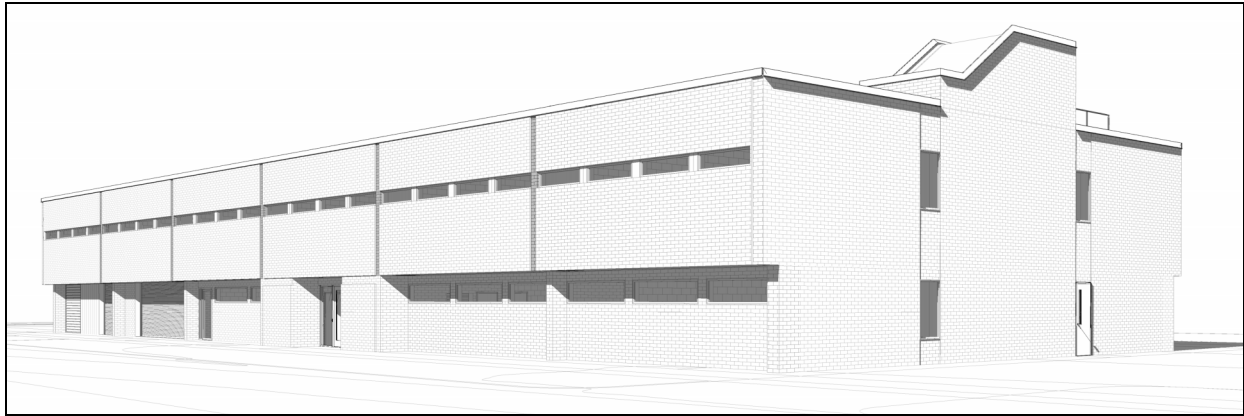




PROJECT MANUAL FOR:

Johnson County 511 Capital Building Stabilization Project

Iowa City, IA

November 14, 2025 – Bidding and Permit Documents

INFORMATION

Bids Due: *December 4th, 2025*

Bid Location: *Johnson County Administration Building – Auditors Office
913 S. Dubuque Street, Iowa City, Iowa 52240*



300 SOUTH CLINTON ST. #200, IOWA CITY, IOWA 52240 | 319.519.6220

2330 12th STREET SW, CEDAR RAPIDS, IA 52404 | 319.519.6220

AXIOM PROJECT #: 10271-10004



24 ½ SOUTH CLINTON ST. #1, IOWA CITY, IOWA 52240

SECTION 00 0102 PROJECT INFORMATION

PART 1 GENERAL

1.1 PROJECT IDENTIFICATION

- A. Project Name: 10271-10004 511 Capitol Street Building Stabilization Project.
511 Capitol Street.
Iowa City, Iowa 52240.
- B. The Owner, hereinafter referred to as Owner: Johnson County, Iowa

1.2 PROJECT DESCRIPTION

- A. Summary Project Description: The project primarily consists of envelope repairs of the Office of Johnson County Sheriff and Jail building due to signs of deterioration within the wall and soffit assemblies, water intrusion, thermal inefficiencies and heavily outdated equipment. To correct these issues, this project includes a full tear-off and replacement of the roof assembly including new insulation, replacement of all electrical and mechanical components on the roof, repair of numerous areas of brick fascia, removal and replacement of exterior steel assemblies at the soffit areas, reconfiguration and re-insulation of certain exterior areas, installation of structural pins/anchors, full soffit reconstruction (including improved drainage systems) and replacement of exterior doors on the main level. Additional interior and exterior features and repairs are also included..

1.3 PROJECT CONSULTANTS

- A. As indicated in Section 00 0103.

1.4 PROCUREMENT TIMETABLE

- A. Draft schedule as included in Section 01 3216.
- B. Final schedule to be completed by General Contractor.
- C. Final schedule will generally follow the draft schedule as indicated.
- D. Desired Final Completion Date: 08-31-2026.
- E. The Owner reserves the right to change the schedule or terminate the entire procurement process at any time.

1.5 PROCUREMENT DOCUMENTS

- A. Availability of Documents: Complete sets of procurement documents may be obtained:
 - 1. See Section 00 1113.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

**SECTION 00 0103
PROJECT DIRECTORY**

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Identification of project team members and their contact information.

1.2 OWNER:

- A. Name: Johnson County, Iowa
- B. Contact: Dave Curtis
 - 1. Telephone: 319-356-6073.
 - 2. Email: dcurtis@johnsoncountyiowa.gov

1.3 ENGINEER / OWNERS' REPRESENTATIVE:

- A. Name: Axiom Consultants.
- B. PROJECT MANAGER: Rob Decker.
 - 1. Cell Phone: 319-333-9322.
 - 2. Email: rdecker@axiom-con.com.
- C. PROJECT COORDINATOR: Adrienne Bricker.
 - 1. Cell Phone: 319-383-1217.
 - 2. Email: abricker@axiom-con.com.
- D. CIVIL LEAD: James Kincade.
 - 1. Cell Phone: 319-400-6163.
 - 2. Email: jkincade@axiom-con.com.
- E. STRUCTURAL LEAD: Justine Siglin.
 - 1. Cell Phone: 563-929-0182.
 - 2. Email: jsiglin@axiom-con.com.
- F. MECHANICAL LEAD: Joe Lomheim.
 - 1. Cell Phone: 712-490-5553.
 - 2. Email: jlomheim@axiom-con.com.
- G. ELECTRICAL / TECH LEAD: Kevin McLaughlin.
 - 1. Cell Phone: 815-985-3549.
 - 2. Email: kmclaughlin@axiom-con.com.

1.4 ARCHITECT

- A. Name: OPN Architects.
- B. PROJECT MANAGER: Zack Writer.
 - 1. Direct Phone: 319-248-5670.
 - 2. Email: zwriter@opnarchitects.com.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

**SECTION 00 0104
DISCLAIMER**

USE OF THIS DOCUMENT

- 1.1 THIS SPECIFICATION MANUAL COMPRISES ONE-HALF OF A COMPLETE SET OF DESIGN DOCUMENTS. WHEN COMBINED WITH THE CORRESPONDING PLAN-SET OF THE SAME NAME, THESE TWO DOCUMENTS CREATE A COMPLETE DESIGN.**
- 1.2 THE AFOREMENTIONED DOCUMENTS MUST BE UTILIZED TOGETHER TO FULLY DETERMINE DESIGN REQUIREMENTS AND INTENT.**
- 1.3 ALL ATTEMPTS HAVE BEEN MADE TO SYNCHRONIZE DATA BETWEEN THE PLANS AND SPECIFICATIONS AND ENSURE THE CONSISTENCY OF THAT DATA.**
- 1.4 DISCREPANCIES NOTED BY THE CONTRACTOR SHOULD BE BROUGHT TO THE IMMEDIATE ATTENTION OF THE DESIGN TEAM SO THAT THEY MAY REPLY WITH FORMAL CLARIFICATIONS.**
- 1.5 ASSUMPTIONS MADE BY THE CONTRACTOR REGARDING THE INTENDED DESIGN FOR ITEMS THAT INCLUDE A DISCREPANCY SHALL NOT BE JUSTIFICATION FOR INCREASED COST CLAIMS TO THE OWNER IF CLARIFICATIONS ARE NOT REQUESTED FOR SAID ITEMS.**
- 1.6 IN THE EVENT THAT CLARIFICATION FOR SAID ITEMS IS NOT REQUESTED, THE STRICTER SPECIFICATION SHALL GOVERN. 'STRICTER SPECIFICATION' SHALL MEAN, ALL THINGS BEING EQUAL, THAT REQUIREMENT WHICH REQUIRES MORE WORK, MORE COMPLEXITY, AND MORE COST.**

**SECTION 00 0107
SEALS PAGE**

CIVIL ENGINEER



I hereby certify that the portion of this technical submission described below was prepared by me or under my direct supervision and responsible charge. I am a duly licensed ENGINEER under the laws of the State of IOWA.

Name BRIAN A. BOELK, PE

Signature  Date 10/30/2025

Registration # 16503

Expiration: 12/31/2026

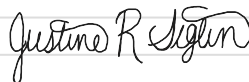
DIVISIONS or SECTIONS covered under this seal:
00, 01, 02, 32,

STRUCTURAL ENGINEER



I hereby certify that the portion of this technical submission described below was prepared by me or under my direct supervision and responsible charge. I am a duly licensed ENGINEER under the laws of the State of IOWA.

Name JUSTINE R. SIGLIN, PE

Signature  Date 10/30/2025

Registration # 25333

Expiration: 12/31/2026

DIVISIONS or SECTIONS covered under this seal:
04 0511, 04 2000, 05 1200, 05 5000, 05 5213

ARCHITECT



I hereby certify that the portion of this technical submission described below was prepared by me or under my direct supervision and responsible charge. I am a duly licensed ARCHITECT under the laws of the State of IOWA.

Name: DAVID J. SORG, AIA

Signature  Date 10/30/25

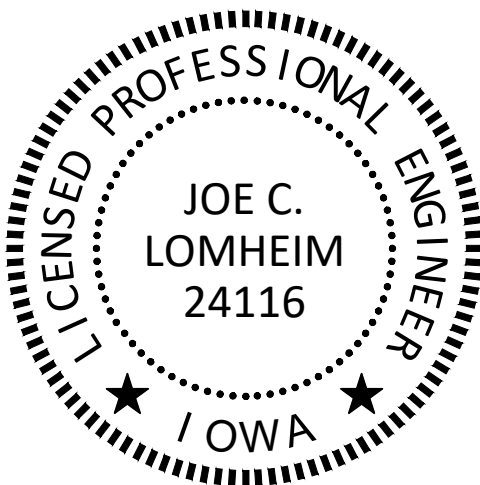
Registration # 03658

Expiration 06/30/2027

DIVISIONS or SECTIONS covered under this seal:

04 0100, 04 2613, 06, 07, 08, 09, 12

MECHANICAL ENGINEER



I hereby certify that the portion of this technical submission described below was prepared by me or under my direct supervision and responsible charge. I am a duly licensed ENGINEER under the laws of the State of IOWA.

Name: JOE C. LOMHEIM, PE

Signature  Date 10/30/2025

Registration # 24116

Expiration 12/31/2026

DIVISIONS or SECTIONS covered under this seal:

22, 23

ELECTRICAL ENGINEER



I hereby certify that the portion of this technical submission described below was prepared by me or under my direct supervision and responsible charge. I am a duly licensed ENGINEER under the laws of the State of IOWA.

Name KEVIN D. MCLAUGHLIN, PE

Signature *Kevin D. McLaughlin* Date 10/30/2025

Registration # 29142

Expiration 12/31/2025

DIVISIONS or SECTIONS covered under this seal:
26, 27, 28

END OF SECTION

SECTION 00 0110 TABLE OF CONTENTS

PROCUREMENT AND CONTRACTING REQUIREMENTS

DIVISION 00 -- PROCUREMENT AND CONTRACTING REQUIREMENTS

- 00 0102 - Project Information
- 00 0103 - Project Directory
- 00 0104 - Project Disclaimer
- 00 0107 - Seals Page
- 00 0110 - Table of Contents
- 00 1113 - Advertisement for Bids
- 00 2113 - Instructions to Bidders
- 00 4100 - Bid Form
- 00 4325 - Substitution Procedures
- 00 5000 - Contracting Forms and Supplements
- 00 7200 - General Conditions
- 00 7300 - Supplementary Conditions
- 00 7413 - Special Conditions

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- 01 1000 - Summary
- 01 2000 - Price and Payment Procedures
- 01 3000 - Administrative Requirements
- 01 3216 - Construction Progress Schedule
- 01 3323 - Submittals
- 01 4000 - Quality Requirements
- 01 4533 - Special Inspections and Procedures
- 01 5000 - Temporary Facilities and Controls
- 01 5213 - Field Offices and Sheds
- 01 5500 - Vehicular Access and Parking
- 01 5713 - Temporary Erosion and Sediment Control
- 01 5813 - Temporary Project Signage
- 01 6000 - Product Requirements
- 01 6116 - Volatile Organic Compound (VOC) Content Restrictions
- 01 7000 - Execution and Closeout Requirements
- 01 7419 - Construction Waste Management and Disposal
- 01 7800 - Closeout Submittals
- 01 7900 - Demonstration and Training

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DIVISION 03 -- CONCRETE

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- 05 5000 - Metal Fabrications
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- 07 4213.53 - Metal Soffit Panels
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- 08 3100 - Access Doors and Panels
- 08 4313 - Aluminum-Framed Storefronts
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DIVISION 09 -- FINISHES

- 09 9123 - Interior Painting
- 09 9600 - High-Performance Coatings

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- 22 0500 - Common Work Results for Plumbing
- 22 0529 - Hangers and Supports
- 22 1423 - Storm Piping Specialties
- 22 1516 - Facility Natural Gas Piping

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

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- 23 0548 - Vibration Controls for HVAC Ductwork and Equipment
- 23 0593 - Testing, Adjusting, And Balancing for HVAC Systems
- 23 0713 - Duct Insulation
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- 26 0519 - Low-Voltage Electrical Power Conductors and Cables
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511 Capitol Street Building

Stabilization Project

Johnson County, Iowa

AXIOM Consultants

10271-10004

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END OF SECTION

**SECTION 00 1113
ADVERTISEMENT FOR BIDS**

JOHNSON COUNTY

511 CAPITOL STREET BUILDING STABILIZATION PROJECT,

IOWA CITY, IOWA

NOTICE IS HEREBY GIVEN: That sealed bids for the 511 Capitol Street Building Stabilization Project will be received by Johnson County Board of Supervisors, at the Johnson County Administration Building – Auditors Office, 913 S Dubuque Street, Iowa City, Iowa 52240 until 2:00 PM CDST on December 4th, 2025. All bids received after the above stipulated closing time for receipt of bids will be returned to the bidder unopened. All bids received in accordance with these guidelines will be publicly opened and read aloud in Betty Sass Conference Room of the Johnson County Administration Building immediately following.

The project primarily consists of envelope repairs of the Office of Johnson County Sheriff and Jail building due to signs of deterioration within the wall and soffit assemblies, water intrusion, thermal inefficiencies and heavily outdated equipment. To correct these issues, this project includes a full tear-off and replacement of the roof assembly including new insulation, replacement of all electrical and mechanical components on the roof, repair of numerous areas of brick fascia, removal and replacement of exterior steel assemblies at the soffit areas, reconfiguration and re-insulation of certain exterior areas, installation of structural pins/anchors, full soffit reconstruction (including improved drainage systems) and replacement of exterior doors on the main level. Additional interior and exterior features and repairs are also included.

The bid is for a Prime Contract as described in the specifications. Bids shall be on a lump sum basis; segregated sub-bids will not be accepted.

A pre-bid conference will be held Thursday, November 20, 2025, at 1:00 PM CDST at the Office of Johnson County Sheriff & Jail, 511 Capitol Street, Iowa City, IA 52240. Attendees will wait in the Public Lobby. The group will then be escorted to the meeting location within the facility. The meeting will be held in the classroom. The Project Engineer and Architect will be on site for this meeting. The project site will be visited after the pre-bid conference.

Plans and specifications governing the construction of the proposed Work have been prepared by Axiom Consultants, 300 S. Clinton Street, Suite 200, Iowa City, Iowa 52240 and will be available after November 14, 2025.

The Contract Documents may be examined at the office of the Engineer and plan rooms listed below. Hard copies printed by the Contractor from electronic downloads will be at the Contractor's expense. Copies of the plans and specifications and other contract documents are now on file and can be ordered through the office of Rapids Reproductions at 415 Highland Ave Ste 100, Iowa City, IA 52240, by logging on to [rapidsrepro.com/plan room](http://rapidsrepro.com/plan%20room), or calling 1-800-383-1223, and upon the deposit of \$50.00 (payable to Rapid Reproductions) or current MBI Card for paper copies, which will be refunded to upon the return of the full set documents to the printer in good reusable condition within fourteen (14) days after bid submission. A separate \$20.00 check must accompany the deposit for mailing fee (non-refundable, paid to the printer). The following information must accompany the deposit: Company name, mailing address, street address, phone number, email address and type of bidder (i.e. General, Mechanical or Electrical Subcontractor to General, or other). All prints will be delivered via UPS Ground.

1. ConstructConnect online plan room; www.constructconnect.com.

2. Dodge Data and Analytics (online plan room) (877) 784-9556;
<https://dodgeprojects.construction.com>.
3. Illowa Builders Exchange (plan room in Rock Island) (309) 788-9260.
4. Construction Update Online Plan Room; Master Builders of Iowa, 4100 Westown Pkwy,
West Des Moines, IA 50266, 515-288-8904; <http://www.mbionline.com>.
5. Rapids/Technigraphics 415 Highland Ave, Suite 100, Iowa City, IA 52240 (319) 354-
5950/(800) 779-0093, www.rapidsrepro.com.

Make proposals on the bid forms supplied in the Project Manual. No oral, telegraphic or telephonic proposals or modifications will be considered. Submit with each bid, a certified check or acceptable bidder's bond payable to Johnson County in an amount equal to ten percent (10%) of the total bid. The successful bidder will be required to furnish satisfactory Labor and Material Payment Bond, and Performance Bond in an amount equal to one hundred percent (100%) of the Contract Sum. The surety providing bonds must have an (A-) A.M. Best rating or better or be listed on the U.S. Department of Treasury listing of approved sureties (Department Circular 570). The cost of the Bonds shall be included in the Contract Sum.

Bids may not be withdrawn within forty-five (45) days after the scheduled time of opening bids, without the consent of the Owner. The award of the contract may be made by Johnson County to any responsible bidder with suitable qualifications offering suitable supplies, equipment and/or service at the lowest price taking into consideration the quality of materials or service in the best interest of the Owner. The Owner reserves the right to accept any bid or to reject any or all bids, or parts of such bids, and waive informalities or irregularities in bidding. Further, Johnson County reserves the right to resolicit and/or re-bid this project at any time in the future.

Award is anticipated to be made by January 8th, 2026. Work under the proposed contract is to commence 30 days after contract is awarded and shall be substantially complete on or before August 31, 2026.

Monthly estimates will be paid to the contractor as the work progresses in amounts equal to ninety-seven per cent (97%) of the contract value of the work completed during the preceding calendar month, including the actual cost (exclusive of overhead or profit to the contractor) of materials and equipment of a permanent nature to be incorporated in the work and delivered to and stored at the job site. Such monthly payments shall in no way be construed as an act of acceptance for any part of the work, partially or totally completed. Final payment of the remaining amount due the contractor will be made not earlier than thirty-one (31) days from the final acceptance of the work by the Owner, subject to the conditions and in accordance with the provisions of Chapters 26 and 573 of the Code of Iowa.

Sales Tax. Iowa sales tax will not be paid on materials purchased for this project. The Owner will issue a sales tax exemption certificate.

By virtue of statutory authority, preference will be given to products and provisions grown and coal produced within the State of Iowa, and to Iowa domestic labor, to the extent lawfully under Iowa statutes. More information on bidding preferences can be found at Iowa Code Chapter 73, Iowa Code Section 8A.311B, and Iowa Administrative Code 875-Chapter 156.

By order of the Contracting Authority.

JOHNSON COUNTY

By: _____
Title: _____

END OF SECTION

SECTION 00 2113 INSTRUCTIONS TO BIDDERS

SUMMARY

1.1 DOCUMENT INCLUDES

1.2 RELATED DOCUMENTS

- A. Document 01 1000 - Summary.
- B. Document 00 1113 - Advertisement for Bids.
- C. Document 00 4100 - Bid Form.

INVITATION

2.1 BID SUBMISSION

- A. Bids for the Johnson County 511 Capitol Street Building Stabilization Project, signed and under seal, executed, and dated will be received at the office of Johnson County Auditors Office, 913 South Dubuque Street in Iowa City, IA 52240 before 2:00 p.m. local standard time on the 4th day of December, 2025.
- B. Offers submitted after the above time shall be returned to the bidder unopened.
- C. Offers will be opened publicly immediately after the time for receipt of bids in a Conference Room of the Johnson County Administration Building adjacent to the Auditors Office.

2.2 INTENT

- A. The intent of this Bid request is to obtain an offer to perform work to complete project named 10271-10004 511 Capitol Street Building Stabilization Project for a Stipulated Sum contract, in accordance with Contract Documents.

2.3 WORK IDENTIFIED IN THE CONTRACT DOCUMENTS

- A. Work of this proposed Contract comprises building construction, renovation, and demolition, including general construction, structural, mechanical, and electrical Work.

2.4 CONTRACT TIME

- A. Perform the Work within the time stated in Section 00 4100 - Bid Form.
- B. The bidder, in submitting an offer, accepts the Contract Time period stated for performing the Work.

BID DOCUMENTS AND CONTRACT DOCUMENTS

3.1 DEFINITIONS

- A. Bid Documents: Contract Documents supplemented with Instructions to Bidders, Bid Form Supplements To Bid Forms and Appendices identified.
- B. Contract Documents: Defined in AIA A201 Article 1 including issued Addenda.
- C. Bid, Offer, or Bidding: Act of submitting an offer under seal.
- D. Bid Amount: Monetary sum identified by the Bidder in the Bid Form.

3.2 CONTRACT DOCUMENTS IDENTIFICATION

- A. Contract Documents are identified as Owner's Project Number 10271-10004, as prepared by Engineer, and with contents as identified in the Table of Contents of the Project Manual and Index of Sheets on the Drawing.

3.3 BIDDER'S REPRESENTATIONS

- A. The Bidder by making a Bid represents that:
 - 1. The Bidder has read and understands the Bidding Documents or Contract Documents, to the extent that such documentation relates to the Work for which the Bid is submitted, and

- for other portions of the Project, if any, being bid concurrently or presently under construction.
2. The Bid is made in compliance with Bidding Documents.
3. The Bidder has visited the site, become familiar with local conditions under which the Work is to be performed and has correlated the Bidder's personal observations with the requirements of the proposed Contract Documents.
4. The Bid is based upon the materials, equipment and systems required by the Bidding Documents without exception.

3.4 AVAILABILITY

- A. Bid documents may be obtained at Rapids Reproductions located at 415 Highland Avenue, Suite 100 in Iowa City, Iowa 52240. Phone Number (800)-383-1223.
 1. Up to Two sets of Bid Documents can be obtained by general contract and one set for subcontract bidders upon receipt of a refundable deposit, by certified check, or current MBI card, in the amount of \$50.00 for one set.
 2. Qualified plan houses receive all-branch sets free of charge, provided they log all usage of the documents and return to the printer within fourteen (14) days after bidding.
 3. Hardcopy sets of Bid Documents can be obtained by bidders from Rapids Reproduction.
 - a. General Contractors shall be limited to two (2) sets each. Mechanical and Electrical Contractors shall be limited to one (1) set each.
 4. A non-refundable check for \$20.00 made out to Rapids Reproductions shall be included if shipping is desired.
 5. Deposit will be refunded if Bid Documents are returned complete, undamaged, unmarked and reusable, within ten (10) days of bid submission. Failure to comply will result in forfeiture of deposit.
- B. Contractors, subcontractors and suppliers may view plans and specifications on <https://rapidsrepro.com/planroom/>.
- C. Bid Documents are made available only for the purpose of obtaining offers for this project.
- D. Bidder shall use complete sets of Bidding Documents in preparing Bids; neither the Owner, Engineer or Architect assumes responsibility for errors or misinterpretations resulting from the use of incomplete sets of Bidding Documents.
- E. Addenda will be available online at <https://rapidsrepro.com/planroom/>. If a contractor, subcontractor, or supplier does not have Internet access; please call Rapids Reproductions, (800)-383-1223, to make alternative arrangements.
 1. Go to <https://rapidsrepro.com/planroom/> on the internet.
 2. Click on applicable planroom.
 3. Click on "Register Now" towards the bottom of the screen.
 4. Click "I Accept" on the End User License Agreement.
 5. Enter your email address and click on "Continue".
 6. Fill in the required "Personal Information" and click on "Continue".
 7. Check your email for your "User ID" and "Password".
 8. Click "Continue" and login with your "User ID" and "Password".
 9. Direct any questions to: (800) 383-1223.

3.5 EXAMINATION

- A. Bid Documents may be viewed at the office of the Engineer which is located at 300 S. Clinton Street, Suite 200, Iowa City, IA 52240.
- B. Bid Documents may be viewed at the Administration Office of Owner which is located at Auditor's Office, 913 S. Dubuque Street, Iowa City, IA 52240.
- C. Bid Documents are on display at the offices of the following construction plan rooms:
 1. Construction Update Online Plan Room; Master Builders of Iowa, 4100 Westown Pkwy, West Des Moines, IA 50266, 515-288-8904; <http://www.mbionline.com>.

2. Dodge Data and Analytics (online plan room); 4300 Beltway Place, Suite 180; Arlington, TX 73018; ph. (877) 784-9556. <http://dodgeprojects.construction.com>.
 3. Illowa Builders Exchange (Plan Room in Rock Island) (309) 788-9260.
 4. Rapids Reproduction/Technographics, 415 Highland Ave, Suite 100, Iowa City, IA; 52240 ph: 319-354-5950 /800-779-0093.
 5. ConstructConnect online plan room; www.constructconnect.com.
- D. Upon receipt of Bid Documents verify that documents are complete. Notify Engineer should the documents be incomplete.
- E. Immediately notify Engineer upon finding discrepancies or omissions in the Bid Documents.

3.6 INQUIRIES/ADDENDA

- A. Direct questions to both Rob Decker and Adrienne Bricker, via email; rdecker@axiom-con.com and abricker@axiom-con.com.
- B. Addenda may be issued during the bidding period. All Addenda become part of Contract Documents. Include resultant costs in the Bid Amount.
- C. Verbal answers are not binding on any party.
- D. The Bidder shall carefully study and compare the Bid Documents with each other, and with other work being bid concurrently or presently under construction to the extent that it relates to the Work for which the Bid is submitted, shall examine the site and local conditions, and shall at once report to the Engineer error, inconsistencies or ambiguities discovered.
- E. Clarifications requested by bidders must be in writing not less than five (5) days before date set for receipt of bids. The reply will be in the form of an Addendum, a copy of which will be forwarded to known recipients and plan holders.
- F. Each Bidder shall indicate receipt of Addendum on Bid Form.

3.7 PRODUCT/ASSEMBLY/SYSTEM SUBSTITUTIONS

- A. General Requirements for Substitution Requests:
1. Project Manual establishes standards for products, assemblies, and systems.
 2. Submit requests only for elements for which substitution is specifically allowed in the Project Manual.
 3. Provide sufficient information to determine acceptability of proposed substitutions.
 4. Provide complete information on required revisions to other work to accommodate each proposed substitution.
- B. Substitution Request Time Restrictions:
1. Where the Bid Documents stipulate a particular product, substitutions will be considered up to seven (7) days before receipt of bids.
- C. Substitution Request Form:
1. Per section 00 4325.
- D. Review and Acceptance of Request:
1. Engineer may approve the proposed substitution and will issue an Addendum to known bidders.
 2. For approved substitutions, include representation of changes in the bid, if any, required in the work and changes to Contract Time and Contract Sum to accommodate such substitutions. A later claim by the bidder for an addition to the Contract Time or Contract Sum because of changes in work necessitated by use of substitutions will not be considered.
 3. In submission of substitutions to products specified, bidders shall include in their bid all changes required in the Work and changes to Contract Time and Contract Sum to accommodate such substitutions. A later claim by the Bidder for an addition to the Contract Time or Contract Sum because of changes in work necessitated by use of substitutions shall not be considered.

4.1 SITE EXAMINATION

- A. Examine the project site before submitting a bid.
 - 1. Extra costs for Work not identified on the drawings, but clearly visible, will not be considered.
- B. A visit to the project site has been arranged for bidders as follows: immediately after the Pre-Bid Conference.
- C. The exterior can be viewed at any time but the contractor must contact the Owner to notify them prior to visiting the site; the interior will only be available for tour at the Pre-Bid Conference.

4.2 PREBID CONFERENCE

- A. A bidders conference has been scheduled for 1:00 p.m. on the 20th day of November, 2025 at the location of Office of Johnson County Sheriff & Jail, 511 Capitol Street, Iowa City, IA 52240.
 - 1. Attendees will wait in the Public Lobby. The group will then be escorted to the meeting location within the facility. The meeting will be held in the classroom.
- B. All general contract and subcontract bidders and suppliers are invited.
- C. Representatives of both Engineer and Architect will be in attendance.
- D. Summarized minutes of this meeting will be circulated to attendees. These minutes will not form part of Contract Documents.
- E. Information relevant to the Bid Documents will be recorded in an Addendum, issued to Bid Document recipients.

QUALIFICATIONS

5.1 EVIDENCE OF QUALIFICATIONS

- A. To demonstrate qualification for performing the Work of this Contract, bidders may be requested to submit written evidence of financial position, license to perform work in the State.
- B. A bidder for the Project shall submit to the Owner, within fourteen (14) days of Owner's identification and notification to the bidder they are the apparent lowest responsible bidder for the Project, a completed Johnson County Post-Bid "GENERAL CONTRACTOR QUALITY ASSURANCE QUESTIONNAIRE", included in this Project Manual after this section and also available at:

<https://johnsoncountyiowa.gov/johnson-county-post-bid-general-contractor-quality-assurance-questionnaire-policy>

which will be used by the Owner to determine responsibility and related factors prior to award of this contract.

5.2 SUBCONTRACTORS/SUPPLIERS/OTHERS

- A. Owner reserves the right to reject a proposed subcontractor for reasonable cause.
- B. Refer to General Conditions.

BID SUBMISSION

6.1 SUBMISSION PROCEDURE

- A. Bidders shall be solely responsible for the delivery of their bids in the manner and time prescribed.
- B. Submit one (1) copy of the executed offer on the Bid Forms provided, signed and sealed with the required security and bonding and insurance requirements, in a closed opaque envelope, clearly identified with Bidder's name, Project name and Owner's name on the outside
 - 1. Label shall include:
BID PROPOSAL FOR 511 CAPITOL STREET BUILDING STABILIZATION
PROJECT

Attn: _____

2. If envelopes are not clearly marked, the bid might be mistakenly opened outside the official bid letting rendering it invalid.
- C. Improperly completed information or irregularities in security deposit may be cause to reject and declare the bid invalid or informal.
- D. Oral, telephonic, facsimile or other electronically transmitted bids will not be considered.
- E. Hand deliver to the location specified by the date and time as noted above.
- F. Double Envelope: Insert the closed and sealed Bid Form envelope plus requested security deposit, in a separate envelope, in a large opaque envelope and label this envelope as noted above.
- G. An abstract summary of submitted bids will be made available to all bidders following bid opening.

6.2 BID INELIGIBILITY

- A. Bids that are unsigned, improperly signed or sealed, conditional, illegible, obscure, contain arithmetical errors, erasures, alterations, or irregularities of any kind, may at the discretion of the Owner, be declared unacceptable.
- B. Bid Forms, Appendices, and enclosures that are improperly prepared may, at the discretion of Owner, be declared unacceptable.
- C. Failure to provide security deposit, bonding or insurance requirements may, at the discretion of Owner, be waived.

BID ENCLOSURES/REQUIREMENTS

7.1 SECURITY DEPOSIT

- A. Bids shall be accompanied by a security deposit as follows:
 1. Bid Bond of a sum no less than 10 percent of the Bid Amount on AIA A310 Bid Bond Form or standard surety company form, or a certified bank check made payable to the Owner.
- B. Deposit serves as security that the bidder will enter into a contract and furnish Performance and Payment Bonds within seven (7) days after the award of the contract.
- C. Endorse the Bid Bond in the name of the Owner as obligee, signed and sealed by the principal (Contractor) and surety.
- D. The security deposit will be returned after delivery to the Owner of the required Performance and Payment Bond(s) by the accepted bidder.
- E. Include the cost of bid security in the Bid Amount.
- F. After a bid has been accepted, all securities will be returned to the respective bidders and other requested enclosures.
- G. If no contract is awarded, all security deposits will be returned.

7.2 PERFORMANCE ASSURANCE

- A. Accepted Bidder is to provide the following:
 1. Provide a 100 percent Performance Bond on an AIA A312, or standard surety form.
 2. Provide a 100 percent Payment Bond on an AIA A311, or standard surety form.
- B. Include the cost of Performance and Payment Bonds in the Bid Amount and identify the cost when requested.

7.3 INSURANCE

- A. Provide an executed "Certificate of Insurance" on a standard form provided by the insurance company stating their intention to provide insurance to the bidder in accordance with the insurance requirements of Contract Documents within seven (7) days after the acceptance of bid.

7.4 BID FORM REQUIREMENTS

- A. Complete all requested information in the Bid Form and Appendices.
- B. Preference for Labor and Materials.
 - 1. By virtue of statutory authority, preference will be given to products and provisions grown and coal produced within the State of Iowa, and to Iowa domestic labor, to the extent lawfully required under Iowa Code Chapter 73 and Section 8A.311B.
 - 2. Such preferences will not be given where funding requirements, federal or otherwise, prohibit the giving of such preferences.
 - 3. The Bidder Status Form is required by the Iowa Labor Commissioner, pursuant to Iowa Administrative Code rule 875-156.2(1). The bidder must complete the form and submit it with the proposal. Failure to provide the Bidder Status Form with the bid may result in the bid being deemed non-responsive and may result in the bid being rejected. If the bidder does not qualify as a resident bidder, the non-resident bidder shall specify on the Bidder Status Form whether any preference to resident bidders, including but not limited to any preference to bidders, the imposition of any type of labor force preference, or any other form of preferential treatment to bidders or laborers from that state or foreign country is in effect in the non-resident bidder's state or country of domicile at the time of a bid submittal.

7.5 SALES AND USE TAXES

- A. This is a sales tax-free construction project. Bidders shall NOT include state sales taxes in their proposals. The Owner will issue a state sales tax exemption certificate for all materials purchased for the project and will issue the appropriate tax exemption certificates and authorization letters to the Contractors and all Subcontractors performing the work on the project. Tax exemption certificates are applicable only for the specific project for which the certificates are issued. The Contractors shall provide a listing to the Owner of all appropriate Subcontractors which are qualified to use the tax exemption certificate. The Contractors and Subcontractors may make copies of the tax exemption certificate and may provide a copy to each Supplier providing construction material. Materials for this contract may then be purchased free from sales tax. Suppliers shall retain this certificate for at least three (3) years.

7.6 ADDITIONAL BID INFORMATION

- A. Equal Opportunity compliance is required for this project and is part of these specifications.
 - 1. MBE/WBE Contract Compliance Program; submit with bid.
 - 2. Proposed Subcontractors List: submit within 48 hours after submission of bids.
- B. The Contractor shall file for the building permit.

OFFER ACCEPTANCE/REJECTION

8.1 DURATION OF OFFER

- A. Bids shall remain open to acceptance and shall be irrevocable for a period of forty-five (45) days after the bid closing date.

8.2 ACCEPTANCE OF OFFER

- A. Owner reserves the right to accept or reject any or all offers and to waive any irregularities or informalities.
- B. After acceptance, a written Notice to Proceed will be sent to the successful Bidder by the Owner of the Engineer on behalf of the Owner.

END OF SECTION



JOHNSON COUNTY, IOWA Post-Bid Information

GENERAL CONTRACTOR QUALITY ASSURANCE QUESTIONNAIRE

Pursuant to Iowa Code §26.9 which requires that contracts for public improvements be awarded to the "lowest responsive, responsible bidder," and also recognizes that a governmental entity may obtain information from the lowest responsible bidder to determine bidder's responsibility relating to the bidder's experience, number of employees, and ability to finance the cost of the public improvement, and in accordance with Iowa law allowing public entities to consider factors other than price in determining who is the lowest responsible bidder; Johnson County does hereby provide the following Questionnaire to the bidder to whom award of a Contract is under consideration ("Contractor") submitting bids for work on the _____ ("Project"). The fully completed Questionnaire, with attachments, shall be submitted to the Special Project Manager **within 14 calendar days of notification** to the apparent lowest bidder. Contractors who do not complete the following questionnaire may be deemed to be non-responsive or non-responsible.

1. Full name of Contractor _____
Address _____
Telephone _____ Fax _____
Email _____
2. All other names under which Contractor has operated in the past five (5) years: _____

3. Provide Contractors' Registration Number and full names of Registration Holders as per Iowa Construction Contractor Registration requirements: _____

Contractor Registration Expiration Date _____
4. Has Registration ever been suspended or revoked in any jurisdiction?
 - a. Yes ____
 - b. No ____If "yes", provide information regarding suspension/revocation and attach all relevant documents.

5. Within the past five (5) years, has Contractor been debarred by any federal, state or local governmental entity from bidding on projects?
 - a. Yes ____
 - b. No ____If "yes", provide information related to debarment.
6. On a separate sheet, list construction projects in value in excess of \$5 million dollars that Contractor has in progress, giving the name of the project, owner, architect, contract amount, key Contractor personnel, percent complete and scheduled completion date.
7. On a separate sheet, list the major projects Contractor has completed in the past three (3) years, giving the name of the project, owner, architect, contract amount, Officer in Charge, Project Manager, Project Superintendent and any other key Contractor personnel, date of completion and percentage of the total project performed by your own employees.
8. On a separate sheet, identify the individuals Contractor intends to be the Officer in Charge, Project Manager, Project Superintendent and any other key personnel on this project.
9. On a separate sheet, list the Contractors last five (5) completed projects, and for each, the scheduled completion date and the final completion date, noting any owner approved extensions.
10. Within the past three (3) years, has Contractor defaulted on a contract, or been disqualified, removed or otherwise prevented from bidding on or completing any project?
 - a. Yes ____
 - b. No ____If "yes", provide the year of the incident, name, address and telephone number of the owner of the project, project name and location.
11. Has Contractor ever been unable to obtain a bond or been denied a bond?
 - a. Yes ____
 - b. No ____If "yes", please provide all relevant details.
12. On a separate sheet, list all surety/bonding companies Contractor has utilized in the past five (5) years.
13. Has Contractor ever declared bankruptcy or been in receivership?
 - a. Yes ____
 - b. No ____If "yes", please provide all relevant details.
14. Is Contractor currently being investigated for or previously been found to have violated in the past five (5) years any of the following state or federal laws: Iowa Minimum Wage Act; Iowa

Non-English Speaking Employees Act; Iowa Child Labor Act; Iowa Labor Commissioner's Right to Inspect Premises, Iowa Compensation Insurance Act; Iowa Employment Security Act; Iowa Competition Act; Iowa Income, Corporate and Sales Tax Code; a "willful" violation of the Iowa or Federal Occupational Safety and Health Act; Iowa Employee Registration Requirements; Iowa Hazardous Chemical Risks Act; Iowa Wage Payment Collection Act; Federal Income and Corporate Tax Code; The National Insurance and Social Security Act; The Fair Labor Standards Act:

a. Yes ____

b. No ____

If "yes", please explain:

15. Has Contractor ever failed to complete any work awarded to it?

a. Yes ____

b. No ____

If "yes", please provide all relevant details.

16. Are there any judgments, arbitration proceedings or suits pending or outstanding against Contractor or its officers that relate to, arise out of or are in the course of the Contractor's business?

a. Yes ____

b. No ____

If "yes", please provide all relevant details.

17. Has Contractor filed any lawsuit or demanded arbitration with regard to any construction contract within the past five (5) years?

a. Yes ____

b. No ____

If "yes", please provide all relevant details.

18. Has Contractor been found by a court or agency of competent jurisdiction to be delinquent in meeting its obligations under local, state or federal tax laws within the last five (5) years? ("delinquent" shall include, but is not limited to: failure to file, failure to pay or imposition of tax liens)

a. Yes ____

b. No ____

If "yes", please provide all relevant details.

19. Contractor affirms that it will retain only subcontractors who can fully comply with the bid specifications, including those that address requirements concerning the Subcontractor Quality Assurance Bid Requirements.

- a. Yes ____
- b. No ____

20. Contractor affirms that it will be responsible for ensuring that each subcontractor meets the Subcontractor Quality Assurance Bid Requirements.

- a. Yes ____
- b. No ____

21. Contractor agrees to submit to the Johnson County Special Projects Manager a list of all intended subcontractors **within 14 calendar days on notification** to the apparent lowest bidder. (In the event Contractor wishes to replace any originally- designated subcontractor or add a subcontractor, such may only occur with the approval of Johnson County. Such approval will not be unreasonably withheld)

- a. Yes ____
- b. No ____

22. Contractor attests that it will comply with each of the following:

Iowa's Minimum Wage Law:

- a. Yes ____
- b. No ____

Maintain workers' compensation insurance or be qualified as a self-insurer and provide proof of insurance or ability to self-insure upon request.

- a. Yes ____
- b. No ____

Properly license Contractor employees with the appropriate licensing authority.

- a. Yes ____
- b. No ____

23. Contractor will make available to the County or County's representative, upon County's request, documentation to satisfy the County, in Counties' sole discretion, that the Contractors' workers utilized on this project are actual employees, with unemployment and workers' compensation coverage not "leased employees" or independent contractors.

- a. Yes ____
- b. No ____

24. That Contractor will provide with this Questionnaire, the name, address, phone number and name of contact for three (3) entities which will provide references.

- a. Yes ____
- b. No ____

25. Contractor will only utilize on-site employees who have completed the Occupational Safety and Health Act (OSHA) 10 hour Construction Industry Training Program.

- a. Yes ____
b. No ____

Provide Contractor's Federal ID Number _____

Provide Name and address of Contractor's Registered Agent _____

I hereby certify, that (1) all of the information provide by me in this Questionnaire is true and correct to the best of my knowledge; (2) I am authorized to sign this Questionnaire on behalf of the Contractor whose name appears in Question #1; (3) if any of the information I have provided herein becomes inaccurate, prior to execution of any Project Contract. I will immediately provide the Special Project Manager with updated accurate information in writing; and (4) I hereby authorize any person or entity named herein to provide the Special Project Manager with whatever information might be required to verify this Questionnaire.

THIS STATEMENT MUST BE NOTORIZED

NAME OF CONTRACTOR _____

BY: _____

Signature

Title

Type/Print Name

Date

STATE OF IOWA, _____ County, ss:

Subscribed and sworn to before me by the said _____ on this day of

_____, 20____

Notary Public in and for the State of Iowa

Contractor Name

**SECTION 00 4100
BID FORM**

THE PROJECT AND THE PARTIES

1.1 TO:

- A. Johnson County (Owner)
Johnson County Administrative Building
913 S. Dubuque Street
Iowa City, Iowa 52240

1.2 FOR:

- A. Project: 10271-10004 511 Capitol Street Building Stabilization Project
511 Capitol Street
Iowa City, Iowa 52240
B. Axiom Consultants, Project Number 10271-10004

1.3 DATE: _____ (BIDDER TO ENTER DATE)

1.4 SUBMITTED BY: (BIDDER TO ENTER NAME AND ADDRESS)

- A. Bidder's Full Name: _____
1. Address: _____
2. City, State, Zip: _____
3. Phone: _____

1.5 OFFER

- A. Having examined the Place of The Work and all matters referred to in the Instructions to Bidders and the Bid Documents prepared by Axiom Consultants for the above mentioned project, we, the undersigned, hereby offer to enter into a Contract to perform the Work for the Sum of:
B. _____ dollars
(\$ _____), in lawful money of the United States of America.
C. All applicable federal taxes are included and State of Iowa taxes are excluded from the Bid Sum.

1.6 ACCEPTANCE

- A. This offer shall be open to acceptance and is irrevocable for forty-five (45) days from the bid closing date.
B. If this bid is accepted by Owner within the time period stated above, we will:
1. Execute the Agreement within seven (7) days of receipt of Notice of Award.
2. Furnish the required bonds within seven (7) days of receipt of Notice of Award.
3. Commence work within thirty (30) days after written Notice to Proceed of this bid.

1.7 CONTRACT TIME

- A. If this Bid is accepted, we will:
1. Commence the work within 30 days after award of contract.
2. Complete the Work by the _____ day of _____, _____. (Bidder to enter day, month, and year.)

1.8 ADDENDA

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

3. Addendum # _____ Dated _____.
4. Addendum # _____ Dated _____.

1.9 BID FORM SUPPLEMENTS

- A. The following information is included with Bid submission:
1. Bidders will be required to complete a Bidder Status Form from the Iowa Department of Labor (downloadable from <https://das.iowa.gov/bidder-status-form>) regarding the Contractor's resident status within the State of Iowa. Failure to submit a fully completed Bidder Status Form with the bid may result in the bid being deemed nonresponsive and rejected.

1.10 BID FORM SIGNATURE(S)

- A. _____
(Bidder - print the full name of your firm)
- B. _____
(Authorized signing officer, Title)

END OF SECTION

SECTION 00 4325 SUBSTITUTION PROCEDURES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Procedural requirements for proposed substitutions.

1.2 RELATED REQUIREMENTS

- A. Section 00 2113 - Instructions to Bidders: Restrictions on timing of substitution requests.
- B. Section 01 3000 - Administrative Requirements: Submittal procedures, coordination.
- C. Section 01 6000 - Product Requirements: Fundamental product requirements, product options, delivery, storage, and handling.
- D. Substitution form to follow this section.

1.3 DEFINITIONS

- A. Substitutions: Changes from Contract Documents requirements proposed by Contractor to materials, products, assemblies, and equipment.
 - 1. "Equals" are products that:
 - a. Are equal in materials of construction, quality, durability, appearance, strength and design characteristics.
 - b. Will reliably perform and function at least equally well as the brand-named product and achieve the results imposed by the design concept of the completed project as it functions as a whole.
 - c. Has a proven record of performance and responsive service.
 - 2. "Substitutes" are items of materials or equipment proposed that are determined by the design professional not to be an equal or may require redesign to incorporate into the project.
 - 3. Substitutions for Cause: Proposed due to changed project circumstances beyond the Contractor's control.
 - a. Unavailability.
 - b. Regulatory changes.
 - 4. Substitutions for Convenience: Proposed due to possibility of offering substantial advantage to the project.
 - 5. Substitutions for this project shall only consist of Equal Products: The proposed products must have the same salient characteristics as the Basis of Design or other listed manufacturer or products, but were not listed as an acceptable manufacturer or product in the specifications.
 - a. The named products and listed qualities in each section establish the salient features against which comparable products will be evaluated. Qualities may include type, function, dimension, in-service performance, physical properties, appearance and other characteristics.
 - b. The Engineer and/or Architect will make the final determination of a proposed product as being equal.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.1 GENERAL REQUIREMENTS

- A. A Substitution Request for products, assemblies, materials, and equipment constitutes a representation that the submitter:

1. Has investigated proposed product and determined that it meets or exceeds the quality level of the specified product, equipment, assembly, or system.
 2. Agrees to provide the same warranty for the substitution as for the specified product.
 3. Agrees to provide same or equivalent maintenance service and source of replacement parts, as applicable.
 4. Agrees to coordinate installation and make changes to other work that may be required for the work to be complete, with no additional cost to Owner.
 5. Waives claims for additional costs or time extension that may subsequently become apparent.
- B. Document each request with complete data substantiating compliance of proposed substitution with Contract Documents. Burden of proof is on proposer.
1. All characteristics shall be compliant.
- C. Content: Include information necessary for tracking the status of each Substitution Request, and information necessary to provide an actionable response.
1. Forms included in the Project Manual are adequate for this purpose, and must be used.
- D. Limit each request to a single proposed substitution item.
1. Submit an electronic document, combining the request form with supporting data into single document.

