Underlayment: Adjustable-type anchors with extension clips, allowing not less than 2-inch height adjustment. Terminate bottom of frames at top of underlayment.
- D. Material: ASTM A879/A879M, Commercial Steel (CS), 04Z coating designation; mill phosphatized.

2.6 MATERIALS

- A. Cold-Rolled Steel Sheet: ASTM A1008/A1008M, Commercial Steel (CS), Type B; suitable for exposed applications.
- B. Metallic-Coated Steel Sheet: ASTM A653/A653M, Commercial Steel (CS), Type B.
- C. Inserts, Bolts, and Fasteners: Hot-dip galvanized according to ASTM A153/A153M.
- D. Power-Actuated Fasteners in Concrete: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with clips or other accessory devices for attaching hollow-metal frames of type indicated.
- E. Glazing: Comply with requirements in Section 088000 "Glazing."

2.7 FABRICATION

- A. Door Astragals: Provide overlapping astragal on one leaf of pairs of doors where required by NFPA 80 for fire-performance rating or where indicated. Extend minimum 3/4 inch beyond edge of door on which astragal is mounted or as required to comply with published listing of qualified testing agency.
- B. Hollow-Metal Frames: Fabricate in one piece except where handling and shipping limitations require multiple sections. Where frames are fabricated in sections, provide alignment plates or angles at each joint, fabricated of metal of same or greater thickness as frames.
 - 1. Sidelite and Transom Bar Frames: Provide closed tubular members with no visible face seams or joints, fabricated from same material as door frame. Fasten members at crossings and to jambs by welding, or by rigid mechanical anchors.
 - 2. Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated.
 - 3. Door Silencers: Except on weather-stripped frames, drill stops to receive door silencers as follows. Keep holes clear during construction.
 - a. Single-Door Frames: Drill stop in strike jamb to receive three door silencers.
 - b. Double-Door Frames: Drill stop in head jamb to receive two door silencers.
 - 4. Plaster Guards: Provide 26 gauge steel plaster guards or mortar boxes welded to frame at hardware cutouts, where frame is installed in concrete, masonry, or plaster walls and partitions.

- C. Hardware Preparation: Factory prepare hollow-metal doors and frames to receive templated mortised hardware, and electrical wiring; include cutouts, reinforcement, mortising, drilling, and tapping according to ANSI/SDI A250.6, the Door Hardware Schedule, and templates.
1. Reinforce doors and frames to receive nontemplated, mortised, and surface-mounted door hardware.
 2. Reinforce hinge side of door with 12 gauge channel for full height of door.
 3. Reinforce latch side (strike) with 14 gauge channel for full height of door.
 4. Reinforce frame with 7 gauge steel plate at hinges.
 5. Comply with BHMA A156.115 for preparing hollow-metal doors and frames for hardware.
- D. Glazed Lites: Provide stops and moldings around glazed lites where indicated. Form corners of stops and moldings with hairline joints.
1. Provide stops and moldings flush with face of door.
 2. Multiple Glazed Lites: Provide fixed and removable stops and moldings so that each glazed lite is capable of being removed independently.
 3. Provide fixed frame moldings on outside of exterior and on secure side of interior doors and frames. Provide loose stops and moldings on inside of hollow-metal doors and frames.
 4. Coordinate rabbet width between fixed and removable stops with glazing and installation types indicated.
 5. Provide stops for installation with countersunk flat- or oval-head machine screws spaced uniformly not more than 9 inches o.c. and not more than 2 inches o.c. from each corner.

2.8 STEEL FINISHES

- A. Prime Finish: Clean, pretreat, and apply manufacturer's standard primer.
1. Shop Primer: Manufacturer's standard, fast-curing, lead- and chromate-free primer complying with ANSI/SDI A250.10; recommended by primer manufacturer for substrate; compatible with substrate and field-applied coatings despite prolonged exposure.

2.9 LOUVERS

- A. Provide louvers for interior doors, where indicated, which comply with SDI 111, with blades or baffles formed of 0.020-inch-thick, cold-rolled steel sheet set into 0.032-inch-thick steel frame.
1. Sightproof Louver: Stationary louvers constructed with inverted-V or inverted-Y blades.
 2. Lightproof Louver: Stationary louvers constructed with baffles to prevent light from passing from one side to the other.
 3. Fire-Rated Automatic Louvers: Louvers constructed with movable blades closed by actuating fusible link, and listed and labeled for use in fire-rated door assemblies of type and fire-resistance rating indicated by same qualified testing and inspecting agency that established fire-resistance rating of door assembly.

- B. Form corners of moldings with hairline joints. Provide fixed frame moldings on outside of exterior and on secure side of interior doors and frames.

PART 3 - EXECUTION

3.1 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. Touch up factory-applied finishes where spreaders are removed.
- B. Drill and tap doors and frames to receive nontemplated, mortised, and surface-mounted door hardware.

3.2 INSTALLATION

- A. Install hollow-metal doors and frames plumb, rigid, properly aligned, and securely fastened in place. Comply with approved Shop Drawings and with manufacturer's written instructions.
- B. Hollow-Metal Frames: Comply with ANSI/SDI A250.11.
 - 1. Set frames accurately in position; plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is complete, remove temporary braces without damage to completed Work.
 - a. Where frames are fabricated in sections, field splice at approved locations by welding face joint continuously; grind, fill, dress, and make splice smooth, flush, and invisible on exposed faces. Touch-up finishes.
 - b. Install frames with removable stops located on secure side of opening.
 - 2. Fire-Rated Openings: Install frames according to NFPA 80.
 - 3. Floor Anchors: Secure with postinstalled expansion anchors.
 - a. Floor anchors may be set with power-actuated fasteners instead of postinstalled expansion anchors if so indicated and approved on Shop Drawings.
 - 4. Solidly pack mineral-fiber insulation inside frames.
 - 5. In-Place Concrete or Masonry Construction: Secure frames in place with postinstalled expansion anchors. Countersink anchors, and fill and make smooth, flush, and invisible on exposed faces.
 - 6. Installation Tolerances: Adjust hollow-metal frames to the following tolerances:
 - a. Squareness: Plus or minus 1/16 inch, measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.
 - b. Alignment: Plus or minus 1/16 inch, measured at jambs on a horizontal line parallel to plane of wall.

- c. Twist: Plus or minus 1/16 inch, measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.
 - d. Plumbness: Plus or minus 1/16 inch, measured at jambs at floor.
- C. Hollow-Metal Doors: Fit and adjust hollow-metal doors accurately in frames, within clearances specified below.
 - 1. Non-Fire-Rated Steel Doors: Comply with ANSI/SDI A250.8.
 - 2. Fire-Rated Doors: Install doors with clearances according to NFPA 80.
 - 3. Smoke-Control Doors: Install doors according to NFPA 105.
- D. Glazing: Comply with installation requirements in Section 088000 "Glazing" and with hollow-metal manufacturer's written instructions.

3.3 FIELD QUALITY CONTROL

- A. Repair or remove and replace installations where inspections indicate that they do not comply with specified requirements.
- B. Reinspect repaired or replaced installations to determine if replaced or repaired door assembly installations comply with specified requirements.
- C. Prepare and submit separate inspection report for each fire-rated door assembly indicating compliance with each item listed in NFPA 80.

3.4 REPAIR

- A. Prime-Coat Touchup: Immediately after erection, sand smooth rusted or damaged areas of prime coat and apply touchup of compatible air-drying, rust-inhibitive primer.

END OF SECTION 081113

SECTION 081416 - FLUSH WOOD DOORS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:

- 1. Five-ply flush wood veneer-faced doors for transparent finish.
- 2. Factory finishing flush wood doors.
- 3. Factory fitting flush wood doors to frames and factory machining for hardware.

- B. Related Requirements:

- 1. Section 088000 "Glazing" for glass view panels in flush wood doors.

1.3 PREINSTALLATION MEETINGS

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

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product, including the following:

- 1. Door core materials and construction.
- 2. Door edge construction
- 3. Door face type and characteristics.
- 4. Door louvers.
- 5. Door trim for openings.
- 6. Factory-machining criteria.
- 7. Factory- finishing specifications.

- B. 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. Details of frame for each frame type, including dimensions and profile.

4. Details of electrical raceway and preparation for electrified hardware, access control systems, and security systems.
5. Dimensions and locations of blocking for hardware attachment.
6. Dimensions and locations of mortises and holes for hardware.
7. Clearances and undercuts.
8. Requirements for veneer matching.
9. Doors to be factory finished and application requirements.

C. Samples for Initial Selection: For factory-finished doors.

D. Samples for Verification:

1. Factory finishes applied to actual door face materials, approximately 8 by 10 inches, for each material and finish. For each wood species and transparent finish, provide set of three Samples showing typical range of color and grain to be expected in finished Work.
2. Frames for light openings, 6 inches long, for each material, type, and finish required.

1.5 INFORMATIONAL SUBMITTALS

A. Sample Warranty: For special warranty.

1.6 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.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Comply with requirements of referenced standard and manufacturer's written instructions.

B. Mark each door on top and bottom rail with opening number used on Shop Drawings.

1.8 FIELD CONDITIONS

A. Environmental Limitations: Do not deliver or install doors until spaces are enclosed and weathertight, wet-work in spaces is complete and dry, and HVAC system is operating and maintaining temperature and relative humidity at levels designed for building occupants for the remainder of construction period.

1.9 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.
 - c. Telegraphing of core construction in face veneers exceeding 0.01 inch in a 3-inch span.
2. Warranty shall also include installation and finishing that may be required due to repair or replacement of defective doors.
3. Warranty Period for Solid-Core Interior Doors: Life of installation.

1.10 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.
- B. Smoke- and Draft-Control Door Assemblies: Listed and labeled for smoke and draft control by a qualified testing agency acceptable to authorities having jurisdiction, based on testing in accordance with UL 1784 and installed in compliance with NFPA 105.

1.11 FLUSH WOOD DOORS, GENERAL

- A. Quality Standard: In addition to requirements specified, comply with ANSI/WDMA I.S. 1A.
- B. Adhesives: Use adhesives that meet 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."
- C. Composite Wood Products: Products shall be made using ultra-low-emitting formaldehyde resins as defined in the California Air Resources Board's "Airborne Toxic Control Measure to Reduce Formaldehyde Emissions from Composite Wood Products" or shall be made with no added formaldehyde.

1.12 SOLID-CORE FIVE-PLY FLUSH WOOD VENEER-FACED DOORS FOR TRANSPARENT FINISH

- A. Interior Doors:
 1. Performance Grade: ANSI/WDMA I.S. 1A Extra Heavy Duty.
 2. Faces: Single-ply wood veneer not less than 1/50 inch thick.
 - a. Species: Select white birch.
 - b. Cut: Plain sliced (flat sliced).
 - c. Match between Veneer Leaves: Slip match.
 - d. Assembly of Veneer Leaves on Door Faces: Balance match.

- e. Pair and Set Match: Provide for doors hung in same opening or separated only by mullions.
 - f. Room Match: Match door faces within each separate room or area of building. Corridor-door faces do not need to match where they are separated by 10 feet or more.
 - g. Room Match: Provide door faces of compatible color and grain within each separate room or area of building.
3. Exposed Vertical and Top Edges: Same species as faces or a compatible species - 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: Provide fire-retardant stiles that are listed and labeled for applications indicated without formed-steel edges and astragals. Provide stiles with concealed intumescent seals. Comply with specified requirements for exposed edges.
 - 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: 475 lbf in accordance with WDMA T.M. 10.
4. Core for Non-Fire-Rated Doors:
- a. WDMA I.S. 10 structural composite lumber.
 - 1) Screw Withdrawal, Door Face: 475 lbf.
 - 2) Screw Withdrawal, Vertical Door Edge: 475 lbf.
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 follows:
 - 1) 5-inch top-rail blocking.
 - 2) 5-inch bottom-rail blocking, in doors indicated to have protection plates.
 - 3) 5-inch midrail blocking, in doors indicated to have armor plates.
 - 4) 4-1/2-by-10-inch lock blocks, in doors indicated to have exit devices.
6. Construction: Five plies, hot-pressed bonded (vertical and horizontal edging is bonded to core), with entire unit abrasive planed before veneering.

1.13 LIGHT FRAMES AND LOUVERS

- A. Wood Beads for Light Openings in Wood Doors: Provide manufacturer's standard wood beads unless otherwise indicated.
 - 1. Wood Species: Species compatible with door faces.
 - 2. Profile: Manufacturer's standard shape.
 - 3. At wood-core doors with 20-minute fire-protection ratings, provide wood beads and metal glazing clips approved for such use.
- B. Wood-Veneered Beads for Light Openings in Fire-Rated Doors: Manufacturer's standard wood-veneered noncombustible beads matching veneer species of door faces and approved for use in doors of fire-protection rating indicated on Drawings. Include concealed metal glazing clips where required for opening size and fire-protection rating indicated.

1.14 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 bottom edges, edges of cutouts, and mortises.
- B. Factory finish doors.
- C. Transparent Finish:
 - 1. ANSI/WDMA I.S. 1A Grade: Custom.
 - 2. Finish: ANSI/WDMA I.S. 1A TR-8 UV Cured Acrylated Polyester/Urethane
 - 3. Stain, Effect, and Sheen: Match Architect's sample.

PART 2 - EXECUTION

2.1 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.

2.2 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 and frames in accordance with NFPA 80.
 - 2. Install smoke- and draft-control doors in accordance with NFPA 105.
- 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.

2.3 FIELD QUALITY CONTROL

- A. Repair or remove and replace installations where inspections indicate that they do not comply with specified requirements.
- B. Reinspect repaired or replaced installations to determine if replaced or repaired door assembly installations comply with specified requirements.

2.4 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 081613 - FIBERGLASS DOORS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Hybrid FRP/Aluminum Doors.
 - 2. Aluminum Frames.

1.3 DEFINITIONS

- A. FRP: Fiberglass-Reinforced Plastic.

1.4 PREINSTALLATION MEETINGS

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

1.5 ACTION SUBMITTALS

- A. Product Data: For each type of product, including the following:
 - 1. Door core materials and construction.
 - 2. Door edge construction
 - 3. Door face type and characteristics.
 - 4. Factory-machining criteria.
- B. 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 and frame 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.

C. Samples for Verification:

1. Factory finishes applied to actual door face materials, approximately 8 by 10 inches, for each material and finish.

1.6 INFORMATIONAL SUBMITTALS

- A. Sample Warranty: For special warranty.

1.7 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.

1.8 QUALITY ASSURANCE

- A. Provide doors, louvers, frames and hardware from a single source from a single manufacturer.
- B. Performance verification and testing shall demonstrate compliance with performance requirements of complete assembly.

1.9 DELIVERY, STORAGE, AND HANDLING

- A. Comply with requirements of referenced standard and manufacturer's written instructions.
- B. Mark each door on bottom rail with opening number used on Shop Drawings.

1.10 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace doors that fail in materials or workmanship within specified warranty period.
 1. Warranty shall also include installation and finishing that may be required due to repair or replacement of defective doors.
 2. Warranty Period of 10 years includes failure due to the following:
 - a. Excessive deflection
 - b. Faulty operation.
 - c. Defects in hardware installation.
 - d. Deterioration of finish, beyond normal weathering.

1.11 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace components of door, frame, and factory installed hardware that does not comply with requirements or that fail in materials or workmanship within specified warranty period.
1. Deterioration includes, but is not limited to, the following:
 - a. Excessive deflection.
 - b. Faulty operation.
 - c. Core deterioration.
 - d. Delamination or bubbling of door skin.
 - e. Corrosion of fiberglass components.
 - f. Limited to door in its original location.
 2. Warranty Period: 10 years from date of Substantial Completion.
- B. Special Finish Warranty, FRP face sheets: Standard form in which manufacturer agrees to repair finishes that show evidence of deterioration of factory-applied finishes within specified warranty period.
1. Deterioration includes, but is not limited to, the following:
 - a. Color fading more than 5 Delta E units when tested according to ASTM D2244.
 - b. Chalking in excess of a No. 8 rating when tested according to ASTM D4214.
 2. Warranty Period: 5 years from date of Substantial Completion.
- C. Special Finish Warranty, Factory-Applied Aluminum Finishes: Standard form in which manufacturer agrees to repair finishes or replace aluminum that shows evidence of deterioration of factory-applied finishes within specified warranty period.
1. Deterioration includes, but is not limited to, the following:
 - a. Color fading more than 5 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. Warranty Period: 10 years from date of Substantial Completion.
- D. Special Finish Warranty, Anodized Aluminum 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 according to ASTM D 2244.
 - b. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.
 - c. Cracking, peeling, or chipping.

2. Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Structural Loads:

1. Wind Loads: As indicated on Drawings.

B. Windborne-Debris Impact Resistance: Passes ASTM E1886 missile-impact and cyclic-pressure tests in accordance with ASTM E1996 for basic protection.

1. Large-Missile Test: For glazed openings located within 30 feet of grade.

C. Air Leakage:

1. Entrance Doors: Air leakage of not more than 0.42 cfm/sq. ft. at a static-air-pressure differential of 6.24 lbf/sq. ft..

D. Pultruded Fiberglass Skin.

1. Surface Burning, ASTM-E84: Flame Spread < 200, Smoke Developed < 450.
2. Tensile Strength, ASTM-D 638: 18×10^3 psi.
3. Barcol Hardness, ASTM D 2583: 40.
4. Water Absorption, ASTM D 570: 0.16 percent/24 hrs. at 77 d F.

E. Door Core.

1. Density, ASTM-D1622: 5.0 pcf.
2. Compressive Strength, ASTM-D1621: 60 psi.
3. Compressive Modulus: 1948 psi.
4. R-Factor, ASTM-C518: $6.25 \text{ hr} \cdot \text{ft}^2 \cdot ^\circ\text{F}/\text{Btu}$.
5. Water Absorption, ASTM-C272: < 0.7% by volume.

F. Door Panel.

1. Thermal Transmittance, ASTM-C1363-11: U-Factor = 0.13

2.2 FRP/ALUMINUM DOORS

A. Basis of Design: Subject to compliance with requirements, provide Special-Lite, Inc. SL-20 or approved substitute by one of the following:

1. Ceco.
2. Chem-pruf.
3. Special-Lite, Inc.

- B. Substitutes shall meet the performance requirements of the specification but alternative construction of door will be considered.
- C. Construction. FRP face skin over aluminum stiles and rails.
 - 1. Door Thickness: 1-3/4".
 - 2. Face Sheet: Sandstone-textured FRP, 0.120-inch thick., integrally colored
 - 3. Stiles and Rails: Extruded aluminum, high-performance organic finish to match FRP faces.
 - 4. Tie Rods: Galvanized steel.
 - 5. Core: Poured in place polyurethane foam.

2.3 LOUVERS AND LITE FRAMES

- A. Form corners of moldings with hairline joints. Provide fixed frame moldings on outside of exterior and on secure side of interior doors and frames.
- B. Glazed Lites: Provide stops and moldings around glazed lites where indicated. Form corners of stops and moldings with mitered hairline joints.
- C. Fixed Louvers: All pultruded fiberglass assembly.
 - 1. Blades: 0.125 inch thick chevron.
- D. Lite Frames: All pultruded fiberglass assembly.
 - 1. Glazing: As specified in Section 088000 "Glazing."

2.4 DOOR FRAMES

- A. Aluminum Framing: ASTM B221, with alloy and temper required to suit structural and finish requirements, reinforced for hinges, strikes and closers.
 - 1. Basis of Design: Special-Lite SL-450TB.
 - 2. 2 by 4-1/2 inch depth.
 - 3. Construction: Shear block.
 - 4. Nominal wall thickness: 0.125 inch.
 - 5. Thermally broken.
 - 6. Factory-installed weatherstripping.

2.5 FABRICATION

- A. Secure face sheets to stiles and rails within aluminum reglets of stiles and rails for flush appearance. Alternative construction shall secure face sheets to stiles and rails/core without adhesive or visible fasteners to achieve a flush appearance.

- B. Factory prepare aluminum frames to receive templated mortised hardware; include cutouts, reinforcements, mortising, drilling, and tapping, according to the Door Hardware Schedule and templates furnished as specified in Section 087100 "Door Hardware."
- C. Factory fit doors to suit frame-opening sizes indicated.
 - 1. Comply with clearance requirements of referenced quality standard for fitting unless otherwise indicated.
- D. Reinforce doors for surface mounted closures.
- E. 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.
 - 4. For doors scheduled to receive electrified locksets, provide factory-installed raceway and wiring to accommodate specified hardware.
- F. Openings: Factory cut and trim openings through doors.
 - 1. Light Openings: Trim openings with moldings of material and profile indicated.
 - 2. Glazing: Factory install glazing in doors indicated to be factory finished. Comply with applicable requirements in Section 088000 "Glazing."
 - 3. Louvers: Factory install louvers in prepared openings.

2.6 ALUMINUM FINISHES

- A. Clear Anodic Finish (Frames): AAMA 611, AA-M12C22A41, Class I, 0.018 mm or thicker.
- B. High-Performance Organic Finish, Two-Coat PVDF (Door Stiles and Rails): Fluoropolymer finish complying with AAMA 2605 and containing not less than 70 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 FRP door faces.

2.7 FACTORY FINISHING

- A. Factory finish doors.
- B. Opaque Finish: Two-part aliphatic polyurethane paint, complying with the following:
 - 1. Color: selected by Architect.
 - 2. Gloss: High Gloss.
 - 3. Impact Resistance: 140 lbs. direct @ 5 mils thickness per ASTM D 2794.

4. Taber Abrasion: 1 kg load, 1000 cycles, CS-17 wheel: 60.2 mg.
5. Chemical Resistance: Excellent resistance to acids, alkalines, salt solutions, seawater and petroleum products.
6. Gloss retention with graffiti cleaning with Amerase: 100 cycles.

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.

3.3 FIELD QUALITY CONTROL

- A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.
- B. Field Quality-Control Testing: Perform the following test on representative areas of fiberglass doors.
 1. Water-Spray Test: Before installation of interior finishes has begun, areas designated by Architect shall be tested according to AAMA 501.2 and shall not evidence water penetration.
 - a. Test a minimum of ten percent of installed fiberglass doors in areas selected by Architect.
- C. Fiberglass doors will be considered defective if they do not pass tests and inspections.
- D. Prepare test and inspection reports.

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 081613

SECTION 083113 - ACCESS DOORS AND FRAMES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes access doors and frames for walls and ceilings.
- B. Related Requirements:
 - 1. Section 077200 "Roof Accessories" for roof hatches.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include construction details material descriptions, dimensions of individual components and profiles, and finishes.
- B. Samples: For each type of access door and frame and for each finish specified, complete assembly minimum 6 by 6 inches in size.
- C. Product Schedule: For access doors and frames. Use same designations indicated on Drawings.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Subject to compliance with requirements, provide products by one of the following:
 - 1. Babcock Davis.
 - 2. Dur-Red Products.
 - 3. J.L. Industries, Inc.
 - 4. Karp Associates, Inc.
 - 5. Larsen's Manufacturing Company.
 - 6. Milcor Inc.
 - 7. Nystrom, Inc.
 - 8. William Bros. Corporation of America.

2.2 ACCESS DOORS AND FRAMES

A. Flush Access Doors with Exposed Flanges:

1. Description: Face of door flush with frame, with exposed flange and concealed hinge.
2. Locations: Wall and ceiling.
3. Door Size: As indicated on Drawings.
4. Metallic-Coated Steel Sheet for Door, in dry locations: Nominal 0.064 inch, 16 gage, factory primed.
5. Stainless Steel Sheet for Doors in wet locations: Nominal 0.062 inch, 16 gage, ASTM A480/A480M No. 4 finish.
6. Frame Material: Same material, thickness, and finish as door.
7. Latch and Lock: Cam latch, screwdriver or hex-head wrench operated.

2.3 MATERIALS

- A. Steel Plates, Shapes, and Bars: ASTM A36/A36M.
- B. Steel Sheet: Uncoated or electrolytic zinc coated, ASTM A879/A879M, with cold-rolled steel sheet substrate complying with ASTM A1008/A1008M, Commercial Steel (CS), exposed.
- C. Metallic-Coated Steel Sheet: ASTM A653/A653M, Commercial Steel (CS), Type B; with minimum G60 or A60 metallic coating.
- D. Frame Anchors: Same material as door face.
- E. Inserts, Bolts, and Anchor Fasteners: Hot-dip galvanized steel according to ASTM A153/A153M or ASTM F2329.

2.4 FABRICATION

- A. General: Provide access door and frame assemblies manufactured as integral units ready for installation.
- B. Metal Surfaces: For metal surfaces exposed to view in the completed Work, provide materials with smooth, flat surfaces without blemishes. Do not use materials with exposed pitting, seam marks, roller marks, rolled trade names, or roughness.
- C. Doors and Frames: Grind exposed welds smooth and flush with adjacent surfaces. Furnish mounting holes, attachment devices and fasteners of type required to secure access doors to types of supports indicated.
- D. Latch and Lock Hardware:
 1. Quantity: Furnish number of latches and locks required to hold doors tightly closed.

2.5 FINISHES

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- C. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.
- D. Painted Finishes: Comply with coating manufacturer's written instructions for cleaning, conversion coating, and applying and baking finish.
 - 1. Factory Primed: Apply manufacturer's standard, lead- and chromate-free, universal primer immediately after surface preparation and pretreatment.

PART 3 - EXECUTION

3.1 EXAMINATION

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

3.2 INSTALLATION

- A. Comply with manufacturer's written instructions for installing access doors and frames.

3.3 FIELD QUALITY CONTROL

- A. Repair or remove and replace installations where inspections indicate that they do not comply with specified requirements.
- B. Reinspect repaired or replaced installations to determine if replaced or repaired door assembly installations comply with specified requirements.

3.4 ADJUSTING

- A. Adjust doors and hardware, after installation, for proper operation.

END OF SECTION 083113

SECTION 083313 - COILING COUNTER DOORS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Counter door assemblies.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type and size of coiling counter door and accessory.
 - 1. Include construction details, material descriptions, dimensions of individual components, profiles for slats, and finishes.
- B. Shop Drawings: For each installation and for special components not dimensioned or detailed in manufacturer's product data.
 - 1. Include plans, elevations, sections, and mounting details.
 - 2. Include details of equipment assemblies, and indicate dimensions, required clearances, method of field assembly, components, and location and size of each field connection.
 - 3. Include points of attachment and their corresponding static and dynamic loads imposed on structure.
 - 4. Show locations of controls, locking devices, and other accessories.
- C. Samples for Verification: For each type of exposed finish on the following components, in manufacturer's standard sizes:
 - 1. Curtain slats.

1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.

1.5 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For coiling counter doors 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 for both installation and maintenance of units required for this Project.
 - 1. Maintenance Proximity: Not more than two hours' normal travel time from Installer's place of business to Project site.

PART 2 - PRODUCTS

2.1 COUNTER DOOR ASSEMBLY

- A. Counter Door: Coiling counter door formed with curtain of interlocking metal slats.
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Cookson Company.
 - 2. Cornell.
 - 3. Overhead Door Corporation.
- C. Operation Cycles: Door components and operators capable of operating for not less than 20,000. One operation cycle is complete when a door is opened from the closed position to the fully open position and returned to the closed position.
 - 1. Include tamperproof cycle counter.
- D. Door Curtain Material: Stainless steel.
- E. Door Curtain Slats: Flat profile slats of 1-1/4-inch 1-1/2-inch center-to-center height.
- F. Bottom Bar: Manufacturer's standard continuous channel or tubular shape, fabricated stainless steel and finished to match door.
- G. Curtain Jamb Guides: Stainless steel with exposed finish matching curtain slats. Provide continuous integral wear strips to prevent metal-to-metal contact and to minimize operational noise.
- H. Hood: Match curtain material and finish.
 - 1. Mounting: Face of wall.
- I. Sill Configuration: No sill.
- J. Locking Devices: Equip door with locking device assembly.

1. Locking Device Assembly: Cremonese-type, both jamb sides locking bars, operable from inside with thumbturn.

K. Manual Door Operator: Manufacturer's standard crank operator.

1. Provide operator with through-wall shaft operation.
2. Provide operator with manufacturer's standard removable operating arm.

L. Door Finish:

1. Stainless Steel Finish: ASTM A480/A480M No. 2B (bright, cold rolled).
2. Interior Curtain-Slat Facing: Match finish of exterior curtain-slat face.

2.2 MATERIALS, GENERAL

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

2.3 DOOR CURTAIN MATERIALS AND FABRICATION

- A. Door Curtains: Fabricate coiling counter door curtain of interlocking metal slats in a continuous length for width of door without splices. Unless otherwise indicated, provide slats of thickness and mechanical properties recommended by door manufacturer for performance, size, and type of door indicated, and as follows:

1. Stainless Steel Door Curtain Slats: ASTM A240/A240M or ASTM A666, Type 304; sheet thickness of 0.025 inch; and as required.
2. Metal Interior Curtain-Slat Facing: Match metal of exterior curtain-slat face.

- B. Curtain Jamb Guides: Manufacturer's standard angles or channels and angles of same material and finish as curtain slats unless otherwise indicated, with sufficient depth and strength to retain curtain, to allow curtain to operate smoothly, and to withstand loading. Slot bolt holes for guide adjustment. Provide removable stops on guides to prevent overtravel of curtain.

2.4 HOODS

- A. General: Form sheet metal hood to entirely enclose coiled curtain and operating mechanism at opening head. Contour to fit end brackets to which hood is attached. Roll and reinforce top and bottom edges for stiffness. Form closed ends for surface-mounted hoods and fascia for any portion of between-jamb mounting that projects beyond wall face. Equip hood with intermediate support brackets as required to prevent sagging.

1. Stainless Steel: 0.025-inch-thick, stainless steel sheet, Type 304, complying with ASTM A240/A240M or ASTM A666.

2.5 LOCKING DEVICES

- A. Slide Bolt: Fabricate with side-locking bolts to engage through slots in tracks for locking by padlock, located on both left and right jamb sides, operable from coil side.

- B. Locking Device Assembly: Fabricate with cylinder lock, spring-loaded dead bolt, operating handle, cam plate, and adjustable locking bars to engage through slots in tracks.
 - 1. Lock Cylinders: As specified in Section 087100 "Door Hardware" and keyed to building keying system.
 - 2. Keys: Three for each cylinder.

2.6 CURTAIN ACCESSORIES

- A. Push/Pull Handles: Equip each push-up-operated or emergency-operated door with lifting handles on each side of door, finished to match door.

2.7 COUNTERBALANCE MECHANISM

- A. General: Counterbalance doors by means of manufacturer's standard mechanism with an adjustable-tension, steel helical torsion spring mounted around a steel shaft and contained in a spring barrel connected to top of curtain with barrel rings. Use grease-sealed bearings or self-lubricating graphite bearings for rotating members.
- B. Brackets: Manufacturer's standard mounting brackets of either cast iron or cold-rolled steel plate.

2.8 MANUAL DOOR OPERATORS

- A. General: Equip door with manual door operator by door manufacturer.
- B. Push-up Door Operation: Design counterbalance mechanism so that required lift or pull for door operation does not exceed 25 lbf.

2.9 GENERAL FINISH REQUIREMENTS

- A. Comply with NAAMM/NOMMA 500 for recommendations for applying and designating finishes.
- B. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

2.10 STAINLESS STEEL FINISHES

- A. Surface Preparation: Remove tool and die marks and stretch lines, or blend into finish.
- B. Polished Finishes: Grind and polish surfaces to produce uniform finish, free of cross scratches.
 - 1. Run grain of directional finishes with long dimension of each piece.

2. When polishing is completed, passivate and rinse surfaces. Remove embedded foreign matter and leave surfaces chemically clean.
 3. Directional Satin Finish: ASTM A480/A480M No. 4.
- C. Bright, Cold-Rolled, Unpolished Finish: ASTM A480/A480M No. 2B.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates areas and conditions, with Installer present, for compliance with requirements for substrate construction and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION, GENERAL

- A. Install coiling counter doors and operating equipment complete with necessary hardware, anchors, inserts, hangers, and equipment supports; according to manufacturer's written instructions and as specified.
- B. Install coiling counter doors, hoods, controls, and operators at the mounting locations indicated for each door.

3.3 ADJUSTING

- A. Adjust hardware and moving parts to function smoothly so that doors operate easily, free of warp, twist, or distortion.
- B. Lubricate bearings and sliding parts as recommended by manufacturer.

3.4 MAINTENANCE SERVICE

- A. Initial Maintenance Service: Beginning at Substantial Completion, maintenance service shall include six months' full maintenance by skilled employees of coiling-door Installer. Include quarterly preventive maintenance, repair or replacement of worn or defective components, lubrication, cleaning, and adjusting as required for proper door operation. Parts and supplies shall be manufacturer's authorized replacement parts and supplies.
 1. Perform maintenance, including emergency callback service, during normal working hours.
 2. Include 24-hour-per-day, seven-day-per-week, emergency callback service.

END OF SECTION 083313

SECTION 084113 - ALUMINUM-FRAMED ENTRANCES AND STOREFRONTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Aluminum-framed storefront systems.
 - 2. Aluminum-framed entrance door systems.

1.3 PREINSTALLATION MEETINGS

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

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.
- B. Shop Drawings: For aluminum-framed storefronts. Include plans, elevations, sections, full-size details, and attachments to other work.
 - 1. Include details of provisions for assembly expansion and contraction and for draining moisture occurring within the assembly to the exterior.
 - 2. Include full-size isometric details of each type of vertical-to-horizontal intersection of aluminum-framed storefronts, showing the following:
 - a. Joinery, including concealed welds.
 - b. Anchorage.
 - c. Expansion provisions.
 - d. Glazing.
 - e. Flashing and drainage.
 - 3. Show connection to and continuity with adjacent thermal, weather, air, and vapor barriers.

- C. Samples for Verification: For each type of exposed finish required, in manufacturer's standard sizes.
- D. Fabrication Sample: Of each vertical-to-horizontal intersection of assemblies, made from 12-inch 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.
- E. Entrance Door Hardware Schedule: Prepared by or under supervision of supplier, detailing fabrication and assembly of entrance door hardware, as well as procedures and diagrams. Coordinate final entrance door hardware schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of entrance door hardware.
- F. Delegated-Design Submittal: For aluminum-framed entrances and storefronts including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data:
 - 1. For Installer.
 - 2. For professional engineer's experience with providing delegated-design engineering services of the kind indicated, including documentation that engineer is licensed in the state in which Project is located.
- B. Energy Performance Certificates: For aluminum-framed storefronts, accessories, and components, from manufacturer.
 - 1. Basis for Certification: NFRC-certified energy performance values for each aluminum-framed storefront.
- C. Product Test Reports: For aluminum-framed storefronts, for tests performed by manufacturer and witnessed by a qualified testing agency.
- D. Quality-Control Program: Developed specifically for Project, including fabrication and installation, according to recommendations in ASTM C1401. Include periodic quality-control reports.
- E. Source quality-control reports.
- F. Field quality-control reports.
- G. Sample Warranties: For special warranties.

1.6 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For aluminum-framed storefronts to include in maintenance manuals.

1.7 QUALITY ASSURANCE

- A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.
- B. Testing Agency Qualifications: Qualified according to ASTM E699 for testing indicated and acceptable to Owner and Architect.
- 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.

1.8 MOCKUPS

- A. Mockups: Furnish and install aluminum-framed storefront in mockups shown on the Drawings. The mockups shall be used to verify selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.

1.9 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace components of aluminum-framed storefronts that do not comply with requirements or that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Structural failures, including, but not limited to, excessive deflection.
 - b. Noise or vibration created by wind and thermal and structural movements.
 - c. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
 - d. Water penetration through fixed glazing and framing areas.
 - e. Failure of operating components.
 - 2. Warranty Period: Two 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 according to ASTM D 2244.
 - b. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.
 - c. Cracking, peeling, or chipping.
2. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Source Limitations: Obtain all components of aluminum-framed storefront system, including framing and accessories, from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Engage a qualified professional engineer, as defined in Section 014000 "Quality Requirements," to design aluminum-framed storefronts.
- B. General Performance: Comply with performance requirements specified, as determined by testing of aluminum-framed entrances and storefronts representing those indicated for this Project without failure due to defective manufacture, fabrication, installation, or other defects in construction.
 1. Aluminum-framed entrances and storefronts shall withstand movements of supporting structure, including, but not limited to, twist, column shortening, long-term creep, and deflection from uniformly distributed and concentrated live loads.
 2. Failure also includes the following:
 - a. Thermal stresses transferring to building structure.
 - b. Glass breakage.
 - c. Noise or vibration created by wind and thermal and structural movements.
 - d. Loosening or weakening of fasteners, attachments, and other components.
 - e. Failure of operating units.
- C. Structural Loads:
 1. Wind Loads: As indicated on Drawings.
 2. Other Design Loads: As indicated on Drawings.
- D. Deflection of Framing Members: At design wind pressure, as follows:
 1. Deflection Normal to Wall Plane: Limited to edge of glass in a direction perpendicular to glass plane not exceeding 1/175 of the glass edge length for each individual glazing lite or an amount that restricts edge deflection of individual glazing lites to 3/4 inch, whichever is less.

2. Deflection Parallel to Glazing Plane: Limited to amount not exceeding that which reduces glazing bite to less than 75 percent of design dimension and that which reduces edge clearance between framing members and glazing or other fixed components to less than 1/8 inch.
- E. Structural: Test according to 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 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 30 seconds.
- F. Water Penetration under Static Pressure: Test according to ASTM E331 as follows:
1. No evidence of water penetration through fixed glazing and framing areas when tested according to a minimum static-air-pressure differential of 20 percent of positive wind-load design pressure, but not less than 15 lbf/sq. ft..
- G. Water Penetration under Dynamic Pressure: Test according to AAMA 501.1 as follows:
1. No evidence of water penetration through fixed glazing and framing areas when tested at dynamic pressure equal to 20 percent of positive wind-load design pressure, but not less than 15 lbf/sq. ft..
 2. Maximum Water Leakage: No uncontrolled water penetrating assemblies or water appearing on assemblies' normally exposed interior surfaces from sources other than condensation. Water leakage does not include water controlled by flashing and gutters, or water that is drained to exterior.
- H. Seismic Performance: Aluminum-framed entrances and storefronts shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.
1. Seismic Drift Causing Glass Fallout: Complying with criteria for passing based on building occupancy type when tested according to AAMA 501.6 at design displacement and 1.5 times the design displacement.
- I. 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 according to NFRC 100.
 - b. Entrance Doors: U-factor of not more than 0.68 Btu/sq. ft. x h x deg F as determined according to NFRC 100.
 2. Solar Heat-Gain Coefficient (SHGC):
 - a. Fixed Glazing and Framing Areas: SHGC for the system of not more than 0.28 as determined according to NFRC 200.

- b. Entrance Doors: SHGC of not more than 0.65 as determined according to NFRC 200.
 - 3. Air Leakage:
 - a. Fixed Glazing and Framing Areas: Air leakage for the system of not more than 0.06 cfm/sq. ft. at a static-air-pressure differential of 6.24 lbf/sq. ft. when tested according to ASTM E283.
 - b. Entrance Doors: Air leakage of not more than 1.0 cfm/sq. ft. at a static-air-pressure differential of 1.57 lbf/sq. ft..
 - 4. Condensation Resistance Factor (CRF):
 - a. Fixed Glazing and Framing Areas: CRF for the system of not less than 55 as determined according to AAMA 1503.
 - b. Entrance Doors: CRF of not less than 57 as determined according to AAMA 1503.
- J. Windborne-Debris Impact Resistance: Passes ASTM E1886 missile-impact and cyclic-pressure tests in accordance with ASTM E1996 for basic protection.
 - 1. Large-Missile Test: For glazing located within 30 feet of grade.
 - 2. Small-Missile Test: For glazing located between 30 feet and 60 feet above grade.
- K. 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. Thermal Cycling: No buckling; stress on glass; sealant failure; excess stress on framing, anchors, and fasteners; or reduction of performance when tested according to AAMA 501.5.
 - a. High Exterior Ambient-Air Temperature: That which produces an exterior metal-surface temperature of 180 deg F.
 - b. Low Exterior Ambient-Air Temperature: 0 deg F.
 - c. Interior Ambient-Air Temperature: 75 deg F.

2.3 STOREFRONT SYSTEMS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. EFCO.
 - 2. Kawneer.
 - 3. Oldcastle Building Envelope.
 - 4. YKK America.
- 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. Finish: Clear anodic finish.
 4. Aluminum: Alloy and temper recommended by manufacturer for type of use and finish indicated.
 5. Steel Reinforcement: As required by manufacturer.
- C. Subsills: Manufacturer's standard thermally-broken extruded aluminum receptor, sloped to exterior with interior flange turned up a minimum of 1-1/4 inch.
- D. Backer Plates: Manufacturer's standard, continuous backer plates for framing members, if not integral, where framing abuts adjacent construction.
- E. Brackets and Reinforcements: Manufacturer's standard high-strength aluminum with nonstaining, nonferrous shims for aligning system components.

2.4 ENTRANCE DOOR SYSTEMS

- A. Provide entrance doors by the same manufacturer as storefront systems.
- B. Entrance Doors: Manufacturer's standard glazed entrance doors for manual-swing or automatic operation.
1. Door Construction: 1-3/4-inch overall thickness, with minimum 0.125-inch-thick, extruded-aluminum tubular rail and stile members. Mechanically fasten corners with reinforcing brackets that are deeply penetrated and fillet welded or that incorporate concealed tie rods.
 - a. Thermal Construction: Separate aluminum members exposed to the exterior from members exposed to the interior in manner consistent with other performance requirements.
 2. Door Design: Wide stile; 5-inch nominal width.
 3. Glazing Stops and Gaskets: Snap-on, extruded-aluminum stops and preformed gaskets.
 - a. Provide nonremovable glazing stops on outside of door.
 4. Finish: Match adjacent storefront framing finish.

2.5 ENTRANCE DOOR HARDWARE

- A. Entrance Door Hardware: Hardware not specified in this Section is specified in Section 087100 "Door Hardware."
- B. Weather Stripping: Manufacturer's standard replaceable components.
1. Compression Type: Made of ASTM D2000 molded neoprene or ASTM D2287 molded PVC.

2. Sliding Type: AAMA 701/702, made of wool, polypropylene, or nylon woven pile with nylon-fabric or aluminum-strip backing.

- C. Weather Sweeps: Manufacturer's standard exterior-door bottom sweep with concealed fasteners on mounting strip.

2.6 GLAZING

- A. Glazing: Comply with Section 088000 "Glazing."

2.7 MATERIALS

- A. Sheet and Plate: ASTM B209.

- B. Extruded Bars, Rods, Profiles, and Tubes: ASTM B221.

- C. Extruded Structural Pipe and Tubes: ASTM B429/B429M.

- D. Structural Profiles: ASTM B308/B308M.

- E. Steel Reinforcement:

1. Structural Shapes, Plates, and Bars: ASTM A36/A36M.
2. Cold-Rolled Sheet and Strip: ASTM A1008/A1008M.
3. Hot-Rolled Sheet and Strip: ASTM A1011/A1011M.

- F. Steel Reinforcement Primer: Manufacturer's standard zinc-rich, corrosion-resistant primer complying with SSPC-PS Guide No. 12.00; applied immediately after surface preparation and pretreatment. Select surface preparation methods according to recommendations in SSPC-SP COM, and prepare surfaces according to applicable SSPC standard.

2.8 ACCESSORIES

- A. Fasteners and Accessories: Manufacturer's standard corrosion-resistant, nonstaining, nonbleeding fasteners and accessories compatible with adjacent materials.

1. Use self-locking devices where fasteners are subject to loosening or turning out from thermal and structural movements, wind loads, or vibration.
2. Reinforce members as required to receive fastener threads.
3. Use exposed fasteners with countersunk Phillips screw heads, finished to match framing system.

- 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.

1. Concrete and Masonry Inserts: Hot-dip galvanized cast-iron, malleable-iron, or steel inserts complying with ASTM A123/A123M or ASTM A153/A153M requirements.
- C. Concealed Flashing: Dead-soft, 0.018-inch-thick stainless steel, complying with ASTM A240/A240M, of type recommended by manufacturer.
- D. Bituminous Paint: Cold-applied asphalt-mastic paint containing no asbestos, formulated for 30-mil thickness per coat.
- E. Rigid PVC Filler.

2.9 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. Entrance Door Frames: Reinforce as required to support loads imposed by door operation and for installing door hardware.
 1. At interior and exterior doors, provide compression weather stripping at fixed stops.
- F. After fabrication, clearly mark components to identify their locations in Project according to Shop Drawings.

2.10 ALUMINUM FINISHES

- A. Clear Anodic Finish: AAMA 611, AA-M12C22A41, Class I, 0.018 mm or thicker.
 1. 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 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, GENERAL

- 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 subsill 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.

3.3 INSTALLATION OF GLAZING

- A. Install glazing as specified in Section 088000 "Glazing."

3.4 INSTALLATION OF WEATHERSEAL SEALANT

- A. Install weatherseal sealant to completely fill cavity, according to sealant manufacturer's written instructions, to produce weatherproof joints.

3.5 INSTALLATION OF ALUMINUM-FRAMED ENTRANCE DOORS

- A. Install entrance doors to produce smooth operation and tight fit at contact points.
 - 1. Exterior Doors: Install to produce weathertight enclosure and tight fit at weather stripping.
 - 2. Field-Installed Entrance Door Hardware: Install surface-mounted entrance door hardware according to entrance door hardware manufacturers' written instructions using concealed fasteners to greatest extent possible.

3.6 ERECTION TOLERANCES

- A. Install aluminum-framed storefronts to comply with the following maximum tolerances:
 - 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.

3.7 INSTALLATION OF ALUMINUM-FRAMED ENTRANCE DOORS

- A. Install entrance doors to produce smooth operation and tight fit at contact points.
 - 1. Exterior Doors: Install to produce weathertight enclosure and tight fit at weather stripping.
 - 2. Field-Installed Entrance Door Hardware: Install surface-mounted entrance door hardware according to entrance door hardware manufacturers' written instructions using concealed fasteners to greatest extent possible.

3.8 FIELD QUALITY CONTROL

- A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.
- B. Field Quality-Control Testing: Perform the following test on representative areas of aluminum-framed storefronts.
 - 1. Water-Spray Test: Before installation of interior finishes has begun, areas designated by Architect shall be tested according to AAMA 501.2 and shall not evidence water penetration.

- a. Test a minimum of ten percent of installed doors and storefront in areas selected by Architect.
- C. Aluminum-framed storefronts will be considered defective if they do not pass tests and inspections.
- D. Prepare test and inspection reports.

3.9 MAINTENANCE SERVICE

- A. Entrance Door Hardware Maintenance:
 - 1. Maintenance Tools and Instructions: Furnish a complete set of specialized tools and maintenance instructions as needed for Owner's continued adjustment, maintenance, and removal and replacement of entrance door hardware.
 - 2. Initial Maintenance Service: Beginning at Substantial Completion, provide six months' full maintenance by skilled employees of entrance door hardware Installer. Include quarterly preventive maintenance, repair or replacement of worn or defective components, lubrication, cleaning, and adjusting as required for proper entrance door hardware operation at rated speed and capacity. Use parts and supplies that are the same as those used in the manufacture and installation of original equipment.