3.2 SUBSTITUTION PROCEDURES DURING PROCUREMENT

- A. Submittal Time Restrictions:
1. Section 00 2113 - Instructions to Bidders specifies time restrictions and the documents required for submitting substitution requests during the bidding period.
- B. Submittal Form (before award of contract):
1. Submit substitution requests by completing the form provided in Section 00 4325. See this form for additional information and instructions. Use only this form; other forms of submission are unacceptable.
 2. Substitution requests shall not be considered approved unless processed via an addendum.

3.3 SUBSTITUTION PROCEDURES DURING CONSTRUCTION

- A. Submittal Form (after award of contract):
1. Submit substitution requests by completing the form provided in Section 00 4325. See this section for additional information and instructions. Use only this form; other forms of submission are unacceptable.
- B. Submit request for Substitution for Cause within 14 days of discovery of need for substitution, but not later than 14 days prior to time required for review and approval by Engineer, in order to stay on approved project schedule.
- C. Submit request for Substitution for Convenience within 14 days of discovery of its potential advantage to the project, but not later than 14 days prior to time required for review and approval by Engineer, in order to stay on approved project schedule.
1. Contractor is responsible for ensuring that the proposed substitution is of equal to or superior to the basis of design in performance, appearance, quality and function prior to Engineer's review.
 2. In addition to meeting general documentation requirements, document how the requested substitution benefits the Owner through cost savings, time savings, greater energy conservation, or in other specific ways.
 3. Document means of coordinating of substitution item with other portions of the work, including work by affected subcontractors.
 4. Bear the costs engendered by proposed substitution of:
 - a. Other construction by Owner.
 - b. Other unanticipated project considerations.
- D. Substitutions will not be considered under one or more of the following circumstances:

1. When they are indicated or implied on shop drawing or product data submittals, without having received prior approval.

3.4 RESOLUTION

- A. Engineer may request additional information and documentation prior to rendering a decision. Provide this data in an expeditious manner.
- B. Engineer will notify Contractor in writing of decision to accept or reject request.
 1. Engineer's decision following review of proposed substitution will be noted on the submitted form.

3.5 ACCEPTANCE

- A. Accepted substitutions change the work of the Project. They will be documented and incorporated into work of the project by Change Order, Construction Change Directive, Architectural Supplementary Instructions, or similar instruments provided for in the Conditions of the Contract.
 1. The approved and returned Substitution Request Form does not provide approval to move forward with the substitution. Formal direction as noted above dictates the release of the approved materials.

3.6 CLOSEOUT ACTIVITIES

- A. See Section 01 7800 - Closeout Submittals, for closeout submittals.

END OF SECTION



SUBSTITUTION REQUEST

PROJECT: Capitol Street Building Stabilization Project

**SUBSTITUTION
REQUEST NUMBER:** _____

511 Capitol Street, Iowa City, Iowa 52240

FROM: _____

TO: _____

DATE: _____

A/E PROJECT NUMBER: 10271-10004

RE: _____

CONTRACT FOR: _____

SPECIFICATION TITLE: _____

DESCRIPTION: _____

SECTION: _____

PAGE: _____

ARTICLE/PARAGRAPH: _____

PROPOSED SUBSTITUTION: _____

MANUFACTURER: _____ **ADDRESS:** _____ **PHONE:** _____

TRADE NAME: _____ **MODEL NO.:** _____

Attached data includes product description, specifications, drawings, photographs, and performance and test data adequate for evaluation of the request; applicable portions of the data are clearly identified.
Attached data also includes a description of changes to the Contract Documents that the proposed substitution will require for its proper installation.

The Undersigned certifies:

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

SUBMITTED BY: _____

SIGNED BY: _____

FIRM: _____

ADDRESS: _____

TELEPHONE: _____

A/E's REVIEW AND RECOMMENDATION:

- ☐ Approve Substitution—Make submittals in accordance with Specification Section 01 33 00 Submittal Procedures.
- ☐ Approve Substitution as noted—Make submittals in accordance with Specification Section 01 33 00 Submittal Procedures.
- ☐ Reject Substitution—Use specified materials.
- ☐ Substitution Request received too late—Use specified materials.

SIGNED BY: _____

DATE: _____

SUPPORTING DATA ATTACHED: ☐ Drawings ☐ Product Data ☐ Samples ☐ Tests ☐ Reports ☐ _____

**SECTION 00 5000
CONTRACTING FORMS AND SUPPLEMENTS**

PART 1 GENERAL

1.1 AGREEMENT AND CONDITIONS OF THE CONTRACT

- A. See Section 00 7200 - General Conditions for the General Conditions.
- B. The Agreement is based on AIA A101.
 - 1. This agreement is a public record governed by Iowa Code Chapter 22.
 - 2. A copy is included in this Project Manual immediately following this section.
- C. The General Conditions are based on AIA A201.
- D. Special Conditions.

1.2 FORMS

- A. Use the following forms for the specified purposes unless otherwise indicated elsewhere in Contract Documents.
- B. Post-Award Certificates and Other Forms:
 - 1. Schedule of Values Form: AIA G703.
 - 2. Application for Payment Forms: AIA G702 with AIA G703 (for Contractors).
- C. Clarification and Modification Forms:
 - 1. Architect's Supplemental Instructions Form: AIA G710.
 - 2. Construction Change Directive Form: AIA G714.
 - 3. Change Order Form: AIA G701.
- D. Closeout Forms:
 - 1. Certificate of Substantial Completion Form: AIA G704.

1.3 REFERENCE STANDARDS

- A. AIA A101 - Standard Form of Agreement Between Owner and Contractor where the basis of Payment is a Stipulated Sum; 2017.
- B. AIA A201 - General Conditions of the Contract for Construction; 2017.
- C. AIA G701 - Change Order; 2017.
- D. AIA G702 - Application and Certificate for Payment; 1992.
- E. AIA G703 - Continuation Sheet; 1992.
- F. AIA G704 - Certificate of Substantial Completion; 2017.
- G. AIA G710 - Architect's Supplemental Instructions; 2017.
- H. AIA G714 - Construction Change Directive; 2017.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

AIA® Document A101® – 2017

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

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

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

Johnson County, Iowa
913 S. Dubuque Street
Iowa City, Iowa 52240

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

[]
[]
[]
[]

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

511 Capitol Street Building Stabilization Project
Office of Johnson County Sheriff & Jail
511 Capitol Street
Iowa City, Iowa 52240

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

Axiom Consultants, LLC
300 S. Clinton Street, Suite 200
Iowa City, Iowa 52240

The Owner and Contractor agree as follows.

ADDITIONS AND DELETIONS:

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

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

The parties should complete A101®–2017, Exhibit A, Insurance and Bonds, contemporaneously with this Agreement. AIA Document A201®–2017, General Conditions of the Contract for Construction, is adopted in this document by reference. Do not use with other general conditions unless this document is modified.

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TABLE OF ARTICLES

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

EXHIBIT A INSURANCE AND BONDS

ARTICLE 1 THE CONTRACT DOCUMENTS

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

ARTICLE 2 THE WORK OF THIS CONTRACT

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

ARTICLE 3 DATE OF COMMENCEMENT AND SUBSTANTIAL COMPLETION

§ 3.1 The date of commencement of the Work shall be:

(Check one of the following boxes.)

☐ The date of this Agreement.

☐ A date set forth in a notice to proceed issued by the Owner.

☐ Established as follows:

(Insert a date or a means to determine the date of commencement of the Work.)

☐

If a date of commencement of the Work is not selected, then the date of commencement shall be the date of this Agreement.

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

§ 3.3 Substantial Completion

§ 3.3.1 Subject to adjustments of the Contract Time as provided in the Contract Documents, the Contractor shall achieve Substantial Completion of the entire Work:

(Check one of the following boxes and complete the necessary information.)

[] Not later than () calendar days from the date of commencement of the Work.

[X] By the following date: August 31, 2026

§ 3.3.2 Subject to adjustments of the Contract Time as provided in the Contract Documents, if portions of the Work are to be completed prior to Substantial Completion of the entire Work, the Contractor shall achieve Substantial Completion of such portions by the following dates:

Portion of Work

Substantial Completion Date

§ 3.3.3 If the Contractor fails to achieve Substantial Completion as provided in this Section 3.3, liquidated damages, if any, shall be assessed as set forth in Section 4.5.

ARTICLE 4 CONTRACT SUM

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

§ 4.2 Alternates

§ 4.2.1 Alternates, if any, included in the Contract Sum:

Item

Price

§ 4.2.2 Subject to the conditions noted below, the following alternates may be accepted by the Owner following execution of this Agreement. Upon acceptance, the Owner shall issue a Modification to this Agreement.

(Insert below each alternate and the conditions that must be met for the Owner to accept the alternate.)

Item

Price

Conditions for Acceptance

§ 4.3 Allowances, if any, included in the Contract Sum:

(Identify each allowance.)

Item

Price

Contingency, Ten Percent
(10%)

§ 4.4 Unit prices, if any:

(Identify the item and state the unit price and quantity limitations, if any, to which the unit price will be applicable.)

Item	Units and Limitations	Price per Unit (\$0.00)
§ 4.5 Liquidated damages, if any: <i>(Insert terms and conditions for liquidated damages, if any.)</i>		
§ 4.6 Other: <i>(Insert provisions for bonus or other incentives, if any, that might result in a change to the Contract Sum.)</i>		
ARTICLE 5 PAYMENTS		
§ 5.1 Progress Payments		
§ 5.1.1 Based upon Applications for Payment submitted to the Architect by the Contractor and Certificates for Payment issued by the Architect, the Owner shall make progress payments on account of the Contract Sum to the Contractor as provided below and elsewhere in the Contract Documents.		
§ 5.1.2 The period covered by each Application for Payment shall be one calendar month ending on the last day of the month, or as follows:		
§ 5.1.3 Provided that an Application for Payment is received by the Architect not later than the <u>10th</u> day of a month, the Owner shall make payment of the amount certified to the Contractor <u>within thirty (30) days, not later than the</u> day of the <u>month</u>. If an Application for Payment is received by the Architect after the application date fixed above, payment of the amount certified shall be made by the Owner <u>not later than</u> (<u> </u>) <u>within thirty (30)</u> days after the Architect receives the Application for Payment. <i>(Federal, state or local laws may require payment within a certain period of time.)</i>		
§ 5.1.4 Each Application for Payment shall be based on the most recent schedule of values submitted by the Contractor in accordance with the Contract Documents. The schedule of values shall allocate the entire Contract Sum among the various portions of the Work. The schedule of values shall be prepared in such form, and supported by such data to substantiate its accuracy, as the Architect may require. This schedule of values shall be used as a basis for reviewing the Contractor's Applications for Payment.		
§ 5.1.5 Applications for Payment shall show the percentage of completion of each portion of the Work as of the end of the period covered by the Application for Payment.		
§ 5.1.6 In accordance with AIA Document A201™–2017, General Conditions of the Contract for Construction, and subject to other provisions of the Contract Documents, the amount of each progress payment shall be computed as follows:		
§ 5.1.6.1 The amount of each progress payment shall first include: .1 That portion of the Contract Sum properly allocable to completed Work; .2 That portion of the Contract Sum properly allocable to materials and equipment delivered and suitably stored at the site for subsequent incorporation in the completed construction, or, if approved in advance by the Owner, suitably stored off the site at a location agreed upon in writing; and .3 That portion of Construction Change Directives that the Architect determines, in the Architect's professional judgment, to be reasonably justified.		

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§ 5.1.6.2 The amount of each progress payment shall then be reduced by:

- .1 The aggregate of any amounts previously paid by the Owner;
- .2 The amount, if any, for Work that remains uncorrected and for which the Architect has previously withheld a Certificate for Payment as provided in Article 9 of AIA Document A201–2017;
- .3 Any amount for which the Contractor does not intend to pay a Subcontractor or material supplier, unless the Work has been performed by others the Contractor intends to pay;
- .4 For Work performed or defects discovered since the last payment application, any amount for which the Architect may withhold payment, or nullify a Certificate of Payment in whole or in part, as provided in Article 9 of AIA Document A201–2017; and
- .5 Retainage withheld pursuant to Section 5.1.7.

§ 5.1.7 Retainage

§ 5.1.7.1 For each progress payment made prior to Substantial Completion of the Work, the Owner may withhold the following amount, as retainage, from the payment otherwise due:

(Insert a percentage or amount to be withheld as retainage from each Application for Payment. The amount of retainage may be limited by governing law.)

Three Percent (3%).

§ 5.1.7.1.1 The following items are not subject to retainage:

(Insert any items not subject to the withholding of retainage, such as general conditions, insurance, etc.)

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

(If the retainage established in Section 5.1.7.1 is to be modified prior to Substantial Completion of the entire Work, including modifications for Substantial Completion of portions of the Work as provided in Section 3.3.2, insert provisions for such modifications.)

At Owner's sole discretion.

§ 5.1.7.3 Except as set forth in this Section 5.1.7.3, upon Substantial Completion of the Work, the Contractor may submit an Application for Payment that includes the retainage withheld from prior Applications for Payment pursuant to this Section 5.1.7. The Application for Payment submitted at Substantial Completion shall not include retainage as follows:

(Insert any other conditions for release of retainage upon Substantial Completion.)

§ 5.1.8 If final completion of the Work is materially delayed through no fault of the Contractor, the Owner shall pay the Contractor any additional amounts in accordance with Article 9 of AIA Document A201–2017.

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

§ 5.2 Final Payment

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

- .1 the Contractor has fully performed the Contract except for the Contractor's responsibility to correct Work as provided in Article 12 of AIA Document A201–2017, and to satisfy other requirements, if any, which extend

- beyond final payment; and
- .2 a final Certificate for Payment has been issued by the Architect.

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

In accordance with Iowa Code Chapter 573, including but not limited to Section 573.14.

§ 5.3 Interest

Payments due and unpaid under the Contract shall bear interest from the date payment is due at the rate stated below, or in the absence thereof, at the legal rate prevailing from time to time at the place where the Project is located.

(Insert rate of interest agreed upon, if any.)

Five (5) % per annum, simple interest.

ARTICLE 6 DISPUTE RESOLUTION

§ 6.1 Initial Decision Maker

The Architect will serve as the Initial Decision Maker pursuant to Article 15 of AIA Document A201–2017, unless the parties appoint below another individual, not a party to this Agreement, to serve as the Initial Decision Maker.

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

§ 6.2 Binding Dispute Resolution

For any Claim subject to, but not resolved by, mediation pursuant to Article 15 of AIA Document A201–2017, the method of binding dispute resolution shall be as follows:

(Check the appropriate box.)

☐ Arbitration pursuant to Section 15.4 of AIA Document A201–2017

☒ Litigation in a court of competent jurisdiction

☐ Other *(Specify)*

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

ARTICLE 7 TERMINATION OR SUSPENSION

§ 7.1 The Contract may be terminated by the Owner or the Contractor as provided in Article 14 of AIA Document A201–2017.

§ 7.1.1 If the Contract is terminated for the Owner's convenience in accordance with Article 14 of AIA Document A201–2017, then the Owner shall pay the Contractor a termination fee as follows:

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(Insert the amount of, or method for determining, the fee, if any, payable to the Contractor following a termination for the Owner's convenience.)

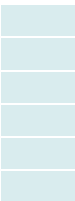


§ 7.2 The Work may be suspended by the Owner as provided in Article 14 of AIA Document A201–2017.

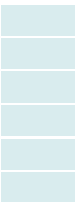
ARTICLE 8 MISCELLANEOUS PROVISIONS

§ 8.1 Where reference is made in this Agreement to a provision of AIA Document A201–2017 or another Contract Document, the reference refers to that provision as amended or supplemented by other provisions of the Contract Documents.

§ 8.2 The Owner's representative:
(Name, address, email address, and other information)



§ 8.3 The Contractor's representative:
(Name, address, email address, and other information)



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

§ 8.5 Insurance and Bonds

§ 8.5.1 The Owner and the Contractor shall purchase and maintain insurance as set forth in AIA Document A101™–2017, Standard Form of Agreement Between Owner and Contractor where the basis of payment is a Stipulated Sum, Exhibit A, Insurance and Bonds, and elsewhere in the Contract Documents.

§ 8.5.2 The Contractor shall provide bonds as set forth in AIA Document A101™–2017 Exhibit A, and elsewhere in the Contract Documents.

§ 8.6 Notice in electronic format, pursuant to Article 1 of AIA Document A201–2017, may be given in accordance with a building information modeling exhibit, if completed, or as otherwise set forth below:
(If other than in accordance with a building information modeling exhibit, insert requirements for delivering notice in electronic format such as name, title, and email address of the recipient and whether and how the system will be required to generate a read receipt for the transmission.)



§ 8.7 Other provisions:

ARTICLE 9 ENUMERATION OF CONTRACT DOCUMENTS

§ 9.1 This Agreement is comprised of the following documents:

- .1 AIA Document A101™–2017, Standard Form of Agreement Between Owner and Contractor
- .2 AIA Document A101™–2017, Exhibit A, Insurance and Bonds
- .3 AIA Document A201™–2017, General Conditions of the Contract for Construction
- .4 Building information modeling exhibit, dated as indicated below:
(Insert the date of the building information modeling exhibit incorporated into this Agreement.)

.5 Drawings

Number	Title	Date
	511 Capitol Street Building Stabilization Project – Project Plan Set	

.6 Specifications

Section	Title	Date	Pages
	511 Capitol Street Building Stabilization Project – Project Manual		

.7 Addenda, if any:

Number	Date	Pages

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

.8 Other Exhibits:

(Check all boxes that apply and include appropriate information identifying the exhibit where required.)

[] AIA Document E204™–2017, Sustainable Projects Exhibit, dated as indicated below:
(Insert the date of the E204-2017 incorporated into this Agreement.)

[] The Sustainability Plan:

Title	Date	Pages

[] Supplementary and other Conditions of the Contract:

Document	Title	Date	Pages
9	Other documents, if any, listed below: <i>(List here any additional documents that are intended to form part of the Contract Documents. AIA Document A201™-2017 provides that the advertisement or invitation to bid, Instructions to Bidders, sample forms, the Contractor's bid or proposal, portions of Addenda relating to bidding or proposal requirements, and other information furnished by the Owner in anticipation of receiving bids or proposals, are not part of the Contract Documents unless enumerated in this Agreement. Any such documents should be listed here only if intended to be part of the Contract Documents.)</i>		

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

OWNER (Signature)

(Printed name and title)

CONTRACTOR (Signature)

(Printed name and title)

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AIA® Document A101® – 2017 Exhibit A

Insurance and Bonds

This Insurance and Bonds Exhibit is part of the Agreement, between the Owner and the Contractor, dated the day of in the year
(In words, indicate day, month and year.)

for the following **PROJECT**:
(Name and location or address)

511 Capitol Street Building Stabilization Project
Office of Johnson County Sheriff & Jail
511 Capitol Street, Iowa City, Iowa 52240

THE OWNER:
(Name, legal status and address)

Johnson County, Iowa
913 S. Dubuque Street, Iowa City, Iowa 52240

THE CONTRACTOR:
(Name, legal status and address)

TABLE OF ARTICLES

- A.1 GENERAL
- A.2 OWNER'S INSURANCE
- A.3 CONTRACTOR'S INSURANCE AND BONDS
- A.4 SPECIAL TERMS AND CONDITIONS

ARTICLE A.1 GENERAL

The Owner and Contractor shall purchase and maintain insurance, and provide bonds, as set forth in this Exhibit. As used in this Exhibit, the term General Conditions refers to AIA Document A201™–2017, General Conditions of the Contract for Construction.

ARTICLE A.2 OWNER'S INSURANCE

§ A.2.1 General

Prior to commencement of the Work, the Owner shall secure the insurance, and provide evidence of the coverage, required under this Article A.2 and, upon the Contractor's request, provide a copy of the property insurance policy or policies required by Section A.2.3. The copy of the policy or policies provided shall contain all applicable conditions, definitions, exclusions, and endorsements.

ADDITIONS AND DELETIONS:
The author of this document may have revised the text of the original AIA standard form. An *Additions and Deletions Report* that notes revisions to the standard form text is available from the author and should be reviewed. A vertical line in the left margin of this document indicates where the author has added to or deleted from the original AIA text.

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

This document is intended to be used in conjunction with AIA Document A201®–2017, General Conditions of the Contract for Construction. Article 11 of A201®–2017 contains additional insurance provisions.



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§ A.2.2 Liability Insurance

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

§ A.2.3 Required Property Insurance

§ A.2.3.1 Unless this obligation is placed on the Contractor pursuant to Section A.3.3.2.1, the Owner shall purchase and maintain, from an insurance company or insurance companies lawfully authorized to issue insurance in the jurisdiction where the Project is located, property insurance written on a builder's risk “all-risks” completed value or equivalent policy form and sufficient to cover the total value of the entire Project on a replacement cost basis. The Owner’s property insurance coverage shall be no less than the amount of the initial Contract Sum, plus the value of subsequent Modifications and labor performed and materials or equipment supplied by others. The property insurance shall be maintained until Substantial Completion and thereafter as provided in Section A.2.3.1.3, unless otherwise provided in the Contract Documents or otherwise agreed in writing by the parties to this Agreement. This insurance shall include the interests of the Owner, Contractor, Subcontractors, and Sub-subcontractors in the Project as insureds. This insurance shall include the interests of mortgagees as loss payees.

§ A.2.3.1.1 Causes of Loss. The insurance required by this Section A.2.3.1 shall provide coverage for direct physical loss or damage, and shall not exclude the risks of fire, explosion, theft, vandalism, malicious mischief, collapse, earthquake, flood, or windstorm. The insurance shall also provide coverage for ensuing loss or resulting damage from error, omission, or deficiency in construction methods, design, specifications, workmanship, or materials. Sub-limits, if any, are as follows:
(Indicate below the cause of loss and any applicable sub-limit.)

Causes of Loss	Sub-Limit

§ A.2.3.1.2 Specific Required Coverages. The insurance required by this Section A.2.3.1 shall provide coverage for loss or damage to falsework and other temporary structures, and to building systems from testing and startup. The insurance shall also cover debris removal, including demolition occasioned by enforcement of any applicable legal requirements, and reasonable compensation for the Architect’s and Contractor’s services and expenses required as a result of such insured loss, including claim preparation expenses. Sub-limits, if any, are as follows:
(Indicate below type of coverage and any applicable sub-limit for specific required coverages.)

Coverage	Sub-Limit

§ A.2.3.1.3 Unless the parties agree otherwise, upon Substantial Completion, the Owner shall continue the insurance required by Section A.2.3.1 or, if necessary, replace the insurance policy required under Section A.2.3.1 with property insurance written for the total value of the Project that shall remain in effect until expiration of the period for correction of the Work set forth in Section 12.2.2 of the General Conditions.

§ A.2.3.1.4 Deductibles and Self-Insured Retentions. If the insurance required by this Section A.2.3 is subject to deductibles or self-insured retentions, the Owner shall be responsible for all loss not covered because of such deductibles or retentions.

§ A.2.3.2 Occupancy or Use Prior to Substantial Completion. The Owner’s occupancy or use of any completed or partially completed portion of the Work prior to Substantial Completion shall not commence until the insurance company or companies providing the insurance under Section A.2.3.1 have consented in writing to the continuance of coverage. The Owner and the Contractor shall take no action with respect to partial occupancy or use that would cause cancellation, lapse, or reduction of insurance, unless they agree otherwise in writing.

§ A.2.3.3 Insurance for Existing Structures

If the Work involves remodeling an existing structure or constructing an addition to an existing structure, the Owner shall purchase and maintain, until the expiration of the period for correction of Work as set forth in Section 12.2.2 of the General Conditions, “all-risks” property insurance, on a replacement cost basis, protecting the existing structure against direct physical loss or damage from the causes of loss identified in Section A.2.3.1, notwithstanding the undertaking of the Work. The Owner shall be responsible for all co-insurance penalties.

§ A.2.4 Optional Extended Property Insurance.

The Owner shall purchase and maintain the insurance selected and described below.

(Select the types of insurance the Owner is required to purchase and maintain by placing an X in the box(es) next to the description(s) of selected insurance. For each type of insurance selected, indicate applicable limits of coverage or other conditions in the fill point below the selected item.)

- [☐] **§ A.2.4.1 Loss of Use, Business Interruption, and Delay in Completion Insurance**, to reimburse the Owner for loss of use of the Owner's property, or the inability to conduct normal operations due to a covered cause of loss.
- [☐] **§ A.2.4.2 Ordinance or Law Insurance**, for the reasonable and necessary costs to satisfy the minimum requirements of the enforcement of any law or ordinance regulating the demolition, construction, repair, replacement or use of the Project.
- [☐] **§ A.2.4.3 Expediting Cost Insurance**, for the reasonable and necessary costs for the temporary repair of damage to insured property, and to expedite the permanent repair or replacement of the damaged property.
- [☐] **§ A.2.4.4 Extra Expense Insurance**, to provide reimbursement of the reasonable and necessary excess costs incurred during the period of restoration or repair of the damaged property that are over and above the total costs that would normally have been incurred during the same period of time had no loss or damage occurred.
- [☐] **§ A.2.4.5 Civil Authority Insurance**, for losses or costs arising from an order of a civil authority prohibiting access to the Project, provided such order is the direct result of physical damage covered under the required property insurance.
- [☐] **§ A.2.4.6 Ingress/Egress Insurance**, for loss due to the necessary interruption of the insured's business due to physical prevention of ingress to, or egress from, the Project as a direct result of physical damage.
- [☐] **§ A.2.4.7 Soft Costs Insurance**, to reimburse the Owner for costs due to the delay of completion of the Work, arising out of physical loss or damage covered by the required property insurance: including construction loan fees; leasing and marketing expenses; additional fees, including those of architects, engineers, consultants, attorneys and accountants, needed for the completion of the construction, repairs, or reconstruction; and carrying costs such as property taxes, building permits, additional interest on loans, realty taxes, and insurance premiums over and above normal expenses.

§ A.2.5 Other Optional Insurance.

The Owner shall purchase and maintain the insurance selected below.

(Select the types of insurance the Owner is required to purchase and maintain by placing an X in the box(es) next to the description(s) of selected insurance.)

[] § A.2.5.1 **Cyber Security Insurance** for loss to the Owner due to data security and privacy breach, including costs of investigating a potential or actual breach of confidential or private information.
(Indicate applicable limits of coverage or other conditions in the fill point below.)

[] § A.2.5.2 **Other Insurance**
(List below any other insurance coverage to be provided by the Owner and any applicable limits.)

Coverage

Limits

ARTICLE A.3 CONTRACTOR'S INSURANCE AND BONDS

§ A.3.1 General

§ A.3.1.1 **Certificates of Insurance.** The Contractor shall provide certificates of insurance acceptable to the Owner evidencing compliance with the requirements in this Article A.3 at the following times: (1) prior to commencement of the Work; (2) upon renewal or replacement of each required policy of insurance; and (3) upon the Owner's written request. An additional certificate evidencing continuation of commercial liability coverage, including coverage for completed operations, shall be submitted with the final Application for Payment and thereafter upon renewal or replacement of such coverage until the expiration of the periods required by Section A.3.2.1 and Section A.3.3.1. The certificates will show the Owner as an additional insured on the Contractor's Commercial General Liability and excess or umbrella liability policy or policies.

§ A.3.1.2 **Deductibles and Self-Insured Retentions.** The Contractor shall disclose to the Owner any deductible or self-insured retentions applicable to any insurance required to be provided by the Contractor.

§ A.3.1.3 **Additional Insured Obligations.** To the fullest extent permitted by law, the Contractor shall cause the commercial general liability coverage to include (1) the Owner, the Architect, and the Architect's consultants as additional insureds for claims caused in whole or in part by the Contractor's negligent acts or omissions during the Contractor's operations; and (2) the Owner as an additional insured for claims caused in whole or in part by the Contractor's negligent acts or omissions for which loss occurs during completed operations. The additional insured coverage shall be primary and non-contributory to any of the Owner's general liability insurance policies and shall apply to both ongoing and completed operations. To the extent commercially available, the additional insured coverage shall be no less than that provided by Insurance Services Office, Inc. (ISO) forms CG 20 10 07 04, CG 20 37 07 04, and, with respect to the Architect and the Architect's consultants, CG 20 32 07 04.

§ A.3.2 Contractor's Required Insurance Coverage

§ A.3.2.1 The Contractor shall purchase and maintain the following types and limits of insurance from an insurance company or insurance companies lawfully authorized to issue insurance in the jurisdiction where the Project is located. The Contractor shall maintain the required insurance until the expiration of the period for correction of Work as set forth in Section 12.2.2 of the General Conditions, unless a different duration is stated below:

(If the Contractor is required to maintain insurance for a duration other than the expiration of the period for correction of Work, state the duration.)

§ A.3.2.2 Commercial General Liability

§ A.3.2.2.1 Commercial General Liability insurance for the Project written on an occurrence form with policy limits of not less than (\$) each occurrence, (\$) general aggregate, and (\$) aggregate for products-completed operations hazard, providing coverage for claims including

- .1 damages because of bodily injury, sickness or disease, including occupational sickness or disease, and death of any person;
- .2 personal injury and advertising injury;
- .3 damages because of physical damage to or destruction of tangible property, including the loss of use of such property;
- .4 bodily injury or property damage arising out of completed operations; and

.5 the Contractor's indemnity obligations under Section 3.18 of the General Conditions.

§ A.3.2.2.2 The Contractor's Commercial General Liability policy under this Section A.3.2.2 shall not contain an exclusion or restriction of coverage for the following:

- .1 Claims by one insured against another insured, if the exclusion or restriction is based solely on the fact that the claimant is an insured, and there would otherwise be coverage for the claim.
- .2 Claims for property damage to the Contractor's Work arising out of the products-completed operations hazard where the damaged Work or the Work out of which the damage arises was performed by a Subcontractor.
- .3 Claims for bodily injury other than to employees of the insured.
- .4 Claims for indemnity under Section 3.18 of the General Conditions arising out of injury to employees of the insured.
- .5 Claims or loss excluded under a prior work endorsement or other similar exclusionary language.
- .6 Claims or loss due to physical damage under a prior injury endorsement or similar exclusionary language.
- .7 Claims related to residential, multi-family, or other habitational projects, if the Work is to be performed on such a project.
- .8 Claims related to roofing, if the Work involves roofing.
- .9 Claims related to exterior insulation finish systems (EIFS), synthetic stucco or similar exterior coatings or surfaces, if the Work involves such coatings or surfaces.
- .10 Claims related to earth subsidence or movement, where the Work involves such hazards.
- .11 Claims related to explosion, collapse and underground hazards, where the Work involves such hazards.

§ A.3.2.3 Automobile Liability covering vehicles owned, and non-owned vehicles used, by the Contractor, with policy limits of not less than (\$) per accident, for bodily injury, death of any person, and property damage arising out of the ownership, maintenance and use of those motor vehicles along with any other statutorily required automobile coverage.

§ A.3.2.4 The Contractor may achieve the required limits and coverage for Commercial General Liability and Automobile Liability through a combination of primary and excess or umbrella liability insurance, provided such primary and excess or umbrella insurance policies result in the same or greater coverage as the coverages required under Section A.3.2.2 and A.3.2.3, and in no event shall any excess or umbrella liability insurance provide narrower coverage than the primary policy. The excess policy shall not require the exhaustion of the underlying limits only through the actual payment by the underlying insurers.

§ A.3.2.5 Workers' Compensation at statutory limits.

§ A.3.2.6 Employers' Liability with policy limits not less than (\$) each accident, (\$) each employee, and (\$) policy limit.

§ A.3.2.7 Jones Act, and the Longshore & Harbor Workers' Compensation Act, as required, if the Work involves hazards arising from work on or near navigable waterways, including vessels and docks

§ A.3.2.8 If the Contractor is required to furnish professional services as part of the Work, the Contractor shall procure Professional Liability insurance covering performance of the professional services, with policy limits of not less than (\$) per claim and (\$) in the aggregate.

§ A.3.2.9 If the Work involves the transport, dissemination, use, or release of pollutants, the Contractor shall procure Pollution Liability insurance, with policy limits of not less than (\$) per claim and (\$) in the aggregate.

§ A.3.2.10 Coverage under Sections A.3.2.8 and A.3.2.9 may be procured through a Combined Professional Liability and Pollution Liability insurance policy, with combined policy limits of not less than (\$) per claim and (\$) in the aggregate.

§ A.3.2.11 Insurance for maritime liability risks associated with the operation of a vessel, if the Work requires such activities, with policy limits of not less than (\$) per claim and (\$) in the aggregate.

§ A.3.2.12 Insurance for the use or operation of manned or unmanned aircraft, if the Work requires such activities, with policy limits of not less than [] (\$ []) per claim and [] (\$ []) in the aggregate.

§ A.3.3 Contractor's Other Insurance Coverage

§ A.3.3.1 Insurance selected and described in this Section A.3.3 shall be purchased from an insurance company or insurance companies lawfully authorized to issue insurance in the jurisdiction where the Project is located. The Contractor shall maintain the required insurance until the expiration of the period for correction of Work as set forth in Section 12.2.2 of the General Conditions, unless a different duration is stated below:

(If the Contractor is required to maintain any of the types of insurance selected below for a duration other than the expiration of the period for correction of Work, state the duration.)

§ A.3.3.2 The Contractor shall purchase and maintain the following types and limits of insurance in accordance with Section A.3.3.1.

(Select the types of insurance the Contractor is required to purchase and maintain by placing an X in the box(es) next to the description(s) of selected insurance. Where policy limits are provided, include the policy limit in the appropriate fill point.)

- [] § A.3.3.2.1 Property insurance of the same type and scope satisfying the requirements identified in Section A.2.3, which, if selected in this section A.3.3.2.1, relieves the Owner of the responsibility to purchase and maintain such insurance except insurance required by Section A.2.3.1.3 and Section A.2.3.3. The Contractor shall comply with all obligations of the Owner under Section A.2.3 except to the extent provided below. The Contractor shall disclose to the Owner the amount of any deductible, and the Owner shall be responsible for losses within the deductible. Upon request, the Contractor shall provide the Owner with a copy of the property insurance policy or policies required. The Owner shall adjust and settle the loss with the insurer and be the trustee of the proceeds of the property insurance in accordance with Article 11 of the General Conditions unless otherwise set forth below:

(Where the Contractor's obligation to provide property insurance differs from the Owner's obligations as described under Section A.2.3, indicate such differences in the space below. Additionally, if a party other than the Owner will be responsible for adjusting and settling a loss with the insurer and acting as the trustee of the proceeds of property insurance in accordance with Article 11 of the General Conditions, indicate the responsible party below.)

- [] § A.3.3.2.2 Railroad Protective Liability Insurance, with policy limits of not less than [] (\$ []) per claim and [] (\$ []) in the aggregate, for Work within fifty (50) feet of railroad property.

- [] § A.3.3.2.3 Asbestos Abatement Liability Insurance, with policy limits of not less than [] (\$ []) per claim and [] (\$ []) in the aggregate, for liability arising from the encapsulation, removal, handling, storage, transportation, and disposal of asbestos-containing materials.

- [] § A.3.3.2.4 Insurance for physical damage to property while it is in storage and in transit to the construction site on an "all-risks" completed value form.

- [] § A.3.3.2.5 Property insurance on an "all-risks" completed value form, covering property owned by the Contractor and used on the Project, including scaffolding and other equipment.

- [] § A.3.3.2.6 Other Insurance
(List below any other insurance coverage to be provided by the Contractor and any applicable limits.)

Coverage

Limits

§ A.3.4 Performance Bond and Payment Bond

The Contractor shall provide surety bonds, from a company or companies lawfully authorized to issue surety bonds in the jurisdiction where the Project is located, as follows:
(Specify type and penal sum of bonds.)

Type	Penal Sum (\$0.00)
Payment Bond	
Performance Bond	

Payment and Performance Bonds shall be AIA Document A312™, Payment Bond and Performance Bond, or contain provisions identical to AIA Document A312™, current as of the date of this Agreement.

ARTICLE A.4 SPECIAL TERMS AND CONDITIONS

Special terms and conditions that modify this Insurance and Bonds Exhibit, if any, are as follows:

**SECTION 00 7200
GENERAL CONDITIONS**

PART 1 GENERAL

1.1 FORM OF GENERAL CONDITIONS

- A. The General Conditions applicable to this contract is attached following this page.

1.2 RELATED REQUIREMENTS

- A. SECTION 00 7300 - Supplementary Conditions.

1.3 SUPPLEMENTARY CONDITIONS

- A. Refer to Document 00 7300 - Supplementary Conditions for amendments to these general conditions.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

AIA® Document A201® – 2017

General Conditions of the Contract for Construction

for the following PROJECT:

(Name and location or address)

511 Capitol Street Building Stabilization Project
Office of Johnson County Sheriff & Jail
511 Capitol Street, Iowa City, Iowa 52240

THE OWNER:

(Name, legal status and address)

Johnson County, Iowa
913 S. Dubuque Street, Iowa City, Iowa 52240

THE ARCHITECT:

(Name, legal status and address)

Axiom Consultants, LLC
300 S. Clinton Street, Suite 200, Iowa City, Iowa 52240

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- 11 INSURANCE AND BONDS
- 12 UNCOVERING AND CORRECTION OF WORK
- 13 MISCELLANEOUS PROVISIONS

ADDITIONS AND DELETIONS:

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

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

For guidance in modifying this document to include supplementary conditions, see AIA Document A503™–2017, Guide for Supplementary Conditions.

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15 CLAIMS AND DISPUTES



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ARTICLE 1 GENERAL PROVISIONS

§ 1.1 Basic Definitions

§ 1.1.1 The Contract Documents

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

§ 1.1.2 The Contract

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

§ 1.1.3 The Work

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

§ 1.1.4 The Project

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

§ 1.1.5 The Drawings

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

§ 1.1.6 The Specifications

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

§ 1.1.7 Instruments of Service

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

§ 1.1.8 Initial Decision Maker

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

§ 1.2 Correlation and Intent of the Contract Documents

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

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

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

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

§ 1.3 Capitalization

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

§ 1.4 Interpretation

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

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

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

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

§ 1.6 Notice

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

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

§ 1.7 Digital Data Use and Transmission

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

§ 1.8 Building Information Models Use and Reliance

Any use of, or reliance on, all or a portion of a building information model without agreement to written protocols governing the use of, and reliance on, the information contained in the model shall be at the using or relying party's sole risk and without liability to the other party and its contractors or consultants, the authors of, or contributors to, the building information model,

and each of their agents and employees.

ARTICLE 2 OWNER

§ 2.1 General

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

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

§ 2.2 Evidence of the Owner's Financial Arrangements

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

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

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

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

§ 2.3 Information and Services Required of the Owner

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

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

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

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

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

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

§ 2.4 Owner's Right to Stop the Work

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

§ 2.5 Owner's Right to Carry Out the Work

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

ARTICLE 3 CONTRACTOR

§ 3.1 General

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

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

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

§ 3.2 Review of Contract Documents and Field Conditions by Contractor

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

§ 3.2.2 Because the Contract Documents are complementary, the Contractor shall, before starting each portion of the Work, carefully study and compare the various Contract Documents relative to that portion of the Work, as well as the information furnished by the Owner pursuant to Section 2.3.4, shall take field measurements of any existing conditions related to that portion of the Work, and shall observe any conditions at the site affecting it. These obligations are for the purpose of

facilitating coordination and construction by the Contractor and are not for the purpose of discovering errors, omissions, or inconsistencies in the Contract Documents; however, the Contractor shall promptly report to the Architect any errors, inconsistencies or omissions discovered by or made known to the Contractor as a request for information in such form as the Architect may require. It is recognized that the Contractor's review is made in the Contractor's capacity as a contractor and not as a licensed design professional, unless otherwise specifically provided in the Contract Documents.

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

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

§ 3.3 Supervision and Construction Procedures

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

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

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

§ 3.4 Labor and Materials

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

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

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

§ 3.5 Warranty

§ 3.5.1 The Contractor warrants to the Owner and Architect that materials and equipment furnished under the Contract will be

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

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

§ 3.6 Taxes

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

§ 3.7 Permits, Fees, Notices and Compliance with Laws

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

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

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

§ 3.7.4 Concealed or Unknown Conditions

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

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

§ 3.8 Allowances

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

§ 3.8.2 Unless otherwise provided in the Contract Documents,

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

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

§ 3.9 Superintendent

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

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

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

§ 3.10 Contractor's Construction and Submittal Schedules

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

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

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

§ 3.11 Documents and Samples at the Site

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

§ 3.12 Shop Drawings, Product Data and Samples

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

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

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

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

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

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

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

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

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

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

§ 3.12.10.1 If professional design services or certifications by a design professional related to systems, materials, or equipment are specifically required of the Contractor by the Contract Documents, the Owner and the Architect will specify all performance and design criteria that such services must satisfy. The Contractor shall be entitled to rely upon the adequacy and accuracy of the performance and design criteria provided in the Contract Documents. The Contractor shall cause such services or certifications to be provided by an appropriately licensed design professional, whose signature and seal shall appear on all drawings, calculations, specifications, certifications, Shop Drawings, and other submittals prepared by such professional. Shop Drawings, and other submittals related to the Work, designed or certified by such professional, if prepared by others, shall bear such professional's written approval when submitted to the Architect. The Owner and the Architect shall be entitled to rely upon the adequacy and accuracy of the services, certifications, and approvals performed or provided by such design professionals, provided the Owner and Architect have specified to the Contractor the performance and design criteria that such

services must satisfy. Pursuant to this Section 3.12.10, the Architect will review and approve or take other appropriate action on submittals only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents.

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

§ 3.13 Use of Site

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

§ 3.14 Cutting and Patching

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

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

§ 3.15 Cleaning Up

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

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

§ 3.16 Access to Work

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

§ 3.17 Royalties, Patents and Copyrights

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

§ 3.18 Indemnification

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

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

ARTICLE 4 ARCHITECT

§ 4.1 General

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

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

§ 4.2 Administration of the Contract

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

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

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

§ 4.2.4 Communications

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

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

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

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

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

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

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

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

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

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

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

ARTICLE 5 SUBCONTRACTORS

§ 5.1 Definitions

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

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

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

§ 5.2.1 Unless otherwise stated in the Contract Documents, the Contractor, as soon as practicable after award of the Contract,

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

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

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

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

§ 5.3 Subcontractual Relations

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

§ 5.4 Contingent Assignment of Subcontracts

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

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

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

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

ARTICLE 6 CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS

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

§ 6.1.1 The term "Separate Contractor(s)" shall mean other contractors retained by the Owner under separate agreements. The

Owner reserves the right to perform construction or operations related to the Project with the Owner's own forces, and with Separate Contractors retained under Conditions of the Contract substantially similar to those of this Contract, including those provisions of the Conditions of the Contract related to insurance and waiver of subrogation.

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

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

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

§ 6.2 Mutual Responsibility

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

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

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

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

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

§ 6.3 Owner's Right to Clean Up

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

ARTICLE 7 CHANGES IN THE WORK

§ 7.1 General

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

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

§ 7.1.3 Changes in the Work shall be performed under applicable provisions of the Contract Documents. The Contractor shall proceed promptly with changes in the Work, unless otherwise provided in the Change Order, Construction Change Directive, or order for a minor change in the Work.

§ 7.2 Change Orders

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

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

§ 7.3 Construction Change Directives

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

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

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

- .1 Mutual acceptance of a lump sum properly itemized and supported by sufficient substantiating data to permit evaluation;
- .2 Unit prices stated in the Contract Documents or subsequently agreed upon;
- .3 Cost to be determined in a manner agreed upon by the parties and a mutually acceptable fixed or percentage fee; or
- .4 As provided in Section 7.3.4.

§ 7.3.4 If the Contractor does not respond promptly or disagrees with the method for adjustment in the Contract Sum, the Architect shall determine the adjustment on the basis of reasonable expenditures and savings of those performing the Work attributable to the change, including, in case of an increase in the Contract Sum, an amount for overhead and profit as set forth in the Agreement, or if no such amount is set forth in the Agreement, a reasonable amount. In such case, and also under Section 7.3.3.3, the Contractor shall keep and present, in such form as the Architect may prescribe, an itemized accounting together with appropriate supporting data. Unless otherwise provided in the Contract Documents, costs for the purposes of this Section 7.3.4 shall be limited to the following:

- .1 Costs of labor, including applicable payroll taxes, fringe benefits required by agreement or custom, workers' compensation insurance, and other employee costs approved by the Architect;
- .2 Costs of materials, supplies, and equipment, including cost of transportation, whether incorporated or consumed;
- .3 Rental costs of machinery and equipment, exclusive of hand tools, whether rented from the Contractor or others;
- .4 Costs of premiums for all bonds and insurance, permit fees, and sales, use, or similar taxes, directly related to the change; and
- .5 Costs of supervision and field office personnel directly attributable to the change.

§ 7.3.5 If the Contractor disagrees with the adjustment in the Contract Time, the Contractor may make a Claim in accordance with applicable provisions of Article 15.

§ 7.3.6 Upon receipt of a Construction Change Directive, the Contractor shall promptly proceed with the change in the Work involved and advise the Architect of the Contractor's agreement or disagreement with the method, if any, provided in the

Construction Change Directive for determining the proposed adjustment in the Contract Sum or Contract Time.

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

§ 7.3.8 The amount of credit to be allowed by the Contractor to the Owner for a deletion or change that results in a net decrease in the Contract Sum shall be actual net cost as confirmed by the Architect. When both additions and credits covering related Work or substitutions are involved in a change, the allowance for overhead and profit shall be figured on the basis of net increase, if any, with respect to that change.