END OF SECTION 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.
 - 2. Other doors to the extent indicated.
- B. Door hardware includes, but is not necessarily limited to, the following:
 - 1. Mechanical door hardware.
 - 2. Electromechanical door hardware.
 - 3. 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".
 - 3. Division 08 Section "Aluminum-Framed Entrances and Storefronts".
 - 4. Division 28 Section "Access Control".
- 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. ASTM E1886 - Test Method for Performance of Exterior Windows, Curtain Walls, Doors and Shutters Impacted by Missiles and Exposed to Cyclic Pressure Differentials.
 - 3. ASTM E330 - Standard Test Method for Structural Performance of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure difference.
 - 4. ICC/IBC - International Building Code.
 - 5. NFPA 70 - National Electrical Code.
 - 6. NFPA 80 - Fire Doors and Windows.
 - 7. NFPA 101 - Life Safety Code.
 - 8. NFPA 105 - Installation of Smoke Door Assemblies.
 - 9. 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.

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. Shop Drawings: Details of electrified access control hardware indicating the following:

1. Wiring Diagrams: Upon receipt of approved schedules, submit detailed system wiring diagrams for power, signaling, monitoring, communication, and control of the access control system electrified hardware. Differentiate between manufacturer-installed and field-installed wiring. Include the following:
 - a. Wiring instructions for each electronic component scheduled herein.
 2. Electrical Coordination: Coordinate with related sections the voltages and wiring details required at electrically controlled and operated hardware openings.
- D. 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.
- E. Informational Submittals:
1. Hurricane Resistant Openings: Exterior hurricane opening assemblies to be tested according to ASTM E330, ASTM E1886, ASTM E1996 standards, and certified by a qualified independent third party testing agency acceptable to authority having jurisdiction, with labeling indicating compliance with the wind load and design pressure level requirements specified for the Project.
 2. 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.
- F. 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.

1.4 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. Building Information Modeling (BIM) Qualifications: BIM software tools and processes are used to produce and support data integration of product and technical information used in specifications, submittals, project reviews, decision support, and quality assurance during all phases of Project design, construction, and facility management. Door and hardware schedules and the associated product data parameters are to be derived, updated, and fully integrated with the coordinated Building Information Modeling as required under Division 01.
- F. 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.
 - 2. Provide electromechanical door hardware from the same manufacturer as mechanical door hardware, unless otherwise indicated.
- G. Hurricane Resistant Exterior Openings: Provide exterior door hardware as complete and tested assemblies, or component assemblies, including approved doors and frames specified under Section 081113 "Hollow Metal Doors and Frames", to meet the wind loads, design pressures, debris impact resistance, and glass and glazing requirements applicable to the Project.
 - 1. Test units according to ASTM E330, ASTM E1886, ASTM E1996 standards, certified by a qualified independent third party testing agency acceptable to authority having jurisdiction, and bearing a third party certification agency permanent label indicating windstorm approved product.
- H. Each unit to bear third party permanent label demonstrating compliance with the referenced standards.
- I. 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.
- J. 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
- K. At completion of installation, provide written documentation that components were applied to manufacturer's instructions and recommendations and according to approved schedule.

1.5 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".

1.6 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 Hardware and Electrical Connections: Coordinate the layout and installation of scheduled electrified door hardware and related access control equipment with required connections to source power junction boxes, low voltage power supplies, detection and monitoring hardware, and fire and detection alarm systems.
- C. 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.

1.7 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. Standard Warranty Period: One year from date of Substantial Completion, unless otherwise indicated.
- D. Special Warranty Periods:
 - 1. Ten years for mortise locks and latches.
 - 2. Five years for exit hardware.
 - 3. Twenty five years for manual overhead door closer bodies.
 - 4. Five years for motorized electric latch retraction exit devices.
 - 5. Two years for electromechanical door hardware, unless noted otherwise.

1.8 MAINTENANCE SERVICE

- A. Maintenance Tools and Instructions: Furnish a complete set of specialized tools and maintenance instructions as needed for Owner's continued adjustment, maintenance, and removal and replacement of door hardware.

PART 2 - PRODUCTS

2.1 SCHEDULED DOOR HARDWARE

- A. General: Provide door hardware for each door to comply with requirements in Door Hardware Sets and each referenced section that products are to be supplied under.
- B. Designations: Requirements for quantity, item, size, finish or color, grade, function, and other distinctive qualities of each type of door hardware are indicated in the Door Hardware Sets at the end of Part 3. Products are identified by using door hardware designations, as follows:

1. Named Manufacturer's Products: Product designation and manufacturer are listed for each door hardware type required for the purpose of establishing requirements. Manufacturers' names are abbreviated in the Door Hardware Schedule.
- C. Substitutions: Requests for substitution and product approval for inclusive mechanical and electromechanical door hardware in compliance with the specifications must be submitted in writing and in accordance with the procedures and time frames outlined in Division 01, Substitution Procedures. Approval of requests is at the discretion of the architect, owner, and their designated consultants.

2.2 HANGING DEVICES

- A. Hinges: ANSI/BHMA A156.1 certified 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 the all out-swinging lockable doors.
 5. Manufacturers:
 - a. Hager Companies (HA).
 - b. McKinney Products; ASSA ABLOY Architectural Door Accessories (MK).
 - c. Stanley Hardware (ST).
 - d. No Substitution.

- B. Continuous Geared Hinges: ANSI/BHMA A156.26 Grade 1-600 certified continuous geared hinge. with minimum 0.120-inch thick extruded 6060 T6 aluminum alloy hinge leaves and a minimum overall width of 4 inches. Hinges are non-handed, reversible and fabricated to template screw locations. Factory trim hinges to suit door height and prepare for electrical cut-outs.

1. Manufacturers:

- a. Pemko Products; ASSA ABLOY Architectural Door Accessories (PE).
- b. Stanley Hardware (ST).
- c. No Substitution.

2.3 POWER TRANSFER DEVICES

- A. Electrified Quick Connect Transfer Hinges: Provide electrified transfer hinges with Molex™ standardized plug connectors and sufficient number of concealed wires (up to 12) to accommodate the electrified functions specified in the Door Hardware Sets with a 1-year warranty. Connectors plug directly to through-door wiring harnesses for connection to electric locking devices and power supplies. Wire nut connections are not acceptable.

1. Manufacturers:

- a. McKinney Products; ASSA ABLOY Architectural Door Accessories (MK) - QC (# wires) Option.
- b. No Substitution.

- B. Concealed Quick Connect Electric Power Transfers: Provide concealed wiring pathway housing mortised into the door and frame for low voltage electrified door hardware. Furnish with Molex™ standardized plug connectors and sufficient number of concealed wires (up to 12) to accommodate the electrified functions specified in the Door Hardware Sets. Connectors plug directly to through-door wiring harnesses for connection to electric locking devices and power supplies. Wire nut connections are not acceptable.

1. Manufacturers:

- a. Securitron (SU) - EL-CEPT Series.
- b. No Substitution.

- C. Electric Door Wire Harnesses: Provide electric/data transfer wiring harnesses with standardized plug connectors to accommodate up to twelve (12) wires. Connectors plug directly to through-door wiring harnesses for connection to electric locking devices and power supplies. Provide sufficient number and type of concealed wires to accommodate electric function of specified hardware. Provide a connector for through-door electronic locking devices and from hinge to junction box above the opening. Wire nut connections are not acceptable. Determine the length required for each electrified hardware component for the door type, size and construction, minimum of two per electrified opening.

1. Provide one each of the following tools as part of the base bid contract:

- a. McKinney Products; ASSA ABLOY Architectural Door Accessories (MK) - Electrical Connecting Kit: QC-R001.
- b. McKinney Products; ASSA ABLOY Architectural Door Accessories (MK) - Connector Hand Tool: QC-R003.

2. Manufacturers:

- a. McKinney Products; ASSA ABLOY Architectural Door Accessories (MK) - QC-C Series.
- b. No Substitution.

2.4 DOOR OPERATING TRIM

A. Flush Bolts and Surface Bolts: ANSI/BHMA A156.3 and A156.16, Grade 1, certified.

1. Flush bolts to be furnished with top rod of sufficient length to allow bolt retraction device location approximately six feet from the floor.
2. Furnish dust proof strikes for bottom bolts.
3. Surface bolts to be minimum 8" in length and U.L. listed for labeled fire doors and U.L. listed for windstorm components where applicable.
4. Provide related accessories (mounting brackets, strikes, coordinators, etc.) as required for appropriate installation and operation.
5. Manufacturers:
 - a. Door Controls International (DC).
 - b. Rockwood Products; ASSA ABLOY Architectural Door Accessories (RO).
 - c. Trimco (TC).
 - d. No Substitution.

B. Coordinators: ANSI/BHMA A156.3 certified door coordinators consisting of active-leaf, hold-open lever and inactive-leaf release trigger. Model as indicated in hardware sets.

1. Manufacturers:
 - a. Door Controls International (DC).
 - b. Rockwood Products; ASSA ABLOY Architectural Door Accessories (RO).
 - c. Trimco (TC).
 - d. No Substitution.

C. Door Push Plates and Pulls: ANSI/BHMA A156.6 certified door pushes and pulls of type and design specified in the Hardware Sets. Coordinate and provide proper width and height as required where conflicting hardware dictates.

1. Push/Pull Plates: Minimum .050 inch thick, size as indicated in hardware sets, with beveled edges, secured with exposed screws unless otherwise indicated.
2. Fasteners: Provide manufacturer's designated fastener type as indicated in Hardware Sets.
3. Manufacturers:

- a. Hiawatha, Inc. (HI).
 - b. Rockwood Products; ASSA ABLOY Architectural Door Accessories (RO).
 - c. Trimco (TC).
 - d. No Substitution.
- D. Flat Latch Locking Pulls: Post-mount style door pulls with integrated flat latch locking system in type and design as specified in the Hardware Sets. Full and half height with latching at top of door. Option for horizontal push bar. Mechanical or electric strike release as specified. Dogging and ADA thumbturn included. Customized sizing and configuration options.
1. Manufacturers:
 - a. Rockwood Products; ASSA ABLOY Architectural Door Accessories (RO) - FL Series.
 - b. No Substitution.

2.5 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.
- B. Source Limitations: Obtain each type of keyed cylinder and keys from the same source manufacturer as locksets and exit devices, unless otherwise indicated.
1. Manufacturers:
 - a. Corbin Russwin Hardware (RU).
 - b. No Substitution.
- C. 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: Manufacturer's Standard.Match Facility Standard.
- D. Removable Cores: Provide removable cores as specified, core insert, removable by use of a special key, and for use with only the core manufacturer's cylinder and door hardware.
- E. 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.

F. Key Quantity: Provide the following minimum number of keys:

1. Change Keys per Cylinder: Six (6).
2. Master Keys (per Master Key Level/Group): Five (5).
3. Construction Keys (where required): Ten (10).
4. Construction Control Keys (where required): Two (2).
5. Permanent Control Keys (where required): Two (2).

G. Construction Keying: Provide temporary keyed construction cores.

H. 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.

2.6 MECHANICAL LOCKS AND LATCHING DEVICES

A. Mortise Locksets, Grade 1 (Heavy Duty): ANSI/BHMA A156.13, Series 1000, Operational Grade 1 Certified Products Directory (CPD) listed. Locksets are to be manufactured with a corrosion resistant steel case and be field-reversible for handing without disassembly of the lock body.

1. Extended cycle test: Locks to have been cycle tested in ordinance with ANSI/BHMA 156.13 requirements to 13 million cycles or greater.
2. Manufacturers:
 - a. Corbin Russwin Hardware (RU) - ML2000 Series.

2.7 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.

2.8 ELECTRIC STRIKES

- A. Standard Electric Strikes: Electric strikes tested to ANSI/BHMA A156.31, Grade 1, for use on non-rated or fire rated openings. Strikes shall be of stainless steel construction tested to a minimum of 1500 pounds of static strength and 70 foot-pounds of dynamic strength with a minimum endurance of 1 million operating cycles. Provide strikes with 12 or 24 VDC capability, fail-secure unless otherwise specified. Where specified provide latchbolt and latchbolt strike monitoring indicating both the position of the latchbolt and locked condition of the strike.

1. Manufacturers:
 - a. HES (HS) - 1500/1600 Series.
 - b. No Substitution.

- B. Surface Mounted Rim Electric Strikes: Surface mounted rim exit device electric strikes tested to ANSI/BHMA A156.31, Grade 1, and UL Listed for both Burglary Resistance and for use on fire rated door assemblies. Construction includes internally mounted solenoid with two heavy-duty, stainless steel locking mechanisms operating independently to provide tamper resistance. Strikes tested for a minimum of 500,000 operating cycles. Provide strikes with 12 or 24 VDC capability supplied standard as fail-secure unless otherwise specified. Option available for latchbolt and latchbolt strike monitoring indicating both the position of the latchbolt and locked condition of the strike. Strike requires no cutting to the jamb prior to installation.

1. Manufacturers:
 - a. HES (HS) - 9400/9500/9600/9700/9800 Series.
 - b. No Substitution.

- C. Provide electric strikes with in-line power controller and surge suppressor by the same manufacturer as the strike with the combined products having a five year warranty.

2.9 CONVENTIONAL EXIT DEVICES

- A. General Requirements: All exit devices specified herein shall meet or exceed the following criteria:
1. At doors not requiring a fire rating, provide devices complying with NFPA 101 and listed and labeled for "Panic Hardware" according to UL305. Provide proper fasteners as required by manufacturer including sex nuts and bolts at openings specified in the Hardware Sets.

2. Where exit devices are required on fire rated doors, provide devices complying with NFPA 80 and with UL labeling indicating "Fire Exit Hardware". Provide devices with the proper fasteners for installation as tested and listed by UL. Consult manufacturer's catalog and template book for specific requirements.
 3. Except on fire rated doors, provide exit devices with hex key dogging device to hold the pushbar and latch in a retracted position. Provide optional keyed cylinder dogging on devices where specified in Hardware Sets.
 4. Devices must fit flat against the door face with no gap that permits unauthorized dogging of the push bar. The addition of filler strips is required in any case where the door light extends behind the device as in a full glass configuration.
 5. Lever Operating Trim: Where exit devices require lever trim, furnish manufacturer's heavy duty escutcheon trim with threaded studs for thru-bolts.
 - a. Lock Trim Design: As indicated in Hardware Sets, provide finishes and designs to match that of the specified locksets.
 - b. Where function of exit device requires a cylinder, provide a cylinder (Rim or Mortise) as specified in Hardware Sets.
 6. Vertical Rod Exit Devices: Where surface or concealed vertical rod exit devices are used at interior openings, provide as less bottom rod (LBR) unless otherwise indicated. Provide dust proof strikes where thermal pins are required to project into the floor.
 7. Narrow Stile Applications: At doors constructed with narrow stiles, or as specified in Hardware Sets, provide devices designed for maximum 2" wide stiles.
 8. Dummy Push Bar: Nonfunctioning push bar matching functional push bar.
 9. Extended cycle test: Devices to have been cycle tested to 9 million cycles.
 10. Rail Sizing: Provide exit device rails factory sized for proper door width application.
 11. Through Bolt Installation: For exit devices and trim as indicated in Door Hardware Sets.
 12. Hurricane and Tornado Resistance Compliance: Conventional exit devices are to be U.L. listed for windstorm assemblies where applicable. Provide the appropriate hurricane or tornado resistant products that have been independent third party tested, certified, and labeled to meet state and local windstorm building codes applicable to project.
- B. Conventional Push Rail Exit Devices (Heavy Duty): ANSI/BHMA A156.3, Grade 1 Certified Products Directory (CPD) listed panic and fire exit hardware devices furnished in the functions specified in the Hardware Sets. Exit device latch to be stainless steel, pullman type, with deadlock feature.
1. Manufacturers:
 - a. Corbin Russwin Hardware (RU) - ED4000 / ED5000 Series.

- C. Security Push Rail Exit Devices (Heavy Duty): ANSI/BHMA A156.3, Grade 1 Certified Products Directory (CPD) listed rim panic and fire exit hardware devices furnished in the functions specified in the Hardware Sets. Exit device latch to be constructed of high grade, heat treated, corrosion resistant nickel steel alloy, and have a full 3/4" throw projection with slide action positive deadlocking.
 - 1. Static Load Force Resistance: Minimum 3000 lbs certified independent tested.
 - 2. Manufacturers:
 - a. Corbin Russwin Hardware (RU) - ED4000S / ED5000S Series.

2.10 ELECTROMECHANICAL EXIT DEVICES

- A. Electromechanical Push Rail Exit Devices (Heavy Duty): ANSI/BHMA A156.3, Grade 1 Certified Products Directory (CPD) listed panic and fire exit hardware devices subject to same compliance standards and requirements as mechanical exit devices. Electrified exit devices to be of type and design as specified below and in the hardware sets.
 - 1. Energy Efficient Design: Provide devices which have a holding current draw of 15mA maximum, and can operate on either 12 or 24 volts. Locks are to be field configurable for fail safe or fail secure operation.
 - 2. Where conventional power supplies are not sufficient, include any specific controllers required to provide the proper inrush current.
 - 3. Motorized Electric Latch Retraction: Devices with an electric latch retraction feature must use motors which have a maximum current draw of 600mA. Solenoid driven latch retraction is not acceptable.
 - 4. Manufacturers:
 - a. Corbin Russwin Hardware (RU) - ED5000 Series.

2.11 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 (Commercial Duty): ANSI/BHMA 156.4, Grade 1 Certified Products Directory (CPD) listed surface mounted, institutional grade 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, closing sweep, and latch speed control valves. Provide non-handed units standard.
1. Manufacturers:
 - a. Corbin Russwin Hardware (RU) - DC6000 Series.
- C. Door Closers, Overhead Concealed Double Acting (Heavy Duty): Center pivot, double acting ANSI/BHMA 156.4 Grade 1 Certified Products Directory (CPD) overhead door closers. UL Listed and ADA-compliant for interior or exterior doors up to 250 lbs. Closers are non-handed, with adjustable spring strength, hydraulic back check, and two closing speed adjustments for sweep and latch. Latch speed can be independently adjustable per door direction. Cast iron body construction with 1-1/4" dual pistons and an optional hold open feature. Closer bodies shall fit in a 1-3/4" x 4" metal or aluminum transom and 2-1/2" x 4-1/2" wood frame.
1. Manufacturers:
 - a. dormakaba (DO) - RTS88 Series.
 - b. LCN Closers (LC) - 6030 Series.
 - c. Rixson Door Controls (RF) - 73 Series.
 - d. No Substitution.
- D. Door Closers, Overhead Concealed Single Acting (Heavy Duty): Single Acting (Heavy Duty): Center pivot, single acting ANSI/BHMA 156.4 Grade 1 Certified Products Directory (CPD) overhead door closers. UL Listed and ADA-compliant for interior or exterior doors up to 250 lbs. Closers are non-handed, with adjustable spring strength, hydraulic back check, and two closing speed adjustments for sweep and latch. Latch speed can be independently adjustable per door direction. Cast iron body construction with 1-1/4" dual pistons and an optional hold open feature. Closer bodies shall fit in a 1-3/4" x 4" metal or aluminum transom and 2-1/2" x 4-1/2" wood frame.
1. Manufacturers:

- a. dormakaba (DO) - RTS88 Series.
- b. LCN Closers (LC) - 2030 Series.
- c. Rixson Door Controls (RF) - 93 Series.
- d. No Substitution.

2.12 SURFACE MOUNTED CLOSER HOLDERS

- A. Electromagnetic Door Holders: Certified ANSI A156.15 electromagnetic door holder/releases with a minimum 20 to 40 pounds holding power and single coil construction able to accommodate 12VDC, 24VAC, 24VDC and 120VAC. Coils to be independently wound, employing an integral fuse and armatures to include a positive release button.

1. Manufacturers:
 - a. Rixson (RF) - 980/990 Series.
 - b. No Substitution.

2.13 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 certified 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. Hiawatha, Inc. (HI).
 - b. Rockwood Products; ASSA ABLOY Architectural Door Accessories (RO).
 - c. No Substitution.

2.14 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 certified 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 Products; ASSA ABLOY Architectural Door Accessories (RO).
 - c. No Substitution.
- C. Overhead Door Stops and Holders: ANSI/BHMA A156.8, Grade 1 Certified Products Directory (CPD) listed overhead stops and holders to be surface or concealed types as indicated in Hardware Sets. Track, slide, arm and jamb bracket to be constructed of extruded bronze and shock absorber spring of heavy tempered steel. Provide non-handed design with mounting brackets as required for proper operation and function.
 - 1. Manufacturers:
 - a. Rixson Door Controls (RF).
 - b. No Substitution.

2.15 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 NPFA 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. Pemko Products; ASSA ABLOY Architectural Door Accessories (PE).
 - 2. Reese Enterprises, Inc. (RE).
 - 3. No Substitution.

2.16 ELECTRONIC ACCESSORIES

- A. Networked Contactless Smart Card Readers: Contactless smart cards reader to securely read access control data from 13.56 MHz contactless smart cards. The contactless smart card reader is designed for use in access control applications by providing:
 - 1. Secure access control data exchange between the smart card and the reader utilizing key diversification and mutual authentication routines.
 - 2. Contactless smart card reader to be designed for low current operation to enable migration from most legacy proximity applications without the need to replace existing access control panels and/or power supplies. Operating voltage: 5-16 VDC. Current requirements: 55 mA Avg, 116 mA Peak at 12 VDC.
 - 3. Universal compatibility with most access control systems and backwards compatibility with legacy 125 KHz proximity access control formats.
 - 4. Product construction suitable for both indoor and outdoor applications.
 - 5. Customizable behavior for indicator lights and audible tones.
 - 6. Manufacturers (13.56 MHz iClass):
 - a. Corbin Russwin Hardware (RU) - 744F709/744F719 Series.
 - b. HID Global (HD) - R10/R40 Series.
 - c. Sargent Manufacturing (SA) - 6100/6120 Series.
 - d. No Substitution.
- B. Push-Button Switches: Industrial grade momentary or alternate contact, back-lighted push buttons with stainless-steel switch enclosures. 12/24 VDC bi-color illumination suitable for either flush or surface mounting.
 - 1. Manufacturers:
 - a. Securitron (SU) - PB Series.
 - b. No Substitution.
- C. Linear Power Supplies: Provide Nationally Recognized Testing Laboratory Listed 12VDC or 24VDC (field selectable) filtered and regulated power supplies. Include battery backup option with integral battery charging capability in addition to operating the DC load in event of line voltage failure. Provide the least number of units, at the appropriate amperage level, sufficient

to exceed the required total draw plus 50% for the specified electrified hardware and access control equipment.

1. Manufacturers:

- a. Corbin Russwin Hardware (RU) - BPS Series.
- b. Securitron (SU) - BPS Series.
- c. No Substitution.

2.17 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.

2.18 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. Wood Doors: DHI WDHS.3, "Recommended Locations for Architectural Hardware for Wood Flush Doors."
 - 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. Thresholds: Set thresholds for exterior and acoustical doors in full bed of sealant complying with requirements specified in Division 7 Section "Joint Sealants."
- E. 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.
 - 2. Submit documentation of incomplete items in the following formats:
 - a. PDF electronic file.

- b. Electronic formatted file integrated with the Openings Studio™ door opening management software platform.
- B. Fire Door Assembly Inspection: Reference Division 01 Sections "Closeout Procedures". Conduct an initial fire door assembly inspection, including documentation reporting, upon completion of door hardware installation according to NFPA 80 Standard for Fire Doors and Other Opening Protectives, paragraph 5.2.4, requirements.
- C. Opening Tags: Provide readable, QR-type label with password protected link-out to Openings Studio™ BIM software suite and the installed door and hardware information. Affix label to door frame as instructed by architect or owner.

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. PE - Pemko
3. SU - Securitron
4. RO - Rockwood
5. RU - Corbin Russwin
6. HS - HES
7. RF - Rixson
8. OT - Other
9. HI - Hiawatha
10. HG - HID Global

Hardware Sets

Set: 1.0

Doors: 156E, 156G, 156N, CR100E

Description: Exterior Aluminum Exit Only

1 Continuous Hinge	CFM_SLF HD1		PE
1 Rim Exit Device, Exit Only	ED5200S EO M107 M54	630	RU
1 Door Closer	DC6210 A11 M54 x BRKTS REQ	689	RU
1 Threshold	171A		PE
1 Weatherstrip	By Frame Manufacturer		OT
1 Sweep	3452CNB		PE

Set: 2.0

Doors: CR100A, CR100B, ST3A

Description: Exterior Aluminum Integrated Card / Keypad Access - Exit Pair x MELR

1 Continuous Hinge	CFM_SLF HD1 PT @ 40" C/L A.F.F		PE
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1 Continuous Hinge	CFM_SLF HD1		PE
1 Electric Power Transfer	*EL-CEPT		SU
1 Mullion	CRWS707AKM or length as required CL6		RU
1 Exit Device (exit only)	*ED5200S EO M107 M54	630	RU
1 Access Control Exit Device	*ED5200SN TH957 MELR SN200 BIKPS BOE M107 CT6R M54	630	RU
1 Interchangeable Core Cylinder	CR8000-Series as Required	626	RU
2 Permanent Core	8000	626	RU
2 Door Closer	DC6210 A11 M54 x BRKTS REQ	689	RU
1 Threshold	171A		PE
1 Weatherstrip	By Frame Manufacturer		OT
2 Sweep	3452CNB		PE
1 ElectroLynx Harness	*QC-C012		MK
1 ElectroLynx Harness	*QC-C000P x LAR		MK
1 ElectroLynx Harness	*QC-C1500P (@ JAMB)		MK
1 Power Supply	**24V As Required by Others		SU

Notes: OPERATION: DOOR TO BE CLOSED AND LOCKED AT ALL TIMES UNLESS HELD IN THE DOGGED POSITION BY THE ACCESS CONTROL SYSTEM. WHEN LOCKED, PRESENTATION OF A VALID CARD OR KEY CODE SIGNALS ELECTRIC LATCH RETRACTION ALLOWING INGRESS. EGRESS AT ALL TIMES BY EXIT DEVICE PUSH BAR.

* ITEMS LISTED ABOVE ARE TO BE FURNISHED BY THE OWNER.

** POWER SUPPLY TO BE PROVIDED BY THE OWNER AND INSTALLED IN THE DATA CLOSET TO ACCOMMODATE THE LENGTH OF WIRE RUN REQUIRED FOR EACH ELECTRICAL DEVICE.

NOTE: THE ABOVE HARDWARE IS ILLUSTRATED AS A BASIS OF DESIGN. IF ALTERNATE HARDWARE IS REQUIRED TO MEET WINDSTORM CODES, PROVIDE ARCHITECT WITH INFORMATION ON HARDWARE SUBSTITUTED FOR THAT WHICH IS SPECIFIED.

Set: 2.1

Doors: V100B, V100C

Description: Exterior Aluminum Integrated Card / Keypad Access - Exit Pair x MELR

2 Continuous Hinge	CFM_SLF HD1 PT @ 40" C/L A.F.F		PE
2 Continuous Hinge	CFM_SLF HD1		PE
2 Electric Power Transfer	*EL-CEPT		SU
1 Removable Mullion	CRFE707A		RU
1 Exit Device (exit only)	*ED5200S EO M107 M54	630	RU

1 Access Control Exit Device	*ED5200SN TH957 MELR SN200 BIKPS BOE M107 CT6R M54	630	RU
1 Permanent Core	8000	626	RU
2 Door Closer	DC6210 A11 M54 x BRKTS REQ	689	RU
1 Threshold	171A		PE
1 Weatherstrip	By Frame Manufacturer		OT
2 Sweep	3452CNB		PE
1 ElectroLynx Harness	*QC-C012		MK
1 ElectroLynx Harness	*QC-C000P x LAR		MK
1 ElectroLynx Harness	*QC-C1500P (@ JAMB)		MK
1 Power Supply	**24V As Required by Others		SU

Notes: OPERATION: DOOR TO BE CLOSED AND LOCKED AT ALL TIMES UNLESS HELD IN THE DOGGED POSITION BY THE ACCESS CONTROL SYSTEM. WHEN LOCKED, PRESENTATION OF A VALID CARD OR KEY CODE SIGNALS ELECTRIC LATCH RETRACTION ALLOWING INGRESS. EGRESS AT ALL TIMES BY EXIT DEVICE PUSH BAR.

* ITEMS LISTED ABOVE ARE TO BE FURNISHED BY THE OWNER.

** POWER SUPPLY TO BE PROVIDED BY THE OWNER AND INSTALLED IN THE DATA CLOSET TO ACCOMMODATE THE LENGTH OF WIRE RUN REQUIRED FOR EACH ELECTRICAL DEVICE.

NOTE: THE ABOVE HARDWARE IS ILLUSTRATED AS A BASIS OF DESIGN. IF ALTERNATE HARDWARE IS REQUIRED TO MEET WINDSTORM CODES, PROVIDE ARCHITECT WITH INFORMATION ON HARDWARE SUBSTITUTED FOR THAT WHICH IS SPECIFIED.

Set: 3.0

Doors: 160, CR100

Description: Exterior Aluminum Integrated Card / Keypad Access - Exit x MELR

1 Continuous Hinge	CFM_SLF HD1 PT @ 40" C/L A.F.F		PE
1 Electric Power Transfer	*EL-CEPT		SU
1 Access Control Exit Device	*ED5200SN TH957 MELR SN200 BIKPS BOE M107 CT6R M54	630	RU
1 Permanent Core	8000	626	RU
1 Door Closer	DC6210 A11 M54 x BRKTS REQ	689	RU
1 Threshold	171A		PE
1 Weatherstrip	By Frame Manufacturer		OT
1 Sweep	3452CNB		PE
1 ElectroLynx Harness	*QC-C012		MK
1 ElectroLynx Harness	*QC-C000P x LAR		MK

1 ElectroLynx Harness	*QC-C1500P (@ JAMB)	MK
1 Power Supply	**24V As Required by Others	SU

Notes: OPERATION: DOOR TO BE CLOSED AND LOCKED AT ALL TIMES. PRESENTATION OF A VALID CARD OR KEY CODE SIGNALS ELECTRIC LATCH RETRACTION ALLOWING INGRESS. EGRESS AT ALL TIMES BY EXIT DEVICE PUSH BAR.

* ITEMS LISTED ABOVE ARE TO BE FURNISHED BY THE OWNER.

** POWER SUPPLY TO BE PROVIDED BY THE OWNER AND INSTALLED IN THE DATA CLOSET TO ACCOMMODATE THE LENGTH OF WIRE RUN REQUIRED FOR EACH ELECTRICAL DEVICE.

NOTE: THE ABOVE HARDWARE IS ILLUSTRATED AS A BASIS OF DESIGN. IF ALTERNATE HARDWARE IS REQUIRED TO MEET WINDSTORM CODES, PROVIDE ARCHITECT WITH INFORMATION ON HARDWARE SUBSTITUTED FOR THAT WHICH IS SPECIFIED.

Set: 4.0

Doors: V100A

Description: Exterior Aluminum Nightlatch Function Exit

2 Continuous Hinge	CFM_SLF HD1		PE
1 Mullion	CRWS707AKM or length as required CL6		RU
1 Rim Exit Device, Exit Only	ED5200S EO M107 M54	630	RU
1 Rim Exit Device, Nightlatch	ED5200S TH957ET M107 M54 CT6R	630	RU
1 Interchangeable Core Cylinder	CR8000-Series as Required	626	RU
2 Permanent Core	8000	626	RU
2 Door Closer	DC6210 A11 M54 x BRKTS REQ	689	RU
1 Threshold	171A		PE
1 Weatherstrip	By Frame Manufacturer		OT
1 Mullion Gasketing	5110BL		PE
2 Sweep	3452CNB		PE

Notes: NOTE: THE ABOVE HARDWARE IS ILLUSTRATED AS A BASIS OF DESIGN. IF ALTERNATE HARDWARE IS REQUIRED TO MEET WINDSTORM CODES, PROVIDE ARCHITECT WITH INFORMATION ON HARDWARE SUBSTITUTED FOR THAT WHICH IS SPECIFIED.

Set: 5.0

Doors: V100E

Description: Aluminum Nightlatch Function Pair

2	Continuous Hinge	CFM_SLF HD1		PE
1	Mullion	CRWS707AKM or length as required CL6		RU
1	Rim Exit Device, Exit Only	ED5200S EO M107 M54	630	RU
1	Rim Exit Device, Nightlatch	ED5200S TH957ET M107 M54 CT6R	630	RU
1	Permanent Core	8000	626	RU
2	Door Closer	DC6210 A11 M54 x BRKTS REQ	689	RU
1	Weatherstrip	By Frame Manufacturer		OT

Set: 7.0

Doors: 156F, 156J, V100D

Description: Exterior Aluminum Pair Integrated Card / Keypad Access - Exit Pair x MELR

1	Continuous Hinge	CFM_SLF HD1 PT @ 40" C/L A.F.F		PE
1	Continuous Hinge	CFM_SLF HD1		PE
1	Electric Power Transfer	*EL-CEPT		SU
1	Removable Mullion	CRFE707A		RU
1	Exit Device (exit only)	*ED5200S EO M107 M54	630	RU
1	Access Control Exit Device	*ED5200SN TH957 MELR SN200 BIKPS BOE M107 CT6R M54	630	RU
1	Permanent Core	8000	626	RU
2	Door Closer	DC6210 A11 M54 x BRKTS REQ	689	RU
1	Weatherstrip	By Frame Manufacturer		OT
1	ElectroLynx Harness	*QC-C012		MK
1	ElectroLynx Harness	*QC-C1500P (@ JAMB)		MK
1	Power Supply	**24V As Required by Others		SU

Notes: OPERATION: DOOR TO BE CLOSED AND LOCKED AT ALL TIMES UNLESS HELD IN THE DOGGED POSITION BY THE ACCESS CONTROL SYSTEM. WHEN LOCKED, PRESENTATION OF A VALID CARD OR KEY CODE SIGNALS ELECTRIC LATCH RETRACTION ALLOWING INGRESS. EGRESS AT ALL TIMES BY EXIT DEVICE PUSH BAR.

* ITEMS LISTED ABOVE ARE TO BE FURNISHED BY THE OWNER.

** POWER SUPPLY TO BE PROVIDED BY THE OWNER AND INSTALLED IN THE DATA CLOSET TO ACCOMMODATE THE LENGTH OF WIRE RUN REQUIRED FOR EACH ELECTRICAL DEVICE.

NOTE: THE ABOVE HARDWARE IS ILLUSTRATED AS A BASIS OF DESIGN. IF ALTERNATE HARDWARE IS REQUIRED TO MEET WINDSTORM CODES, PROVIDE ARCHITECT WITH INFORMATION ON HARDWARE SUBSTITUTED FOR THAT WHICH IS SPECIFIED.

Set: 7.1

Doors: CR118

Description: Exterior Aluminum Pair Integrated Card / Keypad Access - Exit Pair x MELR

2 Continuous Hinge	CFM_SLF HD1 PT @ 40" C/L A.F.F		PE
2 Continuous Hinge	CFM_SLF HD1		PE
2 Electric Power Transfer	*EL-CEPT		SU
1 Mullion	CR907BKM or length as required CL6		RU
1 Exit Device (exit only)	*ED5200S EO M107 M54	630	RU
1 Access Control Exit Device	*ED5200SN TH957 MELR SN200 BIKPS BOE M107 CT6R M54	630	RU
1 Interchangeable Core Cylinder	CR8000-Series as Required	626	RU
1 Permanent Core	8000	626	RU
2 Surface Closer	*DC6210 A11 M54 x BRKTS REQ	689	RU
1 Weatherstrip	By Frame Manufacturer		OT
1 ElectroLynx Harness	*QC-C012		MK
1 ElectroLynx Harness	*QC-C1500P (@ JAMB)		MK
1 Power Supply	**24V As Required by Others		SU

Notes: OPERATION: DOOR TO BE CLOSED AND LOCKED AT ALL TIMES UNLESS HELD IN THE DOGGED POSITION BY THE ACCESS CONTROL SYSTEM. WHEN LOCKED, PRESENTATION OF A VALID CARD OR KEY CODE SIGNALS ELECTRIC LATCH RETRACTION ALLOWING INGRESS. EGRESS AT ALL TIMES BY EXIT DEVICE PUSH BAR.

* ITEMS LISTED ABOVE ARE TO BE FURNISHED BY THE OWNER.

** POWER SUPPLY TO BE PROVIDED BY THE OWNER AND INSTALLED IN THE DATA CLOSET TO ACCOMMODATE THE LENGTH OF WIRE RUN REQUIRED FOR EACH ELECTRICAL DEVICE.

NOTE: THE ABOVE HARDWARE IS ILLUSTRATED AS A BASIS OF DESIGN. IF ALTERNATE HARDWARE IS REQUIRED TO MEET WINDSTORM CODES, PROVIDE ARCHITECT WITH INFORMATION ON HARDWARE SUBSTITUTED FOR THAT WHICH IS SPECIFIED.

Set: 8.0

Doors: ST1B, ST2B, ST4B

Description: Exterior Integrated Card x Keypad Access - Exit x MELR

1 Continuous Hinge	CFM_SLF HD1 PT @ 40" C/L A.F.F		PE
1 Electric Power Transfer	*EL-CEPT		SU
1 Access Control Exit Device	*ED5200SN TH957 MELR SN200 BIKPS BOE M107 CT6R M54	630	RU
1 Interchangeable Core Cylinder	CR8000-Series as Required	626	RU
1 Surface Closer	*DC6210 A11 M54 x BRKTS REQ	689	RU
1 Kick Plate	K1050 10" CSK 3BE34	US32D	RO
1 Threshold	171A		PE
1 Set Weatherstrip	303AS		PE
2 Sweep	3452CNB		PE
1 ElectroLynx Harness	*QC-C012		MK
1 ElectroLynx Harness	*QC-C000P x LAR		MK
1 ElectroLynx Harness	*QC-C1500P (@ JAMB)		MK
1 Power Supply	**24V As Required by Others		SU

Notes: OPERATION: DOOR TO BE CLOSED AND LOCKED AT ALL TIMES UNLESS HELD IN THE DOGGED POSITION BY THE ACCESS CONTROL SYSTEM. WHEN LOCKED, PRESENTATION OF A VALID CARD OR KEY CODE SIGNALS ELECTRIC LATCH RETRACTION ALLOWING INGRESS. EGRESS AT ALL TIMES BY EXIT DEVICE PUSH BAR.

* ITEMS LISTED ABOVE ARE TO BE FURNISHED BY THE OWNER.

** POWER SUPPLY TO BE PROVIDED BY THE OWNER AND INSTALLED IN THE DATA CLOSET TO ACCOMMODATE THE LENGTH OF WIRE RUN REQUIRED FOR EACH ELECTRICAL DEVICE.

Set: 9.0

Doors: 156K

Description: Exterior Aluminum Exit Only

2 Continuous Hinge	CFM_SLF HD1		PE
1 Removable Mullion	CRFE707A		RU
1 Rim Exit Device, Exit Only	ED5200S EO M107 M54	630	RU
2 Door Closer	DC6210 A11 M54 x BRKTS REQ	689	RU
1 Threshold	171A		PE
1 Weatherstrip	By Frame Manufacturer		OT
1 Mullion Gasketing	5110BL		PE
2 Sweep	3452CNB		PE

Notes: NOTE: THE ABOVE HARDWARE IS ILLUSTRATED AS A BASIS OF DESIGN. IF ALTERNATE HARDWARE IS REQUIRED TO MEET WINDSTORM CODES, PROVIDE ARCHITECT WITH INFORMATION ON HARDWARE SUBSTITUTED FOR THAT WHICH IS SPECIFIED.

Set: 10.0

Doors: 161, 301B

Description: Exterior Integrated Card x Keypad Access + Closer / Stop

1 Continuous Hinge	CFM_SLF HD1 PT @ 40" C/L A.F.F		PE
1 Electric Power Transfer	*EL-CEPT		SU
1 Access Control Mort Lock	*ML20606 x SN200-SEC LSA BIKPS BOE CT6R	630	RU
1 Interchangeable Core Cylinder	CR8000-Series as Required	626	RU
1 Surface Closer	*DC6210 A11 M54	689	RU
1 Kick Plate	K1050 10" CSK 3BE34	US32D	RO
1 Threshold	171A		PE
1 Set Weatherstrip	303AS		PE
1 Sweep	3452CNB		PE
1 ElectroLynx Harness	*QC-C000P x LAR		MK
1 ElectroLynx Harness	*QC-C1500P (@ JAMB)		MK
1 Power Supply	**24V As Required by Others		SU

Notes: OPERATION: DOOR TO BE CLOSED AND LOCKED AT ALL TIMES. PRESENTATION OF A VALID CARD OR KEY CODE SIGNALS ELECTRIC LATCH RETRACTION ALLOWING INGRESS. EGRESS AT ALL TIMES BY EXIT DEVICE PUSH BAR.

* ITEMS LISTED ABOVE ARE TO BE FURNISHED BY THE OWNER.

** POWER SUPPLY TO BE PROVIDED BY THE OWNER AND INSTALLED IN THE DATA CLOSET TO ACCOMMODATE THE LENGTH OF WIRE RUN REQUIRED FOR EACH ELECTRICAL DEVICE.

NOTE: THE ABOVE HARDWARE IS ILLUSTRATED AS A BASIS OF DESIGN. IF ALTERNATE HARDWARE IS REQUIRED TO MEET WINDSTORM CODES, PROVIDE ARCHITECT WITH INFORMATION ON HARDWARE SUBSTITUTED FOR THAT WHICH IS SPECIFIED.

Set: 10.1

Doors: 204A

Description: Aluminum Classroom Intruder Function + Closer

1 Continuous Hinge	CFM_SLF HD1		PE
1 Classroom Intruder Lock	ML2072 LWA CT6R	630	RU
2 Permanent Core	8000	626	RU
1 Door Closer	DC6210 A3 M54	689	RU
1 Wall Stop	406	US32D	RO
1 Weatherstrip	By Frame Manufacturer		OT

Notes: Minimum 5" wide stiles required at aluminum doors.

Set: 11.0

Doors: E163

Description: Exterior Integrated Card / Keypad Access / Exit - NEC

1 Continuous Hinge	CFM_SLF HD1 PT @ 40" C/L A.F.F		PE
1 Electric Power Transfer	*EL-CEPT		SU
1 Access Control Exit Device	*ED5200SN TH957 MELR SN200 BIKPS BOE M107 CT6R M54	630	RU
1 Permanent Core	8000	626	RU
1 Surface Closer	*DC6210 A11 M54 x BRKTS REQ	689	RU
1 Threshold	1715A		PE
1 Set Door Seals	303AS		PE
1 Rain Guard	346C		PE
1 Sweep	3452CNB		PE
1 ElectroLynx Harness	*QC-C012		MK
1 ElectroLynx Harness	*QC-C000P x LAR		MK
1 ElectroLynx Harness	*QC-C1500P (@ JAMB)		MK
1 Wiring Diagram	As Required by Others		RU
1 Power Supply	**24V As Required by Others		SU

Notes: OPERATION: DOOR TO BE CLOSED AND LOCKED AT ALL TIMES. PRESENTATION OF A VALID CARD RETRACTS PUSHBAR, ALLOWING INGRESS. EGRESS AT ALL TIMES BY EXIT DEVICE PUSH BAR.

* ITEMS LISTED ABOVE ARE TO BE FURNISHED BY THE OWNER.

** POWER SUPPLY TO BE PROVIDED BY THE OWNER AND INSTALLED IN THE DATA CLOSET TO ACCOMMODATE THE LENGTH OF WIRE RUN REQUIRED FOR EACH ELECTRICAL DEVICE.

NOTE: THE ABOVE HARDWARE IS ILLUSTRATED AS A BASIS OF DESIGN. IF ALTERNATE

HARDWARE IS REQUIRED TO MEET WINDSTORM CODES, PROVIDE ARCHITECT WITH INFORMATION ON HARDWARE SUBSTITUTED FOR THAT WHICH IS SPECIFIED.

Set: 11.1

Doors: [ST3C](#)

Description: Rated Passage Function Exit Pair + Magnetic Wall Holders

6 Hinge, Full Mortise, Hvy Wt	T4A3786	US26D	MK
1 Mullion	CR907A		RU
1 Passage	ED5200A L910ET M54	630	RU
1 Exit Only	ED5200A EO M54	630	RU
2 Surface Closer	DC6200 A10 M54	689	RU
2 Kick Plate	K1050 10" CSK 3BE34	US32D	RO
2 Electromagnetic Holder	996M	689	RF
1 Mullion Gasketing	5110BL		PE
1 Set Door Seals	S88D		PE

Notes: Wall magnets are tied to fire alarm system & release at smoke activation.

Set: 12.0

Doors: [ST1D](#), [ST2C](#), [ST2D](#)

Description: Passage Function Exit - Magnetic Holder

3 Hinge, Full Mortise, Hvy Wt	T4A3786	US26D	MK
1 Rim Exit Device, Passage	ED5200 L910ET M54	630	RU
1 Surface Closer	DC6200 A10 M54	689	RU
1 Kick Plate	K1050 10" CSK 3BE34	US32D	RO
1 Electromagnetic Holder	996M	689	RF
1 Gasketing/Silencers	S88D/608 AS REQUIRED		PE

Set: 12.1

Doors: [ST1C](#), [ST4C](#)

Description: Rated Passage Function Exit - Magnetic Holder

3 Hinge, Full Mortise, Hvy Wt	T4A3786	US26D	MK
1 Classroom	ED5200A L955ET M54 CT6R	630	RU
1 Permanent Core	8000	626	RU
1 Surface Closer	DC6200 A10 M54	689	RU
1 Kick Plate	K1050 10" CSK 3BE34	US32D	RO

1 Electromagnetic Holder	996M	689	RF
1 Gasketing/Silencers	S88D/608 AS REQUIRED		PE

Set: 12.2

Doors: [ST4A](#)

Description: Rated Classroom Intruder Function Exit

3 Hinge, Full Mortise, Hvy Wt	T4A3786	US26D	MK
1 Rim Exit Device, Classroom	ED5202A L955ET M54 CT6R	630	RU
2 Permanent Core	8000	626	RU
1 Surface Closer	DC6200 A10 M54	689	RU
1 Kick Plate	K1050 10" CSK 3BE34	US32D	RO
1 Wall Stop	406	US32D	RO
1 Gasketing/Silencers	S88D/608 AS REQUIRED		PE

Set: 12.3

Doors: [ST3B](#)

Description: Rated Classroom Function Exit Pair + Magnetic Wall Holders

6 Hinge, Full Mortise, Hvy Wt	T4A3786	US26D	MK
1 Mullion	CRWS707AKM or length as required CL6		RU
1 Classroom	ED5200A L955ET M54 CT6R	630	RU
1 Exit Only	ED5200A EO M54	630	RU
1 Interchangeable Core Cylinder	CR8000-Series as Required	626	RU
1 Permanent Core	8000	626	RU
2 Surface Closer	DC6200 A10 M54	689	RU
2 Kick Plate	K1050 10" CSK 3BE34	US32D	RO
2 Electromagnetic Holder	996M	689	RF
1 Mullion Gasketing	5110BL		PE
1 Set Door Seals	S88D		PE

Notes: Wall magnets are tied to fire alarm system & release at smoke activation.

Set: 12.4

Doors: [203A](#)

Description: Integrated Card / Keypad Access Exit

3 Hinge, Full Mortise, Hvy Wt	T4A3786	US26D	MK
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1 Electric Power Transfer	*EL-CEPT Mounted 6" above the center hinge		SU
1 Access Control Exit Device	*ED5200SN TH957 MELR SN200 BIKPS BOE CT6R M54	630	RU
1 Door Closer	*DC6210 A3 M54	689	RU
1 Kick Plate	K1050 10" CSK 3BE34	US32D	RO
1 Wall Stop	406	US32D	RO
1 Set Door Seals	S88D		PE
1 ElectroLynx Harness	*QC-C012		MK
1 ElectroLynx Harness	*QC-C000P x LAR		MK
1 ElectroLynx Harness	*QC-C1500P (@ JAMB)		MK
1 Wiring Diagram	As Required by Others		RU
1 Power Supply	**24V As Required by Others		SU

Notes: Access Control Panel and Security Management Software by Security Integrator.
 Prep door and hinge jamb for electronic device.
 OPERATION: Outside integral reader/keypad temporarily retracts latchbolt: auto-relock. Electronic function is fail-secure with outside key override. Inside pushbar always allows egress.