§ 7.3.9 Pending final determination of the total cost of a Construction Change Directive to the Owner, the Contractor may request payment for Work completed under the Construction Change Directive in Applications for Payment. The Architect will make an interim determination for purposes of monthly certification for payment for those costs and certify for payment the amount that the Architect determines, in the Architect's professional judgment, to be reasonably justified. The Architect's interim determination of cost shall adjust the Contract Sum on the same basis as a Change Order, subject to the right of either party to disagree and assert a Claim in accordance with Article 15.

§ 7.3.10 When the Owner and Contractor agree with a determination made by the Architect concerning the adjustments in the Contract Sum and Contract Time, or otherwise reach agreement upon the adjustments, such agreement shall be effective immediately and the Architect will prepare a Change Order. Change Orders may be issued for all or any part of a Construction Change Directive.

§ 7.4 Minor Changes in the Work

The Architect may order minor changes in the Work that are consistent with the intent of the Contract Documents and do not involve an adjustment in the Contract Sum or an extension of the Contract Time. The Architect's order for minor changes shall be in writing. If the Contractor believes that the proposed minor change in the Work will affect the Contract Sum or Contract Time, the Contractor shall notify the Architect and shall not proceed to implement the change in the Work. If the Contractor performs the Work set forth in the Architect's order for a minor change without prior notice to the Architect that such change will affect the Contract Sum or Contract Time, the Contractor waives any adjustment to the Contract Sum or extension of the Contract Time.

ARTICLE 8 TIME

§ 8.1 Definitions

§ 8.1.1 Unless otherwise provided, Contract Time is the period of time, including authorized adjustments, allotted in the Contract Documents for Substantial Completion of the Work.

§ 8.1.2 The date of commencement of the Work is the date established in the Agreement.

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

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

§ 8.2 Progress and Completion

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

§ 8.2.2 The Contractor shall not knowingly, except by agreement or instruction of the Owner in writing, commence the Work prior to the effective date of insurance required to be furnished by the Contractor and Owner.

§ 8.2.3 The Contractor shall proceed expeditiously with adequate forces and shall achieve Substantial Completion within the Contract Time.

§ 8.3 Delays and Extensions of Time

§ 8.3.1 If the Contractor is delayed at any time in the commencement or progress of the Work by (1) an act or neglect of the Owner or Architect, of an employee of either, or of a Separate Contractor; (2) by changes ordered in the Work; (3) by labor disputes, fire, unusual delay in deliveries, unavoidable casualties, adverse weather conditions documented in accordance with Section 15.1.6.2, or other causes beyond the Contractor's control; (4) by delay authorized by the Owner pending mediation and binding dispute resolution; or (5) by other causes that the Contractor asserts, and the Architect determines, justify delay, then the Contract Time shall be extended for such reasonable time as the Architect may determine.

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

§ 8.3.3 This Section 8.3 does not preclude recovery of damages for delay by either party under other provisions of the Contract Documents.

ARTICLE 9 PAYMENTS AND COMPLETION

§ 9.1 Contract Sum

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

§ 9.1.2 If unit prices are stated in the Contract Documents or subsequently agreed upon, and if quantities originally contemplated are materially changed so that application of such unit prices to the actual quantities causes substantial inequity to the Owner or Contractor, the applicable unit prices shall be equitably adjusted.

§ 9.2 Schedule of Values

Where the Contract is based on a stipulated sum or Guaranteed Maximum Price, the Contractor shall submit a schedule of values to the Architect before the first Application for Payment, allocating the entire Contract Sum to the various portions of the Work. The schedule of values shall be prepared in the form, and supported by the data to substantiate its accuracy, required by the Architect. This schedule, unless objected to by the Architect, shall be used as a basis for reviewing the Contractor's Applications for Payment. Any changes to the schedule of values shall be submitted to the Architect and supported by such data to substantiate its accuracy as the Architect may require, and unless objected to by the Architect, shall be used as a basis for reviewing the Contractor's subsequent Applications for Payment.

§ 9.3 Applications for Payment

§ 9.3.1 At least ten days before the date established for each progress payment, the Contractor shall submit to the Architect an itemized Application for Payment prepared in accordance with the schedule of values, if required under Section 9.2, for completed portions of the Work. The application shall be notarized, if required, and supported by all data substantiating the Contractor's right to payment that the Owner or Architect require, such as copies of requisitions, and releases and waivers of liens from Subcontractors and suppliers, and shall reflect retainage if provided for in the Contract Documents.

§ 9.3.1.1 As provided in Section 7.3.9, such applications may include requests for payment on account of changes in the Work that have been properly authorized by Construction Change Directives, or by interim determinations of the Architect, but not yet included in Change Orders.

§ 9.3.1.2 Applications for Payment shall not include requests for payment for portions of the Work for which the Contractor does not intend to pay a Subcontractor or supplier, unless such Work has been performed by others whom the Contractor intends to pay.

§ 9.3.2 Unless otherwise provided in the Contract Documents, payments shall be made on account of materials and equipment delivered and suitably stored at the site for subsequent incorporation in the Work. If approved in advance by the Owner, payment may similarly be made for materials and equipment suitably stored off the site at a location agreed upon in writing. Payment for materials and equipment stored on or off the site shall be conditioned upon compliance by the Contractor with procedures satisfactory to the Owner to establish the Owner's title to such materials and equipment or otherwise protect the Owner's interest, and shall include the costs of applicable insurance, storage, and transportation to the site, for such materials and equipment stored off the site.

§ 9.3.3 The Contractor warrants that title to all Work covered by an Application for Payment will pass to the Owner no later

than the time of payment. The Contractor further warrants that upon submittal of an Application for Payment all Work for which Certificates for Payment have been previously issued and payments received from the Owner shall, to the best of the Contractor's knowledge, information, and belief, be free and clear of liens, claims, security interests, or encumbrances, in favor of the Contractor, Subcontractors, suppliers, or other persons or entities that provided labor, materials, and equipment relating to the Work.

§ 9.4 Certificates for Payment

§ 9.4.1 The Architect will, within seven days after receipt of the Contractor's Application for Payment, either (1) issue to the Owner a Certificate for Payment in the full amount of the Application for Payment, with a copy to the Contractor; or (2) issue to the Owner a Certificate for Payment for such amount as the Architect determines is properly due, and notify the Contractor and Owner of the Architect's reasons for withholding certification in part as provided in Section 9.5.1; or (3) withhold certification of the entire Application for Payment, and notify the Contractor and Owner of the Architect's reason for withholding certification in whole as provided in Section 9.5.1.

§ 9.4.2 The issuance of a Certificate for Payment will constitute a representation by the Architect to the Owner, based on the Architect's evaluation of the Work and the data in the Application for Payment, that, to the best of the Architect's knowledge, information, and belief, the Work has progressed to the point indicated, the quality of the Work is in accordance with the Contract Documents, and that the Contractor is entitled to payment in the amount certified. The foregoing representations are subject to an evaluation of the Work for conformance with the Contract Documents upon Substantial Completion, to results of subsequent tests and inspections, to correction of minor deviations from the Contract Documents prior to completion, and to specific qualifications expressed by the Architect. However, the issuance of a Certificate for Payment will not be a representation that the Architect has (1) made exhaustive or continuous on-site inspections to check the quality or quantity of the Work; (2) reviewed construction means, methods, techniques, sequences, or procedures; (3) reviewed copies of requisitions received from Subcontractors and suppliers and other data requested by the Owner to substantiate the Contractor's right to payment; or (4) made examination to ascertain how or for what purpose the Contractor has used money previously paid on account of the Contract Sum.

§ 9.5 Decisions to Withhold Certification

§ 9.5.1 The Architect may withhold a Certificate for Payment in whole or in part, to the extent reasonably necessary to protect the Owner, if in the Architect's opinion the representations to the Owner required by Section 9.4.2 cannot be made. If the Architect is unable to certify payment in the amount of the Application, the Architect will notify the Contractor and Owner as provided in Section 9.4.1. If the Contractor and Architect cannot agree on a revised amount, the Architect will promptly issue a Certificate for Payment for the amount for which the Architect is able to make such representations to the Owner. The Architect may also withhold a Certificate for Payment or, because of subsequently discovered evidence, may nullify the whole or a part of a Certificate for Payment previously issued, to such extent as may be necessary in the Architect's opinion to protect the Owner from loss for which the Contractor is responsible, including loss resulting from acts and omissions described in Section 3.3.2, because of

- .1 defective Work not remedied;
- .2 third party claims filed or reasonable evidence indicating probable filing of such claims, unless security acceptable to the Owner is provided by the Contractor;
- .3 failure of the Contractor to make payments properly to Subcontractors or suppliers for labor, materials or equipment;
- .4 reasonable evidence that the Work cannot be completed for the unpaid balance of the Contract Sum;
- .5 damage to the Owner or a Separate Contractor;
- .6 reasonable evidence that the Work will not be completed within the Contract Time, and that the unpaid balance would not be adequate to cover actual or liquidated damages for the anticipated delay; or
- .7 repeated failure to carry out the Work in accordance with the Contract Documents.

§ 9.5.2 When either party disputes the Architect's decision regarding a Certificate for Payment under Section 9.5.1, in whole or in part, that party may submit a Claim in accordance with Article 15.

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

§ 9.5.4 If the Architect withholds certification for payment under Section 9.5.1.3, the Owner may, at its sole option, issue joint

checks to the Contractor and to any Subcontractor or supplier to whom the Contractor failed to make payment for Work properly performed or material or equipment suitably delivered. If the Owner makes payments by joint check, the Owner shall notify the Architect and the Contractor shall reflect such payment on its next Application for Payment.

§ 9.6 Progress Payments

§ 9.6.1 After the Architect has issued a Certificate for Payment, the Owner shall make payment in the manner and within the time provided in the Contract Documents, and shall so notify the Architect.

§ 9.6.2 The Contractor shall pay each Subcontractor, no later than seven days after receipt of payment from the Owner, the amount to which the Subcontractor is entitled, reflecting percentages actually retained from payments to the Contractor on account of the Subcontractor's portion of the Work. The Contractor shall, by appropriate agreement with each Subcontractor, require each Subcontractor to make payments to Sub-subcontractors in a similar manner.

§ 9.6.3 The Architect will, on request, furnish to a Subcontractor, if practicable, information regarding percentages of completion or amounts applied for by the Contractor and action taken thereon by the Architect and Owner on account of portions of the Work done by such Subcontractor.

§ 9.6.4 The Owner has the right to request written evidence from the Contractor that the Contractor has properly paid Subcontractors and suppliers amounts paid by the Owner to the Contractor for subcontracted Work. If the Contractor fails to furnish such evidence within seven days, the Owner shall have the right to contact Subcontractors and suppliers to ascertain whether they have been properly paid. Neither the Owner nor Architect shall have an obligation to pay, or to see to the payment of money to, a Subcontractor or supplier, except as may otherwise be required by law.

§ 9.6.5 The Contractor's payments to suppliers shall be treated in a manner similar to that provided in Sections 9.6.2, 9.6.3 and 9.6.4.

§ 9.6.6 A Certificate for Payment, a progress payment, or partial or entire use or occupancy of the Project by the Owner shall not constitute acceptance of Work not in accordance with the Contract Documents.

§ 9.6.7 Unless the Contractor provides the Owner with a payment bond in the full penal sum of the Contract Sum, payments received by the Contractor for Work properly performed by Subcontractors or provided by suppliers shall be held by the Contractor for those Subcontractors or suppliers who performed Work or furnished materials, or both, under contract with the Contractor for which payment was made by the Owner. Nothing contained herein shall require money to be placed in a separate account and not commingled with money of the Contractor, create any fiduciary liability or tort liability on the part of the Contractor for breach of trust, or entitle any person or entity to an award of punitive damages against the Contractor for breach of the requirements of this provision.

§ 9.6.8 Provided the Owner has fulfilled its payment obligations under the Contract Documents, the Contractor shall defend and indemnify the Owner from all loss, liability, damage or expense, including reasonable attorney's fees and litigation expenses, arising out of any lien claim or other claim for payment by any Subcontractor or supplier of any tier. Upon receipt of notice of a lien claim or other claim for payment, the Owner shall notify the Contractor. If approved by the applicable court, when required, the Contractor may substitute a surety bond for the property against which the lien or other claim for payment has been asserted.

§ 9.7 Failure of Payment

If the Architect does not issue a Certificate for Payment, through no fault of the Contractor, within seven days after receipt of the Contractor's Application for Payment, or if the Owner does not pay the Contractor within seven days after the date established in the Contract Documents, the amount certified by the Architect or awarded by binding dispute resolution, then the Contractor may, upon seven additional days' notice to the Owner and Architect, stop the Work until payment of the amount owing has been received. The Contract Time shall be extended appropriately and the Contract Sum shall be increased by the amount of the Contractor's reasonable costs of shutdown, delay and start-up, plus interest as provided for in the Contract Documents.

§ 9.8 Substantial Completion

§ 9.8.1 Substantial Completion is the stage in the progress of the Work when the Work or designated portion thereof is

sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize the Work for its intended use.

§ 9.8.2 When the Contractor considers that the Work, or a portion thereof which the Owner agrees to accept separately, is substantially complete, the Contractor shall prepare and submit to the Architect a comprehensive list of items to be completed or corrected prior to final payment. Failure to include an item on such list does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents.

§ 9.8.3 Upon receipt of the Contractor's list, the Architect will make an inspection to determine whether the Work or designated portion thereof is substantially complete. If the Architect's inspection discloses any item, whether or not included on the Contractor's list, which is not sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize the Work or designated portion thereof for its intended use, the Contractor shall, before issuance of the Certificate of Substantial Completion, complete or correct such item upon notification by the Architect. In such case, the Contractor shall then submit a request for another inspection by the Architect to determine Substantial Completion.

§ 9.8.4 When the Work or designated portion thereof is substantially complete, the Architect will prepare a Certificate of Substantial Completion that shall establish the date of Substantial Completion; establish responsibilities of the Owner and Contractor for security, maintenance, heat, utilities, damage to the Work and insurance; and fix the time within which the Contractor shall finish all items on the list accompanying the Certificate. Warranties required by the Contract Documents shall commence on the date of Substantial Completion of the Work or designated portion thereof unless otherwise provided in the Certificate of Substantial Completion.

§ 9.8.5 The Certificate of Substantial Completion shall be submitted to the Owner and Contractor for their written acceptance of responsibilities assigned to them in the Certificate. Upon such acceptance, and consent of surety if any, the Owner shall make payment of retainage applying to the Work or designated portion thereof. Such payment shall be adjusted for Work that is incomplete or not in accordance with the requirements of the Contract Documents.

§ 9.9 Partial Occupancy or Use

§ 9.9.1 The Owner may occupy or use any completed or partially completed portion of the Work at any stage when such portion is designated by separate agreement with the Contractor, provided such occupancy or use is consented to by the insurer and authorized by public authorities having jurisdiction over the Project. Such partial occupancy or use may commence whether or not the portion is substantially complete, provided the Owner and Contractor have accepted in writing the responsibilities assigned to each of them for payments, retainage, if any, security, maintenance, heat, utilities, damage to the Work and insurance, and have agreed in writing concerning the period for correction of the Work and commencement of warranties required by the Contract Documents. When the Contractor considers a portion substantially complete, the Contractor shall prepare and submit a list to the Architect as provided under Section 9.8.2. Consent of the Contractor to partial occupancy or use shall not be unreasonably withheld. The stage of the progress of the Work shall be determined by written agreement between the Owner and Contractor or, if no agreement is reached, by decision of the Architect.

§ 9.9.2 Immediately prior to such partial occupancy or use, the Owner, Contractor, and Architect shall jointly inspect the area to be occupied or portion of the Work to be used in order to determine and record the condition of the Work.

§ 9.9.3 Unless otherwise agreed upon, partial occupancy or use of a portion or portions of the Work shall not constitute acceptance of Work not complying with the requirements of the Contract Documents.

§ 9.10 Final Completion and Final Payment

§ 9.10.1 Upon receipt of the Contractor's notice that the Work is ready for final inspection and acceptance and upon receipt of a final Application for Payment, the Architect will promptly make such inspection. When the Architect finds the Work acceptable under the Contract Documents and the Contract fully performed, the Architect will promptly issue a final Certificate for Payment stating that to the best of the Architect's knowledge, information and belief, and on the basis of the Architect's on-site visits and inspections, the Work has been completed in accordance with the Contract Documents and that the entire balance found to be due the Contractor and noted in the final Certificate is due and payable. The Architect's final Certificate for Payment will constitute a further representation that conditions listed in Section 9.10.2 as precedent to the Contractor's being entitled to final payment have been fulfilled.

§ 9.10.2 Neither final payment nor any remaining retained percentage shall become due until the Contractor submits to the Architect (1) an affidavit that payrolls, bills for materials and equipment, and other indebtedness connected with the Work for which the Owner or the Owner's property might be responsible or encumbered (less amounts withheld by Owner) have been paid or otherwise satisfied, (2) a certificate evidencing that insurance required by the Contract Documents to remain in force after final payment is currently in effect, (3) a written statement that the Contractor knows of no reason that the insurance will not be renewable to cover the period required by the Contract Documents, (4) consent of surety, if any, to final payment, (5) documentation of any special warranties, such as manufacturers' warranties or specific Subcontractor warranties, and (6) if required by the Owner, other data establishing payment or satisfaction of obligations, such as receipts and releases and waivers of liens, claims, security interests, or encumbrances arising out of the Contract, to the extent and in such form as may be designated by the Owner. If a Subcontractor refuses to furnish a release or waiver required by the Owner, the Contractor may furnish a bond satisfactory to the Owner to indemnify the Owner against such lien, claim, security interest, or encumbrance. If a lien, claim, security interest, or encumbrance remains unsatisfied after payments are made, the Contractor shall refund to the Owner all money that the Owner may be compelled to pay in discharging the lien, claim, security interest, or encumbrance, including all costs and reasonable attorneys' fees.

§ 9.10.3 If, after Substantial Completion of the Work, final completion thereof is materially delayed through no fault of the Contractor or by issuance of Change Orders affecting final completion, and the Architect so confirms, the Owner shall, upon application by the Contractor and certification by the Architect, and without terminating the Contract, make payment of the balance due for that portion of the Work fully completed, corrected, and accepted. If the remaining balance for Work not fully completed or corrected is less than retainage stipulated in the Contract Documents, and if bonds have been furnished, the written consent of the surety to payment of the balance due for that portion of the Work fully completed and accepted shall be submitted by the Contractor to the Architect prior to certification of such payment. Such payment shall be made under terms and conditions governing final payment, except that it shall not constitute a waiver of Claims.

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

- .1 liens, Claims, security interests, or encumbrances arising out of the Contract and unsettled;
- .2 failure of the Work to comply with the requirements of the Contract Documents;
- .3 terms of special warranties required by the Contract Documents; or
- .4 audits performed by the Owner, if permitted by the Contract Documents, after final payment.

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

ARTICLE 10 PROTECTION OF PERSONS AND PROPERTY

§ 10.1 Safety Precautions and Programs

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

§ 10.2 Safety of Persons and Property

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

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

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

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

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

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

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

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

§ 10.2.8 Injury or Damage to Person or Property

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

§ 10.3 Hazardous Materials and Substances

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

§ 10.3.2 Upon receipt of the Contractor's notice, the Owner shall obtain the services of a licensed laboratory to verify the presence or absence of the material or substance reported by the Contractor and, in the event such material or substance is found to be present, to cause it to be rendered harmless. Unless otherwise required by the Contract Documents, the Owner shall furnish in writing to the Contractor and Architect the names and qualifications of persons or entities who are to perform tests verifying the presence or absence of the material or substance or who are to perform the task of removal or safe containment of the material or substance. The Contractor and the Architect will promptly reply to the Owner in writing stating whether or not either has reasonable objection to the persons or entities proposed by the Owner. If either the Contractor or Architect has an objection to a person or entity proposed by the Owner, the Owner shall propose another to whom the Contractor and the Architect have no reasonable objection. When the material or substance has been rendered harmless, Work in the affected area shall resume upon written agreement of the Owner and Contractor. By Change Order, the Contract Time shall be extended appropriately and the Contract Sum shall be increased by the amount of the Contractor's reasonable additional costs of shutdown, delay, and start-up.

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

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

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

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

§ 10.4 Emergencies

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

ARTICLE 11 INSURANCE AND BONDS

§ 11.1 Contractor's Insurance and Bonds

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

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

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

§ 11.1.4 Notice of Cancellation or Expiration of Contractor's Required Insurance. Within three (3) business days of the date the Contractor becomes aware of an impending or actual cancellation or expiration of any insurance required by the Contract Documents, the Contractor shall provide notice to the Owner of such impending or actual cancellation or expiration. Upon receipt of notice from the Contractor, the Owner shall, unless the lapse in coverage arises from an act or omission of the Owner, have the right to stop the Work until the lapse in coverage has been cured by the procurement of replacement coverage by the Contractor. The furnishing of notice by the Contractor shall not relieve the Contractor of any contractual obligation to provide any required coverage.

§ 11.2 Owner's Insurance

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

§ 11.2.2 Failure to Purchase Required Property Insurance. If the Owner fails to purchase and maintain the required property insurance, with all of the coverages and in the amounts described in the Agreement or elsewhere in the Contract Documents, the Owner shall inform the Contractor in writing prior to commencement of the Work. Upon receipt of notice from the Owner, the Contractor may delay commencement of the Work and may obtain insurance that will protect the interests of the Contractor, Subcontractors, and Sub-Subcontractors in the Work. When the failure to provide coverage has been cured or resolved, the Contract Sum and Contract Time shall be equitably adjusted. In the event the Owner fails to procure coverage,

the Owner waives all rights against the Contractor, Subcontractors, and Sub-subcontractors to the extent the loss to the Owner would have been covered by the insurance to have been procured by the Owner. The cost of the insurance shall be charged to the Owner by a Change Order. If the Owner does not provide written notice, and the Contractor is damaged by the failure or neglect of the Owner to purchase or maintain the required insurance, the Owner shall reimburse the Contractor for all reasonable costs and damages attributable thereto.

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

§ 11.3 Waivers of Subrogation

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

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

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

The Owner, at the Owner's option, may purchase and maintain insurance that will protect the Owner against loss of use of the Owner's property, or the inability to conduct normal operations, due to fire or other causes of loss. The Owner waives all rights of action against the Contractor and Architect for loss of use of the Owner's property, due to fire or other hazards however caused.

§ 11.5 Adjustment and Settlement of Insured Loss

§ 11.5.1 A loss insured under the property insurance required by the Agreement shall be adjusted by the Owner as fiduciary and made payable to the Owner as fiduciary for the insureds, as their interests may appear, subject to requirements of any applicable mortgagee clause and of Section 11.5.2. The Owner shall pay the Architect and Contractor their just shares of insurance proceeds received by the Owner, and by appropriate agreements the Architect and Contractor shall make payments to their consultants and Subcontractors in similar manner.

§ 11.5.2 Prior to settlement of an insured loss, the Owner shall notify the Contractor of the terms of the proposed settlement as well as the proposed allocation of the insurance proceeds. The Contractor shall have 14 days from receipt of notice to object to the proposed settlement or allocation of the proceeds. If the Contractor does not object, the Owner shall settle the loss and the Contractor shall be bound by the settlement and allocation. Upon receipt, the Owner shall deposit the insurance proceeds in a separate account and make the appropriate distributions. Thereafter, if no other agreement is made or the Owner does not terminate the Contract for convenience, the Owner and Contractor shall execute a Change Order for reconstruction of the

damaged or destroyed Work in the amount allocated for that purpose. If the Contractor timely objects to either the terms of the proposed settlement or the allocation of the proceeds, the Owner may proceed to settle the insured loss, and any dispute between the Owner and Contractor arising out of the settlement or allocation of the proceeds shall be resolved pursuant to Article 15. Pending resolution of any dispute, the Owner may issue a Construction Change Directive for the reconstruction of the damaged or destroyed Work.

ARTICLE 12 UNCOVERING AND CORRECTION OF WORK

§ 12.1 Uncovering of Work

§ 12.1.1 If a portion of the Work is covered contrary to the Architect's request or to requirements specifically expressed in the Contract Documents, it must, if requested in writing by the Architect, be uncovered for the Architect's examination and be replaced at the Contractor's expense without change in the Contract Time.

§ 12.1.2 If a portion of the Work has been covered that the Architect has not specifically requested to examine prior to its being covered, the Architect may request to see such Work and it shall be uncovered by the Contractor. If such Work is in accordance with the Contract Documents, the Contractor shall be entitled to an equitable adjustment to the Contract Sum and Contract Time as may be appropriate. If such Work is not in accordance with the Contract Documents, the costs of uncovering the Work, and the cost of correction, shall be at the Contractor's expense.

§ 12.2 Correction of Work

§ 12.2.1 Before Substantial Completion

The Contractor shall promptly correct Work rejected by the Architect or failing to conform to the requirements of the Contract Documents, discovered before Substantial Completion and whether or not fabricated, installed or completed. Costs of correcting such rejected Work, including additional testing and inspections, the cost of uncovering and replacement, and compensation for the Architect's services and expenses made necessary thereby, shall be at the Contractor's expense.

§ 12.2.2 After Substantial Completion

§ 12.2.2.1 In addition to the Contractor's obligations under Section 3.5, if, within one year after the date of Substantial Completion of the Work or designated portion thereof or after the date for commencement of warranties established under Section 9.9.1, or by terms of any applicable special warranty required by the Contract Documents, any of the Work is found to be not in accordance with the requirements of the Contract Documents, the Contractor shall correct it promptly after receipt of notice from the Owner to do so, unless the Owner has previously given the Contractor a written acceptance of such condition. The Owner shall give such notice promptly after discovery of the condition. During the one-year period for correction of Work, if the Owner fails to notify the Contractor and give the Contractor an opportunity to make the correction, the Owner waives the rights to require correction by the Contractor and to make a claim for breach of warranty. If the Contractor fails to correct nonconforming Work within a reasonable time during that period after receipt of notice from the Owner or Architect, the Owner may correct it in accordance with Section 2.5.

§ 12.2.2.2 The one-year period for correction of Work shall be extended with respect to portions of Work first performed after Substantial Completion by the period of time between Substantial Completion and the actual completion of that portion of the Work.

§ 12.2.2.3 The one-year period for correction of Work shall not be extended by corrective Work performed by the Contractor pursuant to this Section 12.2.

§ 12.2.3 The Contractor shall remove from the site portions of the Work that are not in accordance with the requirements of the Contract Documents and are neither corrected by the Contractor nor accepted by the Owner.

§ 12.2.4 The Contractor shall bear the cost of correcting destroyed or damaged construction of the Owner or Separate Contractors, whether completed or partially completed, caused by the Contractor's correction or removal of Work that is not in accordance with the requirements of the Contract Documents.

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

to the time within which proceedings may be commenced to establish the Contractor's liability with respect to the Contractor's obligations other than specifically to correct the Work.

§ 12.3 Acceptance of Nonconforming Work

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

ARTICLE 13 MISCELLANEOUS PROVISIONS

§ 13.1 Governing Law

The Contract shall be governed by the law of the place where the Project is located, excluding that jurisdiction's choice of law rules. If the parties have selected arbitration as the method of binding dispute resolution, the Federal Arbitration Act shall govern Section 15.4.

§ 13.2 Successors and Assigns

§ 13.2.1 The Owner and Contractor respectively bind themselves, their partners, successors, assigns, and legal representatives to covenants, agreements, and obligations contained in the Contract Documents. Except as provided in Section 13.2.2, neither party to the Contract shall assign the Contract as a whole without written consent of the other. If either party attempts to make an assignment without such consent, that party shall nevertheless remain legally responsible for all obligations under the Contract.

§ 13.2.2 The Owner may, without consent of the Contractor, assign the Contract to a lender providing construction financing for the Project, if the lender assumes the Owner's rights and obligations under the Contract Documents. The Contractor shall execute all consents reasonably required to facilitate the assignment.

§ 13.3 Rights and Remedies

§ 13.3.1 Duties and obligations imposed by the Contract Documents and rights and remedies available thereunder shall be in addition to and not a limitation of duties, obligations, rights, and remedies otherwise imposed or available by law.

§ 13.3.2 No action or failure to act by the Owner, Architect, or Contractor shall constitute a waiver of a right or duty afforded them under the Contract, nor shall such action or failure to act constitute approval of or acquiescence in a breach thereunder, except as may be specifically agreed upon in writing.

§ 13.4 Tests and Inspections

§ 13.4.1 Tests, inspections, and approvals of portions of the Work shall be made as required by the Contract Documents and by applicable laws, statutes, ordinances, codes, rules, and regulations or lawful orders of public authorities. Unless otherwise provided, the Contractor shall make arrangements for such tests, inspections, and approvals with an independent testing laboratory or entity acceptable to the Owner, or with the appropriate public authority, and shall bear all related costs of tests, inspections, and approvals. The Contractor shall give the Architect timely notice of when and where tests and inspections are to be made so that the Architect may be present for such procedures. The Owner shall bear costs of tests, inspections, or approvals that do not become requirements until after bids are received or negotiations concluded. The Owner shall directly arrange and pay for tests, inspections, or approvals where building codes or applicable laws or regulations so require.

§ 13.4.2 If the Architect, Owner, or public authorities having jurisdiction determine that portions of the Work require additional testing, inspection, or approval not included under Section 13.4.1, the Architect will, upon written authorization from the Owner, instruct the Contractor to make arrangements for such additional testing, inspection, or approval, by an entity acceptable to the Owner, and the Contractor shall give timely notice to the Architect of when and where tests and inspections are to be made so that the Architect may be present for such procedures. Such costs, except as provided in Section 13.4.3, shall be at the Owner's expense.

§ 13.4.3 If procedures for testing, inspection, or approval under Sections 13.4.1 and 13.4.2 reveal failure of the portions of the Work to comply with requirements established by the Contract Documents, all costs made necessary by such failure, including those of repeated procedures and compensation for the Architect's services and expenses, shall be at the Contractor's expense.

§ 13.4.4 Required certificates of testing, inspection, or approval shall, unless otherwise required by the Contract Documents, be secured by the Contractor and promptly delivered to the Architect.

§ 13.4.5 If the Architect is to observe tests, inspections, or approvals required by the Contract Documents, the Architect will do so promptly and, where practicable, at the normal place of testing.

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

§ 13.5 Interest

Payments due and unpaid under the Contract Documents shall bear interest from the date payment is due at the rate the parties agree upon in writing or, in the absence thereof, at the legal rate prevailing from time to time at the place where the Project is located.

ARTICLE 14 TERMINATION OR SUSPENSION OF THE CONTRACT

§ 14.1 Termination by the Contractor

§ 14.1.1 The Contractor may terminate the Contract if the Work is stopped for a period of 30 consecutive days through no act or fault of the Contractor, a Subcontractor, a Sub-subcontractor, their agents or employees, or any other persons or entities performing portions of the Work, for any of the following reasons:

- .1 Issuance of an order of a court or other public authority having jurisdiction that requires all Work to be stopped;
- .2 An act of government, such as a declaration of national emergency, that requires all Work to be stopped;
- .3 Because the Architect has not issued a Certificate for Payment and has not notified the Contractor of the reason for withholding certification as provided in Section 9.4.1, or because the Owner has not made payment on a Certificate for Payment within the time stated in the Contract Documents; or
- .4 The Owner has failed to furnish to the Contractor reasonable evidence as required by Section 2.2.

§ 14.1.2 The Contractor may terminate the Contract if, through no act or fault of the Contractor, a Subcontractor, a Sub-subcontractor, their agents or employees, or any other persons or entities performing portions of the Work, repeated suspensions, delays, or interruptions of the entire Work by the Owner as described in Section 14.3, constitute in the aggregate more than 100 percent of the total number of days scheduled for completion, or 120 days in any 365-day period, whichever is less.

§ 14.1.3 If one of the reasons described in Section 14.1.1 or 14.1.2 exists, the Contractor may, upon seven days' notice to the Owner and Architect, terminate the Contract and recover from the Owner payment for Work executed, as well as reasonable overhead and profit on Work not executed, and costs incurred by reason of such termination.

§ 14.1.4 If the Work is stopped for a period of 60 consecutive days through no act or fault of the Contractor, a Subcontractor, a Sub-subcontractor, or their agents or employees or any other persons or entities performing portions of the Work because the Owner has repeatedly failed to fulfill the Owner's obligations under the Contract Documents with respect to matters important to the progress of the Work, the Contractor may, upon seven additional days' notice to the Owner and the Architect, terminate the Contract and recover from the Owner as provided in Section 14.1.3.

§ 14.2 Termination by the Owner for Cause

§ 14.2.1 The Owner may terminate the Contract if the Contractor

- .1 repeatedly refuses or fails to supply enough properly skilled workers or proper materials;
- .2 fails to make payment to Subcontractors or suppliers in accordance with the respective agreements between the Contractor and the Subcontractors or suppliers;
- .3 repeatedly disregards applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of a public authority; or
- .4 otherwise is guilty of substantial breach of a provision of the Contract Documents.

§ 14.2.2 When any of the reasons described in Section 14.2.1 exist, and upon certification by the Architect that sufficient cause exists to justify such action, the Owner may, without prejudice to any other rights or remedies of the Owner and after giving the Contractor and the Contractor's surety, if any, seven days' notice, terminate employment of the Contractor and may, subject to any prior rights of the surety:

- .1 Exclude the Contractor from the site and take possession of all materials, equipment, tools, and construction equipment and machinery thereon owned by the Contractor;
- .2 Accept assignment of subcontracts pursuant to Section 5.4; and
- .3 Finish the Work by whatever reasonable method the Owner may deem expedient. Upon written request of the Contractor, the Owner shall furnish to the Contractor a detailed accounting of the costs incurred by the Owner in finishing the Work.

§ 14.2.3 When the Owner terminates the Contract for one of the reasons stated in Section 14.2.1, the Contractor shall not be entitled to receive further payment until the Work is finished.

§ 14.2.4 If the unpaid balance of the Contract Sum exceeds costs of finishing the Work, including compensation for the Architect's services and expenses made necessary thereby, and other damages incurred by the Owner and not expressly waived, such excess shall be paid to the Contractor. If such costs and damages exceed the unpaid balance, the Contractor shall pay the difference to the Owner. The amount to be paid to the Contractor or Owner, as the case may be, shall be certified by the Initial Decision Maker, upon application, and this obligation for payment shall survive termination of the Contract.

§ 14.3 Suspension by the Owner for Convenience

§ 14.3.1 The Owner may, without cause, order the Contractor in writing to suspend, delay or interrupt the Work, in whole or in part for such period of time as the Owner may determine.

§ 14.3.2 The Contract Sum and Contract Time shall be adjusted for increases in the cost and time caused by suspension, delay, or interruption under Section 14.3.1. Adjustment of the Contract Sum shall include profit. No adjustment shall be made to the extent

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

§ 14.4 Termination by the Owner for Convenience

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

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

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

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

ARTICLE 15 CLAIMS AND DISPUTES

§ 15.1 Claims

§ 15.1.1 Definition

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

§ 15.1.2 Time Limits on Claims

The Owner and Contractor shall commence all Claims and causes of action against the other and arising out of or related to the Contract, whether in contract, tort, breach of warranty or otherwise, in accordance with the requirements of the binding dispute resolution method selected in the Agreement and within the period specified by applicable law, but in any case not

more than 10 years after the date of Substantial Completion of the Work. The Owner and Contractor waive all Claims and causes of action not commenced in accordance with this Section 15.1.2.

§ 15.1.3 Notice of Claims

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

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

§ 15.1.4 Continuing Contract Performance

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

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

§ 15.1.5 Claims for Additional Cost

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

§ 15.1.6 Claims for Additional Time

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

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

§ 15.1.7 Waiver of Claims for Consequential Damages

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

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

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

§ 15.2 Initial Decision

§ 15.2.1 Claims, excluding those where the condition giving rise to the Claim is first discovered after expiration of the period for correction of the Work set forth in Section 12.2.2 or arising under Sections 10.3, 10.4, and 11.5, shall be referred to the Initial Decision Maker for initial decision. The Architect will serve as the Initial Decision Maker, unless otherwise indicated in the Agreement. Except for those Claims excluded by this Section 15.2.1, an initial decision shall be required as a condition

precedent to mediation of any Claim. If an initial decision has not been rendered within 30 days after the Claim has been referred to the Initial Decision Maker, the party asserting the Claim may demand mediation and binding dispute resolution without a decision having been rendered. Unless the Initial Decision Maker and all affected parties agree, the Initial Decision Maker will not decide disputes between the Contractor and persons or entities other than the Owner.

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

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

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

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

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

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

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

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

§ 15.3 Mediation

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

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

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

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

§ 15.4 Arbitration

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

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

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

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

§ 15.4.4 Consolidation or Joinder

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

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

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

SECTION 00 7300 SUPPLEMENTARY CONDITIONS

PART 1 GENERAL

1.1 MODIFICATIONS TO GENERAL CONDITIONS

THE FOLLOWING SUPPLEMENTS MODIFY, CHANGE DELETE FROM OR ADD TO THE "GENERAL CONDITIONS OF THE CONTRACT FOR CONSTRUCTION", AIA DOCUMENT A201 -2017. WHERE ANY ARTICLE OF THE GENERAL CONDITIONS IS MODIFIED OR DELETED BY THESE SUPPLEMENTARY CONDITIONS, THE UNALTERED PROVISIONS OF THAT ARTICLE, PARAGRAPH, SUBPARAGRAPH OR CLAUSE SHALL REMAIN IN EFFECT.

ARTICLE 1 - GENERAL PROVISIONS

1. Paragraph 1.2 Correlation and Intent of the Contract Documents

- a. Add sub-paragraph 1.2.4 to paragraph 1.2.

"1.2.4 In the case of an inconsistency between Drawings and Specifications, or within either Document itself, not clarified by Addendum, the better quality or greater quantity of Work shall be provided in accordance with the Architect's interpretation. In any case of discrepancy, the facts are to be brought to the attention of the Architect for a decision or interpretation."

ARTICLE 2 – OWNER

2. Paragraph 2.3 Information and Services Required of the Owner

- a. Sub-paragraph 2.3.4: Add the following to the end of paragraph:

"The Contractor shall compare information furnished by the Owner (including surveys and soil tests with observable physical conditions) and the Contract Documents and on the basis of such review, shall report to the Owner and Architect any conflicts, errors or omissions."

3. Paragraph 2.3 Information and Services Required of the Owner.

- a. Sub-paragraph 2.3.6: Delete and add the following:

"2.3.6 The Contractor will be furnished, free of charge, all returned bid sets of drawings and Project Manuals, and may request up to 10 additional copies of Drawings and Project Manuals for execution of Work. Costs for copies of drawings and Project Manuals in excess of this number shall be the responsibility of the Contractor."

ARTICLE 3 – CONTRACTOR

4. Paragraph 3.1 General

- a. Add the following language to the end of Paragraph 3.1.1

"Contractor shall at request of Owner prior to execution of Agreement and promptly from time to time as requested by the Owner, thereafter furnish Owner an update and current financial statement and/or Contractor Qualification Statement on AIA Document A305."

5. Paragraph 3.2 Review of Contract Documents and Field Conditions by Contractor

- a. Add the following language to the end of Paragraph 3.2.1

"The Contractor also represents that all Contract Documents for the Project have been examined; including those intended for work of trades not normally performed by the Contractor's own forces and has become thoroughly familiar with all conditions which may pertain to or affect the Work under the Contract."

6. Paragraph 3.4 Labor and Materials

- a. Add the following language to the end of Paragraph 3.4.1:

"Work required by the Contract Documents to be performed after working hours or work the Contractor elects to perform after hours shall be completed at no additional cost to the Owner."

b. Add new paragraph 3.4.4 as follows:

"3.4.4 Contractor shall perform the Work so as to cause a minimum of inconvenience to and interruption of the Owner's operations. Any and all interruptions of the operations of the Owner necessary for the performance of the Work shall be noted in the progress schedule and the Contractor shall additionally give the Owner sufficient advance notice of such interruption as to allow the Owner to adjust operations accordingly. Contractor's failure to give the Owner timely notice of such intentions shall place the responsibility of any resulting delays or additional costs solely with the Contractor."

7. Paragraph 3.6 Taxes

a. Add Sub-paragraphs 3.6.1, 3.6.2 and 3.6.3:

"3.6.1 This Project is Exempt from Iowa Sales Tax. The Owner will provide each contractor/subcontractor with an exemption certificate from the Iowa Department of Revenue for the purchase of building materials for this Project.

"3.6.2 At or before the time the Performance Bond is filed, Contractor shall provide a listing to the Owner identifying all subcontractors. Contractor and subcontractors may make copies of the exemption certificate and shall provide, at the time of purchase, a copy of the tax exemption certificate to each supplier providing construction material for the Project. The Contractor or subcontractors may then purchase from the supplier's building materials for the project under this Contract free from sales tax.

3.6.3. The Contractor and subcontractors shall be responsible for keeping records identifying the property purchased exempt from tax and verifying that the property purchased was used in this contract with this Owner. Any property purchased tax-free and not used in this contract is subject to tax which must be paid directly to the Iowa Department of Revenue."

8. Paragraph 3.7 Permits, Fees, Notices and Compliance with Laws

a. Sub-paragraph 3.7.4: Claims for Concealed or Unknown Conditions; add the following before the last line:

"Failure to properly register a claim within the 21-day period shall be grounds for denial of the claim."

b. Sub-paragraph 3.7.5: Modify by adding the underlined words so that the section now reads as follows:

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

c. Add Sub-paragraph 3.7.6:

The Contractor is responsible for scheduling inspections related to the performance of its work and ensuring work is complete for inspections. Any costs associated with reinspection caused by irregularities, deficiencies or non-conforming work will be borne by the responsible contractor including all Architectural and Engineering Services related to evaluation of the problem and development of an acceptable solution."

9. Paragraph 3.10 Contractor's Construction and Submittals Schedules

- a. Refer to Sub-paragraph 3.10.1 in the first sentence replace "promptly after being awarded" with the following text:
"within twenty-one (21) days of the award of"
- b. Refer to Sub-paragraph 3.10.1 in the last sentence after "Work and Project," add the following text:
"or as requested by the Owner or Architect"
- c. Refer to Sub-paragraph 3.10.2 in the first sentence replace " , promptly after being awarded" with the following text:
"within twenty-one (21) days of the award of"

ARTICLE 4 - ARCHITECT

10. Paragraph 4.2.4 Communications

- a. Sub-paragraph 4.2.4; Add the following subparagraphs:
 - "4.2.4.1 All notices, demands, requests, instructions, approvals, proposals and claims must be in writing. Any notice or demand upon the Contractor shall be sufficiently given if delivered at the office of the Contractor stated on the signature page of the agreement (or at such other office as the contractor may from time to time designate in writing to the Owner), or if deposited in the United States mail in a sealed, postage-paid envelope or delivered with charges prepaid to any telegraph company for transportation, in each case addressed to such office."
 - "4.2.4.2 All papers required to be delivered to the Owner shall, unless otherwise specified in writing to the Contractor, be delivered to the office of **Axiom Consultants, 300 S. Clinton Street, Suite 200, Iowa City, Iowa 52240** between the hours of 8AM and 5PM during typical business days and any notice to or demand upon the Owner shall be sufficiently given if so delivered, or if deposited in the United States mail in a sealed, postage prepaid envelope, or delivered with charges prepaid to any company for delivery to said Owner at such address, or to such other representatives of the Owner may subsequently specify in writing to the Contractor for such purpose."
 - "4.2.4.3 Any such notice shall be deemed to have been given as of the time of actual delivery of (in the case of mailing) when the same should have been received in due course of post, or in the case of telegrams, at the time of actual receipt, as the case may be."

ARTICLE 5 - SUBCONTRACTORS

no modifications

ARTICLE 6 – CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACT

no modifications

ARTICLE 7 – CHANGES IN THE WORK

11. Paragraph 7.1 Changes

- a. Sub-paragraph 7.1.4: Add the following sub-paragraph:
"7.1.4 Supporting data used to determine the costs and allowances claimed in Sub-paragraph 7.3.7 must be made available to the Architect upon request."

12. Paragraph 7.2 Change Orders

- a. Sub-paragraph 7.2.2: Add the following sub-paragraph:
"7.2.2 The forms used to process a Change Order will include AIA Document G701, Change Order."
- b. Sub-paragraph 7.2.3: Add the following sub-paragraph:
"7.2.3 Change Order requests will define or confirm in detail the Work which is proposed to be added, deleted, or changed and must include any adjustment which the Contractor believes to be necessary in (i) the Contract Sum, or (ii) the Contract Time. Any proposed adjustment must include detailed documentation including, but not limited to: cost, properly itemized and supported by sufficient substantiating data

to permit evaluation including cost of labor, materials, supplies and equipment, rental cost of machinery and equipment, additional bond cost, plus a fixed fee for profit and overhead which includes office overhead and site-specific overhead and General Conditions. No increase in Contract Sum or an extension of Contract Time will be granted to the Contractor for cost or time in the preparation or modification of Change Order requests."

c. Sub-paragraph 7.2.4: Add the following sub-paragraph:

"7.2.4 The maximum percentage of combined overhead and profit for changes in the work performed by the Contractor shall be 10%. If the changed work is performed by a Subcontractor, a maximum of 5% may be added by that Subcontractor on his work for combined overhead and profit and an additional maximum of 5% may be added by the Contractor for administration and coordination of said Subcontractor work. This paragraph shall apply to the methods set forth in sub-paragraphs 7.3.3.1 and 7.3.3.4 for determining the costs of changed work unless waived in writing by the Owner. The Contractor shall verify compliance of the Subcontractors and shall not sign Change Orders which do not comply with the maximum limits."

d. Sub-paragraph 7.2.5: Add the following sub-paragraph:

"7.2.5 Subcontractors or Sub-subcontractors shall compute their costs in the same way and are subject to the same conditions of what may be included in the cost and same maximum percentages for overhead and profit or commission. To the Sub-Subcontractor's proposal, the Subcontractor may add bond cost, if applicable, and a maximum of 5% for combined overhead and profit or commission. To the Subcontractors proposal, the Contractor may add bond cost and a maximum of 5% for combined overhead and profit or commission."

13. Paragraph 7.3 Construction Change Directives

a. Sub-paragraph 7.3.3.3; Substitute the following:

".3 cost to be determined in a manner agreed upon by the parties, plus the percentage of combined overhead and profit."

b. Sub-paragraph 7.3.4; Line 4:

Replace "set forth in the Agreement, or if no such amount is set forth in the Agreement, a reasonable amount." with "indicated in sub-paragraph 7.3.11."

c. Add sub-paragraph 7.3.11:

"7.3.11 The maximum percentage of combined overhead and profit for changes in the work performed by the Contractor shall be 10%. If the changed work is performed by a Subcontractor, a maximum of 5% may be added by that Subcontractor on his work for combined overhead and profit and an additional maximum of 5% may be added by the Contractor for administration and coordination of said Subcontractor work. This paragraph shall apply to the methods set forth in sub-paragraphs 7.3.3.1 and 7.3.3.4 for determining the costs of changed work unless waived in writing by the Owner. The Contractor shall verify compliance of the Subcontractors and shall not sign Change Orders which do not comply with the maximum limits."

d. Sub-paragraph 7.3.12: Add the following sub-paragraph:

"7.3.12 Subcontractors or Sub-subcontractors shall compute their costs in the same way and are subject to the same conditions of what may be included in the cost and same maximum percentages for overhead and profit or commission. To the Sub-Subcontractor's proposal, the Subcontractor may add bond cost, if applicable, and a maximum of 5% for combined overhead and profit or commission. To the Subcontractors proposal, the Contractor may add bond cost and a maximum of 5% for combined overhead and profit or commission."

ARTICLE 8 – TIME

14. Paragraph 8.3 DELAYS AND EXTENSIONS OF TIME

a. Sub-paragraph 8.3.1, line 4:

"A time extension shall be Contractor's sole remedy and compensation for all such delays other than those resulting from the acts or negligence of the Owner, the Architect, or the Owner's separate contractors (collectively "Owner Caused Delays"). For proven Owner Caused Delays, the Contractor may recoup the actual costs resulting from such delays, but not for any additional profit or fee."

ARTICLE 9 – PAYMENTS AND COMPLETION

15. Paragraph 9.3 Applications for Payment

- a. Sub-paragraph 9.3.1; change to read as follows:
 - 1) "At least thirty days before and shall reflect retainage of three percent of the total amount due the Contractor."
- b. Add the following new text to the end of Sub-paragraph 9.3.1:

"Once the Application is approved by the Architect, the Application for Payment must be submitted for approval to the Johnson County Board at their next regularly scheduled meeting. The approved application must be received at the Board office at least one week prior to the scheduled meeting for it to be included in that meeting's scheduled business. AIA Documents G702 - Application and Certificate for Payment and G703 are to be used for Applications for Payment."
- c. Add the following to the end of sub-paragraph 9.3.1.1.

".... If the Construction Schedule as submitted by the Contractor is deemed unattainable by either the Contractor or the Architect, or if any portion of the Construction Schedule has not been completed as submitted, the Contractor shall submit a revised Construction Schedule with the subsequent Application for Payment. The Architect will review the revised Construction Schedule with the Owner, and if acceptable, will notify the Contractor and will submit the Application for Payment to the Owner as provided in Section 9.4. If the revised Construction Schedule is not acceptable to the Architect and the Owner, the Application for Payment will not be submitted for payment until an acceptable revised Construction Schedule is provided by the Contractor."
- d. Add sub-paragraphs 9.3.1.3 and 9.3.1.4 to paragraph 9.3.1.

"9.3.1.3 Retainage: The Owner shall pay ninety-seven percent (97%) of the amount due to the Contractor on account of progress payments throughout the duration of the project. The Contractor shall submit a final application for payment of retainage at the conclusion of the project.

"9.3.1.4 Applications for Payment shall clearly state the percentage and the amount to be retained. Once the Application is approved by the Architect, the Application for Payment will be submitted for approval to the Johnson County Board for approval at their next regularly scheduled meeting. The application must be received at the Board office in accordance with Board procedures in order to be included in that meeting's scheduled business."

16. Paragraph 9.5 Decisions to Withhold Certification

- a. Add Sub-paragraph 9.5.5:

"9.5.5 The Contractor shall make accessible and available to the Architect all labor, material, and equipment accounts related to the work in question, insofar as they may in any way affect a disputed amount due the Contractor from the Owner."

17. Paragraph 9.6. Progress Payments

- a. Sub-paragraph 9.6.4; Delete the first two sentences of paragraph.

18. Paragraph 9.7 Failure of Payment

- a. Sub-paragraph 9.7.1; revise the sub-paragraph as follows:

In the first line, change "...seven days..." to "... fifteen days...";

In the second line, change "...seven days..." to "... fifteen days..."

19. Paragraph 9.8 Substantial Completion

- a. Sub-paragraph 9.8.1; add the following to the end of the sub-paragraph:

".. subject only to completion of minor punch list items, the absence of

- completion of which does not interfere with the Owner's intended use of the Project."
- b. Sub-paragraph 9.8.6; add the following new sub-paragraph:
"Contractor shall reimburse the Owner for any Architect's additional services made necessary by the Contractor's failure to finally complete the Work within sixty (60) days after the date of Project Substantial Completion."
- c. Sub-paragraph 9.8.7; add the following new sub-paragraph:
"9.8.7 Request for Early Release of Retainage Funds: If the Contractor makes a proper request for early release of retainage funds, the Owner will release all retainage funds within thirty (30) days of receipt of the request, except it may retain from the released retainage the following:
- (a) An amount equal to 200% of the value of labor or materials yet to be provided on the Project as determined by the Owner and its authorized contract representative. For purposes of this section, "authorized contract representative" means the Architect of record on the Project, unless otherwise specified.
 - (b) An amount equal to 200% of the value of any Iowa Code Chapter 573 claims currently on file at the time the Request for Release of Retainage is approved, or otherwise in accordance with Iowa Code Section 573.15A. If the Owner withholds an amount from the retainage payment to the Contractor, the Owner will provide a reason the request is being denied to the Contractor within thirty (30) calendar days of the receipt of the request."

ARTICLE 10 – PROTECTION OF PERSONS AND PROPERTY

20. Paragraph 10.1 Safety Precautions and Programs

"10.1.1 Contractor shall take all necessary precautions to keep the site and work in compliance with the safety and health regulations for construction issued by the Bureau of Labor Standards of the U.S. Department of Labor as well as the Occupational Safety and Health Standards parts 1910 and 1926 as amended and as enforced by the State of Iowa."

21. Paragraph 10.2 Safety of Persons and Property

a. Add the following text to Sub-paragraph 10.2.2:

"Contractors shall also comply with the Iowa Smoke Free Air Act while on Owner Property and shall not smoke any tobacco product while on Owner property. For purposes of this subparagraph, Owner property shall include inside private Contractor or employee-owned vehicles while parked on Owner property."

ARTICLE 11 – INSURANCE AND BONDS

22. Work shall not begin until the Certificate of Insurance and all required endorsements are received and approved by Johnson County.

23. Paragraph 11.1.1 Contractor's Insurance and Bond

a. Delete original Subparagraph 11.1.1 and replace with the following:

"11.1.1 Contractor shall purchase and maintain insurance coverage for limits as specified in the Contract Documents. The limits of liability for the insurance required by Section 11.1.1 of the General Conditions shall not be less than the following amounts or greater where required by laws and regulations:

(a) Workers' Compensation: Statutory

(b) Employer's Liability:

(1) Bodily Injury by Accident, Each Accident: \$500,000

(2) Bodily Injury by Disease, Each Employee: \$500,000

(3) Policy Limit: \$500,000

(c) General Liability, including completed operations and product liability coverages and eliminating the exclusion with respect to property under the care, custody and control of Contractor.

(1) General Aggregate: \$2,000,000

(2) Products – Completed Operations Aggregate: \$2,000,000

- (3) Personal and Advertising Injury (Per Person/Organization): \$1,000,000
- (4) Each Occurrence (Bodily Injury and Property Damage): \$1,000,000
- (5) Fire Legal Liability Damage Limit (any One Fire): \$50,000
- (6) Medical Expense Limit (Any One Person): \$5,000
- (d) Property Damage liability insurance will provide Explosion, Collapse, and Underground coverages. Policy shall include as a minimum the following coverages:
 - (1) Broad Form Property Damage Coverage.
 - (2) An elimination of the exclusions with respect to property under the care, custody or control of the Contractor. In lieu of elimination of the exclusion, Contractor may provide Builder's Risk or Installation Floater coverage for property under the care, custody, or control of Contractor.
 - (3) Contractual Liability Coverage.
 - (4) Independent Contractor Coverage.
- (e) Automobile Liability
 - (1) Bodily Injury, Each Person: \$1,000,000; Each Accident: \$1,000,000
 - (2) Property Damage, Each Accident: \$1,000,000
 - (3) Combined Single Limit: \$1,000,000
 - (4) Policy shall include contractual liability coverage and coverage on all owned, non-owned, and hired vehicles.
- (f) The Contractual Liability coverage required by Sec. 11.1.1.8 of the General Conditions shall provide coverage for not less than the following amounts:
 - (1) Bodily Injury, Each Accident: \$1,000,000; Annual Aggregate \$2,000,000
 - (2) Property Damage, Each Accident: \$ 1,000,000; Annual Aggregate \$2,000,000
- (g) Additional insurances required:
 - (1) Umbrella. The stated limits of paragraphs A(1) through A(5) of this Article 3 can be obtained through individual policies or if Contractor desires to reduce underlying limits to minimums required by its insurance carrier, an umbrella policy must accordingly be provided to maintain overall total level of coverage. Any Umbrella insurance shall be written on an occurrence basis and pay on behalf form and shall include the same endorsements and additional insureds as required of the primary policies.
 - (2) An excess umbrella policy (pay on behalf form) with limits of \$2,000,000 for Employer's liability, Contractor's General Liability, (bodily injury, personal injury and property damage), Automobile Liability, and Contractual Liability on a combined basis shall be provided. Any Excess insurance shall be written on an occurrence basis and pay on behalf form and shall include the same endorsements and additional insureds.
- (h) If the property insurance requires deductibles, the Contractor shall pay costs not covered because of such deductibles in the event of a claim arising from the Contractor's error or negligence.

24. Additional insureds coverage:

- a. Insurance certificates shall specifically indicate by name the additional insureds which are to include Owner and Architect as well as other persons or entities so identified:
 - 1) "Johnson County, Iowa, its officers and employees, and Architect shall be named as additional insureds" on the Contractor's, subcontractor's and independent contractor's liability insurance policies and certificates of insurance.
 - 2) No Others.

General Aggregate Limits specified above shall apply separately to this project by attachment of Additional Insured Endorsement, and Governmental Immunities Endorsement, text as given below.

JOHNSON COUNTY, IOWA

ADDITIONAL INSURED ENDORSEMENT

Johnson County, Iowa, including all its elected and appointed officials, all its employees and volunteers, all its boards, commissions and/or authorities and their board members, employees, and volunteers, are included as Additional Insured with respect to liability arising out the Insured's work and/or services performed for Johnson County, Iowa. This coverage shall be primary to the Additional Insured, and not contributing with any other insurance or similar protection available to the Additional Insureds, whether available coverage be primary, contributing or excess.

A COPY OF ONE (1) ENDORSEMENT IS REQUIRED:

Cancellation and Material Changes Endorsement

Thirty (30) days Advance Written Notice of Cancellation, Non-Renewal, Reduction in insurance coverage and/or limits and ten (10) days written notice of non-payment of premium shall be sent to:

Erin Shane, Executive Director
Johnson County Board of Supervisors Office
913 S. Dubuque Street
Iowa City, Iowa 52240-4273
Email: eshane@johnsoncountyiowa.gov

(Please note that Johnson County does accept a signed letter on the agent's letterhead, from the insured's insurance agent, confirming that the agent will provide notice as indicated above.)

The Contractor is required to purchase and maintain insurance coverage to protect the Contractor and Johnson County throughout the duration of this Contract as enumerated above in the minimum limits above written and the requirement shall be a part of the Contract. Failure on the part of the Contractor to maintain this insurance in full effect will be treated as a failure on the part of the Contractor to comply with these requirements and be considered sufficient cause to suspend the work, withhold payment(s), and/or be disqualified in the future.

The insurance policies shall be issued by insurers authorized to do business in the State of Iowa and currently having an A.M. Best Rating of "B+" or better. All policies shall be occurrence form. If Professional Liability coverage is written on a claim made policy form, the certificate of insurance must clearly state coverage is claims made and coverage must remain in effect for at least two years after final payment with the Contractor continuing to furnish Johnson County certificates of insurance.

The Contractor shall be responsible for deductibles and self-insured retentions in the Contractor's insurance policies.

The Contractor is required to give Johnson County notice of any change in coverage, specifically, any reduction in coverage and cancellation of coverage no less than thirty (30) days prior to the effective date of any non-renewal or cancellation of any policies required by the Contract.

JOHNSON COUNTY intends to be an Additional Insured with coverage being primary and not contributing with any other insurance or similar protection available to JOHNSON COUNTY whether any other coverage is primary, contributing or excess. JOHNSON COUNTY may require an endorsement preserving JOHNSON COUNTY's governmental immunities under such coverage. See attached.

In the case of any work sublet, the Contractor shall require subcontractors and independent contractors working under the direction of either the Contractor or a subcontractor to carry and maintain the same workers compensation and liability insurance required of the Contractor.

A Certificate of Insurance is required evidencing all required insurance coverage as provided above with any required endorsements attached so as to evidence their inclusion in the coverage. The Certificate of Insurance is due before the Contract can be approved.

The following address must appear in the Certificate Holder section:

Johnson County Board of Supervisors
913 S. Dubuque Street
Iowa City, Iowa 52240-4273
Email: Erin Shane: eshane@johnsoncountyiowa.gov

The Producer's contact person's name, phone number and e-mail address are required.

Certificate may be sent by e-mail (eshane@johnsoncountyiowa.gov) to the attention of Erin Shane.

Bonding Requirements: Applicable for construction or facility improvement contracts or subcontracts exceeding the simplified acquisition threshold (\$150,000), the awarding agency may accept the bonding policy and requirements of the recipient (State of Iowa) or sub-recipient (JOHNSON COUNTY) provided the awarding agency has made a determination that the awarding agency's interest is adequately protected. If such a determination has not been made, the minimum requirements shall be as follows:

25. A bid guarantee from each Contractor equivalent to ten percent (10%) of the bid price. The "bid guarantee" shall consist of a firm commitment such as a bid bond, certified check, or other negotiable instrument accompanying a bid as assurance that the Contractor will, upon acceptance of its bid, execute such contractual documents as may be required within the time specified.

26. A performance bond on the part of the Contractor for 100 percent (100%) of the contract price. A "performance bond" is one executed in connection with a contract to secure fulfillment of all the Contractor's obligations under such contract.

27. A payment bond on the part of the Contractor for 100 percent of the contract price. A "payment bond" is one executed in connection with a contract to assure payment as required by law of all persons supplying labor and material in the execution of the work provided for in the contract.

JOHNSON COUNTY, IOWA

GOVERNMENTAL IMMUNITIES ENDORSEMENT

(for use when including the County as an Additional Insured)

28. Nonwaiver of Government Immunity. The insurance carrier expressly agrees and states that the purchase of this policy and the including of Johnson County, Iowa as Additional Insured does not waive any of the defenses of governmental immunity available to Johnson County, Iowa under Code of Iowa Section 670.4 as it now exists and as it may be amended from time to time.

29. Claims Coverage. The insurance carrier further agrees that this policy of insurance shall cover only those claims not subject to the defense of governmental immunity under the Code of Iowa Section 670.4 as it now exists and as may be amended from time to time.

30. Assertion of Government Immunity. Johnson County, Iowa shall be responsible for asserting any defense of governmental immunity and may do so at any time and shall do so upon the timely written request of the insurance carrier. Nothing contained in this endorsement shall prevent the carrier from asserting the defense of governmental immunity on behalf of Johnson County, Iowa.

31. Non-Denial of Coverage. The insurance carrier shall not deny coverage under this policy and the insurance carrier shall not deny any of the rights and benefits accruing to Johnson County, Iowa under this policy for reasons of governmental immunity unless and until a court of competent jurisdiction has ruled in favor of the defense(s) of governmental immunity asserted by Johnson County, Iowa.

32. No Other Change in Policy. The insurance carrier and Johnson County, Iowa agree that the above preservation of governmental immunities shall not otherwise change or alter the coverage available under the policy."

33. Paragraph 11.1.1 Contractor's Insurance and Bond

a. To the end of original Subparagraph 11.2.1 add the following sentence:

"Insofar as there is a deductible for any builder's risk insurance policies or coverage obtained by Owner, the Contractor shall be responsible for any losses or costs associated with such deductible(s)."

ARTICLE 12 – CORRECTION OF WORK

34. Paragraph 12.2.2 after substantial completion:

- a. Sub-Paragraph 12.2.2.1 lines 1 and 8; change "one year" to "two years".
 - b. Sub-Paragraph 12.2.2.2, line 1; change "one-year" to "two-years".
 - c. Sub Paragraph 12.2.2.3, line 1; change "one-year" to "two-years".
35. Paragraph 12.2.5, line 2; change "one-year" to "two-years".

ARTICLE 13 – MISCELLANEOUS PROVISIONS

36. Paragraph 15.1.2 Time Limits on Claims
- a. Delete 15.1.2 and replace with the following:
 - 1) 15.1.2 COMMENCEMENT OF STATUTORY LIMITATION PERIOD
 - 15.1.2 As between the Owner and Contractor:
 - ".1 Before Substantial Completion. As to acts or failures to act occurring prior to the relevant date of Substantial Completion, any applicable statute of limitations shall commence to run and any alleged cause of action shall be deemed to have accrued in any and all events not later than such date of Substantial Completion;
 - .2 Between Substantial Completion and Final Certificate for Payment. As to acts or failures to act occurring subsequent to the relevant date of Substantial Completion and prior to issuance of the final Certificate for Payment, any applicable statute of limitations shall commence to run and any alleged cause of action shall be deemed to have accrued in any and all events not later than the date of issuance of the final Certificate for Payment; and
 - .3 After Final Certificate for Payment. As to acts or failures to act occurring after the relevant date of issuance of the final Certificate for Payment, any applicable statute of limitations shall commence to run and any alleged cause of action shall be deemed to have accrued in any and all events not later than the date of any act or failure to act by the Contractor pursuant to any Warranty provided under Section 3.5, the date of any correction of the Work or failure to correct the Work by the Contractor under Section 12.2, or the date of actual commission of any other act or failure to perform any duty or obligation by the Contractor or Owner, whichever occurs last."
37. Subparagraph 15.2.8: Delete current language in its entirety and replace with the following:
"If a Claim relates to or is the subject of an Iowa Code Chapter 573 Claim, the party asserting such Claim may proceed in accordance with Iowa Code Chapter 573 to comply with the Iowa Code Chapter 573 notice and/or filing deadlines prior to resolution of the Claim by the Architect or by mediation."
38. Paragraph 15.3 Mediation:
- a. Sub-paragraph 15.3.2: delete the last two sentences in this sub-paragraph.
39. Paragraph 15.4 Arbitration: Delete 15.4 in its entirety.

ARTICLE 16 – SUPPLEMENTARY CONDITIONS

40. "16.1 Reference
- a. All references to provisions in Article 16 – Supplementary Conditions are hereby transferred to Section 00 73 00 – Supplementary Conditions. Any modifications stated in Section 00 73 00 shall have the same force and effect as if stated in Article 16."

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

**SECTION 00 7413
SPECIAL CONDITIONS**

CONTRACT COMPLIANCE PROGRAM

ARTICLE 1 - LIQUIDATED DAMAGES (NOT USED)

ARTICLE 2 - EMPLOYMENT PRACTICES

2.1 STATEMENT OF INTENT:

It is the of Johnson County to assure equal employment opportunity in all Contract work. Contractors are required to take affirmative action to ensure that applicants employed or seeking employment with them are treated equally without regard to race, color, creed, religion, national origin, sex, disability, marital status and age.

2.2 ASSURANCE OF COMPLIANCE:

Contractor shall submit an Equal Employment Opportunity Statement for the Owner's files. During the course of the Contract, the Owner will monitor the Contractor's compliance with the EEO/Affirmative Action requirements. Noncompliance wiht the provisions set forth at the tie of contract award may result in termination or suspension of the Contract in whole or in part.

END OF SECTION

SECTION 01 1000 SUMMARY

PART 1 GENERAL

1.1 PROJECT

- A. Project Name: 10271-10004 511 Capitol Street Building Stabilization Project
- B. Owner's Name: Johnson County.
- C. Engineer's Name: Axiom Consultants.
- D. The project primarily consists of envelope repairs of the Office of Johnson County Sheriff and Jail building due to signs of deterioration within the wall and soffit assemblies, water intrusion, thermal inefficiencies and heavily outdated equipment. To correct these issues, this project includes a full tear-off and replacement of the roof assembly including new insulation, replacement of all electrical and mechanical components on the roof, repair of numerous areas of brick fascia, removal and replacement of exterior steel assemblies at the soffit areas, reconfiguration and re-insulation of certain exterior areas, installation of structural pins/anchors, full soffit reconstruction (including improved drainage systems) and replacement of exterior doors on the main level. Additional interior and exterior features and repairs are also included.
- E. The Project shall comply with all applicable public bidding requirements, if any, including, but not limited to, those set forth in Iowa Code chapters 26, 331, 364, 384 and 573. Refer to <http://www.legis.state.ia.us/IACODE/> for more information.
- F. Compliance with Laws and Regulations: The Project shall comply with all applicable federal, state and local laws, rules, ordinances, regulations and orders when performing within the scope of this Agreement, including without limitations, those applicable to the Iowa Jobs Program, prevention of discrimination, wages, competitive bidding, environmental protection, occupational safety and health standards, payment of taxes, conflicts of interest, lobbying and those related to the use of targeted small businesses as contractors or suppliers.

1.2 CONTRACT DESCRIPTION

- A. Contract Type: A single prime contract based on a Stipulated Price as described in Document 00 5000 - Contracting Forms and Supplements.

1.3 DESCRIPTION OF ALTERATIONS WORK

- A. The **511 Capitol Building Envelope Project** consists of the demolition, removal and replacement of specified MEP equipment and materials from the roof, the roof system/membrane, and portions of the front masonry facade along with other miscellaneous repairs and replacements
- B. Scope of demolition and removal work is indicated on drawings and specified in Section 02 4100.
- C. Scope of alterations work is indicated on drawings.
- D. Plumbing: Replace existing system with new construction, keeping existing in operation until ready for changeover.
- E. HVAC: Replace existing system with new construction, keeping existing in operation until ready for changeover.
- F. Electrical Power and Lighting: Replace existing system with new construction, keeping existing in operation until ready for changeover.
- G. Owner will remove the following items before start of work:
 - 1. Not Applicable.
- H. Contractor is required to remove and deliver the following to Owner prior to start of work:
 - 1. Not Applicable.
- I. Contractor is required to remove and store the following prior to start of work, for later reinstallation by Contractor:
 - 1. Not Applicable.

1.4 WORK BY OWNER

- A. Owner will supply the following for installation by Contractor:
 - 1. Not Applicable.

1.5 OWNER OCCUPANCY

- A. Owner intends to continue to occupy portions of the existing building during the entire construction period.
- B. Cooperate with Owner to minimize conflict and to facilitate Owner's operations.
- C. Schedule the Work to accommodate Owner occupancy.
 - 1. Contractor to provide comprehensive phased construction approach to overall project in order to minimize disruption to the facility during construction.
 - 2. Owner requirements are that no more than 50% of the upper floor can be altered and/or shut down at one time.
 - 3. Contractor will coordinate all operations with Owner who will facilitate occupant transfer, security and other coordination needed to access other work areas.

1.6 CONTRACTOR USE OF SITE AND PREMISES

- A. Construction Operations: Limited to areas noted on Drawings.
 - 1. Locate and conduct construction activities in ways that will limit disturbance to site.
- B. Arrange use of site and premises to allow:
 - 1. Owner occupancy.
 - 2. Work by Others.
 - 3. Work by Owner.
 - 4. Use of site and premises by the public.
- C. This is a tobacco free project site as required by State of Iowa Law. Use of tobacco is strictly prohibited on site. General Contractor shall coordinate enforcement efforts.
- D. Provide access to and from site as required by law and by Owner:
 - 1. Emergency Building Exits During Construction: Keep all exits required by code open during construction period; provide temporary exit signs if exit routes are temporarily altered.
 - 2. Do not obstruct roadways, sidewalks, or other public ways without permit.
 - 3. Alternative entrances, exits and interim life safety procedures will be required if the main entrance or any fire exits are closed during construction. Coordinate durations with Owner.
- E. Existing building spaces may not be used for storage.
- F. Time Restrictions:
 - 1. Limit conduct of especially noisy exterior work to those hours required by the City of Iowa City noise ordinance.
- G. Utility Outages and Shutdown:
 - 1. Do not disrupt or shut down life safety systems, including but not limited to fire sprinklers and fire alarm system, without 7 days notice to Owner and authorities having jurisdiction.
 - 2. Limit shutdown of utility services. Shut downs must be arranged at least 24 hours in advance with Owner.
 - 3. Prevent accidental disruption of utility services to other facilities.

1.7 WORK SEQUENCE

- A. Coordinate construction schedule and operations with Owner and Engineer.
- B. Coordinate work of the various Sections of Specifications to assure efficient and orderly sequence of installation of construction elements, with provisions for accommodating items installed later.
- C. Verify characteristics of elements of interrelated operating equipment are compatible; coordinate work of various Sections having interdependent responsibilities for installing, connecting to, and placing in service, such equipment.
- D. Coordinate space requirements and installation of mechanical and electrical work which are indicated diagrammatically on Drawings. Follow routing show for pipes, ducts and conduits, as

closely as practicable; make runs parallel with lines of building. Utilize spaces efficiently to maximize accessibility for other installations, for maintenance and for repairs.

- E. Executed cutting and patching to integrate elements of work, uncover ill-timed, defective and non-conforming work, provide openings for penetrations of existing surfaces, and provide samples for testing if required. Seal penetrations through floors, walls and roof.

1.8 DEFINITIONS AND EXPLANATIONS

- A. Imperative language is used generally in the specifications. Except as otherwise indicated, requirements expressed imperatively are to be performed by the Contractor as if preceded by the phrase "The Contractor shall".
- B. The term "provide" means furnish and install, complete, and ready for intended use. Except as otherwise defined in greater detail, the term "furnish" means supply and deliver to the project site, including unloading, unpacking, inspecting, and storing until ready for receipt by Owner, installation, etc., as applicable.
- C. Except as otherwise defined in greater detail, the term "install" is used to describe operations at project site including assembly, erection, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations, as applicable.
- D. The term "indicated" is as cross-reference to graphics, notes or schedules on drawings, to other paragraphs or schedules in the specifications, and to similar means of recording requirements in contract documents. Where terms such as "shows", "noted", "schedules", and "specified" are used in lieu of "indicated", it is for purpose of helping reader locate cross-reference, and no limitations of location is intended.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01 2000 PRICE AND PAYMENT PROCEDURES

REPART 1 GENERAL

1.1 SECTION INCLUDES

- A. Procedures for preparation and submittal of applications for progress payments.
- B. Documentation of changes in Contract Sum and Contract Time.
- C. Change procedures.
- D. Procedures for preparation and submittal of application for final payment.

1.2 RELATED REQUIREMENTS

- A. Section 00 5000 - Contracting Forms and Supplements: Forms to be used.

1.3 SCHEDULE OF VALUES

- A. Submit a printed schedule on AIA Form G702 - Application and Certificate for Payment Continuation Sheet. Contractor's standard form or electronic media printout will be considered.
- B. Electronic media printout including equivalent information will be considered in lieu of standard form specified; submit draft to Engineer for approval.
- C. Forms filled out by hand will not be accepted.
- D. Submit Schedule of Values to Engineer within ten (10) days prior to first Application for Payment.
- E. Format: Utilize the Table of Contents of this Project Manual. Identify each line item with number and title of the specification section. Identify site mobilization and bonds and insurance.
- F. Revise schedule to list approved Change Orders, with each Application For Payment.

1.4 APPLICATIONS FOR PROGRESS PAYMENTS

- A. Payment Period: Submit at intervals stipulated in the Agreement.
- B. Use Form AIA G702 and Form AIA G703, edition stipulated in the Agreement.
- C. Forms filled out by hand will not be accepted.
- D. For each item, provide a column for listing each of the following:
 - 1. Item Number.
 - 2. Description of work.
 - 3. Scheduled Values.
 - 4. Previous Applications.
 - 5. Work in Place and Stored Materials under this Application.
 - 6. Authorized Change Orders.
 - 7. Total Completed and Stored to Date of Application.
 - 8. Balance to Finish.
 - 9. Retainage (3% held).
- E. Execute certification by signature of authorized officer.
- F. Use data from approved Schedule of Values. Provide dollar value in each column for each line item for portion of work performed and for stored products.
- G. List each authorized Change Order as a separate line item, listing Change Order number and dollar amount as for an original item of work.
- H. Submit one (1) electronic copy of each Application for Payment.
- I. Include the following with the application:
 - 1. Transmittal letter as specified for submittals in Section 01 3000.
 - 2. Partial release of liens from major subcontractors and vendors.
 - 3. Project record documents as specified in Section 01 7800, for review by Owner which will be returned to the Contractor.
 - 4. Affidavits attesting to off-site stored products.

- J. When Engineer requires substantiating information, submit data justifying dollar amounts in question. Provide one copy of data with cover letter for each copy of submittal. Show application number and date, and line item by number and description.

1.5 MODIFICATION PROCEDURES

- A. For minor changes not involving an adjustment to the Contract Sum or Contract Time, Engineer will issue instructions directly to Contractor.
- B. Engineer/Architect will advise of minor changes in the work not involving an adjustment to Contract Sum or Contract Time as authorized by the Conditions of the Contract by issuing supplemental instructions.
- C. For other required changes, Engineer will issue a document signed by Owner instructing Contractor to proceed with the change, for subsequent inclusion in a Change Order.
1. The document will describe the required changes and will designate method of determining any change in Contract Sum or Contract Time.
 2. Promptly execute the change.
- D. For changes for which advance pricing is desired, Engineer will issue a document that includes a detailed description of a proposed change with supplementary or revised drawings and specifications, a change in Contract Time for executing the change with a stipulation of any overtime work required and the period of time during which the requested price will be considered valid. Contractor shall prepare and submit a fixed price quotation within fourteen (14) days.
- E. Contractor may propose a change by submitting a request for change to Engineer, describing the proposed change and its full effect on the work, with a statement describing the reason for the change, and the effect on the Contract Sum and Contract Time with full documentation. Document any requested substitutions in accordance with Section 01 6000.
- F. Computation of Change in Contract Amount: As specified in the Agreement and Conditions of the Contract.
1. For change requested by Engineer for work falling under a fixed price contract, the amount will be based on Contractor's price quotation.
 2. For change ordered by Engineer without a quotation from Contractor, the amount will be determined by Engineer based on the Contractor's substantiation of costs as specified for Time and Material work.
- G. Substantiation of Costs: Provide full information required for evaluation.
1. Provide the following data:
 - a. Quantities of products, labor, and equipment.
 - b. Taxes, insurance, and bonds.
 - c. Overhead and profit.
 - d. Justification for any change in Contract Time.
 - e. Credit for deletions from Contract, similarly documented.
 2. Support each claim for additional costs with additional information:
 - a. Origin and date of claim.
 - b. Dates and times work was performed, and by whom.
 - c. Time records and wage rates paid.
 - d. Invoices and receipts for products, equipment, and subcontracts, similarly documented.
 3. For Time and Material work, submit itemized account and supporting data after completion of change, within time limits indicated in the Conditions of the Contract.
- H. Execution of Change Orders: Engineer will issue Change Orders for signatures of parties as provided in the Conditions of the Contract.
- I. After execution of Change Order, promptly revise Schedule of Values and Application for Payment forms to record each authorized Change Order as a separate line item and adjust the Contract Sum.

- J. Promptly revise progress schedules to reflect any change in Contract Time, revise sub-schedules to adjust times for other items of work affected by the change, and resubmit.
- K. Promptly enter changes in Project Record Documents.

1.6 APPLICATION FOR FINAL PAYMENT

- A. Prepare Application for Final Payment as specified for progress payments, identifying total adjusted Contract Sum, previous payments, and sum remaining due.
- B. Application for Final Payment will not be considered until the following have been accomplished:
 - 1. All closeout procedures specified in Section 01 7000.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01 3000 ADMINISTRATIVE REQUIREMENTS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. General administrative requirements.
- B. Electronic document submittal service.
- C. Preconstruction meeting.
- D. Progress meetings.
- E. Construction progress schedule.
- F. Coordination drawings.
- G. Submittals for review, information, and project closeout.
- H. Number of copies of submittals.
- I. Requests for Information (RFI) procedures.
- J. Submittal procedures.
- K. Release of CAD/BIM files.

1.2 RELATED REQUIREMENTS

- A. Section 00 7200 - General Conditions: Dates for applications for payment.
- B. Section 01 6000 - Product Requirements: General product requirements.
- C. Section 01 7000 - Execution and Closeout Requirements: Additional coordination requirements.
- D. Section 01 7800 - Closeout Submittals: Project record documents; operation and maintenance data; warranties and bonds.

1.3 GENERAL ADMINISTRATIVE REQUIREMENTS

- A. Comply with requirements of Section 01 7000 - Execution and Closeout Requirements for coordination of execution of administrative tasks with timing of construction activities.
- B. Make the following types of submittals to Engineer:
 - 1. Requests for Interpretation (RFI).
 - 2. Requests for substitution.
 - 3. Shop drawings, product data, and samples.
 - 4. Test and inspection reports.
 - 5. Design data.
 - 6. Manufacturer's instructions and field reports.
 - 7. Applications for payment and change order requests.
 - 8. Progress schedules.
 - 9. Coordination drawings.
 - 10. Correction Punch List and Final Correction Punch List for Substantial Completion.
 - 11. Closeout submittals.

1.4 PROJECT COORDINATOR

- A. Project Coordinator: General Contractor.
- B. Cooperate with the Project Coordinator in allocation of mobilization areas of site; for field offices and sheds, for site and existing building access, traffic, and parking facilities.
- C. During construction, coordinate use of site and facilities through the Project Coordinator.
- D. Comply with Project Coordinator's procedures for intra-project communications; submittals, reports and records, schedules, coordination drawings, and recommendations; and resolution of ambiguities and conflicts.
- E. Comply with instructions of the Project Coordinator for use of temporary utilities and construction facilities. Responsibility for providing temporary utilities and construction facilities is identified in Section 01 1000 - Summary.

- F. Coordinate field engineering and layout work under instructions of the Project Coordinator.
- G. Make the following types of submittals to Engineer through the Project Coordinator:
 - 1. Requests for Information.
 - 2. Requests for substitution.
 - 3. Shop drawings, product data, and samples.
 - 4. Test and inspection reports.
 - 5. Design data.
 - 6. Manufacturer's instructions and field reports.
 - 7. Applications for payment and change order requests.
 - 8. Progress schedules.
 - 9. Coordination drawings.
 - 10. Correction Punch List and Final Correction Punch List for Substantial Completion.
 - 11. Closeout submittals.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.1 ELECTRONIC DOCUMENT SUBMITTAL SERVICE

- A. All documents transmitted for purposes of administration of the contract are to be in electronic (PDF, MS Word, or MS Excel) format, as appropriate to the document, and transmitted via an Internet-based submittal service that receives, logs and stores documents, provides electronic stamping and signatures, and notifies addressees via email.
 - 1. The web-based software will provide status logs, reports, searching and automated notifications.
 - 2. Besides submittals for review, information, and closeout, this procedure applies to Requests for Information (RFIs), progress documentation, contract modification documents (e.g. supplementary instructions, change proposals, change orders), applications for payment, field reports and meeting minutes, Contractor's correction punchlist, and any other document any participant wishes to make part of the project record.
 - 3. Contractor, Engineer and Architect are required to use this service.
 - 4. It is Contractor's responsibility to submit documents in allowable format.
 - 5. Subcontractors, suppliers, and Engineer's consultants will be permitted to use the service at no extra charge.
 - 6. Users of the service need an email address, internet access, and PDF review software that includes ability to mark up and apply electronic stamps (such as Adobe Acrobat, www.adobe.com, or Bluebeam PDF Revu, www.bluebeam.com), unless such software capability is provided by the service provider.
 - 7. Paper document transmittals will not be reviewed; emailed electronic documents will not be reviewed.
 - 8. All other specified submittal and document transmission procedures apply, except that electronic document requirements do not apply to samples or color selection charts.
- B. Submittal Service: Use one of the following:
 - 1. Submittal Exchange (telephone: 800-714-0024): www.submittalexchange.com/#sle.
 - 2. Procore (telephone: 833-917-1115): <https://www.procore.com>.
- C. Project Closeout: Engineer will determine when to terminate the service for the project and is responsible for obtaining archive copies of files for Owner.

3.2 RELEASE OF CAD/BIM FILES

- A. Contractors may request plans for their use and to benefit for assistance in preparing submittals or for use in construction.

1. When requesting CAD files, contractor shall identify specific sheets to be produced as files.
2. A signed release form is required from either the Engineer or Architect.

3.3 PRECONSTRUCTION MEETING

- A. Project Coordinator will schedule a meeting within fifteen (15) days after Notice of Award.
- B. Attendance Required:
 1. Owner.
 2. Engineer.
 3. Architect.
 4. Contractor.
 5. Major Subcontractors..
- C. Agenda:
 1. Execution of Owner-Contractor Agreement.
 2. Submission of executed bonds and insurance certificates.
 3. Distribution of Contract Documents.
 4. Submission of list of subcontractors, list of products, schedule of values, and progress schedule.
 5. Submission of initial Submittal schedule.
 6. Designation of personnel representing the parties to Contract, the Owner's Representative and Engineer.
 7. Procedures and processing of field decisions, submittals, substitutions, applications for payments, proposal request, Change Orders, and Contract closeout procedures.
 8. Scheduling.
 9. Construction waste management.
 10. Use of premises.
 11. Temporary utilities.
 12. Safety procedures.
 13. Housekeeping and Final Cleaning procedures.
 14. Specialty coordination with the Owner due to the nature and use of the facility.
 15. Any other items that the Owner or Design Team requests.
- D. Record minutes and distribute copies within seven (7) days after meeting to participants, with two copies to Engineer, Architect, Owner, participants, and those affected by decisions made.
 1. Minutes will be distributed through web-based project management software system.

3.4 PROGRESS MEETINGS (OAEC)

- A. Project Coordinator will make arrangements for meetings, prepare agenda with copies for participants, preside at meetings.
- B. Attendance Required:
 1. Contractor.
 2. Owner.
 3. Engineer.
 4. Architect.
 5. Contractor's superintendent.
 6. General Contractor to coordinate Subcontractor meetings separate from the OAEC (Owner, Architect, Engineer, Contractor) Meetings.
- C. Agenda:
 1. Review minutes of previous meetings.
 2. Review of work progress.
 3. Field observations, problems, and decisions.
 4. Identification of problems that impede, or will impede, planned progress.
 5. Review of submittals schedule and status of submittals.

6. Review of RFIs log and status of responses.
 7. Review of off-site fabrication and delivery schedules.
 8. Maintenance of progress schedule.
 9. Corrective measures to regain projected schedules.
 10. Planned progress during succeeding work period.
 11. Coordination of projected progress.
 12. Maintenance of quality and work standards.
 13. Effect of proposed changes on progress schedule and coordination.
 14. Other business relating to work.
- D. Record minutes and distribute copies within five (5) days after meeting to participants, with copies to Engineer, Architect, Owner, participants, and those affected by decisions made.
1. Minutes will be distributed through web-based project management software system.

3.5 CONSTRUCTION PROGRESS SCHEDULE

- A. See Section 01 3216 for detailed phasing work plan.
- B. Within fourteen (14) days after date established in Notice to Proceed, submit preliminary schedule defining planned operations for the first 60 days of work, with a general outline for remainder of work.
 1. Preliminary schedule to include, within the schedule or as a separate attachment, a detailed phasing work plan.
- C. If preliminary schedule requires revision after review, submit revised schedule within five (5) days.
- D. Within 20 days after review of preliminary schedule, submit draft of proposed complete schedule for review.
 1. Include written certification that major contractors have reviewed and accepted proposed schedule.
- E. Within five (5) days after joint review, submit complete schedule.
- F. Submit updated schedule with each Application for Payment.
- G. Submit in PDF format.

3.6 COORDINATION DRAWINGS

- A. Provide information required by Project Coordinator for preparation of coordination drawings.
- B. Review drawings prior to submission to Engineer.

3.7 REQUESTS FOR INFORMATION (RFI)

- A. Definition: A request seeking one of the following:
 1. An interpretation, amplification, or clarification of some requirement of Contract Documents arising from inability to determine from them the exact material, process, or system to be installed; or when the elements of construction are required to occupy the same space (interference); or when an item of work is described differently at more than one place in Contract Documents.
 2. A resolution to an issue which has arisen due to field conditions and affects design intent.
- B. Whenever possible, request clarifications at the next appropriate project progress meeting, with response entered into meeting minutes, rendering unnecessary the issuance of a formal RFI.
- C. Preparation: Prepare an RFI immediately upon discovery of a need for interpretation of Contract Documents. Failure to submit a RFI in a timely manner is not a legitimate cause for claiming additional costs or delays in execution of the work.
 1. Prepare a separate RFI for each specific item.
 - a. Review, coordinate, and comment on requests originating with subcontractors and/or materials suppliers.
 - b. Do not forward requests which solely require internal coordination between subcontractors.
 2. Prepare in a format and with content acceptable to Owner.
 3. Prepare using software provided by the Electronic Document Submittal Service.

4. Combine RFI and its attachments into a single electronic file. PDF format is preferred.
- D. Reason for the RFI: Prior to initiation of an RFI, carefully study all Contract Documents to confirm that information sufficient for their interpretation is definitely not included.
 1. Include in each request Contractor's signature attesting to good faith effort to determine from Contract Documents information requiring interpretation.
 2. Unacceptable Uses for RFIs: Do not use RFIs to request the following::
 - a. Approval of submittals (use procedures specified elsewhere in this section).
 - b. Approval of substitutions (see Section - 01 6000 - Product Requirements)
 - c. Changes that entail change in Contract Time and Contract Sum (comply with provisions of the Conditions of the Contract).
 - d. Different methods of performing work than those indicated in the Contract Drawings and Specifications (comply with provisions of the Conditions of the Contract).
 3. Improper RFIs: Requests not prepared in compliance with requirements of this section, and/or missing key information required to render an actionable response. They will be returned without a response, with an explanatory notation.
 4. Frivolous RFIs: Requests regarding information that is clearly indicated on, or reasonably inferable from, Contract Documents, with no additional input required to clarify the question. They will be returned without a response, with an explanatory notation.
 - a. The Owner reserves the right to assess the Contractor for the costs (on time-and-materials basis) incurred by the Engineer, and any of its consultants, due to processing of such RFIs.
- E. Content: Include identifiers necessary for tracking the status of each RFI, and information necessary to provide an actionable response.
 1. Official Project name and number, and any additional required identifiers established in Contract Documents.
 2. Owner's, Engineer's, and Contractor's names.
 3. Discrete and consecutive RFI number, and descriptive subject/title.
 4. Reference to particular Contract Document(s) requiring additional information/interpretation. Identify pertinent drawing and detail number and/or specification section number, title, and paragraph(s).
 5. Annotations: Field dimensions and/or description of conditions which have engendered the request.
 6. Contractor's suggested resolution: A written and/or a graphic solution, to scale, is required in cases where clarification of coordination issues is involved, for example; routing, clearances, and/or specific locations of work shown diagrammatically in Contract Documents. If applicable, state the likely impact of the suggested resolution on Contract Time or the Contract Sum.
- F. Attachments: Include sketches, coordination drawings, descriptions, photos, submittals, and other information necessary to substantiate the reason for the request.
- G. RFI Log: Prepare and maintain a tabular log of RFIs for the duration of the project.
 1. Indicate current status of every RFI. Update log promptly and on a regular basis.
 2. Note dates of when each request is made, and when a response is received.
 3. Highlight items requiring priority or expedited response.
 4. Highlight items for which a timely response has not been received to date.
 5. Identify and include improper or frivolous RFIs.
- H. Review Time: Engineer will respond and return RFIs to Contractor within seven calendar days of receipt. For the purpose of establishing the start of the mandated response period, RFIs received after 12:00 noon will be considered as having been received on the following regular working day.
 1. Response period may be shortened or lengthened for specific items, subject to mutual agreement, and recorded in a timely manner in progress meeting minutes.
- I. Responses: Content of answered RFIs will not constitute in any manner a directive or authorization to perform extra work or delay the project. If in Contractor's belief it is likely to

lead to a change to Contract Sum or Contract Time, promptly issue a notice to this effect, and follow up with an appropriate Change Order request to Owner.

1. Response may include a request for additional information, in which case the original RFI will be deemed as having been answered, and an amended one is to be issued forthwith. Identify the amended RFI with an R suffix to the original number.
2. Do not extend applicability of a response to specific item to encompass other similar conditions, unless specifically so noted in the response.
3. Upon receipt of a response, promptly review and distribute it to all affected parties, and update the RFI Log.
4. Notify Engineer within seven calendar days if an additional or corrected response is required by submitting an amended version of the original RFI, identified as specified above.

3.8 SUBMITTAL SCHEDULE

- A. Submit to Engineer for review a schedule for submittals in tabular format.
 1. Submit at the same time as the preliminary schedule.
 2. Coordinate with Contractor's construction schedule and schedule of values.
 3. Format schedule to allow tracking of status of submittals throughout duration of construction.
 4. Arrange information to include scheduled date for initial submittal, specification number and title, submittal category (for review or for information), description of item of work covered, and role and name of subcontractor.
 5. Account for time required for preparation, review, manufacturing, fabrication and delivery when establishing submittal delivery and review deadline dates.
 - a. For assemblies, equipment, systems comprised of multiple components and/or requiring detailed coordination with other work, allow for additional time to make corrections or revisions to initial submittals, and time for their review.