Set: 13.0

Doors: [E114](#), [E221](#)

Description: Nightlatch Function Exit - NEC

3 Hinge, Full Mortise	TA2714	US26D	MK
1 Fire Rated Rim Exit, Nightlatch	ED5200A TH957ET M54 CT6R	630	RU
1 Permanent Core	8000	626	RU
1 Door Closer	DC6210 A3 M54	689	RU
1 Wall Stop	406	US32D	RO
1 Set Door Seals	S88D		PE

Set: 14.0

Doors: [E241](#), [E311](#)

Description: Storeroom Function Exit - NEC

3 Hinge, Full Mortise	TA2714	US26D	MK
1 Fire Rated Rim Exit, Nightlatch	ED5200A TH957ET M54 CT6R	630	RU
1 Permanent Core	8000	626	RU
1 Door Closer	DC6210 A4 M54	689	RU
1 Set Door Seals	S88D		PE

Set: 14.1

Doors: 130

Description: Storeroom Function Exit + Closer / Holder

3 Hinge, Full Mortise	TA2714	US26D	MK
1 Rim Exit Device, Nightlatch	ED5200 L957ET M54 M51 CT6R	630	RU
1 Permanent Core	8000	626	RU
1 Surface Closer	DC6210 A5 M54	689	RU
1 Set Door Seals	S88D		PE

Set: 15.0

Doors: 203, CR100C, CR100D, CR200, CR200A

Description: Integrated Card & Keypad Access / Exit Pair + Magnetic Wall Holders

1 Continuous Hinge	CFM_SLF HD1 PT @ 40" C/L A.F.F		PE
1 Continuous Hinge	CFM_SLF HD1		PE
1 Electric Power Transfer	*EL-CEPT		SU
1 Mullion	CR907A		RU
1 Access Control Exit Device	*ED5200SN TH957 MELR SN200 BIKPS BOE CT6R M54	630	RU
1 Rim Exit Device, Exit Only	*ED5200S EO M54	630	RU
1 Interchangeable Core Cylinder	CR8000-Series as Required	626	RU
1 Permanent Core	8000	626	RU
2 Door Closer	*DC6210 A3 M54	689	RU
2 Kick Plate	K1050 10" CSK 3BE34	US32D	RO
2 Electromagnetic Holder	996M	689	RF
1 Gasketing/Silencers	S88D/608 AS REQUIRED		PE
1 ElectroLynx Harness	*QC-C012		MK
1 ElectroLynx Harness	*QC-C000P x LAR		MK
1 ElectroLynx Harness	*QC-C1500P (@ JAMB)		MK
1 Power Supply	**24V As Required by Others		SU

Notes: OPERATION: CARD READER OUTSIDE TEMPORARILY RETRACTS LATCHBOLT UPON PRESENTATION OF VALID CREDENTIAL OR VALID KEYPAD INPUT. LATCHBOLT CAN BE HELD RETRACTED AS PROGRAMMED BY INTEGRATED SOFTWARE.. MAGNETIC WALL HOLDERS ARE TIED TO FIRE ALARM AND DOOR PANEL FOR RELEASE DURING SMOKE EVENT OR AS PROGRAMMED.

* ITEMS LISTED ABOVE ARE TO BE FURNISHED BY THE OWNER.

** POWER SUPPLY TO BE PROVIDED BY THE OWNER AND INSTALLED IN THE DATA CLOSET TO ACCOMMODATE THE LENGTH OF WIRE RUN REQUIRED FOR EACH

ELECTRICAL DEVICE.

Set: 15.1

Doors: 164

Description: Exterior Storeroom Function - FRP Door

1 Continuous Hinge	CFM_SLF HD1 PT @ 40" C/L A.F.F		PE
1 Storeroom Lock	ML2057 LWA CT6R	630	RU
1 Permanent Core	8000	626	RU
1 Door Closer	DC6210 A4 M54 M75	689	RU
1 Kick Plate	K1050 10" CSK 3BE34	US32D	RO
1 Threshold	171A		PE
1 Set Weatherstrip	303AS		PE
1 Rain Guard	346C		PE
1 Sweep	3452CNB		PE

Notes: NOTE: THE ABOVE HARDWARE IS ILLUSTRATED AS A BASIS OF DESIGN. IF ALTERNATE HARDWARE IS REQUIRED TO MEET WINDSTORM CODES, PROVIDE ARCHITECT WITH INFORMATION ON HARDWARE SUBSTITUTED FOR THAT WHICH IS SPECIFIED.

Set: 16.0

Doors: 161A

Description: Exterior Storeroom Function Pair + Closer / Holder

2 Continuous Hinge	CFM_SLF HD1		PE
2 Surface Bolt	988CR		RU
1 Storeroom Lock	ML2057 LWA CT6R	630	RU
1 Permanent Core	8000	626	RU
2 Surface Closer	DC6210 A5 M75	689	RU
2 Kick Plate	K1050 10" CSK 3BE34	US32D	RO
1 Threshold	1715A		PE
1 Set Weatherstrip	303AS		PE
1 Set Door Seals	S773D		PE
1 Rain Guard	346C		PE
2 Sweep	3452CNB		PE

Notes: NOTE: THE ABOVE HARDWARE IS ILLUSTRATED AS A BASIS OF DESIGN. IF ALTERNATE HARDWARE IS REQUIRED TO MEET WINDSTORM CODES, PROVIDE ARCHITECT WITH INFORMATION ON HARDWARE SUBSTITUTED FOR THAT WHICH IS SPECIFIED.

Set: 17.0

Doors: [CR118A](#)

Description: Rated Double Egress Pair + Magnetic Holders

2 Continuous Hinge	CFM_SLF HD1		PE
2 Exit Only	ED5800A EO	630	RU
2 Surface Closer	DC6200 A10 M54	689	RU
2 Kick Plate	K1050 10" CSK 3BE34	US32D	RO
2 Electromagnetic Holder	996M	689	RF
1 Set Door Seals	S88D		PE

Notes: Overlapping astragal by door manufacturer.

Set: 18.0

Doors: 162

Description: Exterior Storeroom Function + Closer

1 Continuous Hinge	CFM_SLF HD1		PE
1 Storeroom Lock	ML2057 LWA CT6R	630	RU
1 Permanent Core	8000	626	RU
1 Door Closer	DC6210 A4 M54	689	RU
1 Kick Plate	K1050 10" CSK 3BE34	US32D	RO
1 Threshold	171A		PE
1 Set Door Seals	303AS		PE
1 Rain Guard	346C		PE
1 Sweep	3452CNB		PE

Notes: NOTE: THE ABOVE HARDWARE IS ILLUSTRATED AS A BASIS OF DESIGN. IF ALTERNATE HARDWARE IS REQUIRED TO MEET WINDSTORM CODES, PROVIDE ARCHITECT WITH INFORMATION ON HARDWARE SUBSTITUTED FOR THAT WHICH IS SPECIFIED.

Set: 19.0

Doors: [144B](#), [156B](#), [203D](#), [302A](#), [S104D](#)

Description: Classroom Lock

3 Hinge	TA2714	US26D	MK
1 Classroom Lock	ML2055 LWA CT6R	630	RU

1 Permanent Core	8000	626	RU
1 Door Stop	406/441CU	US26D	RO
3 Silencer	608		RO

Notes: Verify hardware compatibility with existing door and frame.

Set: 19.1

Doors: 103S

Description: Classroom Lock + Protection Plates

3 Hinge, Full Mortise	TA2714	US26D	MK
1 Classroom Lock	ML2055 LWA CT6R	630	RU
1 Permanent Core	8000	626	RU
1 Kick Plate	K1050 10" CSK 3BE34	US32D	RO
1 Mop Plate	K1050 6" high	US32D	RO
3 Silencer	608		RO

Set: 19.2

Doors: 156C, 156D

Description: Classroom Function + Wall Holder

3 Hinge, Full Mortise	TA2714	US26D	MK
1 Classroom Lock	ML2055 LWA CT6R	630	RU
1 Permanent Core	8000	626	RU
1 Door Stop & Holder	494S	US26D	RO
3 Silencer	608		RO

Notes: Furnish frame with jamb depth for wrapped wall condition to allow for 180-degree swing of doors.

Set: 20.0

Doors: 150D, 207S, 317S

Description: Classroom Function + O H Holder

3 Hinge, Full Mortise	TA2714	US26D	MK
1 Classroom Lock	ML2055 LWA CT6R	630	RU
1 Permanent Core	8000	626	RU
1 Surf Overhead Stop	9-336	630	RF
3 Silencer	608		RO

Set: 20.1

Doors: [ST1A](#), [ST2A](#)

Description: Rated Classroom Function + Magnetic Wall Holder

3 Hinge, Full Mortise, Hvy Wt	T4A3786	US26D	MK
1 Classroom Lock	ML2055 LWA CT6R	630	RU
1 Permanent Core	8000	626	RU
1 Surface Closer	DC6200 A10 M54	689	RU
1 Kick Plate	K1050 10" CSK 3BE34	US32D	RO
1 Electromagnetic Holder	996M	689	RF
1 Gasketing/Silencers	S88D/608 AS REQUIRED		PE

Set: 20.2

Doors: [144S](#), [150B](#), [314S](#), [S151A](#), [S151B](#), [S151C](#), [S154](#)

Description: Classroom Function Pair + O H Holders

6 Hinge, Full Mortise	TA2714	US26D	MK
2 Flush Bolt	555	US26D	RO
1 Dust Proof Strike	570	US26D	RO
1 Classroom Lock	ML2055 LWA CT6R	630	RU
1 Permanent Core	8000	626	RU
2 Surf Overhead Hold Open	9-326	630	RF
1 Astragal	357SP x Door Height		PE
2 Silencer	608		RO

Set: 20.3

Doors: [118](#), [S156A](#)

Description: Rated Classroom Function Pair + O H Holders

6 Hinge, Full Mortise, Hvy Wt	T4A3786	US26D	MK
1 Flush Bolt	2962	US26D	RO
1 Dust Proof Strike	570	US26D	RO
1 Classroom Lock	ML2055 LWA CT6R	630	RU
1 Permanent Core	8000	626	RU
1 Coordinator	2672	Black	RO
2 Mounting Bracket	2601 as Required	Black	RO
2 Surf Overhead Stop	9-336	630	RF
2 Surface Closer	DC6200 A10 M54	689	RU
1 Set Door Seals	S88D		PE
1 Astragal	357SP x Door Height		PE

1 Astragal Seal S771BL x Door Height PE

Set: 20.4

Doors: 102F

Description: Classroom Function + Closer

3 Hinge, Full Mortise, Hvy Wt	T4A3786	US26D	MK
1 Classroom Lock	ML2055 LWA CT6R	630	RU
1 Permanent Core	8000	626	RU
1 Door Closer	DC6210 A3 M54	689	RU
1 Kick Plate	K1050 10" CSK 3BE34	US32D	RO
1 Wall Stop	406	US32D	RO
3 Silencer	608		RO

Set: 20.5

Doors: 144

Description: Classroom Intruder Function Exit

3 Hinge, Full Mortise, Hvy Wt	T4A3786	US26D	MK
1 Classroom (Dbl Cyl)	ED5202 L955ET M54 CT6R	630	RU
1 Interchangeable Core Cylinder	CR8000-Series as Required	626	RU
1 Door Closer	DC6210 A3 M54	689	RU
1 Kick Plate	K1050 10" CSK 3BE34	US32D	RO
1 Wall Stop	406	US32D	RO
3 Silencer	608		RO

Set: 21.0

Doors: 150C, 154, 154B

Description: Classroom Intruder Function Exit - Gasketed

3 Hinge, Full Mortise, Hvy Wt	T4A3786	US26D	MK
1 Classroom (Dbl Cyl)	ED5202 L955ET M54 CT6R	630	RU
2 Interchangeable Core Cylinder	CR8000-Series as Required	626	RU
1 Door Closer	DC6210 A3 M54	689	RU
1 Kick Plate	K1050 10" CSK 3BE34	US32D	RO
1 Wall Stop	406	US32D	RO
1 Set Door Seals	303AS		PE
1 Auto Door Bottom	4131CRL		PE

Set: 21.1

Doors: [144A](#)

Description: Classroom Intruder Function Exit

3 Hinge, Full Mortise, Hvy Wt	T4A3786	US26D	MK
1 Classroom (Dbl Cyl)	ED5202 L955ET M54 CT6R	630	RU
2 Interchangeable Core Cylinder	CR8000-Series as Required	626	RU
1 Door Closer	DC6210 A11 M54 x BRKTS REQ	689	RU
1 Kick Plate	K1050 10" CSK 3BE34	US32D	RO
3 Silencer	608		RO

Set: 22.0

Doors: [150](#), [151](#), [151A](#), [151B](#)

Description: Classroom Intruder Function Exit Pair - Gasketed

6 Hinge, Full Mortise, Hvy Wt	T4A3786	US26D	MK
1 Mullion	CR907A		RU
1 Classroom (Dbl Cyl)	ED5202 L955ET M54 CT6R	630	RU
2 Rim Exit Device, Exit Only	ED5200 EO M54	630	RU
1 Permanent Core	8000	626	RU
2 Door Closer	DC6210 A3 M54	689	RU
2 Kick Plate	K1050 10" CSK 3BE34	US32D	RO
2 Wall Stop	406	US32D	RO
1 Set Door Seals	S88D		PE
2 Auto Door Bottom	4131CRL		PE

Set: 22.1

Doors: [156](#), [156M](#)

Description: Rated Classroom Function Exit Pair

2 Continuous Hinge	CFM_SLF HD1		PE
1 Mullion	CR907A		RU
1 Exit Only	ED5200A EO M54	630	RU
1 Rim Exit Device, Classroom	ED5202A L955ET M54 CT6R	630	RU
2 Permanent Core	8000	626	RU
2 Door Closer	DC6210 A3 M54	689	RU
2 Kick Plate	K1050 10" CSK 3BE34	US32D	RO
2 Wall Stop	406	US32D	RO
1 Mullion Gasketing	5110BL		PE
1 Set Door Seals	S88D		PE

Set: 23.0

Doors: [D112](#), [D118](#), [D125](#), [D243](#)

Description: Integrated Card Access Control + Closer

3 Hinge, Full Mortise	TA2714	US26D	MK
1 Electric Power Transfer	*EL-CEPT Mounted 6" above the center hinge		SU
1 Access Control Mort Lock	*ML20606 x SN200-SEC LSA BIPS B0E CT6R	630	RU
1 Interchangeable Core Cylinder	CR8000-Series as Required	626	RU
1 Surface Closer	*DC6200 M54	689	RU
1 Kick Plate	K1050 10" CSK 3BE34	US32D	RO
1 Wall Stop	406	US32D	RO
3 Silencer	608		RO
1 ElectroLynx Harness	*QC-C000P x LAR		MK
1 ElectroLynx Harness	*QC-C1500P (@ JAMB)		MK
1 Power Supply	**24V As Required by Others		SU

Notes: OPERATION: DOOR TO BE CLOSED AND LOCKED AT ALL TIMES. PRESENTATION OF A VALID CARD UNLOCKS OUTSIDE LEVER ALLOWING INGRESS. EGRESS AT ALL TIMES BY INSIDE LEVER.

* ITEMS LISTED ABOVE ARE TO BE FURNISHED BY THE OWNER.

** POWER SUPPLY TO BE PROVIDED BY THE OWNER AND INSTALLED IN THE DATA CLOSET TO ACCOMMODATE THE LENGTH OF WIRE RUN REQUIRED FOR EACH ELECTRICAL DEVICE.

Set: 24.0

Doors: [D217](#), [D313](#)

Description: Integrated Card Access Control + Closer

3 Hinge, Full Mortise	TA2714	US26D	MK
1 Electric Power Transfer	*EL-CEPT Mounted 6" above the center hinge		SU
1 Access Control Mort Lock	*ML20606 x SN200-SEC LSA BIPS B0E CT6R	630	RU
1 Interchangeable Core Cylinder	CR8000-Series as Required	626	RU
1 Surface Closer	*DC6210 A4 M54	689	RU
3 Silencer	608		RO
1 ElectroLynx Harness	*QC-C000P x LAR		MK
1 ElectroLynx Harness	*QC-C1500P (@ JAMB)		MK

1 Power Supply **24V As Required by Others SU

Notes: OPERATION: DOOR TO BE CLOSED AND LOCKED AT ALL TIMES. PRESENTATION OF A VALID CARD UNLOCKS OUTSIDE LEVER ALLOWING INGRESS. EGRESS AT ALL TIMES BY INSIDE LEVER.

* ITEMS LISTED ABOVE ARE TO BE FURNISHED BY THE OWNER.

** POWER SUPPLY TO BE PROVIDED BY THE OWNER AND INSTALLED IN THE DATA CLOSET TO ACCOMMODATE THE LENGTH OF WIRE RUN REQUIRED FOR EACH ELECTRICAL DEVICE.

Set: 25.0

Doors: 102G

Description: Integrated Card / Keypad Access + Closer

1 Continuous Hinge	CFM_SLF HD1 PT @ 40" C/L A.F.F		PE
1 Electric Power Transfer	*EL-CEPT		SU
1 Access Control Mort Lock	*ML20606 x SN200-SEC LSA BIKPS B0E CT6R	630	RU
1 Interchangeable Core Cylinder	CR8000-Series as Required	626	RU
1 Door Closer	*DC6210 A3 M54	689	RU
1 Kick Plate	K1050 10" CSK 3BE34	US32D	RO
1 Wall Stop	406	US32D	RO
1 Gasketing/Silencers	S88D/608 AS REQUIRED		PE
1 ElectroLynx Harness	*QC-C000P x LAR		MK
1 ElectroLynx Harness	*QC-C1500P (@ JAMB)		MK
1 Voice Only Aiphone	*IX-BA		OT
1 Release Button	*CCSD Special		OT
1 Power Supply	**24V As Required by Others		SU

Notes: Notes: OPERATION: DOOR TO BE CLOSED AND LOCKED AT ALL TIMES. PRESENTATION OF A VALID CARD OR KEY CODE UNLOCKS OUTSIDE LEVER ALLOWING INGRESS. EGRESS AT ALL TIMES BY INSIDE LEVER. DOOR TO BE CONTROLLED BY REMOTE RELEASE BY FRONT OFFICE STAFF.

* ITEMS LISTED ABOVE ARE TO BE FURNISHED BY THE OWNER.

** POWER SUPPLY TO BE PROVIDED BY THE INTEGRATOR AND INSTALLED IN THE DATA CLOSET TO ACCOMMODATE THE LENGTH OF WIRE RUN REQUIRED FOR EACH ELECTRICAL DEVICE.

Set: 26.0

Doors: 103A, 110

Description: Integrated Card / Keypad Access + Closer + O H Stop

3 Hinge, Full Mortise, Hvy Wt	T4A3786	US26D	MK
1 Electric Power Transfer	*EL-CEPT Mounted 6" above the center hinge		SU
1 Access Control Mort Lock	*ML20606 x SN200-SEC LSA BIKPS BOE CT6R	630	RU
1 Permanent Core	8000	626	RU
1 Surf Overhead Stop	9-336	630	RF
1 Surface Closer	*DC6200	689	RU
1 Kick Plate	K1050 10" CSK 3BE34	US32D	RO
1 Set Door Seals	S88D		PE
1 ElectroLynx Harness	*QC-C000P x LAR		MK
1 ElectroLynx Harness	*QC-C1500P (@ JAMB)		MK
1 Power Supply	**24V As Required by Others		SU

Notes: Notes: OPERATION: DOOR TO BE CLOSED AND LOCKED AT ALL TIMES. PRESENTATION OF A VALID CARD OR KEY CODE UNLOCKS OUTSIDE LEVER ALLOWING INGRESS. EGRESS AT ALL TIMES BY INSIDE LEVER. DOOR TO BE CONTROLLED BY REMOTE RELEASE BY FRONT OFFICE STAFF.

* ITEMS LISTED ABOVE ARE TO BE FURNISHED BY THE OWNER.

** POWER SUPPLY TO BE PROVIDED BY THE INTEGRATOR AND INSTALLED IN THE DATA CLOSET TO ACCOMMODATE THE LENGTH OF WIRE RUN REQUIRED FOR EACH ELECTRICAL DEVICE.

Set: 27.0

Doors: 213, 305

Description: Integrated Card / Keypad Access + Closer

3 Hinge, Full Mortise	TA2714	US26D	MK
1 Electric Power Transfer	*EL-CEPT		SU
1 Access Control Mort Lock	*ML20606 x SN200-SEC LSA BIKPS BOE CT6R	630	RU
1 Permanent Core	8000	626	RU
1 Door Closer	*DC6200 M54	689	RU
1 Kick Plate	K1050 10" CSK 3BE34	US32D	RO
1 Wall Stop	406	US32D	RO
3 Silencer	608		RO

1 ElectroLynx Harness	*QC-C000P x LAR	MK
1 ElectroLynx Harness	*QC-C1500P (@ JAMB)	MK
1 Power Supply	**24V As Required by Others	SU

Notes: Notes: OPERATION: DOOR TO BE CLOSED AND LOCKED AT ALL TIMES. PRESENTATION OF A VALID CARD OR KEY CODE UNLOCKS OUTSIDE LEVER ALLOWING INGRESS. EGRESS AT ALL TIMES BY INSIDE LEVER. DOOR TO BE CONTROLLED BY REMOTE RELEASE BY FRONT OFFICE STAFF.

* ITEMS LISTED ABOVE ARE TO BE FURNISHED BY THE OWNER.

** POWER SUPPLY TO BE PROVIDED BY THE INTEGRATOR AND INSTALLED IN THE DATA CLOSET TO ACCOMMODATE THE LENGTH OF WIRE RUN REQUIRED FOR EACH ELECTRICAL DEVICE.

Set: 27.1

Doors: 121

Description: Integrated Card / Keypad Access + Closer

3 Hinge, Full Mortise, Hvy Wt	T4A3786	US26D	MK
1 Electric Power Transfer	*EL-CEPT		SU
1 Access Control Mort Lock	*ML20606 x SN200-SEC LSA BIKPS BOE CT6R	630	RU
1 Permanent Core	8000	626	RU
1 Door Closer	*DC6200 M54	689	RU
1 Kick Plate	K1050 10" CSK 3BE34	US32D	RO
1 Wall Stop	406	US32D	RO
3 Silencer	608		RO
1 ElectroLynx Harness	*QC-C000P x LAR		MK
1 ElectroLynx Harness	*QC-C1500P (@ JAMB)		MK
1 Power Supply	**24V As Required by Others		SU

Notes: Notes: OPERATION: DOOR TO BE CLOSED AND LOCKED AT ALL TIMES. PRESENTATION OF A VALID CARD OR KEY CODE UNLOCKS OUTSIDE LEVER ALLOWING INGRESS. EGRESS AT ALL TIMES BY INSIDE LEVER. DOOR TO BE CONTROLLED BY REMOTE RELEASE BY FRONT OFFICE STAFF.

* ITEMS LISTED ABOVE ARE TO BE FURNISHED BY THE OWNER.

** POWER SUPPLY TO BE PROVIDED BY THE INTEGRATOR AND INSTALLED IN THE DATA CLOSET TO ACCOMMODATE THE LENGTH OF WIRE RUN REQUIRED FOR EACH ELECTRICAL DEVICE.