3.9 SUBMITTALS FOR REVIEW

- A. When the following are specified in individual sections, submit them for review:
 1. Product data.
 2. Shop drawings.
 3. Samples for selection.
 4. Samples for verification.
 5. Other types as indicated.
- B. Submit to Engineer for review for the limited purpose of checking for compliance with information given and the design concept expressed in Contract Documents.
- C. Samples will be reviewed for aesthetic, color, or finish selection.
- D. After review, provide copies and distribute in accordance with SUBMITTAL PROCEDURES article below and for record documents purposes described in Section 01 7800 - Closeout Submittals.

3.10 SUBMITTALS FOR INFORMATION

- A. When the following are specified in individual sections, submit them for information:
 1. Design data.
 2. Certificates.
 3. Test reports.
 4. Inspection reports.
 5. Manufacturer's instructions.
 6. Manufacturer's field reports.
 7. Other types indicated.
- B. Submit for En's knowledge as contract administrator or for Owner.

3.11 SUBMITTALS FOR PROJECT CLOSEOUT

- A. Submit Correction Punch List for Substantial Completion.
- B. Submit Final Correction Punch List for Substantial Completion.
- C. When the following are specified in individual sections, submit them at project closeout in compliance with requirements of Section 01 7800 - Closeout Submittals:
 - 1. Project record documents.
 - 2. Operation and maintenance data.
 - 3. Warranties.
 - 4. Bonds.
 - 5. Other types as indicated.
- D. Submit for Owner's benefit during and after project completion.

3.12 NUMBER OF COPIES OF SUBMITTALS

- A. Electronic Documents: Submit one electronic copy in PDF format; an electronically-marked up file will be returned. Create PDFs at native size and right-side up; illegible files will be rejected.
 - 1. Transmit to Engineer/Architect via email or via web-based project management software system.
- B. Extra Copies at Project Closeout: See Section 01 7800.
- C. Samples: Submit the number specified in individual specification sections; one of which will be retained by Engineer.
 - 1. After review, produce duplicates.
 - 2. Retained samples will not be returned to Contractor unless specifically so stated.

3.13 SUBMITTAL PROCEDURES

- A. General Requirements:
 - 1. Use a single transmittal for related items.
 - 2. Submit separate packages of submittals for review and submittals for information, when included in the same specification section.
 - 3. Transmit using approved form.
 - a. Use form generated by Electronic Document Submittal Service software.
 - 4. Sequentially identify each item. For revised submittals use original number and a sequential numerical suffix.
 - 5. Identify: Project; Contractor; subcontractor or supplier; pertinent drawing and detail number; and specification section number and article/paragraph, as appropriate on each copy.
 - 6. Apply Contractor's stamp, signed or initialed certifying that review, approval, verification of products required, field dimensions, adjacent construction work, and coordination of information is in accordance with the requirements of the work and Contract Documents.
 - 7. Deliver each submittal on date noted in submittal schedule, unless an earlier date has been agreed to by all affected parties, and is of the benefit to the project.
 - a. Upload submittals in electronic form to Electronic Document Submittal Service website.
 - 8. Schedule submittals to expedite the Project, and coordinate submission of related items.
 - a. For each submittal for review, allow 15 days excluding delivery time to and from the Contractor.
 - b. For sequential reviews involving Engineer's consultants, Owner, or another affected party, allow an additional 7 days.
 - c. For sequential reviews involving approval from authorities having jurisdiction (AHJ), in addition to Engineer's approval, allow an additional 15 days.
 - 9. Identify variations from Contract Documents and product or system limitations that may be detrimental to successful performance of the completed work.
 - 10. Provide space for Contractor and Architect review stamps.
 - 11. When revised for resubmission, identify all changes made since previous submission.

12. Distribute reviewed submittals. Instruct parties to promptly report inability to comply with requirements.
 13. Incomplete submittals will not be reviewed, unless they are partial submittals for distinct portion(s) of the work, and have received prior approval for their use.
 14. Submittals not requested will be recognized, and will be returned "Not Reviewed",
- B. Product Data Procedures:
1. Submit only information required by individual specification sections.
 2. Collect required information into a single submittal.
 3. Do not submit (Material) Safety Data Sheets for materials or products.
- C. Shop Drawing Procedures:
1. Prepare accurate, drawn-to-scale, original shop drawing documentation by interpreting Contract Documents and coordinating related work.
 2. Do not reproduce Contract Documents to create shop drawings.
 3. Generic, non-project-specific information submitted as shop drawings do not meet the requirements for shop drawings.
- D. Samples Procedures:
1. Transmit related items together as single package.
 2. Identify each item to allow review for applicability in relation to shop drawings showing installation locations.
 3. Include with transmittal high-resolution image files of samples to facilitate electronic review and approval. Provide separate submittal page for each item image.

3.14 SUBMITTAL REVIEW

- A. Submittals for Review: Engineer, Architect and Owner will review each submittal, and approve, or take other appropriate action.
- B. Submittals for Information: Engineer, Architect or Owner will acknowledge receipt and review. See below for actions to be taken.
- C. Engineer's and Architect's actions will be reflected by marking each returned submittal using virtual stamp on electronic submittals.
1. Notations may be made directly on submitted items and/or listed on appended Submittal Review cover sheet.
- D. Engineer's and consultants' actions on items submitted for review:
1. Authorizing purchasing, fabrication, delivery, and installation:
 - a. "Approved", or language with same legal meaning.
 - b. "Approved as Noted, Resubmission not required", or language with same legal meaning.
 - 1) At Contractor's option, submit corrected item, with review notations acknowledged and incorporated.
 - c. "Approved as Noted, Resubmit for Record", or language with same legal meaning.
 - 1) Resubmit corrected item, with review notations acknowledged and incorporated. Resubmit separately, or as part of project record documents.
 - 2) Non-responsive resubmittals may be rejected.
 2. Not Authorizing fabrication, delivery, and installation:
 - a. "Revise and Resubmit".
 - 1) Resubmit revised item, with review notations acknowledged and incorporated.
 - 2) Non-responsive resubmittals may be rejected.
 - b. "Rejected".
 - 1) Submit item complying with requirements of Contract Documents.
- E. Engineer's and consultants' actions on items submitted for information:
1. Items for which no action was taken:
 - a. "Received" - to notify the Contractor that the submittal has been received for record only.

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2. Items for which action was taken:
 - a. "Reviewed" - no further action is required from Contractor.
- F. Owner's review will be or Record Only.

END OF SECTION

SECTION 01 3216 CONSTRUCTION PROGRESS SCHEDULE

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Preliminary schedule.
- B. Construction progress schedule, bar chart type.

1.2 RELATED SECTIONS

- A. Section 01 1000 - Summary: Work sequence.

1.3 SUBMITTALS

- A. Within fourteen days after date established in Notice to Proceed, submit preliminary schedule defining planned operations for the first 60 days of Work, with a general outline for remainder of Work.
 - 1. Preliminary schedule to include, within the schedule or as a separate attachment, a detailed phasing work plan.
- B. If preliminary schedule requires revision after review, submit revised schedule within five days.
- C. Within 20 days after review of preliminary schedule, submit draft of proposed complete schedule for review.
 - 1. Include written certification that major contractors have reviewed and accepted proposed schedule.
- D. Within five days after joint review, submit complete schedule.
- E. Submit updated schedule with each Application for Payment.
- F. Submit in PDF format.

1.4 SCHEDULE FORMAT

- A. Listings: In chronological order according to the start date for each activity. Identify each activity with the applicable specification section number.
- B. Sheet Size: 11 x 17 inches minimum.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.1 PRELIMINARY SCHEDULE

- A. Prepare preliminary schedule in the form of a horizontal bar chart.

3.2 CONTENT

- A. Show complete sequence of construction by activity, with dates for beginning and completion of each element of construction.
- B. Identify each item by specification section number.
- C. Identify work of separate stages and other logically grouped activities.
- D. Provide sub-schedules to define critical portions of the entire schedule.
- E. Show accumulated percentage of completion of each item, and total percentage of Work completed, as of the first day of each month.
- F. Indicate delivery dates for long lead items and equipment.
- G. Provide legend for symbols and abbreviations used.
- H. Phasing work plan will indicate the progress of work that will include the Owner's coordination for movement of occupants within the building in order to maintain safe conditions and accommodate the work to be completed.

3.3 BAR CHARTS

- A. Include a separate bar for each major portion of Work or Operation.
- B. Identify the first work day of each week.

3.4 UPDATING SCHEDULE

- A. Maintain schedules to record actual start and finish dates of completed activities.
- B. Indicate progress of each activity to date of revision, with projected completion date of each activity.
- C. Annotate diagrams to graphically depict current status of Work.
- D. Identify activities modified since previous submittal, major changes in Work, and other identifiable changes.
- E. Indicate changes required to maintain Date of Substantial Completion.
- F. Submit reports required to support recommended changes.

3.5 DISTRIBUTION OF SCHEDULE

- A. Distribute copies of updated schedules to Contractor's project site file, to subcontractors, suppliers, Engineer, Architect, Owner, and other concerned parties.
- B. Instruct recipients to promptly report, in writing, problems anticipated by projections indicated in schedules.

END OF SECTION

SECTION 01 3323 SUBMITTALS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Submittal procedures.
- B. Required submittals.

1.2 PROCEDURES

- A. Prior to material, product, or equipment fabrication and/or purchase, Constructor shall submit the following to Design Professional for review:
 - 1. Shop Drawings and Product Data.
 - 2. Samples.
 - 3. Manufacturer's Instructions.
 - 4. Manufacturer's and Installer's Certificates.
- B. No work shall commence until all related submittals have been reviewed by the Design Professional and there is no further action required.
- C. Failure of the Constructor to submit requirements in a timely manner may result in the Owner withholding Constructor payment. (See Division 00 Specifications.)
- D. The Constructor shall identify each submittal item with the following:
 - 1. Project Name.
 - 2. Project Number.
 - 3. Date.
 - 4. Supplier's name and address.
 - 5. Manufacturer name and address.
 - 6. Constructor name and address.
 - 7. Specification Section and Article Number and/or Drawing Number.
 - 8. Deviations from Contract Documents and/or product or system limitations, which may be detrimental to successful performance of the completed Work.
 - 9. Deviations from or revisions to previous submittals.
- E. Submittals shall contain the General Contractor's and Subcontractor's review stamp indicating that the following items have been verified:
 - 1. Contains only listed manufacturers.
 - 2. Equipment connections coordinated with affected trades.
 - 3. Dimensions and service clearances are suitable for the intended location.
 - 4. Dimensions and capacities coordinate with structural support, pads, etc.
 - 5. Coordination with adjacent work.
- F. Provide space for Design Professional's review and action designations.
- G. Revise and resubmit submittals as required, identifying changes made since previous submittal.

1.3 SUBMITTAL PROCESSING

- A. Electronic Submittals via paid service:
 - 1. Service must be set up and managed by the General Contractor and all subs shall submit through this service via the General Contractor.
 - 2. All submittals shall follow a logical and sequential numbering system.
 - 3. Access shall be granted for Owner and Design Professional including whatever staff those entities shall designate as needing said access.
 - 4. General Contractor and/or their provider shall provide training for the Owner and Design Professional on how to utilize the paid service.
 - 5. Costs for the service shall be borne by the Contractor.

1.4 SHOP DRAWINGS AND PRODUCT DATA

- A. Contract Drawings shall not be reproduced for submittals.
- B. Submit multi-page .pdf of each submittal within the division folders labeled by CSI number, description. (Example -10 51 16 Custom wood lockers.pdf).
- C. Individual submittal packages shall be prepared for items in each specification section. Items within a single specification section may be packaged together where possible. An individual submittal may contain items from multiple specifications sections if the items are interrelated (e.g., pumps and motors).
- D. Clearly identify submittals with the same name or symbol used in the contract documents. Clearly identify model, size, finish, options, etc.

1.5 SAMPLES

- A. Submit to the Design Professional two (2) copies of all required samples for the Design Professional's and the Owner's sole use. Additionally, submit copies needed for Constructor's use (number of copies to be determined by Constructor).
- B. Submit samples to illustrate functional and aesthetic characteristics of the Product, with integral parts and attachment devices. Coordinate sample submittals for interfacing work.
- C. Submit samples of finishes from the full range of manufacturers' standard colors, textures, and patterns for the Design Professional's selection.
- D. Include identification on each sample, with pertinent Project information.
- E. Constructor shall maintain an approved set of samples on-site during construction.

1.6 MANUFACTURER'S INSTRUCTIONS

- A. Submit Manufacturers' Instructions for delivery, storage, assembly, installation, start-up, adjusting, and finishing.
- B. Identify conflicts between Manufacturers' Instructions and Contract Documents.

1.7 MANUFACTURER'S AND INSTALLER'S CERTIFICATES

- A. Submit Manufacturers' and Installer's Certificates to the Design Professional for review, as specified in individual specification Sections.
- B. Verify the material / product conforms to, or exceeds, specified requirements. Submit supporting reference date, affidavits, and certifications, as appropriate.
- C. Certificates may be recent or previous test results on material / product but must be acceptable to the Design Professional.

1.8 PHASING WORK PLAN - SCHEDULE

- A. Per Section 01 3216.
 - 1. Schedule to include, within the schedule or as a separate document, a detailed phasing plan that will be heavily coordinated with the Owner.
 - 2. Phasing work plan will indicate the progress of work that will include the Owner's coordination for movement of occupants within the building in order to maintain safe conditions and accommodate the work to be completed.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01 4000 QUALITY REQUIREMENTS

PART 1 GENERAL

1.1 SECTION INCLUDES

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

1.2 RELATED REQUIREMENTS

- A. Section 01 3000 - Administrative Requirements: Submittal procedures.
- B. Section 01 6000 - Product Requirements: Requirements for material and product quality.

1.3 REFERENCE STANDARDS

- A. ASTM C1021 - Standard Practice for Laboratories Engaged in Testing of Building Sealants; 2008 (Reapproved 2023).
- B. ASTM C1093 - Standard Practice for Accreditation of Testing Agencies for Masonry; 2023.
- C. ASTM E329 - Standard Specification for Agencies Engaged in Construction Inspection, Testing, or Special Inspection; 2025a.
- D. ASTM E543 - Standard Specification for Agencies Performing Nondestructive Testing; 2021.
- E. ASTM E699 - Standard Specification for Agencies Involved in Testing, Quality Assurance, and Evaluating of Manufactured Building Components; 2016.
- F. IAS AC89 - Accreditation Criteria for Testing Laboratories; 2021.

1.4 DEFINITIONS

- A. Contractor's Quality Control Plan: Contractor's management plan for executing the Contract for Construction.
- B. Contractor's Professional Design Services: Design of some aspect or portion of the project by party other than the design professional of record. Provide these services as part of the Contract for Construction.
 - 1. Design Services Types Required:
 - a. Construction-Related: Services Contractor needs to provide in order to carry out the Contractor's sole responsibilities for construction means, methods, techniques, sequences, and procedures.
 - b. Design-Related: Design services explicitly required to be performed by another design professional due to highly-technical and/or specialized nature of a portion of the project. Services primarily involve engineering analysis, calculations, and design, and are not intended to alter the aesthetic aspects of the design.
- C. Design Data: Design-related, signed and sealed drawings, calculations, specifications, certifications, shop drawings and other submittals provided by Contractor, and prepared directly by, or under direct supervision of, appropriately licensed design professional.

1.5 CONTRACTOR'S CONSTRUCTION-RELATED PROFESSIONAL DESIGN SERVICES

- A. Coordination: Contractor's professional design services are subject to requirements of project's Conditions for Construction Contract.

- B. Provide such engineering design services as may be necessary to plan and safely conduct certain construction operations, pertaining to, but not limited to the following:
 - 1. Temporary sheeting, shoring, or supports.
 - 2. Temporary scaffolding.
 - 3. Temporary bracing.
 - 4. Temporary stairs or steps required for construction access only.
 - 5. Temporary hoist(s) and rigging.

1.6 CONTRACTOR'S DESIGN-RELATED PROFESSIONAL DESIGN SERVICES

- A. Coordination: Contractor's professional design services are subject to requirements of project's Conditions for Construction Contract.
- B. Base design on performance and/or design criteria indicated in individual specification sections.
 - 1. Submit a Request for Information to Engineer if the criteria indicated are not sufficient to perform required design services.
- C. Scope of Contractor's Professional Design Services: Provide for the following items of work:
 - 1. Scaffolding and shoring design.
 - 2. Any other additional services provided by the design documents.

1.7 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Design Data: Submit for Engineer's knowledge as contract administrator for the limited purpose of assessing compliance with information given and the design concept expressed in the Contract Documents, or for Owner's information.
 - 1. Include calculations that have been used to demonstrate compliance to performance and regulatory criteria provided, and to determine design solutions.
 - 2. Include required product data and shop drawings.
 - 3. Include a statement or certification attesting that design data complies with criteria indicated, such as building codes, loads, functional, and similar engineering requirements.
 - 4. Include signature and seal of design professional responsible for allocated design services on calculations and drawings.
- C. Test Reports: After each test/inspection, promptly submit two copies of report to Engineer and to Contractor.
 - 1. Include:
 - a. Date issued.
 - b. Project title and number.
 - c. Name of inspector.
 - d. Date and time of sampling or inspection.
 - e. Identification of product and specifications section.
 - f. Location in the Project.
 - g. Type of test/inspection.
 - h. Date of test/inspection.
 - i. Results of test/inspection.
 - j. Compliance with Contract Documents.
 - k. When requested by Engineer, provide interpretation of results.
 - 2. Test report submittals are for Engineer's knowledge as contract administrator for the limited purpose of assessing compliance with information given and the design concept expressed in the Contract Documents, or for Owner's information.
- D. Certificates: When specified in individual specification sections, submit certification by the manufacturer and Contractor or installation/application subcontractor to Design Team, in quantities specified for Product Data.
 - 1. Indicate material or product complies with or exceeds specified requirements. Submit supporting reference data, affidavits, and certifications as appropriate.

2. Certificates may be recent or previous test results on material or product, but must be acceptable to Engineer.
- E. Manufacturer's Instructions: When specified in individual specification sections, submit printed instructions for delivery, storage, assembly, installation, start-up, adjusting, and finishing, for the Owner's information. Indicate special procedures, perimeter conditions requiring special attention, and special environmental criteria required for application or installation.

1.8 REFERENCES AND STANDARDS

- A. For products and workmanship specified by reference to a document or documents not included in the Project Manual, also referred to as reference standards, comply with requirements of the standard, except when more rigid requirements are specified or are required by applicable codes.
- B. Comply with reference standard of date of issue current on date of Contract Documents, except where a specific date is established by applicable code.
- C. Obtain copies of standards where required by product specification sections.
- D. Maintain copy at project site during submittals, planning, and progress of the specific work, until Substantial Completion.
- E. Should specified reference standards conflict with Contract Documents, request clarification from Engineer before proceeding.
- F. Neither the contractual relationships, duties, or responsibilities of the parties in Contract nor those of Design Team shall be altered from Contract Documents by mention or inference otherwise in any reference document.

1.9 TESTING AND INSPECTION AGENCIES AND SERVICES

- A. Contractor shall employ and pay for services of an independent testing agency to perform specified testing.
- B. Employment of agency in no way relieves Contractor of obligation to perform Work in accordance with requirements of Contract Documents.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.1 CONTROL OF INSTALLATION

- A. Monitor quality control over suppliers, manufacturers, products, services, site conditions, and workmanship, to produce work of specified quality.
- B. Comply with manufacturers' instructions, including each step in sequence.
- C. Should manufacturers' instructions conflict with Contract Documents, request clarification from Architect before proceeding.
- D. Comply with specified standards as minimum quality for the work except where more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.
- E. Have work performed by persons qualified to produce required and specified quality.
- F. Verify that field measurements are as indicated on shop drawings or as instructed by the manufacturer.
- G. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion, and disfigurement.

3.2 MOCK-UPS

- A. Before installing portions of the Work where mock-ups are required, construct mock-ups for each form of construction and finish required to comply with the following requirements, using materials indicated for the completed Work. The purpose of mock-up is to demonstrate the proposed range of aesthetic effects and workmanship.

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

3.3 TOLERANCES

- A. Monitor fabrication and installation tolerance control of products to produce acceptable Work. Do not permit tolerances to accumulate.
- B. Comply with manufacturers' tolerances. Should manufacturers' tolerances conflict with Contract Documents, request clarification from Architect before proceeding.
- C. Adjust products to appropriate dimensions; position before securing products in place.

3.4 TESTING AND INSPECTION

- A. See Section 01 4533.
- B. Re-testing required because of non-compliance with specified requirements shall be paid for by Contractor.

3.5 MANUFACTURERS' FIELD SERVICES

- A. When specified in individual specification sections, require material or product suppliers or manufacturers to provide qualified staff personnel to observe site conditions, conditions of surfaces and installation, quality of workmanship, start-up of equipment, test, adjust, and balance equipment as applicable, and to initiate instructions when necessary.
- B. Report observations and site decisions or instructions given to applicators or installers that are supplemental or contrary to manufacturers' written instructions.

3.6 DEFECT ASSESSMENT

- A. Replace Work or portions of the Work not complying with specified requirements.
- B. If, in the opinion of Engineer, it is not practical to remove and replace the work, Engineer will direct an appropriate remedy or adjust payment.

END OF SECTION

SECTION 01 4533 SPECIAL INSPECTIONS AND PROCEDURES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Code-required special inspections.
- B. Testing services incidental to special inspections.
- C. Submittals.
- D. Manufacturers' field services.
- E. Fabricators' field services.

1.2 DEFINITIONS

- A. Code or Building Code: ICC (IBC), International Building Code, most recent edition adopted by authority having jurisdiction, including all applicable amendments and supplements without limitation, and specifically Chapter 17 - Special Inspections and Tests.
- B. Authority Having Jurisdiction (AHJ): Agency or individual officially empowered to enforce the building, fire and life safety code requirements of the permitting jurisdiction in which the Project is located.
- C. NIST: National Institute of Standards and Technology.
- D. Special Inspections and Tests: Inspections and testing of materials, installation, fabrication, erection, or placement of components and connections mandated by Building Code to safeguard public welfare.
 - 1. Special inspections and tests are separate from and independent of tests and inspections conducted by Owner or Contractor for purposes of quality assurance and contract administration.

1.3 REFERENCE STANDARDS

- A. ASTM E329 - Standard Specification for Agencies Engaged in Construction Inspection, Testing, or Special Inspection; 2025a.
- B. IAS AC89 - Accreditation Criteria for Testing Laboratories; 2021.
- C. IAS AC291 - Accreditation Criteria for Special Inspection Agencies AC291; 2025.
- D. ICC (IBC) - International Building Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

1.4 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements for submittal procedures.
- B. Testing & Special Inspection Agency Qualifications: Prior to start of work, Special Inspection Agency is required to:
 - 1. Submit agency name, address, and telephone number, names of full time registered Engineer and responsible officer.
 - 2. Submit copy of report of laboratory facilities inspection made by NIST Construction Materials Reference Laboratory during most recent inspection, with memorandum of remedies of any deficiencies reported by the inspection.
 - 3. Submit certification that Special Inspection Agency is acceptable to AHJ.
 - 4. Submit documentation that Special Inspection Agency is accredited by IAS according to IAS AC291.
- C. Special Inspection Reports: After each special inspection, Special Inspector is required to submit at least two copies of report; one to Engineer and one to AHJ.
 - 1. Include:
 - a. Date issued.
 - b. Project title and number.
 - c. Name of Special Inspector.

- d. Date and time of special inspection.
 - e. Identification of product and specifications section.
 - f. Location in the Project.
 - g. Type of special inspection.
 - h. Date of special inspection.
 - i. Results of special inspection.
 - j. Compliance with contract documents.
- D. Fabricator's Inspection Reports: When required by AHJ, submit reports to Engineer and AHJ.

1.5 SPECIAL INSPECTION AND TESTING AGENCY

- A. General Contractor to employ services of Special Inspection Agency to perform inspections and associated testing and sampling in accordance with ASTM E329 and required by building code.
- B. Employment of agency in no way relieves Contractor of obligation to perform work in accordance with requirements of contract documents.

1.6 TESTING AND INSPECTION AGENCIES

- A. Owner may employ services of independent testing agency to perform additional testing and sampling required by contract documents or associated with special inspections but not required by building code.
- B. Employment of agency in no way relieves Contractor of obligation to perform work in accordance with requirements of contract documents.

1.7 QUALITY ASSURANCE

- A. Special Inspection Agency Qualifications:
 - 1. Independent firm specializing in performing testing and inspections of the type specified in this section.
 - 2. Accredited by IAS according to IAS AC291.
- B. Testing Agency Qualifications:
 - 1. Independent firm specializing in performing testing and inspections of the type specified in this section.
 - 2. Accredited by IAS according to IAS AC89.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.1 SPECIAL INSPECTIONS AND TESTING

- A. The Code requires special inspections and testing of certain materials, components, assemblies, and connections used in constructing the project. Special inspections and testing will be performed in accordance with the Code.
- B. Special inspections and testing will be performed in accordance with the Code for the following materials and project components:
 - 1. Steel.
 - 2. Masonry.

3.2 SPECIAL INSPECTION AGENCY DUTIES AND RESPONSIBILITIES

- A. Special Inspection Agency shall:
 - 1. Verify samples submitted by Contractor comply with the referenced standards and the approved Contract Documents.
 - 2. Provide qualified personnel at site. Cooperate with Engineer and Contractor in performance of services.
 - 3. Perform specified sampling and testing of products in accordance with specified reference standards.
 - 4. Ascertain compliance of materials and products with requirements of Contract Documents.

5. Promptly notify Engineer and Contractor of observed irregularities or non-compliance of work or products.
 6. Perform additional tests and inspections required by Engineer.
 7. Submit reports of all tests or inspections specified.
- B. Limits on Special Inspection Agency Authority:
1. Agency may not release, revoke, alter, or enlarge on requirements of Contract Documents.
 2. Agency may not approve or accept any portion of the work.
 3. Agency may not assume any duties of Contractor.
 4. Agency has no authority to stop the work.
- C. Re-testing required because of non-compliance with specified requirements shall be performed by the same agency on instructions by Engineer.
- D. Re-testing required because of non-compliance with specified requirements shall be paid for by Contractor.

3.3 TESTING AGENCY DUTIES AND RESPONSIBILITIES

- A. Testing Agency Duties:
1. Test samples submitted by Contractor.
 2. Provide qualified personnel at site. Cooperate with Engineer and Contractor in performance of services.
 3. Perform specified sampling and testing of products in accordance with specified standards.
 4. Ascertain compliance of materials and mixes with requirements of Contract Documents.
 5. Promptly notify Engineer and Contractor of observed irregularities or non-compliance of work or products.
 6. Perform additional tests and inspections required by Engineer.
 7. Submit reports of all tests or inspections specified.
- B. Limits on Testing or Inspection Agency Authority:
1. Agency may not release, revoke, alter, or enlarge on requirements of Contract Documents.
 2. Agency may not approve or accept any portion of the work.
 3. Agency may not assume any duties of Contractor.
 4. Agency has no authority to stop the work.
- C. On instructions by Engineer, perform re-testing required because of non-compliance with specified requirements, using the same agency.
- D. Contractor will pay for re-testing required because of non-compliance with specified requirements.

3.4 CONTRACTOR DUTIES AND RESPONSIBILITIES

- A. Contractor Responsibilities, General:
1. Deliver to agency at designated location, adequate samples of materials for special inspections that require material verification.
 2. Cooperate with agency and laboratory personnel; provide access to approved documents at project site, to the work, to manufacturers' facilities, and to fabricators' facilities.
 3. Provide incidental labor and facilities:
 - a. To provide access to work to be tested or inspected.
 - b. To obtain and handle samples at the site or at source of Products to be tested or inspected.
 - c. To facilitate tests or inspections.
 - d. To provide storage and curing of test samples.
 4. Notify Engineer and laboratory 48 hours prior to expected time for operations requiring testing or inspection services.

5. Arrange with Owner's agency and pay for additional samples, tests, and inspections required by Contractor beyond specified requirements.
6. Retain special inspection records.

3.5 FABRICATORS' FIELD SERVICES

- A. When required by AHJ or specified in individual specification sections, require fabricators to provide qualified staff personnel to observe site conditions, installation conditions, quality of workmanship, and start-up of equipment and systems and to initiate instructions when necessary.
- B. Submit qualifications of observer to Engineer 30 days in advance of required observations.
- C. Report observations and site decisions or instructions given to applicators or installers that are supplemental or contrary to manufacturers' written instructions.

END OF SECTION

PROJECT NAME:	_____	PROJECT LOCATION/ADDRESS:	_____
PROJECT MGR:	_____	EMAIL/PHONE:	_____
TESTING AGENCY:	_____	AGENCY ADDRESS:	_____
AGENCY CONTACT:	_____	AGENCY CONTACT EMAIL/CELL:	_____
AHJ:	_____	AHJ PHONE NUMBER:	_____

DESIGN PROFESSIONAL RECOMMENDATIONS: Per the associated design documents (plans and specifications) the following list of requirements for specialty inspection is recommended by Axiom Consultants and our engineering staff. The requirements should not be construed as the final requirements for the project as that will be determined by the Authority Having Jurisdiction (AHJ) over the project. This list can be provided to the AHJ at their request as the formal suggestions/requirements by the Engineer(s) of Record on the project. If a form is required for the AHJ approval – i.e. one that requires signatures and names of said EOR(s) that form can be supplemented with this one to finalize overall project requirements. The testing agency should review this list against the plans and specification and amend it/expand on it as necessary.

IBC #	Discipline	Description	Applicable	Not-Applicable	Continuous	Periodic
1705.2	S	Steel Construction	X			X
Periodic visual weld inspection for welded steel connections as shown on the plans.						
1705.3	S	Concrete Construction		X		
1705.4	S	Masonry Construction	X			X
Periodic testing of grout/mortar samples for masonry construction. Minimum 1 set/cubs each day of placement.						
1705.5	S	Wood Construction		X		
1705.6	C	Soils		X		
1705.7	S	Driven Deep Foundation		X		
1705.8	S	Cast-in-Place Deep Foundation		X		
1705.9	S	Helical Pile Foundation		X		
1705.10	S	Structural Integrity of Deep Foundation		X		
1705.11	S	Fabricated Items		X		
1705.12	S	Special Inspections for Wind Resistance		X		
1705.15	A	Sprayed-Fire Resistant Materials		X		
1705.16	A	Mastic and Intumescent Fire Coatings		X		
1705.17	A	Exterior Ins and Finish Systems (EIFS)		X		
1705.18	A	Fire-Resistant Penetrations/Joints		X		
1705.19	A	Testing for Smoke Control		X		
1705.20	S	Sealing Mass Timber		X		
1705.1.1	-	Special Cases		X		

SECTION 01 5000 TEMPORARY FACILITIES AND CONTROLS

PART 1 GENERAL

1.1 SECTION INCLUDES

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

1.2 REFERENCE STANDARDS

- A. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2024.
- B. ASTM E90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements; 2023.

1.3 GENERAL

- A. Install temporary facilities and utilities in conformance with State and Local Codes and Requirements.
- B. Trade Contractors to obtain and pay for required applications, permits and inspections.
- C. Early Service: Any Contractor requiring temporary service before it can be provided as specified, or whose requirements with respect to a particular service differ from the service specified shall provide such service as it suits the needs, at their own expense and in a manner satisfactory to the Project Coordinator.
- D. Maintenance: Temporary facilities and utilities are to be maintained and kept in good operating condition. Maintenance personnel necessary to perform this work shall be provided in accordance with requirements. Maintenance time will include normal working hours for all trades and start up and shut down overtime is required.
- E. Removals: Subject to approval of Project Coordinator, contractor providing temporary facilities or services shall remove this temporary facilities or services when no longer required or when the function is replaced by authorized use of permanent facilities, unless directed otherwise by Project Coordinator.
- F. Install temporary work in such a manner as to not interfere with the permanent construction.
- G. Disclaimer: Specific administrative and procedural minimum actions are specified in this section, as an extension of provisions in General Conditions and other contract documents. These requirements have been included for special purposes as indicated. Nothing in this section is intended to limit types and amounts of temporary work required, and no omission from this section will be recognized as an indication by Engineer, Architect or Project Coordinator that such temporary activity is not required for successful completion of the work and compliance with requirements of contract documents. Provisions of this section are applicable to, but not limited to, utility services, construction facilities, security and protection provisions, and support facilities.
- H. Use of permanent systems and facilities:
 - 1. Obtain written agreement with Owner, establishing start of warranties and conditions of use:
 - a. Systems complete, with utility connections and safety devices.
 - b. Temporary filters and items required for protection of equipment and finishes are in place.
 - c. Replace items damaged during temporary service use.

1.4 TEMPORARY UTILITIES

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

1.5 TELECOMMUNICATIONS SERVICES

- A. Provide, maintain, and pay for telecommunications services to field office at time of project mobilization.
- B. Telecommunications services shall include:
 - 1. Internet Connections: Minimum of one; DSL modem or faster.
 - 2. Communications and correspondence:
 - a. Superintendent must be able to be reached via mobile phone and via email.

1.6 TEMPORARY SANITARY FACILITIES

- A. Provide and maintain temporary toilet facilities at time of project mobilization.
- B. Use of existing facilities is not permitted.
- C. Maintain daily in clean and sanitary condition.

1.7 BARRIERS

- A. Provide barriers to prevent unauthorized entry to construction areas, to prevent access to areas that could be hazardous to workers or the public, to allow for owner's use of site and to protect existing facilities and adjacent properties from damage from construction operations and demolition.
 - 1. Schematic for barrier installation is provided on site exhibit plan page.
- B. Provide barricades and covered walkways required by governing authorities for public rights-of-way and for public access to existing building.
- C. Protect non-owned vehicular traffic, stored materials, site, and structures from damage.
- D. Traffic Controls: Barriers are to be used during road and lane closures and to be coordinated with the Owner..

1.8 FENCING

- A. Optional: Per General Contractor desire/requirements, provide fence around construction site; equip with vehicular and pedestrian gates with locks.

1.9 WEATHER PROTECTION

- A. Protect work and existing or adjacent property against weather, to maintain work, materials apparatus, equipment and fixtures free from injury or damage in accordance with the General Conditions during the entire construction period. Work damaged by failure to provide weather protection all be removed and replaced with new work at the contractor's expense.
- B. Provide temporary non-staining waterproof coverings to close-off cavities and shed water to exterior and lap wall assemblies not less than 4 inches. Maintain in watertight condition until permanent coverings are in place.
- C. Remove all snow and ice as may be required for proper protection and execution of the work, protection and safety of the public, and to maintain laydown and construction areas.

1.10 PROTECTION OF EXISTING WORK

- A. Provide temporary protection of existing floor, walls, ceilings and roof that will be exposed to construction traffic.
- B. Cover floors and walls with 1/4 inch minimum plywood, masonite or OSB, separated with red rosin paper and held in place by methods that will not damage existing finishes.
- C. Temporary protection will need to be applied depending on the demo phasing plan and schedule. Contractor to coordinate with Design Team and Owner.

1.11 SECURITY

- A. Provide security and facilities to protect Work, existing facilities, and Owner's operations from unauthorized entry, vandalism, or theft.

- B. Any interior access that is required during the project must be coordinated with the County and Sheriff personnel per the security requirements of the facility.

1.12 VEHICULAR ACCESS AND PARKING - SEE SECTION 01 5500

- A. Comply with regulations relating to use of streets and sidewalks, access to emergency facilities, and access for emergency vehicles.
- B. Coordinate access and haul routes with governing authorities and Owner.
- C. Provide and maintain access to fire hydrants, free of obstructions.
- D. Provide means of removing mud from vehicle wheels before entering streets.
- E. Provide temporary parking areas to accommodate construction personnel. When site space is not adequate, provide additional off-site parking.
 - 1. Coordination for use of City owned parking facilities must be coordinated by General Contractor, including meter hoods.
 - 2. Construction site parking for General Contractor personnel can be provided within designated work area as space allows.

1.13 WASTE REMOVAL

- A. Provide waste removal facilities and services as required to maintain the site in clean and orderly condition.
- B. Provide containers with lids. Remove trash from site weekly.
- C. Vehicles, trailers, carts, etc. being used to transport trash and demolished materials shall be loaded in a safe manner, materials shall not protrude beyond the sides of the transport being used.
- D. Materials shall not be throw or dropped from scaffolds or other overhead areas.
- E. Open free-fall chutes are not permitted. Terminate closed chutes, as needed, into appropriate containers with lids.

1.14 FIELD OFFICES - SEE SECTION 01 5213

- A. Office: Weathertight, with lighting, electrical outlets, heating, cooling equipment, and equipped with sturdy furniture, drawing rack, and drawing display table.
- B. Provide space for Project meetings, with table and chairs to accommodate four (4) persons.
- C. Expenses incurred and associated with the field office including utility installation costs shall be included in their bid.
- D. General Contractor is to keep a complete and current set of plans and specifications on file in their office. Construction documents are to include revision mark-ups, addendum, as-built drawings. Contractor to also keep on file permits and approved shop drawings.

1.15 REMOVAL OF UTILITIES, FACILITIES, AND CONTROLS

- A. Remove temporary utilities, equipment, facilities, materials, prior to Date of Substantial Completion inspection.
- B. Clean and repair damage caused by installation or use of temporary work.
- C. Restore existing facilities used during construction to original condition.
- D. Restore new permanent facilities used during construction to specified condition.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01 5213 FIELD OFFICES AND SHEDS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Temporary field offices for use of Contractor.

1.2 RELATED REQUIREMENTS

- A. Section 01 5000 - Temporary Facilities and Controls:

1.3 USE OF PERMANENT FACILITIES

- A. Not Applicable.

PART 2 PRODUCTS

2.1 MATERIALS, EQUIPMENT, FURNISHINGS

- A. Materials, Equipment, Furnishings: Serviceable, new or used, adequate for required purpose.

2.2 CONSTRUCTION

- A. Construction: Structurally sound, secure, weather tight enclosures for office. Maintain during progress of Work; remove when no longer needed.
- B. Exterior Materials: Weather resistant, finished in one color.
- C. Interior Materials in Offices: Sheet type materials for walls and ceilings, prefinished or painted; resilient floors and bases.
- D. Lighting for Offices: 50 fc at desk top height, exterior lighting at entrance doors.
- E. Fire Extinguishers: Appropriate type fire extinguisher at each office.

2.3 CONTRACTOR OFFICE AND FACILITIES

- A. Size: For Contractor's needs and to provide space for project meetings.
- B. Furnishings in Meeting Area: Table and chairs to seat at least four persons; racks and files for Contract Documents, submittals, and project record documents.
- C. Other Furnishings: Contractor's option.

PART 3 EXECUTION

3.1 PREPARATION

- A. Fill and grade sites for temporary structures to provide drainage away from buildings.

3.2 INSTALLATION

- A. Install office spaces ready for occupancy 15 days after date fixed in Notice to Proceed.
- B. Parking: 1 hard surfaced parking spaces for use by Owner and Architect, connected to office by hard surfaced walk.

3.3 REMOVAL

- A. At completion of Work remove buildings, foundations, utility services, and debris. Restore areas.

END OF SECTION

**SECTION 01 5500
VEHICULAR ACCESS AND PARKING**

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Access roads.
- B. Parking.
- C. Existing pavements and parking areas.
- D. Permanent pavements and parking facilities.
- E. Construction parking controls.
- F. Haul routes.
- G. Maintenance.
- H. Removal, repair.
- I. Mud from site vehicles.

1.2 RELATED REQUIREMENTS

- A. Section 01 5813 - Temporary Project Signage: Post Mounted and Wall Mounted Traffic Control and Informational Signs.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Temporary Construction: Contractor's option.

PART 3 EXECUTION

3.1 PREPARATION

- A. Clear areas, provide surface and storm drainage of road, parking, area premises, and adjacent areas.

3.2 ACCESS ROADS

- A. Use of existing on-site streets for construction traffic is not permitted unless approved by AHJ.
- B. Tracked vehicles not allowed on paved areas.
- C. Location as approved by Architect.
- D. Provide unimpeded access for emergency vehicles. Maintain 20 foot width driveways with turning space between and around combustible materials.
- E. Provide and maintain access to fire hydrants free of obstructions.

3.3 PARKING

- A. Arrange for temporary parking areas to accommodate use of construction personnel.
- B. When site space is not adequate, provide additional off-site parking.
- C. Locate as indicated.

3.4 CONSTRUCTION PARKING CONTROL

- A. Control vehicular parking to prevent interference with public traffic and parking, access by emergency vehicles, and Owner's operations.

3.5 HAUL ROUTES

- A. Consult with authority having jurisdiction, establish public thoroughfares to be used for haul routes and site access.
- B. Confine construction traffic to designated haul routes.
- C. Provide traffic control at critical areas of haul routes to regulate traffic, to minimize interference with public traffic.

3.6 MAINTENANCE

- A. Maintain traffic and parking areas in a sound condition free of excavated material, construction equipment, products, mud, snow, and ice.
- B. Maintain existing paved areas used for construction; promptly repair breaks, potholes, low areas, standing water, and other deficiencies, to maintain paving and drainage in original, or specified, condition.

3.7 REMOVAL, REPAIR

- A. Repair existing facilities damaged by use, to original condition.
- B. Repair damage caused by installation.

3.8 MUD FROM SITE VEHICLES

- A. Provide means of removing mud from vehicle wheels before entering streets.

END OF SECTION

**SECTION 01 5713
TEMPORARY EROSION AND SEDIMENT CONTROL**

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Prevention of erosion due to construction activities.
- B. Prevention of sedimentation of waterways, open drainage ways, and storm and sanitary sewers due to construction activities.
- C. Restoration of areas eroded due to insufficient preventive measures.
- D. Compensation of Owner for fines levied by authorities having jurisdiction due to non-compliance by Contractor.

1.2 REFERENCE STANDARDS

- A. EPA (NPDES) - National Pollutant Discharge Elimination System (NPDES), Construction General Permit; Current Edition.
- B. FHWA FLP-94-005 - Best Management Practices for Erosion and Sediment Control; 1995.
- C. Local Stormwater/Runoff regulations for Authority Having Jurisdiction.

1.3 PERFORMANCE REQUIREMENTS

- A. Comply with requirements of EPA (NPDES) for erosion and sedimentation control, as specified by the NPDES, for Phases I and II, and in compliance with requirements of Construction General Permit (CGP.)
- B. Develop and follow an Erosion and Sedimentation Prevention Plan and submit periodic inspection reports.
- C. Do not begin clearing, grading, or other work involving disturbance of ground surface cover until applicable permits have been obtained; furnish all documentation required to obtain applicable permits.
- D. Timing: Put preventive measures in place as soon as possible after disturbance of surface cover and before precipitation occurs.
- E. Storm Water Runoff: Control increased storm water runoff due to disturbance of surface cover due to construction activities for this project.
 - 1. Prevent runoff into storm and sanitary sewer systems, including open drainage channels, in excess of actual capacity or amount allowed by authorities having jurisdiction, whichever is less.
- F. Erosion On Site: Minimize wind, water, and vehicular erosion of soil on project site due to construction activities for this project.
 - 1. Control movement of sediment and soil from temporary stockpiles of soil.
 - 2. Prevent development of ruts due to equipment and vehicular traffic.
 - 3. If erosion occurs due to non-compliance with these requirements, restore eroded areas at no cost to Owner.
- G. Erosion Off Site: Prevent erosion of soil and deposition of sediment on other properties caused by water leaving the project site due to construction activities for this project.
 - 1. Prevent windblown soil from leaving the project site.
 - 2. Prevent tracking of mud onto public roads outside site.
 - 3. Prevent mud and sediment from flowing onto sidewalks and pavements.
 - 4. If erosion occurs due to non-compliance with these requirements, restore eroded areas at no cost to Owner.
- H. Sedimentation of Waterways On Site: Prevent sedimentation of waterways on the project site, including rivers, streams, lakes, ponds, open drainage ways, storm sewers, and sanitary sewers.

1. If sedimentation occurs, install or correct preventive measures immediately at no cost to Owner; remove deposited sediments; comply with requirements of authorities having jurisdiction.
2. If sediment basins are used as temporary preventive measures, pump dry and remove deposited sediment after each storm.
- I. Sedimentation of Waterways Off Site: Prevent sedimentation of waterways off the project site, including rivers, streams, lakes, ponds, open drainage ways, storm sewers, and sanitary sewers.
 1. If sedimentation occurs, install or correct preventive measures immediately at no cost to Owner; remove deposited sediments; comply with requirements of authorities having jurisdiction.
- J. Open Water: Prevent standing water that could become stagnant.
- K. Maintenance: Maintain temporary preventive measures until permanent measures have been established.

1.4 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Inspection Reports: Submit report of each inspection; identify each preventive measure, indicate condition, and specify maintenance or repair required and accomplished.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Mulch: Use one of the following:
 1. Straw or hay.
 2. Wood waste, chips, or bark.
 3. Erosion control matting or netting.
- B. Grass Seed For Temporary Cover: Select a species appropriate to climate, planting season, and intended purpose. If same area will later be planted with permanent vegetation, do not use species known to be excessively competitive or prone to volunteer in subsequent seasons.
- C. Silt Fence Fabric: Polypropylene geotextile resistant to common soil chemicals, mildew, and insects; non-biodegradable; in longest lengths possible; fabric including seams with the following minimum average roll lengths:
 1. Average Opening Size: 30 U.S. Std. Sieve, maximum, when tested in accordance with ASTM D4751.
 2. Permittivity: 0.05 sec^{-1} , minimum, when tested in accordance with ASTM D4491.
 3. Ultraviolet Resistance: Retaining at least 70 percent of tensile strength, when tested in accordance with ASTM D4355/D4355M after 500 hours exposure.
 4. Tensile Strength: 100 pounds-force, minimum, in cross-machine direction; 124 pounds-force, minimum, in machine direction; when tested in accordance with ASTM D4632/D4632M.
 5. Elongation: 15 to 30 percent, when tested in accordance with ASTM D4632/D4632M.
 6. Tear Strength: 55 pounds-force, minimum, when tested in accordance with ASTM D4533/D4533M.
 7. Color: Manufacturer's standard, with embedment and fastener lines preprinted.
- D. Silt Fence Posts: One of the following, minimum 5 feet long:
 1. Steel U- or T-section, with minimum mass of 1.33 pound per linear foot.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine site and identify existing features that contribute to erosion resistance; maintain such existing features to greatest extent possible.

3.2 PREPARATION

- A. Schedule work so that soil surfaces are left exposed for the minimum amount of time.