Set: 28.0

Doors: 104, 104L

Description: Integrated Card / Keypad Access + Closer

3 Hinge, Full Mortise, Hvy Wt	T4A3786	US26D	MK
1 Electric Power Transfer	*EL-CEPT Mounted 6" above the center hinge		SU
1 Access Control Mort Lock	*ML20606 x SN200-SEC LSA BIKPS BOE CT6R	630	RU
1 Permanent Core	8000	626	RU
1 Door Closer	*DC6210 A3 M54	689	RU
1 Kick Plate	K1050 10" CSK 3BE34	US32D	RO
1 Wall Stop	406	US32D	RO
3 Silencer	608		RO
1 ElectroLynx Harness	*QC-C000P x LAR		MK
1 ElectroLynx Harness	*QC-C1500P (@ JAMB)		MK
1 Power Supply	**24V As Required by Others		SU

Notes: Notes: OPERATION: DOOR TO BE CLOSED AND LOCKED AT ALL TIMES. PRESENTATION OF A VALID CARD OR KEY CODE UNLOCKS OUTSIDE LEVER ALLOWING INGRESS. EGRESS AT ALL TIMES BY INSIDE LEVER. DOOR TO BE CONTROLLED BY REMOTE RELEASE BY FRONT OFFICE STAFF.

* ITEMS LISTED ABOVE ARE TO BE FURNISHED BY THE OWNER.

** POWER SUPPLY TO BE PROVIDED BY THE INTEGRATOR AND INSTALLED IN THE DATA CLOSET TO ACCOMMODATE THE LENGTH OF WIRE RUN REQUIRED FOR EACH ELECTRICAL DEVICE.

Set: 29.0

Doors: 104E, 108, 109, 119, 123, 126, 129A, 131, 135A, 137, 140, 149, 227, 240, 302, 315, 317A, C240, C307

Description: Storeroom Lock + Protection Plates

3 Hinge, Full Mortise	TA2714	US26D	MK
1 Storeroom Lock	ML2057 LWA CT6R	630	RU
1 Permanent Core	8000	626	RU
1 Kick Plate	K1050 10" CSK 3BE34	US32D	RO
1 Mop Plate	K1050 6" high	US32D	RO
3 Silencer	608		RO

Set: 30.0

Doors: 124, 132, 136, 141, 145, 148, 152, 207, 237, 244, 245, 321, 331, C115, M127, M237, M329

Description: Storeroom Lock + O H Stop

3 Hinge, Full Mortise	TA2714	US26D	MK
1 Storeroom Lock	ML2057 LWA CT6R	630	RU
1 Permanent Core	8000	626	RU
1 Surf Overhead Stop	9-336	630	RF
3 Silencer	608		RO

Notes: Overhead stop - no hold open required.

Set: 31.0

Doors: 104C, 113S, 157G, 202, 204, 301, E104B, M116

Description: Storeroom Function + Closer

3 Hinge, Full Mortise	TA2714	US26D	MK
1 Storeroom Lock	ML2057 LWA CT6R	630	RU
1 Permanent Core	8000	626	RU
1 Surface Closer	DC6200 A10 M54	689	RU
1 Kick Plate	K1050 10" CSK 3BE34	US32D	RO
1 Wall Stop	406	US32D	RO
3 Silencer	608		RO

Set: 31.1

Doors: C107, C117, M301A

Description: Storeroom Function + Closer / Holder

3 Hinge, Full Mortise	TA2714	US26D	MK
1 Storeroom Lock	ML2057 LWA CT6R	630	RU
1 Permanent Core	8000	626	RU
1 Surface Closer	DC6200 M54 A1	689	RU
1 Kick Plate	K1050 10" CSK 3BE34	US32D	RO
1 Wall Stop	406	US32D	RO
3 Silencer	608		RO

Set: 32.0

Doors: 120, 157C, 163

Description: Storeroom Function + Closer / Stop

3 Hinge, Full Mortise	TA2714	US26D	MK
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1 Storeroom Lock	ML2057 LWA CT6R	630	RU
1 Permanent Core	8000	626	RU
1 Door Closer	DC6210 A4 M54	689	RU
3 Silencer	608		RO

Set: 32.1

Doors: 104S

Description: Storeroom Function + Closer / O H Stop

3 Hinge, Full Mortise	TA2714	US26D	MK
1 Storeroom Lock	ML2057 LWA CT6R	630	RU
1 Permanent Core	8000	626	RU
1 Surf Overhead Stop	9-336	630	RF
1 Surface Closer	DC6200 A10 M54	689	RU
1 Kick Plate	K1050 10" CSK 3BE34	US32D	RO
3 Silencer	608		RO

Set: 33.0

Doors: 106S, M122, M128, M133, M134, M139, M142, M143, M146, M147, M214, M225, M226, M233, M242, M246, M247, M250, M251, M300, M310, M318, M319, M324, M325, S118

Description: Storeroom Function Pair + O H Holders

6 Hinge, Full Mortise	TA2714	US26D	MK
2 Flush Bolt	555	US26D	RO
1 Dust Proof Strike	570	US26D	RO
1 Storeroom Lock	ML2057 LWA CT6R	630	RU
1 Permanent Core	8000	626	RU
2 Surf Overhead Hold Open	9-326	630	RF
1 Astragal	357SP x Door Height		PE
2 Silencer	608		RO

Set: 34.0

Doors: M220

Description: Storeroom Function Pair + O H Stops

6 Hinge, Full Mortise	TA2714	US26D	MK
2 Flush Bolt	555	US26D	RO
1 Dust Proof Strike	570	US26D	RO
1 Storeroom Lock	ML2057 LWA CT6R	630	RU
1 Permanent Core	8000	626	RU

2 Surf Overhead Stop	9-336	630	RF
1 Astragal	357SP x Door Height		PE
2 Silencer	608		RO

Set: 35.0

Doors: 102A, 102B, 102E, 102I, 104D, 104F, 104G, 104H, 104J, 104K, 110A, 151C, 201, 205, 206, 215, 239, 309

Description: Office Function

3 Hinge	TA2714	US26D	MK
1 Office Lock	ML2051 LWA CT6R	626	RU
1 Permanent Core	8000	626	RU
1 Door Stop	406/441CU	US26D	RO
3 Silencer	608		RO

Set: 36.0

Doors: 105, 200DA, 200DB, 200EA, 200EB, 203E, 203S

Description: Classroom Function + Closer

3 Hinge	TA2714	US26D	MK
1 Classroom Lock	ML2055 LWA CT6R	630	RU
1 Permanent Core	8000	626	RU
1 Surface Closer	*DC6210 A11 M54	689	RU
1 Kick Plate	K1050 10" CSK 3BE34	US32D	RO
1 Door Stop	406/441CU	US26D	RO
1 Gasketing/Silencers	S88D/608 AS REQUIRED		PE

Set: 37.0

Doors: S156H, S156L

Description: Rated Storeroom Function Pair

6 Hinge, Full Mortise	TA2714	US26D	MK
1 Flush Bolt	2962	US26D	RO
1 Dust Proof Strike	570	US26D	RO
1 Storeroom Lock	ML2057 LWA CT6R	630	RU
1 Permanent Core	8000	626	RU
1 Coordinator	2672	Black	RO
2 Surface Closer	DC6200 A10 M54	689	RU
2 Kick Plate	K1050 10" CSK 3BE34	US32D	RO
2 Wall Stop	406	US32D	RO

1 Set Door Seals	S88D	PE
1 Astragal	357SP x Door Height	PE
1 Astragal Seal	S771BL x Door Height	PE

Set: 38.0

Doors: 216, 216A, 218, 218A, 219, 222, 222A, 223, 224, 224A, 228, 228A, 229, 231, 231A, 235, 235A, 248A, 249, 252A, 253A, 316, 317, 317C, 320, 320A, 322, 322A, 323, 323A, 326, 326A, 327, 327A

Description: Classroom Intruder Function Exit + Closer / Stop

3 Hinge	TA2714	US26D	MK
1 Classroom (Dbl Cyl)	ED5202 L955ET M54 CT6R	630	RU
2 Permanent Core	8000	626	RU
1 Door Closer	DC6210 A4 M54	689	RU
1 Kick Plate	K1050 10" CSK 3BE34	US32D	RO
1 Gasketing/Silencers	S88D/608 AS REQUIRED		PE
1 Sign	***4"W x 6"H "DOOR MUST BE MANUALLY LOCKED"		OT

Notes: *** Signage to be posted on the inside of the door above the lock.

Set: 40.0

Doors: 103

Description: Classroom Intruder Function + Closer

3 Hinge	TA2714	US26D	MK
1 Classroom Intruder Lock	ML2072 LWA CT6R	630	RU
2 Permanent Core	8000	626	RU
1 Surface Closer	DC6200 A10 M54	689	RU
1 Kick Plate	K1050 10" CSK 3BE34	US32D	RO
1 Wall Stop	406	US32D	RO
1 Gasketing/Silencers	S88D/608 AS REQUIRED		PE
1 Sign	***4"W x 6"H "DOOR MUST BE MANUALLY LOCKED"		OT

Notes: *** Signage to be posted on the inside of the door above the lock.

Set: 42.0

Doors: 126T, 129T, 130T, 131T, 132T, 135T, 136T, 137T, 141T, 145T, 148T, 149T, 157T, 244T, 245AT, 245T, 248T, 249T, 252T, 253T, T104D

Description: Privacy Function + Occupancy Indicator

3 Hinge, Full Mortise	TA2714	US26D	MK
1 Privacy Lock	ML2060 LWA M34 V21	630	RU
1 Kick Plate	K1050 10" CSK 3BE34	US32D	RO
1 Wall Stop	406	US32D	RO
1 Gasketing/Silencers	S88D/608 AS REQUIRED		PE

Set: 43.0

Doors: 124T, 157F, 244AT

Description: Privacy Function + Occupancy Indicator + O H Stop

3 Hinge, Full Mortise	TA2714	US26D	MK
1 Privacy Lock	ML2060 LWA M34 V21	630	RU
1 Surf Overhead Stop	9-336	630	RF
1 Kick Plate	K1050 10" CSK 3BE34	US32D	RO
1 Set Door Seals	S88D		PE

Set: 44.0

Doors: 303T, 304T, T102C, T102D, T103A, T103B, T104A, T104B, T203B, T203C

Description: Privacy Function + Occupancy Indicator + Closer

3 Hinge	TA2714	US26D	MK
1 Privacy Lock	ML2060 LWA M34 V21	630	RU
1 Surface Closer	DC6200 A10 M54	689	RU
1 Kick Plate	K1050 10" CSK 3BE34	US32D	RO
1 Door Stop	406/441CU	US26D	RO
1 Gasketing/Silencers	S88D/608 AS REQUIRED		PE

Set: 45.0

Doors: 104A, 153T, 155T, 209T, 211T, T121A, T121B

Description: Keyed Storeroom Function + Occupancy Indicator + Closer

3 Hinge	TA2714	US26D	MK
1 Storeroom Lock	ML2049 LWA M34 V21 CT6R	630	RU
1 Permanent Core	8000	626	RU
1 Surface Closer	DC6200 A10 M54	689	RU
1 Kick Plate	K1050 10" CSK 3BE34	US32D	RO
1 Door Stop	406/441CU	US26D	RO
1 Gasketing/Silencers	S88D/608 AS REQUIRED		PE

Set: 46.0

Doors: 102

Description: Card Reader x Keypad - Both Sides x Electric Strike

1 Continuous Hinge	CFM_SLF HD1		PE
1 Security Vestibule	*ML2087 LSA CT6R Special Vestibule Mortise Lock	630	RU
2 Permanent Core	8000	626	RU
1 Electric Strike	*1500C	630	HS
1 SMART Pac Bridge Rectifier	*2005M3		HS
1 Door Closer	*DC6210 A3 M54	689	RU
1 Kick Plate	K1050 10" CSK 3BE34	US32D	RO
1 Wall Stop	406	US32D	RO
1 Weatherstrip	By Frame Manufacturer		OT
1 Release Button	*CCSD Special		OT
1 Wiring Diagram	As Required by Others		RU
2 Wall Mounted Card Reader/Keypad	By Others		OT
1 Power Supply	**24V As Required by Others		SU

Notes: OPERATION: HALL SIDE LEVER TO BE UNLOCKED DURING BUSINESS HOURS AND LOCKED MANUALLY AFTER HOURS. PRESENTATION OF A VALID CARD OR KEY CODE UNLOCKS OUTSIDE LEVER ALLOWING INGRESS. EGRESS AT ALL TIMES BY INSIDE LEVER. DOOR TO BE CONTROLLED BY REMOTE RELEASE BY FRON OFFICE STAFF.

* ITEMS LISTED ABOVE ARE TO BE FURNISHED BY THE OWNER.

** POWER SUPPLY TO BE PROVIDED BY THE OWNER AND INSTALLED IN THE DATA CLOSET TO ACCOMMODATE THE LENGTH OF WIRE RUN REQUIRED FOR EACH ELECTRICAL DEVICE.

Set: 47.0

Doors: 124A, 126A, 130A, 132A, 136A, 141A, 145A, 149A, 157L

Description: Exterior Aluminum Integrated Card / Keypad Access

1 Continuous Hinge	CFM_SLF HD1 PT @ 40" C/L A.F.F		PE
1 Electric Power Transfer	*EL-CEPT		SU
1 Access Control Mort Lock	*ML20608 x SN200-SEC LSA BIKPS B0E CT6R	626	RU
1 Permanent Core	8000	626	RU
1 Door Closer	DC6210 A11 M54 x BRKTS REQ	689	RU
1 Threshold	171A		PE
1 Weatherstrip	By Frame Manufacturer		OT
1 Sweep	3452CNB		PE

1 ElectroLynx Harness	*QC-C000P x LAR	MK
1 ElectroLynx Harness	*QC-C1500P (@ JAMB)	MK
1 Power Supply	**24V As Required by Others	SU

Notes: OPERATION: DOOR TO BE CLOSED AND LOCKED AT ALL TIMES. PRESENTATION OF A VALID CARD OR KEY CODE SIGNALS ELECTRIC LATCH RETRACTION ALLOWING INGRESS. EGRESS AT ALL TIMES BY EXIT DEVICE PUSH BAR.

MINIMUM 5" STILES REQUIRED.

* ITEMS LISTED ABOVE ARE TO BE FURNISHED BY THE OWNER.

** POWER SUPPLY TO BE PROVIDED BY THE OWNER AND INSTALLED IN THE DATA CLOSET TO ACCOMMODATE THE LENGTH OF WIRE RUN REQUIRED FOR EACH ELECTRICAL DEVICE.

NOTE: THE ABOVE HARDWARE IS ILLUSTRATED AS A BASIS OF DESIGN. IF ALTERNATE HARDWARE IS REQUIRED TO MEET WINDSTORM CODES, PROVIDE ARCHITECT WITH INFORMATION ON HARDWARE SUBSTITUTED FOR THAT WHICH IS SPECIFIED.

Set: 48.0

Doors: 118A

Description: Exterior FRP Integrated Card / Keypad Access Pair + Doorbell + Viewer

1 Continuous Hinge	CFM_SLF HD1 PT @ 40" C/L A.F.F	PE
1 Continuous Hinge	CFM_SLF HD1	PE
1 Electric Power Transfer	*EL-CEPT	SU
2 Flush Bolt	556WS	US26D RO
1 Access Control Mort Lock	*ML20608 x SN200-SEC LSA BIKPS B0E CT6R	626 RU
1 Permanent Core	8000	626 RU
2 Surface Closer	*DC6210 A11 M54	689 RU
2 Kick Plate	K1050 10" CSK 3BE34	US32D RO
1 Threshold	171A	PE
1 Set Weatherstrip	303AS	PE
1 Rain Guard	346C	PE
2 Door Bottom Sweep	BY FRP Door Mmanufacturer	OT
1 ElectroLynx Harness	*QC-C000P x LAR	MK
1 ElectroLynx Harness	*QC-C1500P (@ JAMB)	MK
1 Voice Only Aiphone	*IX-BA	OT
1 Release Button	*CCSD Special	OT
1 Power Supply	**24V As Required by Others	SU

Notes: Notes: OPERATION: DOOR TO BE CLOSED AND LOCKED AT ALL TIMES. PRESENTATION OF A VALID CARD OR KEY CODE UNLOCKS OUTSIDE LEVER ALLOWING INGRESS. EGRESS AT ALL TIMES BY INSIDE LEVER. DOOR TO BE CONTROLLED BY REMOTE RELEASE BY FRONT OFFICE STAFF.

* ITEMS LISTED ABOVE ARE TO BE FURNISHED BY THE OWNER.

** POWER SUPPLY TO BE PROVIDED BY THE INTEGRATOR AND INSTALLED IN THE DATA CLOSET TO ACCOMMODATE THE LENGTH OF WIRE RUN REQUIRED FOR EACH ELECTRICAL DEVICE.

Set: 49.0

Doors: XG07, XG09, XG10, XG11

Description: Exterior Card Access Exit Gate

1 Nightlatch	*ED5200S K157ET x LC M54 CT6R x weather proof finish Spar #05579	630	RU
1 Electric Strike	*9600	630	HS
1 SMART Pac Bridge Rectifier	*2005M3		HS
1 Hydraulic Gate Closer / Hinge	Tiger-9005 + Puma Hinge	BLK	OT
1 Wiring Diagram	As Required by Others		RU
1 Wall Mounted Card Reader/Keypad	By Others		OT
1 Power Supply	**24V As Required by Others		SU

Notes: Furnish panic device rail with factory drilled weep holes for exterior location.

Set: 50.0

Doors: XG02, XG03, XG04, XG05

Description: Exterior Gate Exit

1 Nightlatch	*ED5200S K157ET x LC M54 CT6R x weather proof finish Spar #05579	630	RU
1 Interchangeable Core Cylinder	CR8000-Series as Required	626	RU
1 Electric Strike	*9600	630	HS
2 Card Reader Keypad	*20K / 40K		HG
1 Power Supply	**24V As Required by Others		SU

Notes: * ITEMS LISTED ABOVE ARE TO BE FURNISHED BY THE OWNER.

** POWER SUPPLY TO BE PROVIDED BY THE INTEGRATOR AND INSTALLED IN THE DATA CLOSET TO ACCOMMODATE THE LENGTH OF WIRE RUN REQUIRED FOR EACH ELECTRICAL DEVICE.

FENCE COMPANY TO PREP GATE FOR EXIT DEVICE.

Set: 51.0

Description: Elevator Door

1	Wall Mounted Card Reader x Keypad	*RPK40		HI
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Notes: Balance of hardware by door manufacturer.

Set: 52.0

Doors: 157B

Description: Overhead Coiling Shutter

2	Interchangeable Core Cylinder	CR8000-Series as Required	626	RU
1	Permanent Core	8000	626	RU

Set: 53.0

Doors: 130B, 149S

Description: Cased Opening

1	Cased Opening	No Hardware Required		OT
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END OF SECTION 087100

SECTION 088000 - GLAZING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Glass for windows, doors, interior borrowed lites, and storefront framing.
 - 2. Glazing sealants and accessories.
- B. Related Requirements:
 - 1. Section 088300 "Mirrors."
 - 2. Section 088813 "Fire-Rated Glazing."
 - 3. Section 088853 "Security Glazing."

1.3 DEFINITIONS

- A. Glass Manufacturers: Firms that produce primary glass, fabricated glass, or both, as defined in referenced glazing publications.
- B. Glass Thicknesses: Indicated by thickness designations in millimeters according to ASTM C1036.
- C. IBC: International Building Code.
- D. Interspace: Space between lites of an insulating-glass unit.

1.4 COORDINATION

- A. Coordinate glazing channel dimensions to provide necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances.

1.5 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.
 - 1. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.

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2. Review temporary protection requirements for glazing during and after installation.

1.6 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Sustainable Design Submittals:
 1. Product Data: For sealants, indicating VOC content.
- C. Glass Samples: For each type of the following products; 12 inches square.
 1. Coated glass.
 2. Laminated glass.
 3. Insulating glass.
- D. Glazing Accessory Samples: For sealants, in 12-inch lengths. Install sealant Samples between two strips of material representative in color of the adjoining framing system.
- E. Glazing Schedule: List glass types and thicknesses for each size opening and location. Use same designations indicated on Drawings.
- F. Delegated-Design Submittal: For glass indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.7 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer manufacturers of insulating-glass units with sputter-coated, low-E coatings, glass testing agency, and sealant testing agency.
- B. Product Certificates: For glass.
- C. Product Test Reports: For coated glass, insulating 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.
- D. Preconstruction adhesion and compatibility test report.
- E. Sample Warranties: For special warranties.

1.8 QUALITY ASSURANCE

- A. Manufacturer Qualifications for Insulating-Glass Units with Sputter-Coated, Low-E Coatings: A qualified insulating-glass manufacturer who is approved and certified by coated-glass manufacturer.

- B. Installer Qualifications: A qualified installer who employs glass installers for this Project who are certified under the National Glass Association's Certified Glass Installer Program.
- 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.
- E. Mockups: Furnish and install glazing where indicated in mockups shown on the Drawings. The mockups shall be used to verify selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.

1.9 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 Samples of each type of material, including joint substrates, shims, sealant backings, secondary seals, and miscellaneous materials.
 - 4. Schedule enough time for testing and analyzing results to prevent delaying the Work.
 - 5. For materials failing tests, submit sealant manufacturer's written instructions for corrective measures including the use of specially formulated primers.

1.10 DELIVERY, STORAGE, AND HANDLING

- A. Protect glazing materials according to manufacturer's written instructions. Prevent damage to glass and glazing materials from condensation, temperature changes, direct exposure to sun, or other causes.
- B. Comply with insulating-glass manufacturer's written instructions for venting and sealing units to avoid hermetic seal ruptures due to altitude change.

1.11 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.

1.12 WARRANTY

- A. Manufacturer's Special Warranty for Coated-Glass Products: Manufacturer agrees to replace coated-glass units that deteriorate within specified warranty period. Deterioration of coated glass is defined as defects developed from normal use that are not attributed to glass breakage or to maintaining and cleaning coated glass contrary to manufacturer's written instructions. Defects include peeling, cracking, and other indications of deterioration in coating.
 - 1. Warranty Period: 10 years from date of Substantial Completion.
- B. Manufacturer's Special Warranty for Laminated Glass: Manufacturer agrees to replace laminated-glass units that deteriorate within specified warranty period. Deterioration of laminated glass is defined as defects developed from normal use that are not attributed to glass breakage or to maintaining and cleaning laminated glass contrary to manufacturer's written instructions. Defects include edge separation, delamination materially obstructing vision through glass, and blemishes exceeding those allowed by referenced laminated-glass standard.
 - 1. Warranty Period: Five years from date of Substantial Completion.
- C. Manufacturer's Special Warranty for Insulating Glass: Manufacturer agrees to replace insulating-glass units that deteriorate within specified warranty period. Deterioration of insulating glass is defined as failure of hermetic seal under normal use that is not attributed to glass breakage or to maintaining and cleaning insulating glass contrary to manufacturer's written instructions. Evidence of failure is the obstruction of vision by dust, moisture, or film on interior surfaces of glass.
 - 1. Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. AGC Glass Company North America, Inc.
 - 2. Guardian Glass; SunGuard.
 - 3. Oldcastle BuildingEnvelope™.
 - 4. Pilkington North America.
 - 5. Vitro Architectural Glass.
- B. Source Limitations for Glass: Obtain from single source from single manufacturer for each glass type.
- C. Source Limitations for Glazing Accessories: Obtain from single source from single manufacturer for each product and installation method.