3.3 SCOPE OF PREVENTIVE MEASURES

- A. Construction Entrances: Traffic-bearing aggregate surface. Large enough to knock off dirt and store it in void spaces. Required at all entry points to project.
 - 1. Width: As required; 20 feet, minimum.
 - 2. Length: 30 feet, minimum.
 - 3. Provide at each construction entrance from public right-of-way.
 - 4. Where necessary to prevent tracking of mud onto right-of-way, provide wheel washing area out of direct traffic lane, with drain into sediment trap or basin.
- B. Linear Sediment Barriers: Made of silt fences.
 - 1. Provide linear sediment barriers:
 - a. Along downhill perimeter edge of disturbed areas, including soil stockpiles.
 - 2. Space sediment barriers with the following maximum slope length upslope from barrier:
 - a. Slope of Less Than 2 Percent: 100 feet..
 - b. Slope Between 2 and 5 Percent: 75 feet.
 - c. Slope Between 5 and 10 Percent: 50 feet.
 - d. Slope Between 10 and 20 Percent: 25 feet.
 - e. Slope Over 20 Percent: 15 feet.
- C. Storm Drain Curb Inlet Sediment Trap: Protect each curb inlet using one of the following measures:
 - 1. Filter fabric wrapped around hollow concrete blocks blocking entire inlet face area; use one piece of fabric wrapped at least 1-1/2 times around concrete blocks and secured to prevent dislodging; orient cores of blocks so runoff passes into inlet.
 - 2. Straw bale row blocking entire inlet face area; anchor into pavement.
- D. Soil Stockpiles: Protect using one of the following measures:
 - 1. Cover with mulch at least 4 inches thickness of pine needles, sawdust, bark, wood chips, or shredded leaves, or 6 inches of straw or hay.
- E. Mulching: Use only for areas that may be subjected to erosion for less than 6 months.
 - 1. Wood Waste: Use only on slopes 3:1 or flatter; no anchoring required.
- F. Temporary Seeding: Use where temporary vegetated cover is required.

3.4 INSTALLATION

- A. Silt Fences:
 - 1. Store and handle fabric in accordance with ASTM D4873/D4873M.
 - 2. Where slope gradient is less than 3:1 or barriers will be in place less than 6 months, use nominal 16 inch high barriers with minimum 36 inch long posts spaced at 6 feet maximum, with fabric embedded at least 4 inches in ground.
 - 3. Where slope gradient is steeper than 3:1 or barriers will be in place over 6 months, use nominal 28 inch high barriers, minimum 48 inch long posts spaced at 6 feet maximum, with fabric embedded at least 6 inches in ground.
 - 4. Where slope gradient is steeper than 3:1 and vertical height of slope between barriers is more than 20 feet, use nominal 32 inch high barriers with woven wire reinforcement and steel posts spaced at 4 feet maximum, with fabric embedded at least 6 inches in ground.
 - 5. Install with top of fabric at nominal height and embedment as specified.
 - 6. Do not splice fabric width; minimize splices in fabric length; splice at post only, overlapping at least 18 inches, with extra post.
 - 7. Fasten fabric to steel posts using wire, nylon cord, or integral pockets.
 - 8. Wherever runoff will flow around end of barrier or over the top, provide temporary splash pad or other outlet protection; at such outlets in the run of the barrier, make barrier not more than 12 inches high with post spacing not more than 4 feet.
- B. Temporary Seeding:

1. When hydraulic seeder is used, seedbed preparation is not required.
2. When surface soil has been sealed by rainfall or consists of smooth undisturbed cut slopes, and conventional or manual seeding is to be used, prepare seedbed by scarifying sufficiently to allow seed to lodge and germinate.
3. If temporary mulching was used on planting area but not removed, apply nitrogen fertilizer at 1 pound per 1000 sq ft.
4. On soils of very low fertility, apply 10-10-10 fertilizer at rate of 12 to 16 pounds per 1000 sq ft.
5. Incorporate fertilizer into soil before seeding.
6. Apply seed uniformly; if using drill or cultipacker seeders place seed 1/2 to 1 inch deep.
7. Irrigate as required to thoroughly wet soil to depth that will ensure germination, without causing runoff or erosion.
8. Repeat irrigation as required until grass is established.

3.5 MAINTENANCE

- A. Inspect preventive measures weekly.
- B. Repair deficiencies immediately if possible and never more than 72 hours after notice. Log all repairs and record dates and actions on SWPPP plan markup.
- C. Silt Fences:
 1. Promptly replace fabric that deteriorates unless need for fence has passed.
 2. Remove silt deposits that exceed one-third of the height of the fence.
 3. Repair fences that are undercut by runoff or otherwise damaged, whether by runoff or other causes.
- D. Clean out temporary sediment control structures weekly and relocate soil on site.
- E. Place sediment in appropriate locations on site; do not remove from site.

3.6 CLEAN UP

- A. Remove temporary measures after permanent measures have been installed, unless permitted to remain by Engineer.
- B. Clean out temporary sediment control structures that are to remain as permanent measures.
- C. Where removal of temporary measures would leave exposed soil, shape surface to an acceptable grade and finish to match adjacent ground surfaces.

END OF SECTION

SECTION 01 5813 TEMPORARY PROJECT SIGNAGE

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Project identification sign.
- B. Project informational signs.

PART 2 PRODUCTS

2.1 PROJECT IDENTIFICATION SIGN

- A. One painted sign, 48 sq ft area, bottom 6 feet above ground.
- B. Content:
 - 1. Project number, title, logo and name of Owner as indicated on Contract Documents.
 - 2. Names and titles of Engineer, Architect and Consultants.
 - 3. Name of Prime Contractor and major Subcontractors.
- C. Graphic Design, Colors, Style of Lettering: Designated by Architect.

2.2 PROJECT INFORMATIONAL SIGNS

- A. Provide signage at each field office, storage shed, and directional signs to direct traffic into and within site. Relocate as Work progress requires.
- B. Provide, at walk-ways, pedestrian way-finding signs to direct public through work area and direction to access/enter the building.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install project identification sign within 30 days after date fixed by Notice to Proceed.
- B. Provide all pedestrian way-finding signs prior to the starting of demolition work around the building.
- C. Erect at designated location.
- D. Install sign surface plumb and level, with butt joints. Anchor securely.

3.2 MAINTENANCE

- A. Maintain signs and supports clean, repair deterioration and damage.

3.3 REMOVAL

- A. Remove signs, framing, supports, and foundations at completion of Project and restore the area.

END OF SECTION

SECTION 01 6000 PRODUCT REQUIREMENTS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. General product requirements.
- B. Re-use of existing products.
- C. Transportation, handling, storage and protection.
- D. Product option requirements.
- E. Substitution limitations.
- F. Procedures for Owner-supplied products.
- G. Maintenance materials, including extra materials, spare parts, tools, and software.

1.2 RELATED REQUIREMENTS

- A. Section 00 4325 - Substitution Procedures: Substitutions made during procurement and/or construction phases.
- B. Section 01 4000 - Quality Requirements: Product quality monitoring.
- C. Section 01 6116 - Volatile Organic Compound (VOC) Content Restrictions: Requirements for VOC-restricted product categories.

1.3 SUBMITTALS

- A. Product Data Submittals: Submit manufacturer's standard published data. Mark each copy to identify applicable products, models, options, and other data. Supplement manufacturers' standard data to provide information specific to this Project.
- B. Shop Drawing Submittals: Prepared specifically for this Project; indicate utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.
- C. Sample Submittals: Illustrate functional and aesthetic characteristics of the product, with integral parts and attachment devices. Coordinate sample submittals for interfacing work.
 - 1. For selection from standard finishes, submit samples of the full range of the manufacturer's standard colors, textures, and patterns.

PART 2 PRODUCTS

2.1 EXISTING PRODUCTS

- A. Do not use materials and equipment removed from existing premises unless specifically required or permitted by Contract Documents.
- B. Existing materials and equipment indicated to be removed, but not to be re-used, relocated, reinstalled, delivered to the Owner, or otherwise indicated as to remain the property of the Owner, become the property of the Contractor; remove from site.
- C. Specific Products to be Reused: The reuse of certain materials and equipment already existing on the project site is required.
 - 1. If reuse of other existing materials or equipment is desired, submit substitution request.

2.2 NEW PRODUCTS

- A. Provide new products unless specifically required or permitted by Contract Documents.
- B. See Section 01 4000 - Quality Requirements, for additional source quality control requirements.
- C. Use of products having any of the following characteristics is not permitted:
 - 1. Made using or containing CFC's or HCFC's.
 - 2. Made of wood from newly cut old growth timber.
 - 3. Containing lead, cadmium, or asbestos.
- D. Where other criteria are met, Contractor shall give preference to products that:
 - 1. If used on interior, have lower emissions, as defined in Section 01 6116.

2. If wet-applied, have lower VOC content, as defined in Section 01 6116.
3. Are extracted, harvested, and/or manufactured closer to the location of the project.
4. Result in less construction waste. See Section 01 7419

2.3 PRODUCT OPTIONS

- A. Products Specified by Reference Standards or by Description Only: Use any product meeting those standards or description.
- B. Products Specified by Naming One or More Manufacturers: Use a product of one of the manufacturers named and meeting specifications, no options or substitutions allowed.
- C. Products Specified by Naming One or More Manufacturers with a Provision for Substitutions: Submit a request for substitution for any manufacturer not named.
 1. See Section 01 2500 - Substitution Procedures.

2.4 MAINTENANCE MATERIALS

- A. Furnish extra materials, spare parts, tools, and software of types and in quantities specified in individual specification sections.
- B. Deliver to Project site; obtain receipt prior to final payment.

PART 3 EXECUTION

3.1 SUBSTITUTION LIMITATIONS

- A. See Section 00 4325 - Substitution Procedures.

3.2 TRANSPORTATION AND HANDLING

- A. Package products for shipment in manner to prevent damage; for equipment, package to avoid loss of factory calibration.
- B. If special precautions are required, attach instructions prominently and legibly on outside of packaging.
- C. Coordinate schedule of product delivery to designated prepared areas in order to minimize site storage time and potential damage to stored materials.
- D. Transport and handle products in accordance with manufacturer's instructions.
- E. Transport materials in covered trucks to prevent contamination of product and littering of surrounding areas.
- F. Promptly inspect shipments to ensure that products comply with requirements, quantities are correct, and products are undamaged.
- G. Provide equipment and personnel to handle products by methods to prevent soiling, disfigurement, or damage, and to minimize handling.
- H. Arrange for the return of packing materials, such as wood pallets, where economically feasible.

3.3 STORAGE AND PROTECTION

- A. Provide protection of stored materials and products against theft, casualty, or deterioration.
- B. Designate receiving/storage areas for incoming products so that they are delivered according to installation schedule and placed convenient to work area in order to minimize waste due to excessive materials handling and misapplication.
 1. Structural Loading Limitations: Handle and store products and materials so as not to exceed static and dynamic load-bearing capacities of project floor and roof areas.
- C. Store and protect products in accordance with manufacturers' instructions.
- D. Store with seals and labels intact and legible.
- E. Arrange storage of materials and products to allow for visual inspection for the purpose of determination of quantities, amounts, and unit counts.
- F. Store sensitive products in weathertight, climate-controlled enclosures in an environment favorable to product.
- G. For exterior storage of fabricated products, place on sloped supports above ground.
- H. Provide off-site storage and protection when site does not permit on-site storage or protection.

- I. Protect products from damage or deterioration due to construction operations, weather, precipitation, humidity, temperature, sunlight and ultraviolet light, dirt, dust, and other contaminants.
- J. Comply with manufacturer's warranty conditions, if any.
- K. Do not store products directly on the ground.
- L. Cover products subject to deterioration with impervious sheet covering. Provide ventilation to prevent condensation and degradation of products.
- M. Store loose granular materials on solid flat surfaces in a well-drained area. Prevent mixing with foreign matter.
- N. Prevent contact with material that may cause corrosion, discoloration, or staining.
- O. Provide equipment and personnel to store products by methods to prevent soiling, disfigurement, or damage.
- P. Arrange storage of products to permit access for inspection. Periodically inspect to verify products are undamaged and are maintained in acceptable condition.

END OF SECTION

SECTION 01 6116
VOLATILE ORGANIC COMPOUND (VOC) CONTENT RESTRICTIONS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Requirements for Indoor-Emissions-Restricted products.
- B. Requirements for VOC-Content-Restricted products.

1.2 RELATED REQUIREMENTS

- A. Section 01 3000 - Administrative Requirements: Submittal procedures.
- B. Section 01 4000 - Quality Requirements: Procedures for testing and certifications.
- C. Section 01 6000 - Product Requirements: Fundamental product requirements, substitutions and product options, delivery, storage, and handling.

1.3 DEFINITIONS

- A. Indoor-Emissions-Restricted Products: All products in the following product categories, whether specified or not:
 - 1. Interior paints and coatings applied on site.
 - 2. Interior adhesives and sealants applied on site, including flooring adhesives.
 - 3. Flooring.
 - 4. Composite wood.
 - 5. Products making up wall and ceiling assemblies.
 - 6. Thermal and acoustical insulation.
- B. VOC-Content-Restricted Products: All products in the following product categories, whether specified or not:
 - 1. Interior paints and coatings applied on site.
 - 2. Interior adhesives and sealants applied on site, including flooring adhesives.
 - 3. Wet-applied roofing and waterproofing.
- C. Interior of Building: Anywhere inside the exterior weather barrier.
- D. Adhesives: All gunnable, trowelable, liquid-applied, and aerosol adhesives, whether specified or not; including flooring adhesives, resilient base adhesives, and pipe jointing adhesives.
- E. Sealants: All gunnable, trowelable, and liquid-applied joint sealants and sealant primers, whether specified or not; including firestopping sealants and duct joint sealers.
- F. Inherently Non-Emitting Materials: Products composed wholly of minerals or metals, unless they include organic-based surface coatings, binders, or sealants; and specifically the following:
 - 1. Concrete.
 - 2. Clay brick.
 - 3. Metals that are plated, anodized, or powder-coated.
 - 4. Glass.
 - 5. Ceramics.
 - 6. Solid wood flooring that is unfinished and untreated.

1.4 REFERENCE STANDARDS

- A. 40 CFR 59, Subpart D - National Volatile Organic Compound Emission Standards for Architectural Coatings; U.S. Environmental Protection Agency; Current Edition.
- B. ASTM D3960 - Standard Practice for Determining Volatile Organic Compound (VOC) Content of Paints and Related Coatings; 2025.
- C. CARB (SCM) - Suggested Control Measure for Architectural Coatings; California Air Resources Board; 2020.
- D. SCAQMD 1113 - Architectural Coatings; 1977, with Amendment (2016).
- E. SCAQMD 1168 - Adhesive and Sealant Applications; 1989, with Amendment (2022).

1.5 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: For each VOC-restricted product used in the project, submit evidence of compliance.

1.6 QUALITY ASSURANCE

- A. VOC Content Test Method: 40 CFR 59, Subpart D (EPA Method 24), or ASTM D3960, unless otherwise indicated.
 - 1. Evidence of Compliance: Acceptable types of evidence are:
 - a. Report of laboratory testing performed in accordance with requirements.
- B. Testing Agency Qualifications: Independent firm specializing in performing testing and inspections of the type specified in this section.

PART 2 PRODUCTS

2.1 MATERIALS

- A. All Products: Comply with the most stringent of federal, State, and local requirements, or these specifications.
- B. VOC-Content-Restricted Products: VOC content not greater than required by the following:
 - 1. Adhesives, Including Flooring Adhesives: SCAQMD 1168 Rule.
 - 2. Joint Sealants: SCAQMD 1168 Rule.
 - 3. Paints and Coatings: Each color; most stringent of the following:
 - a. 40 CFR 59, Subpart D.
 - b. SCAQMD 1113 Rule.
 - c. CARB (SCM).
 - 4. Wet-Applied Roofing and Waterproofing: Comply with requirements for paints and coatings.

PART 3 EXECUTION

3.1 FIELD QUALITY CONTROL

- A. Owner reserves the right to reject non-compliant products, whether installed or not, and require their removal and replacement with compliant products at no extra cost to Owner.
- B. Additional costs to restore indoor air quality due to installation of non-compliant products will be borne by Contractor.

END OF SECTION

SECTION 01 7000 EXECUTION AND CLOSEOUT REQUIREMENTS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Examination, preparation, and general installation procedures.
- B. Pre-installation meetings.
- C. Cutting and patching.
- D. Cleaning and protection.
- E. Starting of systems and equipment.
- F. Demonstration and instruction of Owner personnel.
- G. Closeout procedures, including Contractor's Correction Punch List, except payment procedures.
- H. General requirements for maintenance service.

1.2 RELATED REQUIREMENTS

- A. Section 01 1000 - Summary: Limitations on working in existing building; continued occupancy; work sequence; identification of salvaged and relocated materials.
- B. Section 01 3000 - Administrative Requirements: Submittals procedures, Electronic document submittal service.
- C. Section 01 4000 - Quality Requirements: Testing and inspection procedures.
- D. Section 01 5000 - Temporary Facilities and Controls: Temporary exterior enclosures.
- E. Section 01 5000 - Temporary Facilities and Controls: Temporary interior partitions.
- F. Section 01 7800 - Closeout Submittals: Project record documents, operation and maintenance data, warranties, and bonds.
- G. Section 02 4100 - Demolition: Demolition of whole structures and parts thereof; site utility demolition.

1.3 REFERENCE STANDARDS

- A. NFPA 241 - Standard for Safeguarding Construction, Alteration, and Demolition Operations; 2022, with Errata (2021).

1.4 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Demolition Plan: Submit demolition plan as specified by OSHA and local authorities.
 - 1. Indicate extent of demolition, removal sequence, bracing and shoring, and location and construction of barricades and fences. Include design drawings and calculations for bracing and shoring.
- C. Cutting and Patching: Submit written request in advance of cutting or alteration that affects:
 - 1. Structural integrity of any element of Project.
 - 2. Integrity of weather exposed or moisture resistant element.
 - 3. Efficiency, maintenance, or safety of any operational element.
 - 4. Visual qualities of sight exposed elements.
 - 5. Work of Owner or separate Contractor.
 - 6. Include in request:
 - a. Identification of Project.
 - b. Location and description of affected work.
 - c. Necessity for cutting or alteration.
 - d. Description of proposed work and products to be used.
 - e. Effect on work of Owner or separate Contractor.
 - f. Written permission of affected separate Contractor.
 - g. Date and time work will be executed.

- D. Project Record Documents: Accurately record actual locations of capped and active utilities.

1.5 QUALIFICATIONS

- A. For design of temporary shoring and bracing, employ a Professional Engineer experienced in design of this type of work and licensed in the State in which the Project is located.

1.6 PROJECT CONDITIONS

- A. Protect site from puddling or running water.
- B. Ventilate enclosed areas to assist cure of materials, to dissipate humidity, and to prevent accumulation of dust, fumes, vapors, or gases.
- C. Dust Control: Execute work by methods to minimize raising dust from construction operations. Provide positive means to prevent air-borne dust from dispersing into atmosphere and over adjacent property.
- D. Noise Control: Provide methods, means, and facilities to minimize noise produced by construction operations.
1. Outdoors: Per the City requirements.
2. Indoors: Per Jail Manager requirements.
- E. Pollution Control: Provide methods, means, and facilities to prevent contamination of soil, water, and atmosphere from discharge of noxious, toxic substances, and pollutants produced by construction operations. Comply with federal, state, and local regulations.

1.7 COORDINATION

- A. See Section 01 1000 for occupancy-related requirements.
- B. Coordinate scheduling, submittals, and work of the various sections of the Project Manual to ensure efficient and orderly sequence of installation of interdependent construction elements, with provisions for accommodating items installed later.
- C. Notify affected utility companies and comply with their requirements.
- D. Verify that utility requirements and characteristics of new operating equipment are compatible with building utilities. Coordinate work of various sections having interdependent responsibilities for installing, connecting to, and placing in service, such equipment.
- E. Coordinate space requirements, supports, and installation of mechanical and electrical work that are indicated diagrammatically on drawings. Follow routing indicated for pipes, ducts, and conduit, as closely as practicable; place runs parallel with lines of building. Utilize spaces efficiently to maximize accessibility for other installations, for maintenance, and for repairs.
- F. In finished areas except as otherwise indicated, conceal pipes, ducts, and wiring within the construction. Coordinate locations of fixtures and outlets with finish elements.
- G. Coordinate completion and clean-up of work of separate sections.
- H. After Owner occupancy of premises, coordinate access to site for correction of defective work and work not in accordance with Contract Documents, to minimize disruption of Owner's activities.

PART 2 PRODUCTS

2.1 PATCHING MATERIALS

- A. New Materials: As specified in product sections; match existing products and work for patching and extending work.
- B. Type and Quality of Existing Products: Determine by inspecting and testing products where necessary, referring to existing work as a standard.
- C. Product Substitution: For any proposed change in materials, submit request for substitution described in Section 01 6000 - Product Requirements.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that existing site conditions and substrate surfaces are acceptable for subsequent work. Start of work means acceptance of existing conditions.
- B. Verify that existing substrate is capable of structural support or attachment of new work being applied or attached.
- C. Examine and verify specific conditions described in individual specification sections.
- D. Take field measurements before confirming product orders or beginning fabrication, to minimize waste due to over-ordering or misfabrication.
- E. Verify that utility services are available, of the correct characteristics, and in the correct locations.
- F. Prior to Cutting: Examine existing conditions prior to commencing work, including elements subject to damage or movement during cutting and patching. After uncovering existing work, assess conditions affecting performance of work. Beginning of cutting or patching means acceptance of existing conditions.

3.2 PREPARATION

- A. Clean substrate surfaces prior to applying next material or substance.
- B. Seal cracks or openings of substrate prior to applying next material or substance.
- C. Apply manufacturer required or recommended substrate primer, sealer, or conditioner prior to applying any new material or substance in contact or bond.

3.3 PREINSTALLATION MEETINGS

- A. When required in individual specification sections, convene a preinstallation meeting at the site prior to commencing work of the section.
- B. Require attendance of parties directly affecting, or affected by, work of the specific section.
- C. Notify Engineer five days in advance of meeting date.
- D. Prepare agenda and preside at meeting:
 - 1. Review conditions of examination, preparation and installation procedures.
 - 2. Review coordination with related work.
- E. Record minutes and distribute copies within two days after meeting to participants, with electronic copies to Engineer, Architect, Owner, participants, and those affected by decisions made. Submit with the web-based construction management services.

3.4 LAYING OUT THE WORK

- A. Verify locations of survey control points prior to starting work.
- B. Promptly notify Engineer of any discrepancies discovered.
- C. Promptly report to Engineer the loss or destruction of any reference point or relocation required because of changes in grades or other reasons.
- D. Replace dislocated survey control points based on original survey control. Make no changes without prior written notice to Architect.
- E. Utilize recognized engineering survey practices.
- F. Establish elevations, lines and levels. Locate and lay out by instrumentation and similar appropriate means:
 - 1. Site improvements including pavements; stakes for grading, fill and topsoil placement; utility locations, slopes, and invert elevations.
 - 2. Grid or axis for structures.
- G. Periodically verify layouts by same means.
- H. Maintain a complete and accurate log of control and survey work as it progresses.

3.5 GENERAL INSTALLATION REQUIREMENTS

- A. In addition to compliance with regulatory requirements, conduct construction operations in compliance with NFPA 241, including applicable recommendations in Appendix A.

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

3.6 ALTERATIONS

- A. Drawings showing existing construction and utilities are based on casual field observation and existing record documents only.
 - 1. Verify that construction and utility arrangements are as indicated.
 - 2. Report discrepancies to Engineer before disturbing existing installation.
 - 3. Beginning of alterations work constitutes acceptance of existing conditions.
- B. Keep areas in which alterations are being conducted separated from other areas that are still occupied.
 - 1. Provide, erect, and maintain temporary dustproof partitions of construction specified in Section 01 5000 in locations indicated on drawings.
- C. Maintain weatherproof exterior building enclosure except for interruptions required for replacement or modifications; take care to prevent water and humidity damage.
 - 1. Where openings in exterior enclosure exist, provide construction to make exterior enclosure weatherproof.
 - 2. Insulate existing ducts or pipes that are exposed to outdoor ambient temperatures by alterations work.
- D. Remove existing work as indicated and as required to accomplish new work.
 - 1. Remove items indicated on drawings.
 - 2. Relocate items indicated on drawings.
 - 3. Where new surface finishes are to be applied to existing work, perform removals, patch, and prepare existing surfaces as required to receive new finish; remove existing finish if necessary for successful application of new finish.
 - 4. Where new surface finishes are not specified or indicated, patch holes and damaged surfaces to match adjacent finished surfaces as closely as possible.
- E. Services (Including but not limited to HVAC, Plumbing, Fire Protection, Electrical, and Telecommunications): Remove, relocate, and extend existing systems to accommodate new construction.
 - 1. Maintain existing active systems that are to remain in operation; maintain access to equipment and operational components; if necessary, modify installation to allow access or provide access panel.
 - 2. Where existing systems or equipment are not active and Contract Documents require reactivation, put back into operational condition; repair supply, distribution, and equipment as required.
 - 3. Where existing active systems serve occupied facilities but are to be replaced with new services, maintain existing systems in service until new systems are complete and ready for service.
 - a. Disable existing systems only to make switchovers and connections; minimize duration of outages.
 - b. See Section 01 1000 for other limitations on outages and required notifications.
 - c. Provide temporary connections as required to maintain existing systems in service.
 - 4. Verify that abandoned services serve only abandoned facilities.
 - 5. Remove abandoned pipe, ducts, conduits, and equipment, including those above accessible ceilings; remove back to source of supply where possible, otherwise cap stub and tag with identification; patch holes left by removal using materials specified for new construction.

- F. Protect existing work to remain.
 - 1. Prevent movement of structure; provide shoring and bracing if necessary.
 - 2. Perform cutting to accomplish removals neatly and as specified for cutting new work.
 - 3. Repair adjacent construction and finishes damaged during removal work.
- G. Adapt existing work to fit new work: Make as neat and smooth transition as possible.
 - 1. When existing finished surfaces are cut so that a smooth transition with new work is not possible, terminate existing surface along a straight line at a natural line of division and make recommendation to Engineer.
 - 2. Where a change of plane of 1/4 inch or more occurs in existing work, submit recommendation for providing a smooth transition for Engineer review and request instructions.
- H. Patching: Where the existing surface is not indicated to be refinished, patch to match the surface finish that existed prior to cutting. Where the surface is indicated to be refinished, patch so that the substrate is ready for the new finish.
- I. Refinish existing surfaces as indicated:
 - 1. Where rooms or spaces are indicated to be refinished, refinish all visible existing surfaces to remain to the specified condition for each material, with a neat transition to adjacent finishes.
 - 2. If mechanical or electrical work is exposed accidentally during the work, re-cover and refinish to match.
- J. Clean existing systems and equipment.
- K. Remove demolition debris and abandoned items from alterations areas and dispose of off-site; do not burn or bury.
- L. Do not begin new construction in alterations areas before demolition is complete.
 - 1. Contractors to follow demolition phasing plan and schedule.
- M. Comply with all other applicable requirements of this section.

3.7 CUTTING AND PATCHING

- A. Whenever possible, execute the work by methods that avoid cutting or patching.
- B. See Alterations article above for additional requirements.
- C. Perform whatever cutting and patching is necessary to:
 - 1. Complete the work.
 - 2. Fit products together to integrate with other work.
 - 3. Provide openings for penetration of mechanical, electrical, and other services.
 - 4. Match work that has been cut to adjacent work.
 - 5. Repair areas adjacent to cuts to required condition.
 - 6. Repair new work damaged by subsequent work.
 - 7. Remove samples of installed work for testing when requested.
 - 8. Remove and replace defective and non-complying work.
- D. Execute work by methods that avoid damage to other work and that will provide appropriate surfaces to receive patching and finishing. In existing work, minimize damage and restore to original condition.
- E. Employ skilled and experienced installer to perform cutting for weather exposed and moisture resistant elements, and sight exposed surfaces.
- F. Cut rigid materials using masonry saw or core drill. Pneumatic tools not allowed without prior approval.
- G. Restore work with new products in accordance with requirements of Contract Documents.
- H. Fit work tightly to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.
- I. Patching:
 - 1. Finish patched surfaces to match finish that existed prior to patching. On continuous surfaces, refinish to nearest intersection or natural break. For an assembly, refinish entire unit.

2. Match color, texture, and appearance.
3. Repair patched surfaces that are damaged, lifted, discolored, or showing other imperfections due to patching work. If defects are due to condition of substrate, repair substrate prior to repairing finish.

3.8 PROGRESS CLEANING

- A. Maintain areas free of waste materials, debris, and rubbish. Maintain site in a clean and orderly condition.
- B. Remove debris and rubbish from pipe chases, plenums, attics, crawl spaces, and other closed or remote spaces, prior to enclosing the space.
- C. Broom and vacuum clean interior areas prior to start of surface finishing, and continue cleaning to eliminate dust.
- D. Collect and remove waste materials, debris, and trash/rubbish from interior site daily and exterior site weekly, dispose off-site; do not burn or bury.

3.9 PROTECTION OF INSTALLED WORK

- A. Protect installed work from damage by construction operations.
- B. Provide special protection where specified in individual specification sections.
- C. Provide temporary and removable protection for installed products. Control activity in immediate work area to prevent damage.
- D. Provide protective coverings at walls, projections, jambs, sills, and soffits of openings.
- E. Protect finished floors, stairs, and other surfaces from traffic, dirt, wear, damage, or movement of heavy objects, by protecting with durable sheet materials.
- F. Protect work from spilled liquids. If work is exposed to spilled liquids, immediately remove protective coverings, dry out work, and replace protective coverings.
- G. Prohibit traffic or storage upon waterproofed or roofed surfaces. If traffic or activity is necessary, obtain recommendations for protection from waterproofing or roofing material manufacturer.
 1. Contractors to follow their submitted and approved demolition phasing plan and schedule. Coordinate and protect newly installed surfaces or newly installed equipment per the phasing plan.
 2. After completion of work operations on roof, remove temporary protection, restore roof to pre-construction condition, and repair damage to roof, if any; see below:
 - a. Damage/Warranties: Damage to existing roofing due to operations under this Contract to be repaired as required by roofing membrane manufacturer without reduction in Owner's warranty provisions and rights.
 - b. All costs associated with repairs and warranty reinstatements, if any, to be borne by the Contractor who caused the damage.
 - c. Existing Warranties: Coordinate with Owner for areas of roof which carry existing warranty; repairs in these areas, if any, to be made by original installer.
- H. Remove protective coverings when no longer needed; reuse or recycle coverings if possible.

3.10 SYSTEM STARTUP

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

- G. Submit a written report that equipment or system has been properly installed and is functioning correctly.

3.11 DEMONSTRATION AND INSTRUCTION

- A. See Section 01 7900 - Demonstration and Training.
- B. Demonstrate operation and maintenance of products to Owner's personnel two weeks prior to date of Substantial Completion.
- C. Demonstrate start-up, operation, control, adjustment, trouble-shooting, servicing, maintenance, and shutdown of each item of equipment at scheduled time, at equipment location.
- D. For equipment or systems requiring seasonal operation, perform demonstration for other season within six months.
- E. Provide a qualified person who is knowledgeable about the Project to perform demonstration and instruction of Owner's personnel.
- F. Utilize operation and maintenance manuals as basis for instruction. Review contents of manual with Owner's personnel in detail to explain all aspects of operation and maintenance.
- G. Prepare and insert additional data in operations and maintenance manuals when need for additional data becomes apparent during instruction.

3.12 ADJUSTING

- A. Adjust operating products and equipment to ensure smooth and unhindered operation.
- B. Testing, adjusting, and balancing HVAC systems: See Section 23 0593 - Testing, Adjusting, and Balancing for HVAC.

3.13 FINAL CLEANING

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

3.14 CLOSEOUT PROCEDURES

- A. Make submittals that are required by governing or other authorities.
 - 1. Provide copies to Engineer and Owner.
- B. Accompany Engineer, Architect and Owner on preliminary inspection to determine items to be listed for completion or correction in the Contractor's Correction Punch List for Contractor's Notice of Substantial Completion.
- C. Notify Engineer when work is considered ready for Engineer's Substantial Completion inspection.
- D. Submit written certification containing Contractor's Correction Punch List, that Contract Documents have been reviewed, work has been inspected, and that work is complete in accordance with Contract Documents and ready for Engineer's Substantial Completion inspection.
- E. Owner will occupy all of the building as specified in Section 01 1000.

- F. Conduct Substantial Completion inspection and create Final Correction Punch List containing Engineer's and Contractor's comprehensive list of items identified to be completed or corrected and submit to Engineer.
- G. Correct items of work listed in Final Correction Punch List and comply with requirements for access to Owner-occupied areas.
- H. Accompany Engineer, Architect and Owner on Contractor's preliminary final inspection.
- I. Notify Engineer when work is considered finally complete and ready for Engineer's Substantial Completion final inspection.
- J. Complete items of work determined by Engineer listed in executed Certificate of Substantial Completion.

3.15 MAINTENANCE

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

END OF SECTION

SECTION 01 7419 CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL

PART 1 GENERAL

1.1 WASTE MANAGEMENT REQUIREMENTS

- A. Owner requires that this project generate the least amount of trash and waste possible.
- B. Employ processes that ensure the generation of as little waste as possible due to error, poor planning, breakage, mishandling, contamination, or other factors.
- C. Minimize trash/waste disposal in landfills; reuse, salvage, or recycle as much waste as economically feasible.
- D. Methods of trash/waste disposal that are not acceptable are:
 - 1. Burning on the project site.
 - 2. Burying on the project site.
 - 3. Dumping or burying on other property, public or private.
 - 4. Other illegal dumping or burying.
- E. Regulatory Requirements: Contractor is responsible for knowing and complying with regulatory requirements, including but not limited to Federal, state and local requirements, pertaining to legal disposal of all construction and demolition waste materials.
 - 1. This includes, but is not limited to, compliance with National Emission Standards for Hazardous Air Pollutants (NESHAP) requirements as it pertains to transite piping or other materials containing asbestos detected on the property during construction. Compliance with regulations in 40 CFR 61 Subpart M must be documented.

1.2 RELATED REQUIREMENTS

- A. Section 01 3000 - Administrative Requirements: Additional requirements for project meetings, reports, submittal procedures, and project documentation.
- B. Section 01 5000 - Temporary Facilities and Controls: Additional requirements related to trash/waste collection and removal facilities and services.
- C. Section 01 6000 - Product Requirements: Waste prevention requirements related to delivery, storage, and handling.
- D. Section 01 7000 - Execution and Closeout Requirements: Trash/waste prevention procedures related to demolition, cutting and patching, installation, protection, and cleaning.

1.3 DEFINITIONS

- A. Clean: Untreated and unpainted; not contaminated with oils, solvents, caulk, or the like.
- B. Construction and Demolition Waste: Solid wastes typically including building materials, packaging, trash, debris, and rubble resulting from construction, remodeling, repair and demolition operations.
- C. Hazardous: Exhibiting the characteristics of hazardous substances, i.e., ignitibility, corrosivity, toxicity or reactivity.
- D. Nonhazardous: Exhibiting none of the characteristics of hazardous substances, i.e., ignitibility, corrosivity, toxicity, or reactivity.
- E. Nontoxic: Neither immediately poisonous to humans nor poisonous after a long period of exposure.
- F. Recyclable: The ability of a product or material to be recovered at the end of its life cycle and remanufactured into a new product for reuse by others.
- G. Recycle: To remove a waste material from the project site to another site for remanufacture into a new product for reuse by others.
- H. Recycling: The process of sorting, cleansing, treating and reconstituting solid waste and other discarded materials for the purpose of using the altered form. Recycling does not include burning, incinerating, or thermally destroying waste.
- I. Return: To give back reusable items or unused products to vendors for credit.

- J. Reuse: To reuse a construction waste material in some manner on the project site.
- K. Salvage: To remove a waste material from the project site to another site for resale or reuse by others.
- L. Sediment: Soil and other debris that has been eroded and transported by storm or well production run-off water.
- M. Source Separation: The act of keeping different types of waste materials separate beginning from the first time they become waste.
- N. Toxic: Poisonous to humans either immediately or after a long period of exposure.
- O. Trash: Any product or material unable to be reused, returned, recycled, or salvaged.
- P. Waste: Extra material or material that has reached the end of its useful life in its intended use. Waste includes salvageable, returnable, recyclable, and reusable material.

1.4 SUBMITTALS

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

PART 2 PRODUCTS - NOT USE

PART 3 EXECUTION

3.1 WASTE MANAGEMENT PROCEDURES

- A. See Section 01 3000 for additional requirements for project meetings, reports, submittal procedures, and project documentation.
- B. See Section 01 5000 for additional requirements related to trash/waste collection and removal facilities and services.
- C. See Section 01 6000 for waste prevention requirements related to delivery, storage, and handling.
- D. See Section 01 7000 for trash/waste prevention procedures related to demolition, cutting and patching, installation, protection, and cleaning.

3.2 WASTE MANAGEMENT PLAN IMPLEMENTATION

- A. Manager: Designate an on-site person or persons responsible for instructing workers and overseeing and documenting results of the Waste Management Plan.
- B. Instruction: Provide on-site instruction of appropriate separation, handling, and recycling, salvage, reuse, and return methods to be used by all parties at the appropriate stages of the project.
- C. Meetings: Discuss trash/waste management goals and issues at project meetings.
 - 1. Prebid meeting.
 - 2. Preconstruction meeting.
 - 3. Regular job-site meetings.
- D. Facilities: Provide specific facilities for separation and storage of materials for recycling, salvage, reuse, return, and trash disposal, for use by all contractors and installers.
 - 1. Provide containers as required.
 - 2. Provide adequate space for pick-up and delivery and convenience to subcontractors.
 - 3. Keep recycling and trash/waste bin areas neat and clean and clearly marked in order to avoid contamination of materials.
- E. Hazardous Wastes: Separate, store, and dispose of hazardous wastes according to applicable regulations.
- F. Recycling: Separate, store, protect, and handle at the site identified recyclable waste products in order to prevent contamination of materials and to maximize recyclability of identified materials. Arrange for timely pickups from the site or deliveries to recycling facility in order to prevent contamination of recyclable materials.
- G. Reuse of Materials On-Site: Set aside, sort, and protect separated products in preparation for reuse.

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H. Salvage: Set aside, sort, and protect products to be salvaged for reuse off-site.

END OF SECTION

SECTION 01 7800 CLOSEOUT SUBMITTALS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Project record documents.
- B. Operation and maintenance data.
- C. Warranties and bonds.

1.2 RELATED REQUIREMENTS

- A. Section 01 3000 - Administrative Requirements: Submittals procedures, shop drawings, product data, and samples.
- B. Section 01 7000 - Execution and Closeout Requirements: Contract closeout procedures.
- C. Individual Product Sections: Specific requirements for operation and maintenance data.
- D. Individual Product Sections: Warranties required for specific products or Work.

1.3 SUBMITTALS

- A. Project Record Documents: Submit documents to Engineer with claim for final Application for Payment.
- B. Operation and Maintenance Data:
 - 1. Submit two copies of preliminary draft or proposed formats and outlines of contents before start of Work. Engineer will review draft and return one copy with comments.
 - 2. For equipment, or component parts of equipment put into service during construction and operated by Owner, submit completed documents within ten days after acceptance.
 - 3. Submit one copy of completed documents 30 days prior to final inspection. This copy will be reviewed and returned after final inspection, with Engineer comments. Revise content of all document sets as required prior to final submission.
 - 4. Submit two sets of revised final documents in final form within prior to final inspection.
- C. Warranties and Bonds:
 - 1. For equipment or component parts of equipment put into service during construction with Owner's permission, submit documents within 10 days after acceptance.
 - 2. Make other submittals within 10 days after Date of Substantial Completion, prior to final Application for Payment.
 - 3. For items of Work for which acceptance is delayed beyond Date of Substantial Completion, submit within 10 days after acceptance, listing the date of acceptance as the beginning of the warranty period.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.1 PROJECT RECORD DOCUMENTS

- A. Maintain on site one set of the following record documents; record actual revisions to the Work:
 - 1. Drawings.
 - 2. Addenda.
 - 3. Change Orders and other modifications to the Contract.
- B. Ensure entries are complete and accurate, enabling future reference by Owner.
- C. Store record documents separate from documents used for construction.
- D. Record information concurrent with construction progress.
- E. Record Drawings: Legibly mark each item to record actual construction including:
 - 1. Field changes of dimension and detail.
 - 2. Details not on original Contract drawings.

3.2 OPERATION AND MAINTENANCE DATA

- A. Product Data: Mark each sheet to clearly identify specific products and component parts, and data applicable to installation. Delete inapplicable information.
- B. Drawings: Supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams. Do not use Project Record Documents as maintenance drawings.
- C. Typed Text: As required to supplement product data. Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions.

3.3 OPERATION AND MAINTENANCE DATA FOR MATERIALS AND FINISHES

- A. For Each Product, Applied Material, and Finish:
 - 1. Product data, with catalog number, size, composition, and color and texture designations.
 - 2. Information for re-ordering custom manufactured products.
- B. Instructions for Care and Maintenance: Manufacturer's recommendations for cleaning agents and methods, precautions against detrimental cleaning agents and methods, and recommended schedule for cleaning and maintenance.
- C. Moisture protection and weather-exposed products: Include product data listing applicable reference standards, chemical composition, and details of installation. Provide recommendations for inspections, maintenance, and repair.
- D. Additional information as specified in individual product specification sections.
- E. Where additional instructions are required, beyond the manufacturer's standard printed instructions, have instructions prepared by personnel experienced in the operation and maintenance of the specific products.

3.4 OPERATION AND MAINTENANCE DATA FOR EQUIPMENT AND SYSTEMS

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

3.5 ASSEMBLY OF OPERATION AND MAINTENANCE MANUALS

- A. Assemble operation and maintenance data into durable manuals for Owner's personnel use, with data arranged in the same sequence as, and identified by, the specification sections for hard copies. Electronic copies should be organized similarly in PDF format and tabbed for bookmarking.
- B. Where systems involve more than one specification section, provide separate tabbed divider for each system.
- C. Binders: Commercial quality, 8-1/2 by 11 inch three D side ring binders with durable plastic covers; 2 inch maximum ring size. When multiple binders are used, correlate data into related consistent groupings.
- D. Cover: Identify each binder with typed or printed title OPERATION AND MAINTENANCE INSTRUCTIONS; identify title of Project; identify subject matter of contents.
- E. Project Directory: Title and address of Project; names, addresses, and telephone numbers of Engineer, Architect/Contractor and subcontractors, with names of responsible parties.
- F. Tables of Contents: List every item separated by a divider, using the same identification as on the divider tab; where multiple volumes are required, include all volumes Tables of Contents in each volume, with the current volume clearly identified.
- G. Dividers: Provide tabbed dividers for each separate product and system; identify the contents on the divider tab; immediately following the divider tab include a description of product and major component parts of equipment. For electronic copies, provide tabbed bookmarks.
- H. Text: Manufacturer's printed data, or typewritten data on 20 pound paper.
- I. Drawings: Provide with reinforced punched binder tab. Bind in with text; fold larger drawings to size of text pages.
- J. Arrangement of Contents: Organize each volume in parts as follows:
 - 1. Project Directory.
 - 2. Table of Contents, of all volumes, and of this volume.
 - 3. Operation and Maintenance Data: Arranged by system, then by product category.
 - a. Source data.
 - b. Product data, shop drawings, and other submittals.
 - c. Operation and maintenance data.
 - d. Field quality control data.
 - e. Original warranties and bonds.

3.6 WARRANTIES AND BONDS

- A. Obtain warranties and bonds, executed in duplicate by responsible Subcontractors, suppliers, and manufacturers, within 10 days after completion of the applicable item of work. Except for items put into use with Owner's permission, leave date of beginning of time of warranty until Date of Substantial completion is determined.
- B. Verify that documents are in proper form, contain full information, and are notarized.
- C. Co-execute submittals when required.
- D. Retain warranties and bonds until time specified for submittal.
- E. Include originals of each in operation and maintenance manuals, indexed separately on Table of Contents.

END OF SECTION

SECTION 01 7900 DEMONSTRATION AND TRAINING

PART 1 GENERAL

1.1 SUMMARY

- A. Demonstration of products and systems to be commissioned and where indicated in specific specification sections.
- B. Training of Owner personnel in operation and maintenance is required for:
 - 1. HVAC systems and equipment.
 - 2. Plumbing equipment.
 - 3. Electrical systems and equipment.
 - 4. Landscape irrigation.
 - 5. Items specified in individual product Sections.

1.2 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures; except:
 - 1. Make all submittals specified in this section, and elsewhere where indicated for commissioning purposes, directly to the Commissioning Authority.
- B. Draft Training Plans: Owner will designate personnel to be trained; tailor training to needs and skill-level of attendees.
 - 1. Submit not less than four weeks prior to start of training.
 - 2. Revise and resubmit until acceptable.
 - 3. Provide an overall schedule showing all training sessions.
 - 4. Include at least the following for each training session:
 - a. Identification, date, time, and duration.
 - b. Description of products and/or systems to be covered.
 - c. Name of firm and person conducting training; include qualifications.
 - d. Intended audience, such as job description.
 - e. Objectives of training and suggested methods of ensuring adequate training.
 - f. Methods to be used, such as classroom lecture, live demonstrations, hands-on, etc.
 - g. Media to be used, such as slides, hand-outs, etc.
 - h. Training equipment required, such as projector, projection screen, etc., to be provided by Contractor.
- C. Training Manuals: Provide training manual for each attendee; allow for minimum of two attendees per training session.
 - 1. Include applicable portion of O&M manuals.
 - 2. Include copies of all hand-outs, slides, overheads, video presentations, etc., that are not included in O&M manuals.
 - 3. Provide one extra copy of each training manual to be included with operation and maintenance data.

1.3 QUALITY ASSURANCE

- A. Instructor Qualifications: Familiar with design, operation, maintenance and troubleshooting of the relevant products and systems.
 - 1. Provide as instructors the most qualified trainer of those contractors and/or installers who actually supplied and installed the systems and equipment.
 - 2. Where a single person is not familiar with all aspects, provide specialists with necessary qualifications.