2.2 PERFORMANCE REQUIREMENTS

- A. General: Installed glazing systems shall withstand normal thermal movement and wind and impact loads (where applicable) without failure, including loss or glass breakage attributable to the following: defective manufacture, fabrication, or installation; failure of sealants or gaskets to remain watertight and airtight; deterioration of glazing materials; or other defects in construction.
- B. Delegated Design: Engage a qualified professional engineer, as defined in Section 014000 "Quality Requirements," to design glazing.
- C. Structural Performance: Glazing shall withstand the following design loads within limits and under conditions indicated determined according to the IBC and ASTM E1300.
 - 1. Design Wind Pressures:
 - a. As indicated on Drawings.
 - 2. Maximum Lateral Deflection: For glass supported on all four edges, limit center-of-glass deflection at design wind pressure to not more than 1/50 times the short-side length or 1 inch, whichever is less.
 - 3. Differential Shading: Design glass to resist thermal stresses induced by differential shading within individual glass lites.
- D. Windborne-Debris Impact Resistance: Exterior glazing shall pass ASTM E1886 missile-impact and cyclic-pressure tests in accordance with ASTM E1996 for basic protection.
 - 1. Large-Missile Test: For glazing located within 30 feet of grade.
 - 2. Small-Missile Test: For glazing located between 30 feet and 60 feet above grade.
- E. Safety Glazing: Where safety glazing is indicated, provide glazing that complies with 16 CFR 1201, Category II.
- F. Thermal and Optical Performance Properties: Provide glass with performance properties specified, as indicated in manufacturer's published test data, based on procedures indicated below:
 - 1. For monolithic-glass lites, properties are based on units with lites 6 mm thick.
 - 2. For laminated-glass lites, properties are based on products of construction indicated.
 - 3. For insulating-glass units, properties are based on units of thickness indicated for overall unit and for each lite.
 - 4. U-Factors: Center-of-glazing values, according to NFRC 100 and based on LBL's WINDOW 5.2 computer program, expressed as Btu/sq. ft. x h x deg F.
 - 5. Solar Heat-Gain Coefficient and Visible Transmittance: Center-of-glazing values, according to NFRC 200 and based on LBL's WINDOW 5.2 computer program.
 - 6. Visible Reflectance: Center-of-glazing values, according to NFRC 300.

2.3 GLASS PRODUCTS, GENERAL

- A. Glazing Publications: Comply with published recommendations of glass product manufacturers and organizations below unless more stringent requirements are indicated. See these publications for glazing terms not otherwise defined in this Section or in referenced standards.
1. GANA Publications: "Laminated Glazing Reference Manual" and "Glazing Manual."
 2. AAMA Publications: AAMA GDSG-1, "Glass Design for Sloped Glazing," and AAMA TIR A7, "Sloped Glazing Guidelines."
 3. IGMA Publication for Sloped Glazing: IGMA TB-3001, "Guidelines for Sloped Glazing."
 4. IGMA Publication for Insulating Glass: SIGMA TM-3000, "North American Glazing Guidelines for Sealed Insulating Glass Units for Commercial and Residential Use."
- B. Safety Glazing Labeling: Where safety glazing is indicated, permanently mark glazing with certification label of the SGCC or another certification agency acceptable to authorities having jurisdiction. Label shall indicate manufacturer's name, type of glass, thickness, and safety glazing standard with which glass complies.
- C. Insulating-Glass Certification Program: Permanently marked either on spacers or on at least one component lite of units with appropriate certification label of IGCC.
- D. Thickness: Where glass thickness is indicated, it is a minimum. Provide glass that complies with performance requirements and is not less than the thickness indicated.
1. Minimum Glass Thickness for Exterior Lites: 6 mm.
 2. Thickness of Tinted Glass: Provide same thickness for each tint color indicated throughout Project.
- E. Strength: Where annealed float glass is indicated, provide annealed float glass, heat-strengthened float glass, or fully tempered float glass as needed to comply with "Performance Requirements" Article. Where heat-strengthened float glass is indicated, provide heat-strengthened float glass or fully tempered float glass as needed to comply with "Performance Requirements" Article. Where fully tempered float glass is indicated, provide fully tempered float glass.

2.4 GLASS PRODUCTS

- A. Clear Annealed Float Glass: ASTM C1036, Type I, Class 1 (clear), Quality-Q3.
- B. Fully Tempered Float Glass: ASTM C1048, Kind FT (fully tempered), Condition A (uncoated) unless otherwise indicated, Type I, Class 1 (clear) or Class 2 (tinted) as indicated, Quality-Q3.
1. Fabrication Process: By horizontal (roller-hearth) process with roll-wave distortion parallel to bottom edge of glass as installed unless otherwise indicated.
- C. Heat-Strengthened Float Glass: ASTM C1048, Kind HS (heat strengthened), Type I, Condition A (uncoated) unless otherwise indicated, Type I, Class 1 (clear) or Class 2 (tinted) as indicated, Quality-Q3.

1. Fabrication Process: By horizontal (roller-hearth) process with roll-wave distortion parallel to bottom edge of glass as installed unless otherwise indicated.

2.5 LAMINATED GLASS

- A. Laminated Glass: ASTM C1172. Use materials that have a proven record of no tendency to bubble, discolor, or lose physical and mechanical properties after fabrication and installation.
 1. Construction: Laminate glass with polyvinyl butyral interlayer, ionomeric polymer interlayer or cast-in-place and cured-transparent-resin interlayer to comply with interlayer manufacturer's written instructions.
 2. Interlayer Thickness: Provide thickness not less than that indicated and as needed to comply with requirements.
 3. Interlayer Color: Clear unless otherwise indicated.
- B. Windborne-Debris-Impact-Resistant Laminated Glass: Comply with requirements specified above for laminated glass except laminate glass with one of the following to comply with interlayer manufacturer's written instructions:
 1. Polyvinyl butyral interlayer.
 2. Polyvinyl butyral interlayers reinforced with polyethylene terephthalate film.
 3. Ionomeric polymer interlayer.
 4. Cast-in-place and cured-transparent-resin interlayer.
 5. Cast-in-place and cured-transparent-resin interlayer reinforced with polyethylene terephthalate film.

2.6 INSULATING GLASS

- A. Insulating-Glass Units: Factory-assembled units consisting of sealed lites of glass separated by a dehydrated interspace, qualified according to ASTM E2190.

2.7 GLAZING SEALANTS

- A. General:
 1. Compatibility: Compatible with one another and with other materials they contact, including glass products, seals of insulating-glass units, and glazing channel substrates, under conditions of service and application, as demonstrated by sealant manufacturer based on testing and field experience.
 2. Suitability: Comply with sealant and glass manufacturers' written instructions for selecting glazing sealants suitable for applications indicated and for conditions existing at time of installation.
 3. VOC Content: Not to exceed 250 g/L.
 4. Sealant 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."

5. Colors of Exposed Glazing Sealants: As selected by Architect from manufacturer's full range.

B. Glazing Sealant:

1. Neutral-curing silicone glazing sealant complying with ASTM C920, Type S, Grade NS, Class 100/50, Use NT.
 - a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1) GE Construction Sealants; Momentive Performance Materials Inc.
 - 2) Pecora Corporation.
 - 3) Sika Corporation.
 - 4) The Dow Chemical Company.
 - 5) Tremco Incorporated.

2.8 GLAZING TAPES

- A. Back-Bedding Mastic Glazing Tapes: Preformed, butyl-based, 100 percent solids elastomeric tape; nonstaining and nonmigrating in contact with nonporous surfaces; with or without spacer rod as recommended in writing by tape and glass manufacturers for application indicated; and complying with ASTM C1281 and AAMA 800 for products indicated below:
 1. AAMA 804.3 tape, where indicated.
 2. AAMA 806.3 tape, for glazing applications in which tape is subject to continuous pressure.
 3. AAMA 807.3 tape, for glazing applications in which tape is not subject to continuous pressure.
- B. Expanded Cellular Glazing Tapes: Closed-cell, PVC foam tapes; factory coated with adhesive on both surfaces; and complying with AAMA 800 for the following types:
 1. AAMA 810.1, Type 1, for glazing applications in which tape acts as the primary sealant.
 2. AAMA 810.1, Type 2, for glazing applications in which tape is used in combination with a full bead of liquid sealant.

2.9 MISCELLANEOUS GLAZING MATERIALS

- A. General: Provide products of material, size, and shape complying with referenced glazing standard, with requirements of manufacturers of glass and other glazing materials for application indicated, and with a proven record of compatibility with surfaces contacted in installation.
- B. Cleaners, Primers, and Sealers: Types recommended by sealant or gasket manufacturer.
- C. Setting Blocks: Type recommended 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 by sealant or glass manufacturer.

E. Edge Blocks:

1. Type recommended by sealant or glass manufacturer.

F. Cylindrical Glazing Sealant Backing: ASTM C1330, Type O (open-cell material), of size and density to control glazing sealant depth and otherwise produce optimum glazing sealant performance.

2.10 FABRICATION OF GLAZING UNITS

A. Fabricate glazing units in sizes required to fit openings indicated for Project, with edge and face clearances, edge and surface conditions, and bite complying with written instructions of product manufacturer and referenced glazing publications, to comply with system performance requirements.

1. Allow for thermal movements from ambient and surface temperature changes acting on glass framing members and glazing components.

a. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces .

B. Clean-cut or flat-grind vertical edges of butt-glazed monolithic lites to produce square edges with slight chamfers at junctions of edges and faces.

C. Grind smooth and polish exposed glass edges and corners.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine framing, glazing channels, and stops, with Installer present, for compliance with the following:

1. Manufacturing and installation tolerances, including those for size, squareness, and offsets at corners.
2. Presence and functioning of weep systems.
3. Minimum required face and edge clearances.
4. Effective sealing between joints of glass-framing members.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Clean glazing channels and other framing members receiving glass immediately before glazing. Remove coatings not firmly bonded to substrates.

- B. Examine glazing units to locate exterior and interior surfaces. Label or mark units as needed so that exterior and interior surfaces are readily identifiable. Do not use materials that leave visible marks in the completed Work.

3.3 GLAZING, GENERAL

- A. Comply with combined written instructions of manufacturers of glass, sealants, gaskets, and other glazing materials, unless more stringent requirements are indicated, including those in referenced glazing publications.
- B. Protect glass edges from damage during handling and installation. Remove damaged glass from Project site and legally dispose of off Project site. Damaged glass includes glass with edge damage or other imperfections that, when installed, could weaken glass, impair performance, or impair appearance.
- C. Apply primers to joint surfaces where required for adhesion of sealants, as determined by preconstruction testing.
- D. Install setting blocks in sill rabbets, sized and located to comply with referenced glazing publications, unless otherwise required by glass manufacturer. Set blocks in thin course of compatible sealant suitable for heel bead.
- E. Do not exceed edge pressures stipulated by glass manufacturers for installing glass lites.
- F. Provide spacers for glass lites where length plus width is larger than 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 according to requirements in referenced glazing publications.
- H. Set glass lites in each series with uniform pattern, draw, bow, and similar characteristics.
- I. Set glass lites with proper orientation so that coatings face exterior or interior as specified.
 - 1. Verify observer side of one-way mirrors.
- J. Where wedge-shaped gaskets are driven into one side of channel to pressurize sealant or gasket on opposite side, provide adequate anchorage so gasket cannot walk out when installation is subjected to movement.
- K. Square cut wedge-shaped gaskets at corners and install gaskets in a manner recommended by gasket manufacturer to prevent corners from pulling away; seal corner joints and butt joints with sealant recommended by gasket manufacturer.

3.4 TAPE GLAZING

- A. Position tapes on fixed stops so that, when compressed by glass, their exposed edges are flush with or protrude slightly above sightline of stops.
- B. Install tapes continuously, but not necessarily in one continuous length. Do not stretch tapes to make them fit opening.
- C. Cover vertical framing joints by applying tapes to heads and sills first, then to jambs. Cover horizontal framing joints by applying tapes to jambs, then to heads and sills.
- D. Place joints in tapes at corners of opening with adjoining lengths butted together, not lapped. Seal joints in tapes with compatible sealant approved by tape manufacturer.
- E. Do not remove release paper from tape until right before each glazing unit is installed.
- F. Apply heel bead of elastomeric sealant.
- G. Center glass lites in openings on setting blocks, and press firmly against tape by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings.
- H. Apply cap bead of elastomeric sealant over exposed edge of tape.

3.5 GASKET GLAZING (DRY)

- A. Cut compression gaskets to lengths recommended by gasket manufacturer to fit openings exactly, with allowance for stretch during installation.
- B. Insert soft compression gasket between glass and frame or fixed stop so it is securely in place with joints miter cut and bonded together at corners.
- C. Installation with Drive-in Wedge Gaskets: Center glass lites in openings on setting blocks, and press firmly against soft compression gasket by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.
- D. Installation with Pressure-Glazing Stops: Center glass lites in openings on setting blocks, and press firmly against soft compression gasket. Install dense compression gaskets and pressure-glazing stops, applying pressure uniformly to compression gaskets. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.
- E. Install gaskets so they protrude past face of glazing stops.

3.6 SEALANT GLAZING (WET)

- A. Install continuous spacers, or spacers combined with cylindrical sealant backing, between glass lites and glazing stops to maintain glass face clearances and to prevent sealant from extruding into glass channel and blocking weep systems until sealants cure. Secure spacers or spacers and backings in place and in position to control depth of installed sealant relative to edge clearance for optimum sealant performance.
- B. Force sealants into glazing channels to eliminate voids and to ensure complete wetting or bond of sealant to glass and channel surfaces.
- C. Tool exposed surfaces of sealants to provide a substantial wash away from glass.

3.7 CLEANING AND PROTECTION

- A. Immediately after installation remove nonpermanent labels and clean surfaces.
- B. Protect glass from contact with contaminating substances resulting from construction operations. Examine glass surfaces adjacent to or below exterior concrete and other masonry surfaces at frequent intervals during construction, but not less than once a month, for buildup of dirt, scum, alkaline deposits, or stains.
 - 1. If, despite such protection, contaminating substances do come into contact with glass, remove substances immediately as recommended in writing by glass manufacturer. Remove and replace glass that cannot be cleaned without damage to coatings.
- C. Remove and replace glass that is damaged during construction period.
- D. Wash glass on both exposed surfaces not more than four days before date scheduled for inspections that establish date of Substantial Completion. Wash glass as recommended in writing by glass manufacturer.

3.8 MONOLITHIC GLASS SCHEDULE

- A. Glass Type **CFG**: Clear annealed float glass.
 - 1. Minimum Thickness: 6 mm.
- B. Glass Type **TFG**: Clear fully tempered float glass.
 - 1. Minimum Thickness: 6 mm.
 - 2. Safety glazing required.

3.9 LAMINATED GLASS SCHEDULE

- A. Glass Type **LG-1**: Clear laminated glass with two plies of heat-strengthened float glass.
 - 1. Overall Unit Thickness: 9/16 inch.

2. Minimum Thickness of Each Glass Ply: 6 mm.
3. Interlayer Thickness: As required to resist wind-borne debris.
4. Safety glazing required.
5. Winter Nighttime U-Factor: 0.94 maximum.
6. Summer Daytime U-Factor: 0.85 maximum.
7. Visible Light Transmittance: 86 percent minimum.
8. Solar Heat Gain Coefficient: 0.73 maximum.
9. Safety glazing required.

3.10 INSULATING-LAMINATED-GLASS SCHEDULE

A. Glass Type **IGU-1**: Low-E-coated, clear insulating laminated glass.

1. Overall Unit Thickness: 1-5/16 inch.
2. Minimum Thickness of Outdoor Lite: 6 mm.
3. Outdoor Lite: Fully tempered float glass.
4. Interspace Content: Air.
5. Indoor Lite: Clear laminated glass with two plies of heat-strengthened float glass.
 - a. Minimum Thickness of Each Glass Ply: 6 mm.
 - b. Interlayer Thickness: As required to meet requirements for resistance to wind-borne debris..
6. Low-E Coating: Sputtered on second surface.
 - a. Basis of Design: Guardian Sunguard SN 62/27.
7. Winter Nighttime U-Factor: 0.29 maximum.
8. Summer Daytime U-Factor: 0.27 maximum.
9. Visible Light Transmittance: 62 percent minimum.
10. Solar Heat Gain Coefficient: 0.27 maximum.

END OF SECTION 088000

SECTION 088300 - MIRRORS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Silvered flat glass mirrors.

B. Related Requirements:

1. Section 102800 "Toilet, Bath, and Laundry Accessories" for metal-framed mirrors.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Mirrors: Include description of materials and process used to produce each type of silvered flat glass mirror specified that indicates sources of glass, glass coating components, edge sealer, and quality-control provisions.

B. Sustainable Design Submittals:

1. Product Data: For adhesives, indicating VOC content.

C. Shop Drawings: Include mirror elevations, edge details, mirror hardware, and attachment details.

D. Samples: For each type of the following:

1. Mirrors: 12 inches square, including edge treatment on two adjoining edges.
2. Mirror Clips: Full size.
3. Mirror Trim: 12 inches long.

1.3 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer.

B. Product Certificates: For each type of mirror and mirror mastic.

C. Preconstruction Test Reports: From mirror manufacturer indicating that mirror mastic was tested for compatibility and adhesion with mirror backing and substrates on which mirrors are installed.

D. Sample Warranty: For special warranty.

1.4 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For mirrors to include in maintenance manuals.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: A qualified Installer, who employs glass installers for this Project who are certified under the National Glass Association's Certified Glass Installer Program.

1.6 PRECONSTRUCTION TESTING

- A. Preconstruction Mirror Mastic Compatibility Test: Submit mirror mastic products to mirror manufacturer for testing to determine compatibility of mastic with mirror backing.
 - 1. Testing is not required if data are submitted based on previous testing of mirror mastic products and mirror backing matching those submitted.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Protect mirrors in accordance with mirror manufacturer's written instructions and as needed to prevent damage to mirrors from moisture, condensation, temperature changes, direct exposure to sun, or other causes.
- B. Comply with mirror manufacturer's written instructions for shipping, storing, and handling mirrors as needed to prevent deterioration of silvering, damage to edges, and abrasion of glass surfaces and applied coatings. Store indoors.

1.8 FIELD CONDITIONS

- A. Environmental Limitations: Do not install mirrors until ambient temperature and humidity conditions are maintained at levels indicated for final occupancy.

1.9 WARRANTY

- A. Special Warranty: Manufacturer agrees to replace mirrors that deteriorate within specified warranty period. Deterioration of mirrors is defined as defects developed from normal use that are not attributed to mirror breakage or to maintaining and cleaning mirrors contrary to manufacturer's written instructions. Defects include discoloration, black spots, and clouding of the silver film.
 - 1. Warranty Period: Five years from date of manufacture.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Binswanger Mirror.
 - 2. Gardner Glass.
 - 3. Independent Mirror Industries, Inc.
 - 4. Lenoir Mirror Company.
 - 5. National Glass Industries.
 - 6. Virginia Mirror Company, Inc.
- B. Source Limitations for Mirrors: Obtain mirrors from single source from single manufacturer.
- C. Source Limitations for Mirror Accessories: Obtain mirror-glazing accessories from single source.

2.2 SILVERED FLAT GLASS MIRRORS

- A. Mirrors, General: ASTM C1503.
- B. Annealed Monolithic Glass Mirrors: Mirror Glazing Quality, clear.
 - 1. Nominal Thickness: 6.0 mm.

2.3 MISCELLANEOUS MATERIALS

- A. Setting Blocks: Elastomeric material with a Shore, Type A durometer hardness of 85, plus or minus 5.
- B. Edge Sealer: Coating compatible with glass coating and approved by mirror manufacturer for use in protecting against silver deterioration at mirrored glass edges.
- C. Mirror Mastic: An adhesive setting compound, asbestos-free, produced specifically for setting mirrors and certified by both mirror and mastic manufacturer as compatible with glass coating and substrates on which mirrors will be installed.
 - 1. Subject to compliance with requirements, provide products by one of the following:
 - a. C. R. Laurence.
 - b. Liquid Nails Adhesive.
 - c. Macco Adhesives.
 - d. Henkel Corporation; OSI Sealants.
 - e. Pecora Corporation.
 - f. Sommer & Maca.

2. VOV Content: Not to exceed 70 g/L.

2.4 MIRROR HARDWARE

- A. Aluminum J-Channels: Aluminum extrusions with a return deep enough to produce a glazing channel to accommodate mirrors of thickness indicated and in lengths required to cover edges of mirrors in a single piece.
 1. Manufacturers: Subject to compliance with requirements, available Manufacturers offering products that may be incorporated into the project include, but are not limited to, the following:
 - a. C. R. Laurence.
 - b. Andscot Company, Inc.
 - c. Stylmark, Inc.
 2. Bottom Trim: J-channels formed with front leg and back leg not less than 3/8 and 7/8 inch in height, respectively, and a thickness of not less than 0.04 inch.
 3. Top Trim: J-channels formed with front leg and back leg not less than 5/8 and 1 inch in height, respectively, and a thickness of not less than 0.04 inch.
 4. Finish: Clear bright anodized.

2.5 FABRICATION

- A. Shop fabricate mirrors to greatest extent possible.
- B. Fabricate cutouts for notches and holes in mirrors without marring visible surfaces. Locate and size cutouts, so they fit closely around penetrations in mirrors.
- C. Mirror Edge Treatment: Rounded polished.
 1. Seal edges of mirrors with edge sealer after edge treatment to prevent chemical or atmospheric penetration of glass coating.
 2. Require mirror manufacturer to perform edge treatment and sealing in factory immediately after cutting to final sizes.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, over which mirrors are to be mounted, with Installer present, for compliance with installation tolerances, substrate preparation, and other conditions affecting performance of the Work.

- B. Verify compatibility with and suitability of substrates, including compatibility of existing finishes or primers with mirror mastic.
- C. Proceed with installation only after unsatisfactory conditions have been corrected and surfaces are dry.

3.2 PREPARATION

- A. Comply with mastic manufacturer's written installation instructions for preparation of substrates, including coating substrates with mastic manufacturer's special bond coating where applicable.

3.3 INSTALLATION

- A. General: Install mirrors to comply with mirror manufacturer's written instructions and with referenced National Glass Association (NGA) publications. Mount mirrors accurately in place in a manner that avoids distorting reflected images.
 - 1. NGA Publications: "Glazing Manual" and "Installation Techniques Designed to Prolong the Life of Flat Glass Mirrors."
- B. Provide a minimum airspace of 1/8 inch between back of mirrors and mounting surface for air circulation between back of mirrors and face of mounting surface.
- C. Install mirrors with mastic and mirror hardware. Attach mirror hardware securely to mounting surfaces with mechanical fasteners installed with anchors or inserts as applicable. Install fasteners so heads do not impose point loads on backs of mirrors.
 - 1. Aluminum J-Channels: Provide setting blocks 1/8 inch thick by 4 inches long at quarter points. To prevent trapping water, provide, between setting blocks, two slotted weeps not less than 1/4 inch wide by 3/8 inch long at bottom channel.
 - 2. Install mastic as follows:
 - a. Apply barrier coat to mirror backing where approved in writing by manufacturers of mirrors and backing material.
 - b. Apply mastic to comply with mastic manufacturer's written instructions for coverage and to allow air circulation between back of mirrors and face of mounting surface.
 - c. After mastic is applied, align mirrors and press into place while maintaining a minimum airspace of 1/8 inch between back of mirrors and mounting surface.

3.4 CLEANING AND PROTECTION

- A. Protect mirrors from breakage and contaminating substances resulting from construction operations.
- B. Do not permit edges of mirrors to be exposed to standing water.

- C. Maintain environmental conditions that prevent mirrors from being exposed to moisture from condensation or other sources for continuous periods of time.
- D. Clean exposed surface of mirrors not more than four days before date scheduled for inspections that establish date of Substantial Completion. Clean mirrors as recommended in writing by mirror manufacturer and NGA's publication "Proper Procedures for Cleaning Flat Glass Mirrors."

END OF SECTION 088300

SECTION 088813 - FIRE-RATED GLAZING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Fire-protection-rated glazing.

1.3 DEFINITIONS

- A. Fire-Protection-Rated Glazing: Glazing in rated doors and openings, limited in size, and not capable of blocking radiant heat.
- B. Glass Manufacturers: Firms that produce primary glass, fabricated glass, or both, as defined in referenced glazing publications.
- C. Glass Thicknesses: Indicated by thickness designations in millimeters in accordance with ASTM C1036.