PART 3 EXECUTION

3.1 DEMONSTRATION - GENERAL

- A. Demonstrations conducted during system start-up do not qualify as demonstrations for the purposes of this section, unless approved in advance by Owner.
- B. Demonstrations conducted during Functional Testing need not be repeated unless Owner personnel training is specified.
- C. Demonstration may be combined with Owner personnel training if applicable.
- D. Operating Equipment and Systems: Demonstrate operation in all modes, including start-up, shut-down, seasonal changeover, emergency conditions, and troubleshooting, and maintenance procedures, including scheduled and preventive maintenance.
 - 1. Perform demonstrations not less than two weeks prior to Substantial Completion.
 - 2. For equipment or systems requiring seasonal operation, perform demonstration for other season within six months.
- E. Non-Operating Products: Demonstrate cleaning, scheduled and preventive maintenance, and repair procedures.
 - 1. Perform demonstrations not less than two weeks prior to Substantial Completion.

3.2 TRAINING - GENERAL

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

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PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

**SECTION 024100
DEMOLITION**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Selective demolition of built site elements.
- B. Selective demolition of building elements for alteration purposes.

1.02 RELATED REQUIREMENTS

- A. Section 011000 - Summary: Limitations on Contractor's use of site and premises.
- B. Section 011000 - Summary: Description of items to be salvaged or removed for re-use by Contractor.
- C. Section 015000 - Temporary Facilities and Controls: Site fences, security, protective barriers, and waste removal.
- D. Section 016000 - Product Requirements: Handling and storage of items removed for salvage and relocation.
- E. Section 017000 - Execution and Closeout Requirements: Project conditions; protection of bench marks, survey control points, and existing construction to remain; reinstallation of removed products; temporary bracing and shoring.
- F. Section 070150.19 - Preparation for Re-Roofing: Removal of existing roofing, roof insulation, flashing, trim, and accessories.
- G. Section 312200 - Grading: Rough and fine grading.
- H. Section 312323 - Fill: Fill material for filling holes, pits, and excavations generated as a result of removal operations.

1.03 REFERENCE STANDARDS

- A. 29 CFR 1926 - Safety and Health Regulations for Construction; Current Edition.
- B. NFPA 241 - Standard for Safeguarding Construction, Alteration, and Demolition Operations; 2022, with Errata (2021).

PART 3 EXECUTION

2.01 DEMOLITION

- A. Remove other items indicated, for salvage, relocation, and recycling.
- B. Fill excavations, open pits, and holes in ground areas generated as result of removals, using specified fill; compact fill as specified in Section 312200.

2.02 GENERAL PROCEDURES AND PROJECT CONDITIONS

- A. Comply with applicable codes and regulations for demolition operations and safety of adjacent structures and the public.
 - 1. Obtain required permits.
 - 2. Take precautions to prevent catastrophic or uncontrolled collapse of structures to be removed; do not allow worker or public access within range of potential collapse of unstable structures.
 - 3. Provide, erect, and maintain temporary barriers and security devices.
 - 4. Conduct operations to minimize effects on and interference with adjacent structures and occupants.
 - 5. Do not close or obstruct roadways or sidewalks without permits from authority having jurisdiction.
 - 6. Conduct operations to minimize obstruction of public and private entrances and exits. Do not obstruct required exits at any time. Protect persons using entrances and exits from removal operations.

7. Obtain written permission from owners of adjacent properties when demolition equipment will traverse, infringe upon, or limit access to their property.
- B. Do not begin removal until receipt of notification to proceed from Owner.
- C. Protect existing structures and other elements to remain in place and not removed.
 1. Provide bracing and shoring.
 2. Prevent movement or settlement of adjacent structures.
 3. Stop work immediately if adjacent structures appear to be in danger.

2.03 SELECTIVE DEMOLITION FOR ALTERATIONS

- A. Existing construction and utilities indicated on drawings are based on casual field observation and existing record documents only.
 1. Verify construction and utility arrangements are as indicated.
 2. Report discrepancies to Architect before disturbing existing installation.
 3. Beginning of demolition work constitutes acceptance of existing conditions that would be apparent upon examination prior to starting demolition.
- B. Remove existing work as indicated and required to accomplish new work.
 1. Remove items indicated on drawings.
- C. Services including, but not limited to, HVAC, Plumbing, Fire Protection, Electrical, and Telecommunications: Remove existing systems and equipment as indicated.
 1. Maintain existing active systems to remain in operation, and maintain access to equipment and operational components.
 2. Where existing active systems serve occupied facilities but are to be replaced with new services, maintain existing systems in service until new systems are complete and ready for service.
 3. Verify that abandoned services serve only abandoned facilities before removal.
 4. Remove abandoned pipe, ducts, conduits, and equipment, including those above accessible ceilings. Remove back to source of supply where possible, otherwise cap stub and tag with identification.
- D. Protect existing work to remain.
 1. Prevent movement of structure. Provide shoring and bracing as required.
 2. Perform cutting to accomplish removal work neatly and as specified for cutting new work.
 3. Repair adjacent construction and finishes damaged during removal work.
 4. Patch to match new work.

2.04 DEBRIS AND WASTE REMOVAL

- A. Remove debris, junk, and trash from site.
- B. Leave site in clean condition, ready for subsequent work.
- C. Clean up spillage and wind-blown debris from public and private lands.

END OF SECTION

**SECTION 040100
MAINTENANCE OF MASONRY**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Replacement of brick masonry units.
- B. Repointing mortar joints.
- C. Repair of damaged masonry.
- D. Retrofitting masonry veneer construction with brick ties and weeps.

1.02 RELATED REQUIREMENTS

- A. Section 042000 - Unit Masonry: Brick masonry units.

1.03 REFERENCE STANDARDS

- A. ACI PRC-440.7 - Externally Bonded Fiber-Reinforced Polymer Systems Design and Construction for Strengthening Masonry Structures - Guide; 2022.
- B. ACI SPEC-548.14 - Specification for Repairing Concrete with Epoxy Mortar; 2014.
- C. ASTM C881/C881M - Standard Specification for Epoxy-Resin-Base Bonding Systems for Concrete; 2020a.
- D. ASTM D3039/D3039M - Standard Test Method for Tensile Properties of Polymer Matrix Composite Materials; 2017.
- E. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2024.
- F. ICC-ES AC125 - Acceptance Criteria for Concrete and Reinforced and Unreinforced Masonry Strengthening Using Externally Bonded Fiber-Reinforced Polymer (FRP) Composite Systems; 2021, with Editorial Revision (2022).
- G. ICC-ES AC178 - Acceptance Criteria for Inspection and Verification of Concrete and Reinforced and Unreinforced Masonry Strengthening Using Fiber-Reinforced Polymer (FRP) or Steel-Reinforced Polymer (SRP) Composite Systems; 2017, with Editorial Revision (2020).
- H. TMS 402/602 - Building Code Requirements and Specification for Masonry Structures; 2022, with Errata (2024).

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Preinstallation Meeting: Convene one week prior to commencing work of this section.
 - 1. Require attendance of parties directly affecting work of this section.
 - 2. Review conditions of installation, installation procedures, and coordination with related work.

1.05 SUBMITTALS

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Indicate special supports for the work. Detail shoring.

1.06 QUALITY ASSURANCE - MASONRY WORK

- A. Comply with provisions of TMS 402/602, except where exceeded by requirements of Contract Documents.
 - 1. Maintain one copy of each document on project site.

1.07 MOCK-UPS

- A. See Section 014000 - Quality Requirements for additional requirements.
- B. Restore and repoint an existing masonry wall area sized 8 feet (2.40 m) long by 6 feet (2 m) high; include in mock-up area instances of mortar, accessories, wall openings, and flashings.

- C. Locate where directed.
- D. Acceptable panel and procedures employed will become the standard for work of this section.
- E. Mock-up may remain as part of the Work.

1.08 DELIVERY, STORAGE, AND HANDLING

- A. Deliver masonry neatly stacked and tied on pallets. Store clear of ground with adequate waterproof covering.
- B. Store materials in covered, well-ventilated area protected from exposure to detrimental conditions, including airborne contaminants, dirt, dust, sunlight, temperatures lower than 40 degrees F (4 degrees C) or greater than 100 degrees F (38 degrees C), rainfall, sparks, or flame, and in accordance with the manufacturer's requirements. Store polymer resins and hardeners in separate area from construction materials that can absorb odors.

1.09 FIELD CONDITIONS - MASONRY WORK

- A. Cold and Hot Weather Requirements: Comply with requirements of TMS 402/602 or applicable building code, whichever is more stringent.
- B. Maintain materials and surrounding air temperature to minimum 40 degrees F (5 degrees C) prior to, during, and 48 hours after completion of masonry work.
- C. Maintain materials and surrounding air temperature to maximum 90 degrees F (32 degrees C) prior to, during, and 48 hours after completion of masonry work.

1.10 WARRANTY

- A. See Section 017800 - Closeout Submittals for additional warranty requirements.
- B. Warranty: Provide 5-year warranty for CFRP system design, installation, bond to the substrate, and interlaminar bond, as well as mechanical property retention and fabric-resin compatibility, commencing on Date of Substantial Completion. Complete forms in Owner's name and register with warrantor.

PART 2 PRODUCTS

2.01 MORTAR MATERIALS

- A. Comply with requirements of Section 040511.

2.02 MASONRY MATERIALS

- A. Brick: Section 042000.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that surfaces to be cleaned are ready for work of this section.
- B. Verify that masonry surfaces to receive CFRP are as dry as recommended by CFRP system manufacturer. Evaluate moisture content in accordance with ACI SPEC-548.14.

3.02 PREPARATION

- A. Protect surrounding elements from damage due to restoration procedures.
- B. Carefully remove and store removable items located in areas to be restored, including fixtures, fittings, finish hardware, and accessories; reinstall upon completion.
- C. Separate areas to be protected from restoration areas using means adequate to prevent damage.
- D. Mask immediately adjacent surfaces with material that will withstand cleaning and restoration procedures.

3.03 REBUILDING

- A. Cut out damaged and deteriorated masonry with care in a manner to prevent damage to any adjacent remaining materials.

- B. Support structure as necessary in advance of cutting out units. Support and shoring design shall be the responsibility of the Contractor.
- C. Cut away loose or unsound adjoining masonry to provide firm and solid bearing for new work.
- D. Build in new units following procedures for new work specified in other section(s).
- E. Mortar Mix: Colored and proportioned to match existing work.
- F. Ensure that anchors are correctly located and built in.

3.04 REPOINTING

- A. Perform repointing prior to cleaning masonry surfaces.
- B. Cut out loose or disintegrated mortar in joints to minimum 1/2 inch (6 mm) depth or until sound mortar is reached.
- C. Use power tools only after test cuts determine no damage to masonry units will result.
- D. Do not damage masonry units.
- E. When cutting is complete, remove dust and loose material by brushing.
- F. Premoisten joint and apply mortar. Pack tightly in maximum 1/4 inch (6 mm) layers. Form a smooth, compact concave joint to match existing.
- G. Moist cure for 72 hours.

3.05 CLEANING

- A. Immediately remove stains, efflorescence, or other excess resulting from the work of this section.
- B. Remove excess mortar, smears, and droppings as work proceeds and upon completion.
- C. Clean surrounding surfaces.

END OF SECTION

SECTION 04 0511 MASONRY MORTARING AND GROUTING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Mortar for masonry.
- B. Grout for masonry.

1.2 RELATED REQUIREMENTS

- A. Section 04 2000 - Unit Masonry: Installation of mortar and grout.

1.3 REFERENCE STANDARDS

- A. TMS 402/602 - Building Code Requirements and Specification for Masonry Structures; 2022, with Errata (2024).
- B. ASTM C91/C91M - Standard Specification for Masonry Cement; 2025.
- C. ASTM C144 - Standard Specification for Aggregate for Masonry Mortar; 2025.
- D. ASTM C270 - Standard Specification for Mortar for Unit Masonry; 2025a.
- E. ASTM C387/C387M - Standard Specification for Packaged, Dry, Combined Materials for Concrete and High Strength Mortar; 2023.
- F. ASTM C404 - Standard Specification for Aggregates for Masonry Grout; 2024.
- G. ASTM C476 - Standard Specification for Grout for Masonry; 2023.
- H. ASTM C780 - Standard Test Methods for Preconstruction and Construction Evaluation of Mortars for Plain and Reinforced Unit Masonry; 2025a.
- I. ASTM C1019 - Standard Test Method for Sampling and Testing Grout for Masonry; 2025.
- J. ASTM C1314 - Standard Test Method for Compressive Strength of Masonry Prisms; 2024.

1.4 SUBMITTALS

- A. Product Data: Include design mix and indicate whether the Proportion or Property specification of ASTM C270 is to be used. Also include required environmental conditions and admixture limitations.
- B. Reports: Submit reports on mortar indicating compliance of mortar to property requirements of ASTM C270 and test and evaluation reports per ASTM C780.
- C. Reports: Submit reports on grout indicating compliance of component grout materials to requirements of ASTM C476 and test and evaluation reports to requirements of ASTM C1019.
- D. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
- E. Manufacturer's Installation Instructions: Submit packaged dry mortar manufacturer's installation instructions.

1.5 QUALITY ASSURANCE

- A. Comply with provisions of TMS 402/602, except where exceeded by requirements of Contract Documents.

1.6 PRECONSTRUCTION TESTING

- A. Mortar Mixes: Test mortars prebatched by weight in accordance with ASTM C780 recommendations for preconstruction testing.
- B. Grout Mixes: Test grout batches in accordance with ASTM C1019 procedures.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Maintain packaged materials clean, dry, and protected against dampness, freezing, and foreign matter.

1.8 FIELD CONDITIONS

- A. Cold and Hot Weather Requirements: Comply with requirements of TMS 402/602 or applicable building code, whichever is more stringent.

PART 2 PRODUCTS

2.1 MORTAR AND GROUT APPLICATIONS

- A. At Contractor's option, mortar and grout may be field-mixed from packaged dry materials, made from factory premixed dry materials with addition of water only, or ready-mixed.
- B. Mortar Color: To match existing.
- C. Mortar Mix Designs: ASTM C270, Property Specification.
 - 1. Interior, Loadbearing Masonry: Type N.
- D. Grout Mix Designs:
 - 1. Bond Beams and Lintels: 3,000 psi strength at 28 days; 8-10 inches slump; provide premixed type in accordance with ASTM C 94/C 94M.
 - a. Fine grout for spaces with smallest horizontal dimension of 2 inches or less.
 - b. Coarse grout for spaces with smallest horizontal dimension greater than 2 inches.

2.2 MATERIALS

- A. Packaged Dry Material for Mortar for Unit Masonry: Premixed Portland cement, hydrated lime, and sand; complying with ASTM C387/C387M and capable of producing mortar of the specified strength in accordance with ASTM C270 with the addition of water only.
 - 1. Type: Type N.
 - 2. Color: Standard gray.
- B. Portland Cement: ASTM C150/C150M.
 - 1. Type: Type I - Normal; ASTM C150/C150M.
 - 2. Color: Standard gray.
- C. Masonry Cement: ASTM C91/C91M.
 - 1. Type: Type N; ASTM C91/C91M.
- D. Hydrated Lime: ASTM C207, Type S.
- E. Quicklime: ASTM C5, non-hydraulic type.
- F. Mortar Aggregate: ASTM C144.
- G. Grout Aggregate: ASTM C404.
- H. Water: Clean and potable.
- I. Bonding Agent: Latex type.

2.3 MORTAR MIXING

- A. Thoroughly mix mortar ingredients using mechanical batch mixer, in accordance with ASTM C270 and in quantities needed for immediate use.
- B. Maintain sand uniformly damp immediately before the mixing process.
- C. Do not use anti-freeze compounds to lower the freezing point of mortar.
- D. If water is lost by evaporation, re-temper only within two hours of mixing.

2.4 GROUT MIXING

- A. Mix grout in accordance with ASTM C94/C94M.
- B. Thoroughly mix grout ingredients in quantities needed for immediate use in accordance with ASTM C476 for fine and coarse grout.

PART 3 EXECUTION

3.1 PREPARATION

- A. Apply bonding agent to existing concrete surfaces.
- B. Plug clean-out holes for grouted masonry with brick masonry units. Brace masonry to resist wet grout pressure.

3.2 INSTALLATION

- A. Install mortar and grout to requirements of section(s) in which masonry is specified.
- B. Work grout into masonry cores and cavities to eliminate voids.

- C. Do not install grout in lifts greater than 16 inches without consolidating grout by rodding.
- D. Do not displace reinforcement while placing grout.
- E. Remove excess mortar from grout spaces.

3.3 GROUTING

- A. Use either high-lift or low-lift grouting techniques, at Contractor's option, subject to other limitations of Contract Documents.
- B. Low-Lift Grouting:
 - 1. Limit height of pours to 64 inches.
 - 2. Limit height of masonry to 16 inches above each pour.
 - 3. Pour grout only after vertical reinforcing is in place; place horizontal reinforcing as grout is poured. Prevent displacement of bars as grout is poured.
 - 4. Place grout for each pour continuously and consolidate immediately; do not interrupt pours for more than 1-1/2 hours.
- C. High-Lift Grouting:
 - 1. Verify that horizontal and vertical reinforcement is in proper position and adequately secured before beginning pours.
 - 2. Place grout for spanning elements in single, continuous pour.

3.4 FIELD QUALITY CONTROL

- A. An independent testing agency will perform field tests, in accordance with provisions of Section 01 4000 - Quality Requirements.
- B. Test and evaluate mortar in accordance with ASTM C780 procedures.
 - 1. Test with same frequency as specified for masonry units.
- C. Test and evaluate grout in accordance with ASTM C1019 procedures.

END OF SECTION

SECTION 04 2000 UNIT MASONRY

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Concrete block.
- B. Mortar and grout.
- C. Reinforcement and anchorage.
- D. Flashings.
- E. Lintels.
- F. Accessories.

1.2 RELATED REQUIREMENTS

- A. Section 03 2000 - Concrete Reinforcing: Reinforcing steel for grouted masonry.
- B. Section 04 0511 - Masonry Mortaring and Grouting.

1.3 REFERENCE STANDARDS

- A. ASTM A666/A666M - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2024.
- B. ASTM A951/A951M - Standard Specification for Steel Wire for Masonry Joint Reinforcement; 2022.
- C. ASTM B370 - Standard Specification for Copper Sheet and Strip for Building Construction; 2022.
- D. ASTM C90 - Standard Specification for Dry-Cast Loadbearing Concrete Masonry Units; 2024a.
- E. ASTM C91/C91M - Standard Specification for Masonry Cement; 2025.
- F. ASTM C129 - Standard Specification for Dry-Cast Nonloadbearing Concrete Masonry Units; 2025.
- G. ASTM C140/C140M - Standard Test Methods for Sampling and Testing Concrete Masonry Units and Related Units; 2025.
- H. ASTM C144 - Standard Specification for Aggregate for Masonry Mortar; 2025.
- I. ASTM C270 - Standard Specification for Mortar for Unit Masonry; 2025a.
- J. ASTM C404 - Standard Specification for Aggregates for Masonry Grout; 2024.
- K. ASTM C476 - Standard Specification for Grout for Masonry; 2023.
- L. ASTM C780 - Standard Test Methods for Preconstruction and Construction Evaluation of Mortars for Plain and Reinforced Unit Masonry; 2025a.
- M. ASTM C1314 - Standard Test Method for Compressive Strength of Masonry Prisms; 2024.
- N. ASTM C1714/C1714M - Standard Specification for Preblended Dry Mortar Mix for Unit Masonry; 2019a.
- O. BIA Technical Notes No. 7 - Water Penetration Resistance – Design and Detailing; 2017.
- P. BIA Technical Notes No. 28B - Brick Veneer/Cold-Formed Steel Framed Walls; 2025.
- Q. BIA Technical Notes No. 46 - Maintenance of Brick Masonry; 2017.
- R. TMS 402/602 - Building Code Requirements and Specification for Masonry Structures; 2022, with Errata (2024).
- S. UL (FRD) - Fire Resistance Directory; Current Edition.

1.4 SUBMITTALS

- A. Product Data: Provide data for masonry units, fabricated wire reinforcement, mortar, and masonry accessories.
- B. Manufacturer's Certificate: Certify that masonry units meet or exceed specified requirements.
- C. Control jointing layout per Paragraph 3.13.

- D. Manufacturer's Certificate: Certify that water repellent admixture manufacturer has certified masonry unit manufacturer as an approved user of water repellent admixture in the manufacture of concrete block.

1.5 QUALITY ASSURANCE

- A. Comply with provisions of TMS 402/602, except where exceeded by requirements of Contract Documents.
- B. Fire Rated Assemblies: Comply with applicable code for UL (FRD) Assembly No. 263.

1.6 DELIVERY, STORAGE, AND HANDLING

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

PART 2 PRODUCTS

2.1 CONCRETE MASONRY UNITS

- A. Concrete Block: Comply with referenced standards and as follows:
 - 1. Size: Standard units with nominal face dimensions of 16 by 8 inches and nominal depths as indicated on drawings for specific locations.
 - 2. Special Shapes: Provide non-standard blocks configured for corners.
 - 3. Load-Bearing Units: ASTM C90, normal weight.
 - a. Hollow block, as indicated.
 - 4. Non-Loadbearing Units: ASTM C129.
 - a. Hollow block, as indicated.
 - 5. Units with Integral Water Repellent: Concrete block units as specified in this section with polymeric liquid admixture added to concrete masonry units at the time of manufacture.
 - a. Weather exposed concrete block and mortar to have integral water repellent.
 - b. Use only in combination with mortar that also has integral water repellent admixture.
 - c. Use water repellent admixtures for masonry units and mortar by a single manufacturer.

2.2 MORTAR AND GROUT MATERIALS

- A. Mortar and Grout: As specified in Section 04 0511.

2.3 REINFORCEMENT AND ANCHORAGE

- A. Multiple Wythe Joint Reinforcement: ASTM A951/A951M.
 - 1. Type: Truss.
 - 2. Material: ASTM A1064/A1064M steel wire, mill galvanized to ASTM A641/A641M Class 3.
 - 3. Size: 0.1483 inch side rods with 0.1483 inch cross rods; width as required to provide not less than 5/8 inch of mortar coverage on each exposure.
- B. Strap Anchors: Bent steel shapes, 1-1/2 inch width, 0.105 inch thick, 24 inch length, with 1-1/2 inch long, 90 degree bend at each end to form a U or Z shape or with cross pins, hot dip galvanized to ASTM A153/A153M Class B.
- C. Flexible Anchors: 2-piece anchors that permit differential movement between masonry and building frame, sized to provide not less than 5/8 inch of mortar coverage from masonry face.
 - 1. Steel frame: Crimped wire anchors for welding to frame, 0.25 inch thick, with trapezoidal wire ties 0.1875 inch thick, hot dip galvanized to ASTM A 153/A 153M, Class B.
- D. Helical Ties: supplemental helical anchors as noted in drawings
 - 1. Type: Stainless Steel
 - 2. Diameter: as noted on plans
 - 3. Length: as noted on plans
 - 4. Manufacturer
 - a. HeliFix - HeliBar

- 1) Leviaat - Windcrest, TX
 - 2) <https://www.helifix.com/products/retrofit-products/helibar/>
- b. Engineer Approved Equivalent

2.4 FLASHINGS

- A. Metal Flashing Materials:
1. Copper Flashing: ASTM B370, 060 soft annealed; 20 oz/sq ft thick; natural finish.
 2. Stainless Steel Flashing: ASTM A666/A666M, Type 304, soft temper; 26 gage, 0.0187 inch thick; finish 2B to 2D.
 3. Prefabricated Metal Flashing: Smooth fabricated 12 oz/sq ft copper flashing for surface mounted conditions.
- B. Membrane Non-Asphaltic Flashing Materials:
1. Composite Polymer Flashings - Self-Adhering: Composite polyethylene; 40 mil thick with pressure-sensitive adhesive and release paper.
 2. EPDM Flashing: ASTM D4637/D4637M, Type I, 0.040 inch thick.
- C. Factory-Fabricated Flashing Corners and End Dams: Stainless steel.
- D. Flashing Sealant/Adhesives: Silicone, polyurethane, or silyl-terminated polyether/polyurethane or other type required or recommended by flashing manufacturer; type capable of adhering to type of flashing used.
- E. Termination Bars: Stainless steel; compatible with membrane and adhesives.
- F. Drip Edge: Stainless steel; angled drip with hemmed edge; compatible with membrane and adhesives.

2.5 ACCESSORIES

- A. Preformed Control Joints: Rubber material. Provide with corner and tee accessories, fused joints.
- B. Joint Filler: Closed cell polyvinyl chloride; oversized 50 percent to joint width; self expanding; in maximum lengths available.
- C. Cavity Mortar Control: Semi-rigid polyethylene or polyester mesh panels, sized to thickness of wall cavity, and designed to prevent mortar droppings from clogging weeps and cavity vents and allow proper cavity drainage.
- D. Building Paper: ASTM D226/D226M, Type I ("No.15") asphalt felt.
- E. Nailing Strips: Softwood lumber, preservative treated for moisture resistance, dovetail shape, sized to masonry joints.
- F. Weeps:
1. Type: Extruded propylene with honeycomb design.
 2. Color(s): As selected by Architect from manufacturer's full range.
- G. Cavity Vents:
1. Type: Extruded propylene with honeycomb design.
 2. Color(s): As selected by Architect from manufacturer's full range.
- H. Drainage Fabric: Polyester or polypropylene mesh bonded to a water and vapor-permeable fabric.
- I. Cleaning Solution: Non-acidic, not harmful to masonry work or adjacent materials.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that field conditions are acceptable and are ready to receive masonry.
- B. Verify that related items provided under other sections are properly sized and located.
- C. Verify that built-in items are in proper location, and ready for roughing into masonry work.

3.2 PREPARATION

- A. Direct and coordinate placement of metal anchors supplied for installation under other sections.

- B. Provide temporary bracing during installation of masonry work. Maintain in place until building structure provides permanent bracing.

3.3 COLD AND HOT WEATHER REQUIREMENTS

- A. Comply with requirements of TMS 402/602 or applicable building code, whichever is more stringent.

3.4 COURSING

- A. Establish lines, levels, and coursing indicated. Protect from displacement.
- B. Maintain masonry courses to uniform dimension. Form vertical and horizontal joints of uniform thickness.
- C. Concrete Masonry Units:
 - 1. Bond: Running.
 - 2. Coursing: One unit and one mortar joint to equal 8 inches.
 - 3. Mortar Joints: Concave.
- D. Brick Units:
 - 1. Bond: Running.
 - 2. Coursing: Three units and three mortar joints to equal 8 inches.
 - 3. Mortar Joints: Concave.

3.5 PLACING AND BONDING

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

3.6 WEEPS/CAVITY VENTS

- A. Install weeps in veneer and cavity walls at 24 inches on center horizontally on top of through-wall flashing above shelf angles and lintels and at bottom of walls.
- B. Install cavity vents in veneer and cavity walls at 32 inches on center horizontally below shelf angles and lintels and near top of walls.

3.7 CAVITY MORTAR CONTROL

- A. Do not permit mortar to drop or accumulate into cavity air space or to plug weep/cavity vents.
- B. For cavity walls, build inner wythe ahead of outer wythe to accommodate accessories.

3.8 REINFORCEMENT AND ANCHORAGE - GENERAL AND SINGLE WYTHER MASONRY

- A. Unless otherwise indicated on drawings or specified under specific wall type, install horizontal joint reinforcement 16 inches on center.
- B. Place masonry joint reinforcement in first and second horizontal joints above and below openings. Extend minimum 16 inches each side of opening.
- C. Place continuous joint reinforcement in first and second joint below top of walls.

- D. Embed longitudinal wires of joint reinforcement in mortar joint with at least 5/8 inch mortar cover on each side.
- E. Lap joint reinforcement ends minimum 6 inches.
- F. Reinforce stack bonded unit joint corners and intersections with strap anchors 16 inches on center.
- G. Fasten anchors to structural framing and embed in masonry joints as masonry is laid. Unless otherwise indicated on drawings or closer spacing is indicated under specific wall type, space anchors at maximum of 36 inches horizontally and 24 inches vertically.
- H. Embed ties and anchors in mortar joint and extend into masonry unit a minimum of 1-1/2 inches with at least 5/8 inch mortar cover to the outside face of the anchor.

3.9 REINFORCEMENT AND ANCHORAGE - MASONRY VENEER

- A. Masonry Back-Up: Embed anchors to bond veneer at maximum 16 inches on center vertically and 36 inches on center horizontally. Place additional anchors at perimeter of openings and ends of panels, so maximum spacing of anchors is 8 inches on center.

3.10 MASONRY FLASHINGS

- A. Whether or not specifically indicated, install masonry flashing to divert water to exterior at all locations where downward flow of water will be interrupted.
 - 1. Extend flashings full width at such interruptions and at least 6 inches, minimum, into adjacent masonry or turn up flashing ends at least 1 inch, minimum, to form watertight pan at non-masonry construction.
 - 2. Remove or cover protrusions or sharp edges that could puncture flashings.
 - 3. Seal lapped ends and penetrations of flashing before covering with mortar.
- B. Terminate flashing up 8 inches minimum on vertical surface of backing:
 - 1. Install vertical leg of flashing behind water-resistive barrier sheet over backing.
 - 2. Install vertical leg of flashing over fluid-applied or self-adhered air/vapor barriers over backing or per manufacturer's directions.
 - 3. Terminate vertical leg of flashing into bed joint in masonry or reglet in concrete.
- C. Install flashing in accordance with manufacturer's instructions and BIA Technical Notes No. 7.
- D. Extend metal flashings through exterior face of masonry and terminate in an angled drip with hemmed edge. Install joint sealer below drip edge to prevent moisture migration under flashing.
- E. Extend plastic, laminated, EPDM, and _____ flashings to within 1/2 inch of exterior face of masonry and adhere to top of stainless steel angled drip with hemmed edge.
- F. Lap end joints of flashings at least 6 inches, minimum, and seal watertight with flashing sealant/adhesive.

3.11 LINTELS

- A. Install loose steel lintels over openings.
- B. Install reinforced unit masonry lintels over openings where steel or precast concrete lintels are not scheduled.
 - 1. Openings to 42 inches: Place two, No. 3 reinforcing bars 1 inch from bottom web.
 - 2. Openings from 42 inches to 78 inches: Place two, No. 5 reinforcing bars 1 inch from bottom web.
 - 3. Openings over 78 inches: Reinforce openings as detailed.
 - 4. Do not splice reinforcing bars.
 - 5. Support and secure reinforcing bars from displacement. Maintain position within 1/2 inch of dimensioned position.
 - 6. Place and consolidate grout fill without displacing reinforcing.
 - 7. Allow masonry lintels to attain specified strength before removing temporary supports.
- C. Maintain minimum 8 inch bearing on each side of opening.

3.12 GROUTED COMPONENTS

- A. Reinforcing indicated on plans - if not, the following shall be at a minimum:

1. Reinforce bond beams with 2, #4 bars, 1 inch (25 mm) from bottom web.
2. Reinforce columns and pilasters with 3, #5 bars, placed in center.
- B. Lap splices minimum 24 bar diameters.
- C. Support and secure reinforcing bars from displacement. Maintain position within 1/2 inch of dimensioned position.
- D. Place and consolidate grout fill without displacing reinforcing.
- E. At bearing locations, fill masonry cores with grout for a minimum 12 inches either side of opening.

3.13 CONTROL AND EXPANSION JOINTS

- A. Do not continue horizontal joint reinforcement through control or expansion joints.
- B. Install preformed control joint device in continuous lengths. Seal butt and corner joints in accordance with manufacturer's instructions.
- C. Size control joints as indicated on drawings; if not indicated, 3/4 inch wide and deep.
- D. Form expansion joint as detailed on drawings.
- E. Masonry subcontractor to submit control joint layout for Engineer approval prior to placing foundation walls.
- F. Project has four (4) conditions for control jointing;
 1. Openings greater than 6'-0": both sides
 2. Openings less than 6'-0": one side
 3. At every corner/directional change: no more than 10' beyond the directional change
 4. Typical spacing on straight wall runs: $\leq$ every 20'

3.14 BUILT-IN WORK

- A. As work progresses, install built-in metal door frames and glazed frames and other items to be built into the work and furnished under other sections.
- B. Install built-in items plumb, level, and true to line.
- C. Bed anchors of metal door and glazed frames in adjacent mortar joints. Fill frame voids solid with grout.
 1. Fill adjacent masonry cores with grout minimum 12 inches from framed openings.
- D. Do not build into masonry construction organic materials that are subject to deterioration.

3.15 TOLERANCES

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

3.16 CUTTING AND FITTING

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

3.17 FIELD QUALITY CONTROL

- A. An independent testing agency will perform field quality control tests, as specified in Section 01 4000 - Quality Requirements.
- B. Mortar Tests: Test each type of mortar in accordance with ASTM C780, testing with same frequency as masonry samples.

3.18 CLEANING

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

3.19 PROTECTION

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

END OF SECTION

**SECTION 042613
MASONRY VENEER**

PART 1 GENERAL

1.01 SECTION INCLUDES

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

1.02 REFERENCE STANDARDS

- A. ASTM C67/C67M - Standard Test Methods for Sampling and Testing Brick and Structural Clay Tile; 2023.
- B. ASTM C144 - Standard Specification for Aggregate for Masonry Mortar; 2025.
- C. ASTM C150/C150M - Standard Specification for Portland Cement; 2024.
- D. ASTM C207 - Standard Specification for Hydrated Lime for Masonry Purposes; 2024.
- E. ASTM C216 - Standard Specification for Facing Brick (Solid Masonry Units Made from Clay or Shale); 2024.
- F. ASTM C270 - Standard Specification for Mortar for Unit Masonry; 2025a.
- G. ASTM C404 - Standard Specification for Aggregates for Masonry Grout; 2024.
- H. ASTM C979/C979M - Standard Specification for Pigments for Integrally Colored Concrete; 2024.
- I. BIA Technical Notes No. 7 - Water Penetration Resistance – Design and Detailing; 2017.
- J. TMS 402/602 - Building Code Requirements and Specification for Masonry Structures; 2022, with Errata (2024).

1.03 SUBMITTALS

- A. Product Data: Provide data for masonry units, fabricated wire reinforcement, and mortar.
- B. Samples: Submit four samples of decorative block units to illustrate color, texture, and extremes of color range.

1.04 QUALITY ASSURANCE

- A. Comply with provisions of TMS 402/602, except where exceeded by requirements of Contract Documents.

1.05 DELIVERY, STORAGE, AND HANDLING

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

1.06 FIELD CONDITIONS

- A. Cold Weather Requirements: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen substrates. Remove and replace unit masonry damaged by frost or by freezing conditions. Comply with cold-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602. Provide winter protection and heat sources for installation of masonry units, as required to maintain project constructions schedule, at no additional cost to Owner.
 - 1. Heat mortar sand or mixing water to produce mortar temperatures between 40°F and 120°F at the time of mixing. Maintain mortar above freezing until used in masonry.
 - 2. When the mean daily temperature is between 40°F and 32°F, protect completed masonry from rain or snow by covering.

3. When the mean daily temperature is between 32°F and 25°F, completely cover completed masonry with a weather resistive membrane for 24 hours after construction.
 4. When ambient temperature is between 25°F and 20°F, use heat sources on both sides of the masonry under construction and install wind breaks when wind velocity is in excess of 15 mph. Completely cover completed masonry with insulating blankets or equal protection for 24 hour period after construction.
 5. When ambient temperature is below 20°F, provide an enclosure for the masonry under construction and use heat sources to maintain temperatures above 32°F within the enclosure 24 hours after construction.
 6. Frozen Materials:
 - a. Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen work. Do not lay masonry units having a temperature below 20°F.
 7. Remove and replace masonry work damaged by frost or freezing.
- B. Hot Weather Requirements: Comply with hot-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602. When ambient temperatures exceeds 100 deg F, or 90 deg F with a wind velocity greater than 8 mph, do not spread mortar beds more than 48 inches ahead of masonry. Set masonry units within one minute of spreading mortar.
1. Maintain sand piles in a damp, loose condition.
 2. Maintain temperature of mortar and grout below 120°F.
 3. Flush mixer, mortar transport container, and mortarboards with cool water before they come in contact with mortar ingredients or mortar.
 4. Maintain mortar consistency by retempering with cool water.
 5. Use mortar within 2 hours of initial mixing.
 6. Fog spray all newly constructed masonry until damp, at least three times a day until the masonry is three days old.

PART 2 PRODUCTS

2.01 BRICK UNITS

- A. Facing Veneer: ASTM C216, Type FBX, Grade SW.
1. Color and Texture: Color blend to match existing.
 2. Nominal Size: 4" X 12" UTILITY.
 3. Special Shapes: Molded units as required by conditions indicated, unless standard units can be sawn to produce equivalent effect.
 4. Compressive Strength: As indicated on drawings, measured in accordance with ASTM C67/C67M.
 5. Basis-of-Design: Glen Gery Cosmopolitan Series: Midtown Ironspot Velour

2.02 MORTAR MATERIALS

- A. Portland Cement: ASTM C150/C150M, Type I; color as required to produce approved color sample.
- B. Hydrated Lime: ASTM C207, Type S.
- C. Mortar Aggregate: ASTM C144.
- D. Grout Aggregate: ASTM C404.
- E. Pigments for Colored Mortar: Pure, concentrated mineral pigments specifically intended for mixing into mortar and complying with ASTM C979/C979M.
- F. Water: Clean and potable.
- G. Do not use calcium chloride in mortar.
- H. Cold Weather Admixtures: ASTM C494, non-chloride, non-corrosive, accelerating type recommended by manufacturer for use in masonry mortar of composition indicated.

2.03 REINFORCEMENT AND ANCHORAGE

- A. Adjustable Masonry-Veneer Anchors:

1. General: Provide anchors that allow vertical adjustment but resist tension and compression forces perpendicular to pane of wall for attachment over metal studs, concrete or concrete masonry, and as follows:
 - a. Structural Performance Characteristics: Capable of withstanding a 100-lbf loads in both tension and compression without deforming or developing play in excess of 0.05 inch.
2. Screw-Attached, Masonry-Veneer Anchors: Units consisting of a wire tie and a metal anchor section.
 - a. Products: Subject to compliance with requirements, provide the following:
 - 1) Heckmann Building Products Inc.; No. 75-TC ThermalClip Pos-I-Tie with Wire Tie.
 - 2) Hohmann & Barnard, Inc.; Thermal 2-seal Wing Nut Anchor with Wire Tie.
 - b. Anchor Section: Corrosion-resistant, self-drilling, eye-screw designed to receive wire tie. Eye-screw has spacer that seats directly aligns frames and is same thickness as sheathing and has gasketed washer head that covers hole in sheathing. Overall length as required for wall thickness.
 - c. Wire Ties: Triangular-shaped wire ties fabricated from 0.187-inch diameter, hot-dip galvanized steel wire.

2.04 FLASHINGS

- A. Flexible Through Wall Flashing with Stainless Steel Drip: As specified in Section 07 25 00 - Weather Barriers.

2.05 ACCESSORIES

- A. Preformed Control Joints: Rubber material. Provide with corner and tee accessories, fused joints.
- B. Cavity Vents:
 1. Type: Extruded propylene with honeycomb design.
 2. Color(s): As selected by Architect from manufacturer's full range.
 3. Manufacturers:
 - a. Heckman Building Products, Inc., Cell Vents 85: www.heckmannbuildingproducts.com
 - b. Hohmann & Barnard, Inc., Quadro-Vent: www.h-b.com/#sle.
 - c. WIRE-BOND, 3601 CellVent: www.wirebond.com/#sle.
- C. Cavity Mortar Control: Semi-rigid polyethylene or polyester mesh panels, sized to thickness of wall cavity, and designed to prevent mortar droppings from clogging weeps and cavity vents and allow proper cavity drainage. Provide one of the following:
 1. Full-Height Drainage Material: Mesh panels fitted full height between masonry ties.
 - a. CavClear, a Division of Archovations Inc., CavClear Masonry Mat: www.cavclear.com/#sle.
 2. Mortar Diverter: Semi-rigid mesh design for installation at flashing locations:
 - a. Manufacturers:
 - 1) Advanced Building Products, Inc., MortarBreak: www.advancedbuildingproducts.com.
 - 2) Masonpro, Pronet DT, www.masonpro.com.
 - 3) Mortar Net Solutions; MortarNet: www.mortarnet.com.
- D. Cleaning Solution: Non-acidic, not harmful to masonry work or adjacent materials.

2.06 MORTAR MIXING

- A. Mortar for Unit Masonry: ASTM C270, Proportion Specification.
 1. Exterior, non-loadbearing masonry; Type N.
- B. Colored Mortar: Proportion selected pigments and other ingredients to match Architect's sample, without exceeding manufacturer's recommended pigment-to-cement ratio.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that field conditions are acceptable and are ready to receive masonry.
- B. Verify that built-in items are in proper location, and ready for roughing into masonry work.

3.02 INSTALLATION, GENERAL

- A. Use full-size units without cutting if possible. If cutting is required, 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.
- B. Select and arrange units for exposed unit masonry produce a uniform blend of colors and textures.
- C. Wetting of Brick: Wet brick before laying if initial rate of absorption exceeds 30g/30 sq. in. per minute where tested per ASTM C 67. Allow units to absorb water so they are damp but not wet at time of laying.
- D. Comply with tolerances in ACI 530.1/ASCE 6/TMS 620 and with the following:
 - 1. 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.
 - 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.

3.03 COURSING

- A. Establish lines, levels, and coursing indicated. Protect from displacement.
- B. Maintain masonry courses to uniform dimension. Form vertical and horizontal joints of uniform thickness.
- C. Brick Units:
 - 1. Bond: Running.
 - 2. Coursing: Three units and three mortar joints to equal 8 inches (200 mm).
 - 3. Mortar Joints: Concave.

3.04 PLACING AND BONDING

- A. Lay solid masonry units in full bed of mortar, with full head joints, uniformly jointed with other work.
- B. Buttering corners of joints or excessive furrowing of mortar joints is not permitted.
- C. Remove excess mortar as work progresses.
- D. Do not shift or tap masonry units after mortar has achieved initial set. Where adjustment must be made, remove mortar and replace.
- E. Perform job site cutting of masonry units with proper tools to provide straight, clean, unchipped edges. Prevent broken masonry unit corners or edges.
- F. Isolate top joint of masonry veneer from horizontal structural framing members or support angles with compressible joint filler.
- G. Bed and Head Joints:
 - 1. Unless otherwise required, construct 3/8 inch thick bed and head joints.
 - 2. At foundation, construct bed joints of the starting course a thickness not less than 1/4 inch and not more than 3/4 inch.
 - 3. Unless otherwise noted, tool joint with a round jointer when the mortar is thumbprint hard.
- H. Collar Joints:
 - 1. Unless otherwise required, solidly fill collar joints less than 3/4 inch wide with mortar as the job progresses.

- I. Stopping and Resuming Work: Stop work by racking back units in each course from those in course below; do not tooth. When resuming work, clean masonry surfaces that are to receive mortar, remove loose masonry units and mortar, and wet brick if required before laying fresh masonry.

3.05 WEEPS/CAVITY VENTS

- A. Install cavity vents in veneer walls at 24 inches (600 mm) on center horizontally below shelf angles and lintels and at top of walls.
- B. Close cavities off vertically and horizontally with compressible filler materials in manner indicated on drawings. Install through-wall flashing and weep holes above horizontal filler locations.

3.06 CAVITY MORTAR CONTROL

- A. Do not permit mortar to drop or accumulate into cavity air space or to plug weep/cavity vents.
- B. For cavity walls, build inner wythe ahead of outer wythe to accommodate accessories.
- C. Install cavity mortar control panels continuously throughout full height of exterior masonry cavities during construction of exterior wythe, complying with manufacturer's installation instructions.
- D. Install cavity mortar diverter at base of cavity and at other flashing locations as recommended by manufacturer to prevent mortar droppings from blocking weep/cavity vents.

3.07 REINFORCEMENT AND ANCHORAGE - MASONRY VENEER

- A. Masonry Back-Up: Embed anchors in masonry back-up to bond veneer at maximum 1.77 sq ft (0.16 sq m) of wall surface per anchor. Place additional anchors at perimeter of openings and ends of panels, so maximum spacing of anchors is 8 inches (200 mm) on center.
- B. Stud back-Up: Secure veneer anchors to stud framed back-up and embed into masonry veneer at maximum 1.77 sq ft (0.16 sq m) of wall surface per anchor. Place additional anchors at perimeter of openings and ends of panels, so maximum spacing of anchors is 8 inches (200 mm) on center.

3.08 MASONRY FLASHINGS

- A. Whether or not specifically indicated, install masonry flashing to divert water to exterior at all locations where downward flow of water will be interrupted.
 1. Extend flashings full width at such interruptions and at least 6 inches (152 mm), minimum, into adjacent masonry or turn up at least 8 inches, minimum, to form watertight pan at non-masonry construction.
 2. Remove or cover protrusions or sharp edges that could puncture flashings.
 3. Seal lapped ends and penetrations of flashing before covering with mortar.
 4. Install metal drip edges beneath flexible flashing at exterior face of wall. Stop flexible flashing 1/2 inch back from outside face of wall and adhere flexible flashing to top of metal drip edge.
 5. Lap end joints of flashings at least 4 inches and seal watertight with manufacturer approved sealant.

3.09 LINTELS

- A. Install loose steel lintels over openings.

3.10 CONTROL AND EXPANSION JOINTS

- A. Do not continue horizontal joint reinforcement through control or expansion joints.
- B. Install preformed control joint device in continuous lengths. Seal butt and corner joints in accordance with manufacturer's instructions.

3.11 TOLERANCES

- A. Install masonry within the site tolerances found in TMS 402/602.

- B. Maximum Variation From Unit to Adjacent Unit: 1/16 inch (1.6 mm).
- C. Maximum Variation from Plane of Wall: 1/4 inch in 10 ft (6 mm in 3 m) and 1/2 inch in 20 ft (13 mm in 6 m) or more.
- D. Maximum Variation from Plumb: 1/4 inch (6 mm) per story non-cumulative; 1/2 inch (13 mm) in two stories or more.
- E. Maximum Variation from Level Coursing: 1/8 inch in 3 ft (3 mm in 1 m) and 1/4 inch in 10 ft (6 mm in 3 m); 1/2 inch in 30 ft (13 mm in 9 m).

3.12 CLEANING

- A. Remove excess mortar and mortar smears as work progresses.
- B. Clean soiled surfaces with cleaning solution.
- C. Use non-metallic tools in cleaning operations.