1.4 COORDINATION

- A. Coordinate glazing channel dimensions to provide necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances.

1.5 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Sustainable Design Submittals:
 - 1. Product Data: For sealants, indicating VOC content.
- C. Glass Samples: For each type of glass product; 12 inches square.
- D. Glazing Schedule: List glass types and thicknesses for each size opening and location. Use same designations indicated on Drawings.

1.6 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.
- B. Product Certificates: For each type of glass and glazing product.
- C. Sample Warranties: For special warranties.

1.7 QUALITY ASSURANCE

- A. Installer Qualifications: A qualified installer who employs glass installers for this Project who are certified under the NGA's Certified Glass Installer Program.

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.

1.9 FIELD CONDITIONS

- A. Environmental Limitations: Do not deliver or install fire-resistant glazing until spaces are enclosed and weathertight and temporary HVAC system is operating and maintaining ambient temperature conditions at occupancy levels during remainder of construction period.

1.10 WARRANTY

- A. Manufacturer's Special Warranty for Laminated Glass: Manufacturer agrees to replace laminated-glass units that deteriorate within specified warranty period. Deterioration of laminated glass is defined as defects developed from normal use that are not attributed to glass breakage or to maintaining and cleaning laminated glass contrary to manufacturer's written instructions. Defects include edge separation, delamination materially obstructing vision through glass, and blemishes exceeding those allowed by referenced laminated-glass standard.
 - 1. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Source Limitations for Glass: For each glass type, obtain from single source from single manufacturer.
- B. 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 impact loads (where applicable) without failure, including loss or glass breakage attributable to defective manufacture, fabrication, or installation; deterioration of glazing materials; or other defects in construction.

2.3 GLASS PRODUCTS, GENERAL

- A. Glazing Publications: Comply with published recommendations of glass product manufacturers and organization below unless more stringent requirements are indicated. See these publications for glazing terms not otherwise defined in this Section or in referenced standards.
 - 1. NGA Publications: "Laminated Glazing Reference Manual" and "Glazing Manual."
- 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. Label shall indicate manufacturer's name, type of glass, glass thickness, and safety glazing standard with which glass complies.

2.4 GLASS PRODUCTS

- A. Float Glass: ASTM C1036, Type I, Quality-Q3, Class I (clear) unless otherwise indicated.
- B. Tempered Float Glass: ASTM C1048, Kind FT (fully tempered), Condition A (uncoated) unless otherwise indicated, Type I, Class I (clear) unless otherwise indicated, Quality-Q3.
 - 1. Fabrication Process: By horizontal (roller-hearth) process with roll-wave distortion parallel to bottom edge of glass as installed unless otherwise indicated.
- C. Laminated Glass: ASTM C1172. Use materials that have a proven record of no tendency to bubble, discolor, or lose physical and mechanical properties after fabrication and installation.
 - 1. Construction: Laminate glass with polyvinyl butyral interlayer unless fire-protection or fire-resistance rating is based on another product.
 - 2. Interlayer Thickness: Provide thickness as needed to comply with requirements.
 - 3. Interlayer Color: Clear unless otherwise indicated.

2.5 FIRE-PROTECTION-RATED GLAZING

- A. Fire-Protection-Rated Glazing: Listed and labeled by a testing agency acceptable to authorities having jurisdiction, for fire-protection ratings indicated, based on positive-pressure testing in accordance with NFPA 257 or UL 9, including hose-stream test, and shall comply with NFPA 80.
- B. Fire-Protection-Rated Glazing Labeling: Permanently mark fire-protection-rated glazing with certification label of a testing agency acceptable to authorities having jurisdiction. Label shall

indicate manufacturer's name; test standard; whether glazing is permitted to be used in doors or openings; if permitted in openings, whether glazing has passed hose-stream test; whether glazing meets 450 deg F temperature-rise limitation; and fire-resistance rating in minutes.

- C. Fire-Protection-Rated Laminated Ceramic Glazing: Laminated glass made from two plies of clear, ceramic glass; 8-mm total thickness; complying with 16 CFR 1201, Category II. Provide one of the following:
1. SaftiFirst; Pyran Platinum L.
 2. Technical Glass Products; FireLite Plus.
 3. Vetrotech St. Gobain; Keralite Laminated.

2.6 GLAZING ACCESSORIES

- A. Provide glazing gaskets, glazing sealants, glazing tapes, setting blocks, spacers, edge blocks, and other glazing accessories that are compatible with glazing products and each other and are approved by testing agencies that listed and labeled fire-resistant glazing products with which products are used for applications and fire-protection ratings indicated.
- B. Glazing Sealants for Fire-Rated Glazing Products: Neutral-curing silicone glazing sealant complying with ASTM C920, Type S, Grade NS, Class 50, Use NT. Comply with sealant and glass manufacturers' written instructions for selecting glazing sealants suitable for applications indicated.
1. VOC Content: Not to exceed 250 g/L.
 2. Colors of Exposed Glazing Sealants: As selected by Architect from manufacturer's full range of industry colors.
- C. 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 for products indicated below:
1. AAMA 804.3 tape, where indicated.
 2. AAMA 806.3 tape, for glazing applications in which tape is subject to continuous pressure.
 3. AAMA 807.3 tape, for glazing applications in which tape is not subject to continuous pressure.
- D. Expanded Cellular Glazing Tapes: Closed-cell, PVC foam tapes; factory coated with adhesive on both surfaces; and complying with AAMA 800 for the following types:
1. AAMA 810.1, Type 1, for glazing applications in which tape acts as primary sealant.
 2. AAMA 810.1, Type 2, for glazing applications in which tape is used in combination with a full bead of liquid sealant.

2.7 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. Cylindrical Glazing Sealant Backing: ASTM C1330, Type O (open-cell material), of size and density to control glazing sealant depth and otherwise produce optimum glazing sealant performance.
- C. Perimeter Insulation for Fire-Resistance-Rated Glazing: Product that is approved by testing agency that listed and labeled fire-resistant glazing product with which it is used for application and fire-protection rating indicated.

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.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine framing, glazing channels, and stops, with Installer present, for compliance with manufacturing and installation tolerances, including those for size, squareness, and offsets at corners, and for compliance with minimum required face and edge clearances.
- 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 fire side and protected side. Label or mark units as needed so that fire side and protected side are readily identifiable. Do not use materials that leave visible marks in the completed Work.

3.3 GLAZING, GENERAL

- A. Use methods approved by testing agencies that listed and labeled fire-resistant glazing products.

- B. 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.
- C. Protect glass edges from damage during handling and installation. Remove damaged glass from Project site and legally dispose of off Project site. Damaged glass is glass with edge damage or other imperfections that, when installed, could weaken glass and impair performance and appearance.
- D. Apply primers to joint surfaces where required for adhesion of sealants, as determined by preconstruction testing.
- E. 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.
- F. Do not exceed edge pressures stipulated by glass manufacturers for installing glass lites.
- G. 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.
- H. 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.
- I. Set glass lites with proper orientation so that coatings face fire side or protected side 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 and then to jambs. Cover horizontal framing joints by applying tapes to jambs and 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.
- D. 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. 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 washaway 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.
- 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 FIRE-PROTECTION-RATED GLAZING SCHEDULE

- A. Glass Type **FRG-45**: 45-minute fire-protection-rated glazing; fire-protection-rated laminated ceramic glazing.
- B. Glass Type **FRG-60**: 60-minute fire-protection-rated laminated ceramic glazing.

END OF SECTION 088813

SECTION 088853 - SECURITY GLAZING

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes:

1. Laminated-glass security glazing
2. Polycarbonate security glazing.

B. Related Sections

1. Section 012300 "Alternates" for work of this Section affected by Alternates.

1.2 DEFINITIONS

- A. Glazing Manufacturers: Firms that produce primary glass, monolithic plastic glazing, or fabricated security glazing, as defined in referenced glazing publications.

- B. Interspace: Space between lites of air-gap security glazing or insulating security glazing.

1.3 COORDINATION

- A. Coordinate glazing channel dimensions to provide necessary bite on security glazing, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances.

1.4 PREINSTALLATION MEETINGS

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

1. Review and finalize construction schedule, and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
2. Review temporary protection requirements for security glazing during and after installation.

1.5 ACTION SUBMITTALS

- A. Product Data: For each type of product.

- A. Sustainable Design Submittals:

1. Product Data: For sealants, indicating VOC content.

B. Samples for Verification:

1. Glazing: Actual sample of finished products for each type of security glazing.
 - a. Size: Manufacturers' standard size.
2. Glazing Accessories: Actual sample of sealants. Install sealant Samples between two strips of material representative in color of the adjoining framing system.

C. Security Glazing Schedule: List security glazing types and thicknesses for each size opening and location. Use same designations indicated on Drawings. Indicate coordinated dimensions of security glazing and construction that receives security glazing, including clearances and glazing channel dimensions.

D. Delegated Design Submittal: For security glazing, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.6 INFORMATIONAL SUBMITTALS

A. Test and Evaluation Reports:

1. Product Test Reports:
 - a. For each type of security glazing, for tests performed by qualified testing agency.
 - b. For each type of glazing sealant, for tests performed by a qualified testing agency.
 - 1) Provide test reports based on testing current sealant formulations within previous 36-month period.
2. Preconstruction Test Reports: For preconstruction adhesion and compatibility testing.

B. Qualification Statements: For installers/sealant testing agency.

C. Delegated design engineer qualifications.

D. Sample warranties.

1.7 QUALITY ASSURANCE

A. Qualifications:

1. Installers: Authorized representative who is trained and approved by manufacturer.
2. Delegated Design Engineer: A professional engineer who is legally qualified to practice in state where Project is located and who is experienced in providing engineering services of type indicated.
3. Security Glazing Testing Agency: Subject to compliance with requirements, testing agency is one of the following:

- a. Intertek.
 - b. Underwriters Laboratories, Inc.
 - c. Wiss, Janney, Elstner Associates, Inc.
4. Sealant Testing Agency: An independent testing agency qualified in accordance with ASTM C1021 to conduct the testing indicated.

1.8 PRECONSTRUCTION TESTING

- A. Preconstruction Adhesion and Compatibility Testing: Test each security glazing type, tape sealant, gasket, glazing accessory, and glazing-framing member for adhesion to and compatibility with elastomeric glazing sealants.
1. Testing will not be required if data based on previous testing of current sealant products and glazing materials match 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 security glazing, tape sealants, gaskets, and glazing channel substrates.
 3. Test no fewer than eight Samples of each type of material, including joint substrates, shims, sealant backings, secondary seals, and miscellaneous materials.
 4. Schedule sufficient time for testing and analyzing results to prevent delaying the Work.
 5. For materials failing tests, submit sealant manufacturer's written instructions for corrective measures, including the use of specially formulated primers.

1.9 DELIVERY, STORAGE, AND HANDLING

- A. Protect security glazing and glazing materials according to manufacturer's written instructions. Prevent damage from condensation, temperature changes, direct exposure to sun, or other causes.
- B. Comply with insulating security glazing and with air-gap security glazing manufacturers' written recommendations for venting and sealing units to avoid hermetic seal ruptures due to altitude change.

1.10 FIELD CONDITIONS

- A. Environmental Limitations: Do not proceed with glazing when ambient and substrate temperature conditions are outside limits permitted by glazing material manufacturers and when glazing channel substrates are wet from rain, frost, condensation, or other causes.
1. Do not install glazing sealants when ambient and substrate temperature conditions are outside limits permitted by sealant manufacturer or below 40 deg F.

1.11 WARRANTY

- A. Special Warranty, Laminated-Glass Security Glazing: Manufacturer agrees to replace laminated-glass security glazing that fails in materials or workmanship within specified warranty period.
1. Failures include, but are not limited to, the following:
 - a. Defects developed from normal use that are not attributed to glass breakage or to maintaining and cleaning laminated-glass security glazing contrary to manufacturer's written instructions. Defects include edge separation, delamination materially obstructing vision through glass, and blemishes exceeding those allowed by referenced laminated-glass standard.
 2. Warranty Period: years from date of Substantial Completion.
- B. Special Warranty, Monolithic Polycarbonate Security Glazing: Manufacturer agrees to replace monolithic polycarbonate security glazing that fails in materials or workmanship within specified warranty period.
1. Failures include, but are not limited to, the following:
 - a. Defects developed from normal use that are not attributed to maintaining and cleaning monolithic polycarbonate security glazing contrary to manufacturer's written instructions. Defects include yellowing and loss of light transmission.
 2. Warranty Period: 10 years from date of Substantial Completion.
- C. Special Warranty, Laminated-Polycarbonate Security Glazing: Manufacturer agrees to replace laminated-polycarbonate security glazing that fails in materials or workmanship within specified warranty period.
1. Failures include, but are not limited to, the following:
 - a. Defects developed from normal use that are not attributed to maintaining and cleaning laminated-polycarbonate security glazing contrary to manufacturer's written instructions. Defects include edge separation, delamination materially obstructing vision through glazing, blemishes exceeding those allowed by referenced standard, yellowing, and loss of light transmission.
 2. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 SOURCE LIMITATIONS

- A. Obtain each type of security glazing from single source from single manufacturer.

- B. Obtain glazing sealants from single source from single manufacturer for each product and installation method.

2.2 PERFORMANCE REQUIREMENTS

A. General:

1. Installed security glazing will withstand normal thermal movement and wind and impact loads (where applicable) without failure, including loss or 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.
2. Installed security glazing will withstand security-related loads and forces without damage to the glazing beyond that allowed by referenced standards.

- B. Structural Performance: Glazing will withstand the following design loads within limits and under conditions indicated.

1. Design Procedure for Glass: ASTM E1300 and the IBC.
2. Design Wind Pressures: As indicated on Drawings.

- C. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes.

- D. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.

- E. Windborne-Debris Impact Resistance: Exterior security glazing passes ASTM E1886 missile-impact and cyclic-pressure tests in accordance with ASTM E1996 for basic protection.

1. Large-Missile Test: For glazing located within 30 feet of grade.
2. Small-Missile Test: For glazing located between 30 feet and 60 feet above grade.

- F. Safety Glazing: Where safety glazing is indicated, provide glazing that complies with 16 CFR 1201, Category II.

2.3 LAMINATED-GLASS SECURITY GLAZING

- A. Laminated-Glass Security Glazing: ASTM C1172. Two or more glass lites bonded with interlayer. Use materials that have a proven record of no tendency to bubble, discolor, or lose physical and mechanical properties after fabrication and installation.

1. Thickness: 1/4 inch.
2. Interlayer Thickness: 90
3. Interlayer Color: Clear unless otherwise indicated.

- B. Laminated-Glass Security Glazing: ASTM C1172. Two or more glass lites bonded with interlayer. Use materials that have a proven record of no tendency to bubble, discolor, or lose physical and mechanical properties after fabrication and installation.

1. Thickness: 15/16 inch.
2. Interlayer Thickness: 90
3. Interlayer Color: Clear unless otherwise indicated.

2.4 BULLET-RESISTANT SECURITY GLAZING

- A. Bullet-Resistant Glazing: Polycarbonate, acrylic, or laminated glass products that are tested and labeled to comply with bullet-resistant level as follows:
 1. Level 1 per UL 752.
- B. Manufacturers: Subject to compliance with requirements, provide acrylic sheets from Total Security Solutions or other configurations and materials from one of the following:
 1. Dlubak Specialty Glass Corporation.
 2. Global Security Glazing.
 3. ShotShield.
 4. Total Security Solutions.

2.5 GLAZING SEALANTS

- A. Security Sealant: Manufacturer's standard, nonsag, tamper-resistant sealant for joints with low movement complying with ASTM C920, Grade NS, Class 12.5 or 25, Use NT, and with a Shore A hardness of at least 45 when tested in accordance with ASTM C661.
 1. VOC Content: Not to exceed 250 g/L.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine framing for security glazing, 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 system.
 3. Minimum required face or edge clearances.
 4. Minimum required bite.
 5. Effective sealing between joints of 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 security glazing 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 will leave visible marks in the completed work.

3.3 GLAZING, GENERAL

- A. Comply with combined written instructions of manufacturers of security glazing, sealants, gaskets, and other glazing materials unless more stringent requirements are indicated, including those in referenced glazing publications.
- B. Protect edges of security glazing from damage during handling and installation. Remove damaged security glazing from Project site and legally dispose of it off Project site. Damaged security glazing includes units with edge or face damage or other imperfections that, when installed, could weaken security glazing and impair performance and 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 glazing unit manufacturer. Set blocks in thin course of compatible sealant suitable for heel bead.
- E. Do not exceed edge pressures stipulated by security glazing manufacturers for installing lites.
- F. Provide spacers for security glazing lites where the length plus width is larger than 50 inches.
 - 1. Locate spacers directly opposite each other on both inside and outside faces of security glazing. 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 performance requirements.
 - 2. Provide 1/8-inch minimum bite of spacers on glazing lites and use thickness equal to sealant width. With glazing tape, use thickness of slightly less than final compressed thickness of tape.
- G. Provide edge blocking where indicated or needed to prevent security glazing from moving sideways in glazing channel, as recommended in writing by security glazing manufacturer and in accordance with requirements in referenced glazing publications.
- H. Set security glazing in each series with uniform pattern, draw, bow, and similar characteristics.
- I. Set coated security glazing with proper orientation so that coatings and films 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 security glazing, 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 and then to jambs. Cover horizontal framing joints by applying tapes to jambs and 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 just before each glazing unit is installed.
- F. Apply heel bead of elastomeric sealant.
- G. Center security glazing 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 in writing by gasket manufacturer to fit openings exactly, with allowance for stretch during installation.
- B. Insert soft compression gasket between glazing unit 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 security glazing 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 security glazing. Seal gasket joints with sealant recommended in writing by gasket manufacturer.

- D. Installation with Pressure-Glazing Stops: Center security glazing 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 security glazing. 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 security glazing and glazing stops to maintain face clearances and to prevent sealant from extruding into glazing channel and blocking weep systems. 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 security glazing and channel surfaces.
- C. Tool exposed surfaces of sealants to provide a substantial wash away from security glazing.

3.7 CLEANING AND PROTECTION

- A. Immediately after installation remove nonpermanent labels and clean surfaces.
- B. Protect security glazing from contact with contaminating substances resulting from construction operations, including weld splatter. Examine security glazing 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 security glazing, remove substances immediately as recommended in writing by security glazing manufacturer. Remove and replace security glazing that cannot be cleaned without damage.
- C. Wash security glazing on both exposed surfaces not more than four days before date scheduled for inspections that establish date of Substantial Completion. Wash security glazing as recommended in writing by security glazing manufacturer.

END OF SECTION 088853

SECTION 089200 – EQUIPMENT SCREENS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Equipment screens.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: For equipment screens. Include plans, elevations, sections, details, and attachments to other work. Show frame profiles and blade profiles, angles, and spacing.

C. Samples: For each type of metal finish required.

1.3 QUALITY ASSURANCE

A. Welding Qualifications: Qualify procedures and personnel according to the following:

1. AWS D1.2/D1.2M, "Structural Welding Code - Aluminum."

1.4 FIELD CONDITIONS

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

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Structural Performance: Equipment screens shall withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated without permanent deformation of louver components, noise or metal fatigue caused by blade rattle or flutter, or permanent damage to fasteners and anchors. Wind pressures shall be considered to act normal to the face of the building.

1. Wind Loads: Determine loads based on pressures as indicated on Drawings.

B. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes.

1. Temperature Change (Range): 120 deg F, ambient; 180 deg F, material surfaces.

C. SMACNA Standard: Comply with recommendations in SMACNA's "Architectural Sheet Metal Manual" for fabrication, construction details, and installation procedures.

2.2 EQUIPMENT SCREENS

A. Direct Mount Louvered Roof Top Equipment Screen:

1. Basis-of-Design Product: Subject to compliance with requirements, provide Safe-Air Dowco; IEC-4 system or comparable product from one of the following:
 - a. Architectural Louvers.
 - b. Ametco.
 - c. Construction Specialties.
 - d. Industrial Louvers.
 - e. Roof Screen.

B. Horizontal, Inverted Sightproof, Louver, Extruded Aluminum:

1. Louver Depth: 4 inches.
2. Frame and Blade Nominal Thickness: Not less than 0.080 inch.
3. Blade Angle and Spacing: 45 degrees with 5 inches o.c.
4. Mullion Type: Concealed.
5. Corners: Mitered.
6. Louver Performance Ratings:
 - a. Free Area: Not less than 8.0 sq. ft. for 48-inch-wide by 48-inch-high louver.

C. Supports: 2- by 2- inch aluminum angle supports.

D. Unit Supports: Refer to Section 05 1200 "Structural Framing" and Structural Drawings.

2.3 MATERIALS

A. Aluminum Extrusions: ASTM B 221, Alloy 6063-T5, T-52, or T6.

B. Aluminum Sheet: ASTM B 209, Alloy 1100, 3003 or 5005 with temper as required for forming, or as otherwise recommended by metal producer for required finish.

C. Fasteners: Use types and sizes to suit unit installation conditions.

1. Use hex-head or Phillips's pan-head screws for exposed fasteners unless otherwise indicated.
2. For fastening aluminum, use aluminum or 300 series stainless-steel fasteners.
3. For color-finished louvers, use fasteners with heads that match color of louvers.

D. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D 1187.

2.4 FABRICATION

A. Factory-assemble louvered equipment screens to minimize field splicing and assembly. Disassemble units as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation.

- B. Maintain equal louver blade spacing to produce uniform appearance.
- C. Include supports, anchorages, and accessories required for complete assembly.
- D. Provide vertical mullions of type and at spacings indicated, but not more than is recommended by manufacturer, or 72 inches o.c., whichever is less.
 - 1. Fully Recessed Mullions: Where indicated, provide mullions fully recessed behind louver blades. Where length of louver exceeds fabrication and handling limitations, fabricate with close-fitting blade splices designed to permit expansion and contraction.
- E. Join frame members to each other and to fixed louver blades with fillet welds, threaded fasteners, or both, as standard with louver manufacturer unless otherwise indicated or size of louver assembly makes bolted connections between frame members necessary.

2.5 ALUMINUM FINISHES

- A. Finish screens after assembly.
- B. High-Performance Organic Finish, Two-Coat PVDF: Fluoropolymer finish complying with AAMA 2605 and containing not less than 70 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 for seacoast and severe environments.
 - 2. Color and Gloss: As indicated by manufacturer's designations.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine structural supports, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Coordinate setting drawings, diagrams, templates, instructions, and directions for installation of anchorages that are to be embedded in concrete or masonry construction. Coordinate delivery of such items to Project site.

3.3 INSTALLATION

- A. Locate and place equipment screens level, plumb, and at indicated alignment with adjacent work.
- B. Use concealed anchorages where possible. Provide brass or lead washers fitted to screws where required to protect metal surfaces and to make a weathertight connection.
- C. Form closely fitted joints with exposed connections accurately located and secured.

- D. Provide perimeter reveals and openings of uniform width for sealants and joint fillers, as indicated.
- E. Protect unpainted galvanized and nonferrous-metal surfaces that are in contact with concrete, masonry, or dissimilar metals from corrosion and galvanic action by applying a heavy coating of bituminous paint or by separating surfaces with waterproof gaskets or nonmetallic flashing.

3.4 ADJUSTING AND CLEANING

- A. Clean exposed screen surfaces that are not protected by temporary covering, to remove fingerprints and soil during construction period. Do not let soil accumulate during construction period.
- B. Before final inspection, clean exposed surfaces with water and a mild soap or detergent not harmful to finishes. Thoroughly rinse surfaces and dry.
- C. Restore screens damaged during installation and construction so no evidence remains of corrective work. If results of restoration are unsuccessful, as determined by Architect, remove damaged units and replace with new units.
 - 1. Touch up minor abrasions in finishes with air-dried coating that matches color and gloss of, and is compatible with, factory-applied finish coating.

END OF SECTION 089200