3.13 PROTECTION

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

END OF SECTION

SECTION 05 1200 STRUCTURAL STEEL FRAMING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Structural steel framing members.
- B. Structural steel support members and struts.
- C. Base plates, shear stud connectors and expansion joint plates.
- D. Grouting under base plates.

1.2 RELATED REQUIREMENTS

- A. Section 05 5000 - Metal Fabrications: Steel fabrications affecting structural steel work.

1.3 REFERENCE STANDARDS

- A. AISC (MAN) - Steel Construction Manual 2017.
- B. AISC 303 - Code of Standard Practice for Steel Buildings and Bridges 2016.
- C. ASTM A36/A36M - Standard Specification for Carbon Structural Steel 2014.
- D. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware 2016a.
- E. ASTM A307 - Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60 000 PSI Tensile Strength 2014, with Editorial Revision (2017).
- F. ASTM A449 - Standard Specification for Hex Cap Screws, Bolts and Studs, Steel, Heat Treated, 120/105/90 ksi Minimum Tensile Strength, General Use 2014.
- G. ASTM A500/A500M - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes 2018.
- H. ASTM A563 - Standard Specification for Carbon and Alloy Steel Nuts 2015.
- I. ASTM A992/A992M - Standard Specification for Structural Steel Shapes 2011 (Reapproved 2015).
- J. ASTM A1011/A1011M - Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength 2018a.
- K. ASTM C1107/C1107M - Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink) 2017.
- L. ASTM E164 - Standard Practice for Contact Ultrasonic Testing of Weldments 2019.
- M. ASTM F3125/F3125M - Standard Specification for High Strength Structural Bolts and Assemblies, Steel and Alloy Steel, Heat Treated, Inch Dimensions 120 ksi and 150 ksi Minimum Tensile Strength, and Metric Dimensions 830 MPa and 1040 MPa Minimum Tensile Strength 2018.
- N. ASTM F436/F436M - Standard Specification for Hardened Steel Washers Inch and Metric Dimensions 2018a.
- O. ASTM F1554 - Standard Specification for Anchor Bolts, Steel, 36, 55, and 105-ksi Yield Strength 2018.
- P. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination 2012.
- Q. AWS D1.1/D1.1M - Structural Welding Code - Steel 2015, with Errata (2016).
- R. RCSC (HSBOLT) - Specification for Structural Joints Using High-Strength Bolts; Research Council on Structural Connections 2014, with Errata (2015).

1.4 SUBMITTALS

- A. Shop Drawings:
 - 1. Indicate profiles, sizes, spacing, locations of structural members, openings, attachments and fasteners.
- B. Manufacturer's Mill Certificate: Certify that products meet or exceed specified requirements.

- C. Mill Test Reports: Indicate structural strength, destructive test analysis and non-destructive test analysis.
- D. Fabricator Test Reports: Comply with ASTM A1011/A1011M.
- E. Welders Certificates: Certify welders employed on the Work, verifying AWS qualification within the previous 12 months.

1.5 QUALITY ASSURANCE

- A. Fabricate structural steel members in accordance with AISC (MAN) "Steel Construction Manual."

PART 2 PRODUCTS

2.1 MATERIALS

- A. Steel Angles and Plates:
 - 1. Non-Moment Connections: ASTM A36/A36M.
 - 2. Moment Connections: ASTM A572, Gr.50
- B. Steel W Shapes and Tees: ASTM A992/A992M.
- C. Cold-Formed Structural Tubing: ASTM A500/A500M, Grade B.
- D. Structural Bolts and Nuts: Carbon steel, ASTM A325, Grade A and galvanized in compliance with ASTM A153/A153M Class C.
- E. Grout: ASTM C1107/C1107M; Non-shrink; premixed compound consisting of non-metallic aggregate, cement, water reducing and plasticizing agents.
 - 1. Minimum Compressive Strength at 48 Hours: 2,000 pounds per square inch.
 - 2. Minimum Compressive Strength at 28 Days: 7,000 pounds per square inch.
 - 3. Height Change, Plastic State; when tested according to ASTM C827/C827M:
 - 4. Maximum: Plus 4 percent.
 - 5. Minimum: Plus 1 percent.
- F. Touch-Up Primer for Galvanized Surfaces: Fabricator's standard, complying with VOC limitations of authorities having jurisdiction.

2.2 FABRICATION

- A. Shop fabricate to greatest extent possible.
- B. Continuously seal joined members by continuous welds. Grind exposed welds smooth.
- C. Fabricate connections for bolt, nut, and washer connectors.
- D. Develop required camber for members.

2.3 FINISH

- A. Prepare structural component surfaces in accordance with SSPC-SP 3.
- B. Shop prime structural steel members. Do not prime surfaces that will be fireproofed, field welded, in contact with concrete or high strength bolted.

2.4 SOURCE QUALITY CONTROL

- A. Provide shop testing and analysis of structural steel.
- B. Welded Connections: Visually inspect all shop-welded connections and test at least 10 percent of welds using one of the following:
 - 1. Radiographic testing performed in accordance with ASTM E94/E94M.

PART 3 EXECUTION

3.1 ERECTION

- A. Erect structural steel in compliance with AISC 303.
- B. Allow for erection loads and provide sufficient temporary bracing to maintain structure in safe condition, plumb, and in true alignment until completion of erection and installation of permanent bracing.

- C. Field weld components and shear studs indicated on shop drawings.
- D. Use carbon steel bolts only for temporary bracing during construction, unless otherwise specifically permitted on drawings. Install high-strength bolts in accordance with RCSC (HSBOLT) "Specification for Structural Joints Using High-Strength Bolts".
- E. Do not field cut or alter structural members without approval of Engineer.
- F. After erection, prime welds, abrasions, and surfaces not shop primed, except surfaces to be in contact with concrete.
- G. Grout solidly between column plates and bearing surfaces, complying with manufacturer's instructions for nonshrink grout. Trowel grouted surfaces smooth, splaying neatly to 45 degrees.

3.2 TOLERANCES

- A. Maximum Variation From Plumb: 1/4 inch per story, non-cumulative.
- B. Maximum Offset From True Alignment: 1/4 inch.

3.3 FIELD QUALITY CONTROL

- A. An independent testing agency will perform field quality control tests, as specified in Section 01 4533.

END OF SECTION

SECTION 05 5000 METAL FABRICATIONS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Shop fabricated steel and aluminum items.

1.2 RELATED REQUIREMENTS

- A. Section 05 1200 - Structural Steel Framing: Structural steel column anchor bolts.

1.3 REFERENCE STANDARDS

- A. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2019.
- B. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless; 2024.
- C. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2024.
- D. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2023.
- E. ASTM A283/A283M - Standard Specification for Low and Intermediate Tensile Strength Carbon Steel Plates; 2024.
- F. ASTM A307 - Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60 000 PSI Tensile Strength; 2021.
- G. ASTM A501/A501M - Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing; 2021.
- H. ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2014.
- I. ASTM B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate (Metric); 2014.
- J. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2021.
- K. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric); 2021.
- L. ASTM F3125/F3125M - Standard Specification for High Strength Structural Bolts and Assemblies, Steel and Alloy Steel, Heat Treated, Inch Dimensions 120 ksi, 144 ksi, and 150 ksi Minimum Tensile Strength, and Metric Dimensions 830 MPa and 1040 MPa Minimum Tensile Strength; 2025.
- M. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination; 2020.
- N. AWS D1.1/D1.1M - Structural Welding Code - Steel; 2025.
- O. AWS D1.2/D1.2M - Structural Welding Code - Aluminum; 2014, with Errata (2020).
- P. SSPC-Paint 15 - Steel Joist Shop Primer/Metal Building Primer; 2004.
- Q. SSPC-Paint 20 - Zinc-Rich Coating (Type I - Inorganic, and Type II - Organic); 2019.

1.4 SUBMITTALS

- A. Shop Drawings: Indicate profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners, and accessories. Include erection drawings, elevations, and details where applicable.
 - 1. Indicate welded connections using standard AWS A2.4 welding symbols. Indicate net weld lengths.
 - 2. Design data: Submit drawings and supporting calculations, signed and sealed by a qualified professional structural engineer.
 - a. Include the following, as applicable:
 - 1) Member sizes and gages.
 - 2) Details of connections.
 - 3) Bracing requirements.

- B. Welders' Certificates: Submit certification for welders employed on the project, verifying AWS qualification within the previous 12 months.

1.5 QUALITY ASSURANCE

- A. Design under direct supervision of a Professional Structural Engineer experienced in design of this work and licensed in Iowa.
- B. Fabricator Qualifications: A qualified steel fabricator that is accredited by IAS AC172.

PART 2 PRODUCTS

2.1 MATERIALS - STEEL

- A. Steel Sections: ASTM A36/A36M.
- B. Steel Tubing: ASTM A501/A501M hot-formed structural tubing.
- C. Plates: ASTM A283/A283M.
- D. Pipe: ASTM A53/A53M, Grade B Schedule 40, black finish.
- E. Mechanical Fasteners: Same material as or compatible with materials being fastened; type consistent with design and specified quality level.
- F. Bolts, Nuts, and Washers: ASTM A307, Grade A, plain.
- G. Welding Materials: AWS D1.1/D1.1M; type required for materials being welded.
- H. Shop and Touch-Up Primer: SSPC-Paint 15, complying with VOC limitations of authorities having jurisdiction.
- I. Touch-Up Primer for Galvanized Surfaces: SSPC-Paint 20, Type I - Inorganic, complying with VOC limitations of authorities having jurisdiction.

2.2 MATERIALS - ALUMINUM

- A. Extruded Aluminum: ASTM B221 (ASTM B221M), 6063 alloy, T6 temper.
- B. Sheet Aluminum: ASTM B209 (ASTM B209M), 5052 alloy, H32 or H22 temper.
- C. Bolts, Nuts, and Washers: Stainless steel.
- D. Welding Materials: AWS D1.2/D1.2M; type required for materials being welded.

2.3 FABRICATION

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

2.4 FABRICATED ITEMS

- A. Bollards: Steel pipe, concrete filled, crowned cap, as detailed; prime paint finish.
- B. Joist Hangers: Strap anchors, fabricated with sheet steel, 18 gage, 0.0478 inch minimum base metal thickness; galvanized finish.
- C. Ledge Angles, Shelf Angles, Channels, and Plates Not Attached to Structural Framing: For support of metal decking; prime paint finish.
- D. Door Frames for : Channel sections; prime paint finish.
- E. Slotted Channel Framing: Fabricate channels and fittings from structural steel complying with the referenced standards; factory-applied, rust-inhibiting thermoset acrylic enamel finish.

2.5 FINISHES - STEEL

- A. Prime paint steel items.
 - 1. Exceptions: Galvanize items to be embedded in concrete and items to be embedded in masonry.
- B. Prepare surfaces to be primed in accordance with SSPC-SP2.
- C. Clean surfaces of rust, scale, grease, and foreign matter prior to finishing.

- D. Prime Painting: One coat.
- E. Galvanizing of Structural Steel Members: Galvanize after fabrication to ASTM A123/A123M requirements. Provide minimum 1.7 oz/sq ft galvanized coating.
- F. Galvanizing of Non-structural Items: Galvanize after fabrication to ASTM A123/A123M requirements.

2.6 FABRICATION TOLERANCES

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

PART 3 EXECUTION

3.1 EXAMINATION

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

3.2 PREPARATION

- A. Clean and strip primed steel items to bare metal where site welding is required.
- B. Supply setting templates to the appropriate entities for steel items required to be cast into concrete or embedded in masonry.

3.3 INSTALLATION

- A. Install items plumb and level, accurately fitted, free from distortion or defects.
- B. Provide for erection loads, and for sufficient temporary bracing to maintain true alignment until completion of erection and installation of permanent attachments.
- C. Field weld components as indicated on drawings.
- D. Perform field welding in accordance with AWS D1.1/D1.1M.
- E. Obtain approval prior to site cutting or making adjustments not scheduled.
- F. After erection, prime welds, abrasions, and surfaces not shop primed, except surfaces to be in contact with concrete.

3.4 TOLERANCES

- A. Maximum Variation From Plumb: 1/4 inch per story, non-cumulative.
- B. Maximum Offset From True Alignment: 1/4 inch.
- C. Maximum Out-of-Position: 1/4 inch.

END OF SECTION

SECTION 05 5213 PIPE AND TUBE RAILINGS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Free-standing railings at steps.
- B. Balcony railings and guardrails.

1.2 RELATED REQUIREMENTS

- A. Section 05 5100 - Metal Stairs: Handrails other than those specified in this section.

1.3 REFERENCE STANDARDS

- A. ADA Standards - 2010 ADA Standards for Accessible Design; 2010.
- B. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless; 2024.
- C. ASTM A500/A500M - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes; 2023.
- D. SSPC-Paint 15 - Steel Joist Shop Primer/Metal Building Primer; 2004.

1.4 SUBMITTALS

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Indicate profiles, sizes, connection attachments, anchorage, size and type of fasteners, and accessories.

PART 2 PRODUCTS

2.1 RAILINGS - GENERAL REQUIREMENTS

- A. Design, fabricate, and test railing assemblies in accordance with the most stringent requirements of applicable local code.
- B. Allow for expansion and contraction of members and building movement without damage to connections or members.
- C. Dimensions: See drawings for configurations and heights.
- D. Provide anchors and other components as required to attach to structure, made of same materials as railing components unless otherwise indicated; where exposed fasteners are unavoidable provide flush countersunk fasteners.
 - 1. For anchorage to concrete, provide inserts to be cast into concrete, for bolting anchors.
- E. Provide slip-on non-weld mechanical fittings to join lengths, seal open ends, and conceal exposed mounting bolts and nuts, including but not limited to elbows, T-shapes, splice connectors, flanges, escutcheons, and wall brackets.

2.2 STEEL RAILING SYSTEM

- A. Steel Tube: ASTM A500/A500M Grade B cold-formed structural tubing.
- B. Steel Pipe: ASTM A53/A53M Grade B Schedule 80, black finish.
- C. Non-Weld Mechanical Fittings: Slip-on, galvanized malleable iron castings, for Schedule 40 pipe, with flush setscrews for tightening by standard hex wrench, no bolts or screw fasteners.
- D. Welding Fittings: Factory- or shop-welded from matching pipe or tube; seams continuously welded; joints and seams ground smooth.
- E. Exposed Fasteners: Flush countersunk screws or bolts; consistent with design of railing.
- F. Shop and Touch-Up Primer: SSPC-Paint 15, complying with VOC limitations of authorities having jurisdiction.

2.3 FABRICATION

- A. Accurately form components to suit specific project conditions and for proper connection to building structure.

- B. Fit and shop assemble components in largest practical sizes for delivery to site.
- C. Fabricate components with joints tightly fitted and secured. Provide spigots and sleeves to accommodate site assembly and installation.
- D. Welded Joints:
 - 1. Exterior Components: Continuously seal joined pieces by continuous welds. Drill condensate drainage holes at bottom of members at locations that will not encourage water intrusion.
 - 2. Interior Components: Continuously seal joined pieces by intermittent welds and plastic filler.
 - 3. Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush, and hairline. Ease exposed edges to small uniform radius.

PART 3 EXECUTION

3.1 EXAMINATION

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

3.2 PREPARATION

- A. Supply items required to be cast into concrete with setting templates, for installation as work of other sections.

3.3 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Install components plumb and level, accurately fitted, free from distortion or defects, with tight joints.
- C. Install railings in compliance with ADA Standards for accessible design at applicable locations.
- D. Anchor railings securely to structure.
- E. Conceal anchor bolts and screws whenever possible. Where not concealed, use flush countersunk fastenings.

3.4 TOLERANCES

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

END OF SECTION

**SECTION 061000
ROUGH CARPENTRY**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Sheathing.
- B. Roof-mounted curbs.
- C. Roofing nailers.
- D. Preservative treated wood materials.
- E. Fire retardant treated wood materials.
- F. Concealed wood blocking, nailers, and supports.
- G. Miscellaneous wood nailers, furring, and grounds.

1.02 RELATED REQUIREMENTS

- A. Section 01 35 46 – Indoor Air Quality Procedures
- B. Section 01 60 00 – Product Requirements
- C. Section 01 74 19 – Construction Waste Management
- D. Section 055000 - Metal Fabrications: Miscellaneous steel connectors and support angles for wood framing.

1.03 REFERENCE STANDARDS

- A. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2023.
- B. ASTM C1177/C1177M - Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing; 2024.
- C. ASTM D2898 - Standard Practice for Accelerated Weathering of Fire-Retardant-Treated Wood for Fire Testing; 2010 (Reapproved 2024).
- D. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2024.
- E. AWPA U1 - Use Category System: User Specification for Treated Wood; 2025.
- F. PS 1 - Structural Plywood; 2023.
- G. PS 20 - American Softwood Lumber Standard; 2025.

1.04 SUBMITTALS

- A. Performance Documentation: For permanently installed products and materials related to the work of this Section, provide submittals as required in Section 01 60 00 - Product Requirements. This includes the following documentation where applicable:
 - 1. Bill of materials, including material quantity, manufacturing location, and material extraction location(s).
 - 2. Environmental Product Declaration.
- B. Product Data: Provide technical data on insulated sheathing, wood preservative materials, and application instructions.
- C. Manufacturer's Certificate: Certify that wood products supplied for rough carpentry meet or exceed specified requirements.

1.05 DELIVERY, STORAGE, AND HANDLING

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

- B. Fire Retardant Treated Wood: Prevent exposure to precipitation during shipping, storage, and installation.

PART 2 PRODUCTS

2.01 PERFORMANCE REQUIREMENTS

- A. Sustainability Performance: For permanently installed products and materials related to the work of this Section, provide products and materials that meet the sustainability performance requirements outlined in PART 2 – PRODUCTS of Section 01 60 00 – Product Requirements.

2.02 GENERAL REQUIREMENTS

- A. Dimension Lumber: Comply with PS 20 and requirements of specified grading agencies.
 - 1. If no species is specified, provide species graded by the agency specified; if no grading agency is specified, provide lumber graded by grading agency meeting the specified requirements.
 - 2. Grading Agency: Grading agency whose rules are approved by the Board of Review, American Lumber Standard Committee at www.alsc.org, and who provides grading service for the species and grade specified; provide lumber stamped with grade mark unless otherwise indicated.
- B. Lumber fabricated from old growth timber is not permitted.

2.03 DIMENSION LUMBER

- A. Sizes: Nominal sizes as indicated on drawings, S4S.
- B. Moisture Content: S-dry or MC19.
- C. Miscellaneous Framing, Blocking, Nailers, Grounds, and Furring:
 - 1. Lumber: S4S, No. 2 or Standard Grade.
 - 2. Boards: Standard or No. 3.

2.04 CONSTRUCTION PANELS

- A. Plywood Wall Sheathing: Plywood, PS 1, Grade C-D, Exposure I.
 - 1. Performance: Comply with the following sustainability performance requirements:
 - a. Environmental Product Declaration (EPD): Has an industry-wide or product-specific Type III EPD.
- B. Glass Matt Wall Sheathing: Glass mat faced gypsum, ASTM C1177/C1177M, 5/8 inch Type X fire resistant (16 mm Type X fire resistant).
 - 1. Performance: Comply with the following sustainability performance requirements:
 - a. Environmental Product Declaration (EPD): Has an industry-wide or product-specific Type III EPD.
- C. OSB Wall Sheathing: Oriented strand board wood structural panel; PS 2.
 - 1. Grade: Structural 1 Sheathing.
 - 2. Bond Classification: Exposure 1.
 - 3. Edges: Square.
 - 4. Provide fastening guide on top panel surface with separate markings indicating fastener spacing for 16 inches (406 mm) and 24 inches (610 mm) on center, respectively.
- D. Communications and Electrical Room Mounting Boards: PS 1 A-D plywood, or medium density fiberboard; 3/4 inch (19 mm) thick; flame spread index of 25 or less, smoke developed index of 450 or less, when tested in accordance with ASTM E84.

2.05 ACCESSORIES

- A. Fasteners and Anchors:
 - 1. Metal and Finish: Hot-dipped galvanized steel complying with ASTM A153/A153M for high humidity and preservative-treated wood locations, unfinished steel elsewhere.

2.06 FACTORY WOOD TREATMENT

- A. Treated Lumber and Plywood: Comply with requirements of AWWA U1 - Use Category System for wood treatments determined by use categories, expected service conditions, and specific applications.
 - 1. Fire-Retardant Treated Wood: Mark each piece of wood with producer's stamp indicating compliance with specified requirements.
 - 2. Preservative-Treated Wood: Provide lumber and plywood marked or stamped by an ALSC-accredited testing agency, certifying level and type of treatment in accordance with AWWA standards.
- B. Fire Retardant Treatment:
 - 1. Products:
 - a. Lonza Group: www.wolmanizedwood.com/#sle.
 - b. Hoover Treated Wood Products, Inc: www.frtw.com/#sle.
 - c. Koppers, Inc: www.koppersperformancechemicals.com/#sle.
 - 2. Exterior Type: AWWA U1, Category UCFB, Commodity Specification H, chemically treated and pressure impregnated; capable of providing a maximum flame spread index of 25 when tested in accordance with ASTM E84, with no evidence of significant combustion when test is extended for an additional 20 minutes both before and after accelerated weathering test performed in accordance with ASTM D2898.
 - a. Kiln dry wood after treatment to a maximum moisture content of 19 percent for lumber and 15 percent for plywood.
 - b. Treat exterior rough carpentry items.
 - c. Do not use treated wood in direct contact with the ground.
 - 3. Interior Type A: AWWA U1, Use Category UCFA, Commodity Specification H, low temperature (low hygroscopic) type, chemically treated and pressure impregnated; capable of providing a maximum flame spread index of 25 when tested in accordance with ASTM E84, with no evidence of significant combustion when test is extended for an additional 20 minutes.
 - a. Kiln dry wood after treatment to a maximum moisture content of 19 percent for lumber and 15 percent for plywood.
 - b. Treat rough carpentry items as indicated .
 - c. Do not use treated wood in applications exposed to weather or where the wood may become wet.
- C. Preservative Treatment:
 - 1. Preservative Pressure Treatment of Lumber Above Grade: AWWA U1, Use Category UC3B, Commodity Specification A using waterborne preservative.
 - a. Kiln dry lumber after treatment to maximum moisture content of 19 percent.
 - b. Treat lumber in contact with roofing or flashing.

PART 3 EXECUTION

3.01 PREPARATION

- A. Coordinate installation of rough carpentry members specified in other sections.

3.02 INSTALLATION - GENERAL

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

3.03 BLOCKING, NAILERS, AND SUPPORTS

- A. Provide framing and blocking members as indicated or as required to support finishes, fixtures, specialty items, and trim.

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

3.04 INSTALLATION OF CONSTRUCTION PANELS

- A. Wall Sheathing: Secure with long dimension perpendicular to wall studs, with ends over firm bearing and staggered, using nails, screws, or staples.
 - 1. Wood Structural Panel Sheathing Installation:
 - a. Comply with applicable recommendations in APA Form No. E30, "Engineered Wood Construction Guide," for types of structural-use panels and applications indicated.
 - b. Fasten panels as indicated below:
 - 1) Screw to cold-formed metal framing.
 - 2) Space panels 1/8 inch apart at edges and ends.
 - 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 boards with a 3/8 inch gap where non-load bearing construction abuts structural elements.
 - 3) Install boards with a 1/4 inch gap where they abut masonry or similar materials that might retain moisture, to prevent wicking.
- B. Communications and Electrical Room Mounting Boards: Secure with screws to studs with edges over firm bearing; space fasteners at maximum 24 inches (610 mm) on center on all edges and into studs in field of board.
 - 1. At fire-rated walls, install board over wall board indicated as part of the fire-rated assembly.
 - 2. Where boards are indicated as full floor-to-ceiling height, install with long edge of board parallel to studs.
 - 3. Install adjacent boards without gaps.
 - 4. Size and Location: As indicated on drawings.

3.05 TOLERANCES

- A. Framing Members: 1/4 inch (6 mm) from true position, maximum.
- B. Variation from Plane, Other than Floors: 1/4 inch in 10 feet (2 mm/m) maximum, and 1/4 inch in 30 feet (7 mm in 10 m) maximum.

3.06 CLEANING

- A. Waste Disposal:

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

END OF SECTION

**SECTION 072100
THERMAL INSULATION**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Board insulation at cavity wall construction, perimeter foundation wall, underside of floor slabs, and exterior wall behind wall finish.
- B. Batt insulation in exterior wall construction.
- C. Batt insulation for filling perimeter window and door shim spaces and crevices in exterior wall and roof.

1.02 RELATED REQUIREMENTS

1.03 REFERENCE STANDARDS

- A. ASTM C553 - Standard Specification for Mineral Fiber Blanket Thermal Insulation for Commercial and Industrial Applications; 2024.
- B. ASTM C665 - Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing; 2024.
- C. ASTM C1289 - Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board; 2025.
- D. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2024.

1.04 SUBMITTALS

- A. Product Data: Provide data on product characteristics, performance criteria, and product limitations.
- B. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
- C. Manufacturer's Installation Instructions: Include information on special environmental conditions required for installation and installation techniques.

1.05 QUALITY ASSURANCE

- A. Products provided under this section and installed at part of an exterior wall assembly shall have passed NFPA 285 testing as part of a wall assembly matching those detailed on drawings

PART 2 PRODUCTS

2.01 APPLICATIONS

- A. Insulation Inside Masonry Cavity Walls: Polyisocyanurate board.

2.02 FOAM BOARD INSULATION MATERIALS

- A. Polyisocyanurate (ISO) Board Insulation: Rigid cellular foam, comply with ASTM C1289.
 - 1. Classifications:
 - a. Type I: Faced with aluminum foil on both major surfaces of the core foam.
 - 1) Class 1 - Non-reinforced core foam.
 - 2) Compressive Strength: 16 psi (110 kPa), minimum.
 - 3) Thermal Resistance, R-value (RSI-value): At 1-1/2 inch (38.1 mm) thick; 9.0 (1.59), minimum, at 75 degrees F (24 degrees C).
 - 2. Board Size: 48 inch by 96 inch (1220 mm by 2440 mm).
 - 3. Board Thickness: 2.0 inch (50 mm).
 - 4. Products:
 - a. Atlas Roofing Corporation; Energyshield Foil Faced: www.atlasroofing.com/#sle.
 - b. Carlisle Coatings & Waterproofing, Inc; R2+ Matte: www.carlisleccw.com/#sle.
 - c. DuPont de Nemours, Inc; Thermax (ci): building.dupont.com/#sle.
 - d. GAF; EnergyGuard Polyiso Insulation: www.gaf.com/#sle.

- e. Hunter Panels; Xci Foil (Class A): www.hunterpanels.com/#sle.
 - f. Johns Manville; AP Foil-Faced: www.jm.com/#sle.
 - g. Substitutions: See Section 016000 - Product Requirements.
- B. Foil Faced Polyisocyanurate Board Insulation: Rigid cellular foam, complying with ASTM C1289.
- 1. Classifications:
 - a. Type I: Faced with aluminum foil on both major surfaces of core foam.
 - 1) Class 2 - Glass fiber reinforced or non-reinforced core foam.
 - 2) Compressive Strength: 16 psi (110 kPa), minimum.
 - 3) Thermal Resistance, R-value (RSI-value): At 1-1/2 inch (38.1 mm) thick; 9.0 (1.59), minimum, at 75 degrees F (24 degrees C).
 - 2. Board Thickness: As indicated on drawings.
 - 3. Board Edges: Square.
 - 4. Products:
 - a. Atlas Roofing Corporation; EnergyShield Pro Continuous Wall Insulation: www.atlasroofing.com/sle.
 - b. Hunter Panels, LLC; Xci Foil: www.hunterxci.com/sle.
 - c. Substitutions: See Section 01 25 00 - Substitution Procedures.

2.03 MINERAL FIBER BOARD INSULATION MATERIALS

- A. Mineral Wool Batt Insulation: Semi-rigid preformed batt or blanket, complying with ASTM C665; friction fit; unfaced flame spread index of 0 (zero) when tested in accordance with ASTM E84.
- 1. Smoke Developed Index: 450 or less, when tested in accordance with ASTM E84.
 - 2. R value/1 inch at 75 °F: 4.0 h sq. ft. °F/Btu
 - 3. Density: 2 lb/cu.ft. to ASTM C167.
 - 4. Thickness: As indicated on drawings.
 - 5. Acceptable Products:
 - a. Rockwool, Comfortbatt.
 - b. Owens Corning, Thermafiber, UltraBatt.

2.04 ACCESSORIES

- A. Gas-Actuated Insulation Fasteners: Galvanized steel pins driven through polypropylene anchor with 2-1/4-inch (57 mm) diameter washer head; suitable for fastening insulation to concrete, CMU, or steel studs, length to suit insulation thickness and substrate, capable of securely and rigidly fastening insulation in place.
- B. Adhesive: Type recommended by insulation manufacturer for application.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that substrate, adjacent materials, and insulation materials are dry and that substrates are ready to receive insulation.
- B. Verify substrate surfaces are flat, free of honeycomb, fins, irregularities, or materials or substances that may impede adhesive bond.

3.02 BOARD INSTALLATION AT FOUNDATION PERIMETER

- A. Apply adhesive to back of boards:
- B. Install boards horizontally on foundation perimeter.
- 1. Install in running bond pattern.
 - 2. Butt edges and ends tightly to adjacent boards and to protrusions.
- C. Cut and fit insulation tightly to protrusions or interruptions to the insulation plane.

3.03 BOARD INSTALLATION AT CAVITY WALLS

- A. Secure impale fasteners to substrate at following frequency:

- B. Install boards to fit snugly between wall ties.
- C. Install boards horizontally on walls.
- D. Cut and fit insulation tightly to protrusions or interruptions to the insulation plane.
- E. Seal joints with foil tape.

3.04 BATT INSTALLATION

- A. Install insulation in accordance with manufacturer's instructions.
- B. Install in exterior wall spaces without gaps or voids. Do not compress insulation.
- C. Trim insulation neatly to fit spaces. Insulate miscellaneous gaps and voids.
- D. Fit insulation tightly in cavities and tightly to exterior side of mechanical and electrical services within the plane of the insulation.
- E. Retain insulation batts in place with spindle fasteners at 12 inches (305 mm) on center.

3.05 PROTECTION

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

END OF SECTION

**SECTION 072500
WEATHER BARRIERS**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Vapor Retarders: Materials to make exterior walls, joints between exterior walls and roof, and joints around frames of openings in exterior walls water vapor resistant and air tight.
- B. Air Barriers: Materials that form a system to stop passage of air through exterior walls, joints between exterior walls and roof, and joints around frames of openings in exterior walls.

1.02 DEFINITIONS

- A. Weather Barriers: Assemblies that form either water-resistive barriers, air barriers, or vapor retarders.

1.03 REFERENCE STANDARDS

- A. ASTM D1970/D1970M - Standard Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection; 2021.

1.04 PERFORMANCE REQUIREMENTS

- A. Air barrier shall be capable of performing as a continuous vapor-permeable air barrier and as a liquid-water drainage plane flashed to discharge to the exterior incidental condensation or water penetration. Air barrier assemblies shall be capable of accommodating substrate movement and of sealing substrate expansion and control joints, construction material changes, and transitions at perimeter conditions without deterioration and air leakage exceeding specified limits.
- B. Water barrier shall be capable of performing as a continuous non-vapor-permeable air and water barrier flashed to discharge to exterior condensation and water penetration. Water barrier membrane assemblies shall be capable of accommodating substrate movement and of sealing substrate expansion and control joints, construction material changes, and transitions at perimeter conditions without deterioration and air leakage exceeding specified limits.

1.05 SUBMITTALS

- A. Product Data: Provide data on material characteristics.
- B. Shop Drawings: Provide drawings of special joint conditions.
 - 1. Include details of interface between air barriers and water barriers.
- C. Manufacturer's Installation Instructions: Indicate preparation and installation methods.
- D. Compatibility Certification: Provide certification of compatibility of all products to be provided in this section and adjacent products that are part of the building envelope system.
- E. Testing agency reports.

1.06 QUALITY ASSURANCE

- A. Provide products for all components specified in the section from the same manufacturer, or provide certification of compatibility of all products not provided by same manufacturer.
- B. Products provided under this section and installed at part of an exterior wall assembly shall have passed NFPA 285 testing as part of a wall assembly matching those detailed on drawings.
- C. The same manufacturer of material used for Section 07 14 00 Fluid-Applied Waterproofing of this project, shall be the same manufacturer of material used for this section. Written manufacturer compatibility and adhesion certification shall be required.

1.07 MOCK-UPS

1.08 FIELD CONDITIONS

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

1.09 DELIVERY, STORAGE AND HANDLING

- A. Store liquid materials in their original undamaged packages in a clean, dry, protected location and within temperature range required by manufacturer.
- B. Remove and replace liquid materials that cannot be applied within their stated shelf life.
- C. Store rolls according to manufacturer's written instructions.
- D. Protect stored materials from direct sunlight.

1.10 PROJECT CONDITIONS

- A. Environmental Limitations: Apply weather barriers within the range of ambient and substrate temperatures recommended by weather barrier manufacturers. Protect substrates from environmental conditions that affect performance of weather barriers. Do not apply weather barriers to a damp or wet substrate or during snow, rain, fog, or mist.

PART 2 PRODUCTS

2.01 VAPOR PERMEABLE AIR BARRIER

- A. Vapor Permeable Air Barrier, Fluid Applied: Vapor permeable, elastomeric waterproofing.
 - 1. Air Barrier Membrane:
 - a. Air Permeance: 0.004 cubic feet per minute per square foot (0.02 L/s/sq m), maximum, when tested in accordance with ASTM E2178.
 - b. Water Vapor Permeance: 5 perms (287 ng/(Pa s sq m)), minimum, when tested in accordance with ASTM E96/E96M, Procedure B.
 - c. Elongation: 300 percent, minimum, when tested in accordance with ASTM D412.
 - d. Sealants, Tapes and Accessories: As recommended by coating manufacturer.
 - e. Manufacturers:
 - 1) Carlisle Coatings and Waterproofing, Inc; Fire Resist Barritech-VP: www.carlisleccw.com.
 - 2) GCP Applied Technologies; Perm-A-Barrier VPL: www.gcpat.com.
 - 3) Henry Company; Air-Bloc 17MR: www.henry.com.
 - 4) TK Products, AirMax 2104 VP: www.tkproducts.com.
 - 5) Tremco Commercial Sealants & Waterproofing; ExoAir 230: www.tremcosealants.com.

2.02 NON-PERMEABLE AIR AND WATER BARRIER (VAPOR RETARDER)

- A. Non-Permeable Air and Water Barrier Sheet: ASTM D1970/D1970M.
 - 1. Type: Rubberized asphalt bonded to thermoplastic sheet, self-adhesive.
 - 2. Water Vapor Permeance: Between 0.02 and 0.08, when tested in accordance with ASTM E96/E96M.
 - 3. Seam and Perimeter Tape: As recommended by sheet manufacturer.
 - 4. Manufacturers:
 - a. Carlisle Coatings and Waterproofing, Inc; CCW-705 Air and Vapor Barrier Sheet: www.carlisleccw.com/#sle.
 - b. GPC Applied Technologies (Grace), Perm-A-Barrier.
 - c. Henry Company; Blueskin SA: www.henry.com.
 - d. Tremco Sealants and Waterproofing; ExoAir 110AT.

2.03 ACCESSORIES

- A. Transition Membrane: A 40 mil self-adhering waterproofing used for flashing around beams, columns, and wall openings (including window, door and curtain wall frames, louvers, etc.);

consisting of 36 mils of rubberized asphalt, integrally bonded to a 4 mil high-density cross-laminated polyethylene film. Membrane shall be interleaved with disposable silicone-coated release paper until installed. Fully-supported self-adhered membranes must be provided at all corners, (inside and outside), transitions, and changes in substrate. Liquid applied membranes that utilize mesh reinforcements will not be allowed.

1. Basis-of-Design Product: GCP Applied Technologies (Grace) Perm-A-Barrier Detail Membrane.
 2. Other Acceptable Manufacturers:
 - a. Henry Corporation
 - b. Carlisle Coatings & Waterproofing
 - c. Tremco.
 - d. TK Products.
- B. Flexible Membrane Through-Wall Flashing: Self-adhesive sheet flashing complying with ASTM D1970/D1970M, except slip resistance requirement is waived if not installed on a roof.
1. Thickness: 22 - 40 mil.
 2. Provide flexible membrane through-wall flashings by the same manufacturer as weather barrier.
 3. Basis-of-Design Product: GCP Applied Technologies (Grace) Perm-A-Barrier Wall Flashing.
 4. Other Acceptable Manufacturers:
 - a. Henry Corporation.
 - b. Carlisle Coatings & Waterproofing.
 - c. TK Products.
 - d. Tremco Sealants and Waterproofing.
 5. Performance Requirements:
- C. Detailing Compound: Two-part, elastomeric, trowel grade material for use with self-adhered membranes and tapes.
1. Basis-of-Design Product: GCP Applied Technologies (Grace) Bituthene Liquid Membrane.
 2. Other Acceptable Manufacturers:
 - a. Henry Corporation.
 - b. Carlisle Coatings & Waterproofings.
 - c. TK Products.
 - d. Tremco Sealants and Waterproofing.
- D. Metal Drip Edge: Provide metal drip edge where flashing is exposed or partially exposed and where indicated, complying with Division 7 Section "Sheet Metal Flashing and Trim" and as follows:
1. Stainless Steel: ASTM A 240/A 240M, Type 304, 0.016 inch thick.
 - a. Metal Drip Edges: Fabricate from stainless steel. Extend into wall and 1/2 inch out from wall, with outer edge bent down 30 degrees and hemmed.
 2. Basis-of-Design Product: Hohmann & Barnard 26 gage minimum, 1-1/2" minimum, stainless steel hemmed drip plate.
- E. Miscellaneous Materials: Tape and other accessories specified or acceptable to manufacturer of fluid- applied air and vapor barrier membrane.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that surfaces and conditions comply with requirements of this section.
- B. The installer shall examine conditions of substrates and other conditions under which this work is to be performed and notify the Contractor, in writing, of circumstances detrimental to the proper completion of the work. Do not proceed with work until unsatisfactory conditions are corrected

- C. Verify that items built-in under other sections are properly located, sized, and securely installed.

3.02 PREPARATION

- A. Protect adjacent work areas and finish surfaces from damage during installation.
- B. Refer to manufacturer's literature for requirements for preparation of substrates. Surfaces shall be structurally sound and free of voids, spalled areas, loose aggregate and sharp protrusions. Remove contaminants such as grease, oil and wax from exposed surfaces. Remove dust, dirt, loose stone and debris. Use repair materials and methods which are acceptable to manufacturer of fluid-applied air and vapor barrier.
- C. Cast-In-Place Concrete Substrates:
1. Surface shall be free of any visible water, frost, or ice.
 2. Fill form tie rod holes with concrete and finish flush with surrounding surface.
 3. Repair bug holes greater than 1/2 inch in diameter and 1/4 inch deep, and finish flush with surrounding surface.
 4. Remove scaling to sound, unaffected concrete, and repair exposed area.
 5. Grind irregular construction joints and protrusions taller than 1/8" to suitable flush surface.
- D. Exterior Sheathing Panels: Ensure that the boards are sufficiently stabilized with corners and edges fastened with appropriate screws. Pre-treat all board joints with 2 to 3 inch wide, reinforced self-adhesive tape, or fiberglass mesh-style gypsum board tape. Fill gaps greater than 1/4 inch with mastic or caulk, allowing sufficient time for full curing before application of tape and fluid-applied membrane
- E. Masonry Substrates: Apply air and vapor barrier over concrete block with smooth flush mortar joints. Fill all voids and holes, particularly in the mortar joints, with a lean mortar mix, non-shrinking grout or parge coat.
- F. Related Materials: Treat joints and install flashing as recommended by membrane manufacturer.

3.03 INSTALLATION

- A. Install materials in accordance with manufacturer's installation instructions.
- B. Application of Fluid-Applied Membrane:
1. Spray- or trowel-apply a continuous uniform film at minimum 60 mils dry film thickness using multiple, overlapping passes.
 2. When spraying, use a cross-hatching technique (alternating horizontal and vertical passes) to ensure even thickness and coverage.
 3. When spraying, use high pressure, multi-component, airless spray equipment approved by material manufacturer.
 4. Carry membrane into any openings a minimum of 2 inches.
 5. Seal all brick-ties and other penetrations as work progresses.
- C. Application of Transition Membrane:
1. After allowing the fluid-applied membrane to cure to tack-free finish, apply transition membrane with a minimum overlap of 3 inches onto each surface at all beams, columns and joints as indicated on Drawings.
 2. Tie-in to window and door frames, spandrel panels, roof and floor intersections and changes in substrate.
 - a. Install products in accordance to manufacturer's installation instructions, necessary to provide a continuous weather barrier for all transitions in plane.
 3. Use pre-cut, easily-handled lengths for each location.
 4. Remove silicone-coated release paper and position membrane flashing carefully before placing it against the surface.
 5. When properly positioned, place against surface by pressing firmly into place using hand roller.
 6. Overlap adjacent pieces 2 inches, and roll all seams with a hand roller.

7. Seal top edge of flashing with sealant compatible with all surrounding materials.
 8. Transition flashing is not to be pre-installed prior to application of fluid-applied membrane, apply transition flashing as above. Spray or trowel a continuous uniform film of Fluid-Applied Membrane at minimum 60 mils dry film thickness using multiple, overlapping passes, with a minimum overlap of 3 inches between the fluid applied and the transition flashing
- D. Application of Flexible Membrane Wall Flashing:
1. Precut pieces of flashing to easily handled lengths for each location.
 2. Remove silicone-coated release paper and position flashing carefully before placing it against the surface.
 3. When properly positioned, place against surface by pressing firmly into place using hand roller. Fully-adhere flashing to substrate to prevent water from migrating under flashing.
 4. Overlap adjacent pieces 2 inches and roll all seams with a hand roller.
 5. Trim bottom edge 1/2 inch back from exposed face of the wall. Flashing shall not be permanently exposed to sunlight.
 6. At heads, sills and all flashing terminations, turn up flashing ends a minimum of 2 inches, and make careful folds to form an end dam, with the seams sealed.
 7. Seal top edge of flashing with sealant compatible with all surrounding materials.
 8. Do not allow the rubberized-asphalt surface of the flashing membrane to come in contact with poly- sulfide sealants, creosote, uncured coal tar products, or ethylene-propylene-diene-terpolymer products (EPDM).
- E. Installation of the primary membrane is to occur prior to all inside and outside corners, fenestration rough openings and penetrations, then install the initial application of detail membrane.

3.04 TOLERANCES

- A. System to be installed to accommodate the following maximum live load deflection in the plane of the exterior wall:
1. Verify maximum live load deflection with structural requirements or 3/8 inch, whichever is greater.

3.05 CLEANING AND PROTECTION

- A. Remove any masking materials after installation. Clean any stains on materials which would be exposed in the completed work using procedures as recommended by manufacturer.
- B. Fluid-applied air and vapor barrier membrane is not suitable for permanent exposure and should be protected from the effects of sunlight.
- C. Schedule work to ensure that the membrane system is covered as soon as possible after installation. Protect membrane system from damage during subsequent operations. If the air and vapor barrier membrane system cannot be covered within sixty (60) days after installation, apply temporary UV protection such as dark plastic sheet or tarpaulins.

3.06 FIELD QUALITY CONTROL

- A. Owner's Inspection and Testing: Cooperate with Owner's testing agency.
1. Allow access to work areas and staging.
 2. Notify Owner's testing agency in writing of schedule for work of this section to allow sufficient time for testing and inspection.
 3. Do not cover work of this section until testing and inspection is accepted.
- B. Do not cover installed fluid-applied air and vapor barrier until required inspections have been completed by testing agency.
- C. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections and prepare test reports.
- D. The testing agency shall verify proper application thickness via a wet mil gauge during the application process.

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- E. Testing agency shall perform "Bubble Gun" testing in accordance ASTM E1186 at no less than six (6) areas, or visual inspections at Owner/Architect's discretion.

3.07 PROTECTION

- A. Do not leave materials exposed to weather longer than recommended by manufacturer.

END OF SECTION

**SECTION 074213.53
METAL SOFFIT PANELS**

PART 1 GENERAL

1.01 SUMMARY

- A. Section includes metal soffit panels.

1.02 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: 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.
- C. Samples: For each type of metal panel indicated.

1.03 INFORMATIONAL SUBMITTALS

- A. Product test reports.
- B. Warranties: Samples of special warranties.

1.04 CLOSEOUT SUBMITTALS

- A. Maintenance data.

1.05 WARRANTY

- A. 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. Finish Warranty Period: 20 years from date of Substantial Completion.

PART 2 PRODUCTS

2.01 PERFORMANCE REQUIREMENTS

- A. Structural Performance: Provide metal panel systems capable of withstanding the effects of the following loads, based on testing according to ASTM E 1592:
 - 1. Wind Loads: As indicated on Drawings.
 - 2. Deflection Limits: For wind loads, no greater than 1/240 of the span.
- B. 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.

2.02 METAL SOFFIT PANELS

- A. General: 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: Factory formed panels with vertical panel edges and a flat pan between panel edges; with flush joint between panels.
 - 1. Basis-of-Design Product: Subject to compliance with requirements, provide McElroy, Marquee II Soffit Panels or comparable product by one of the following:
 - a. Berridge Manufacturing Company .
 - b. Englert, Inc .
 - c. Firestone Metal Products, LLC.
 - d. MBCI; a division of NCI Building Systems, L.P.
 - e. Petersen Aluminum Corporation.
 - 2. Metallic-Coated Steel Sheet: Zinc-coated (galvanized) steel sheet complying with ASTM A 653/A 653M, G90 coating designation, or aluminum-zinc alloy-coated steel sheet

complying with ASTM A 792/A 792M, Class AZ50 coating designation; structural quality.
Prepainted by the coil-coating process to comply with ASTM A 755/A 755M.

- a. Nominal (Uncoated) Thickness: [22 gauge, 0.03125 inch]
 - b. Exterior Finish: [Fluoropolymer].
 - c. Color: [As selected by Architect from manufacturer's full range].
3. Panel Coverage: 12 inches.
 4. Panel Height: 1.0 inch.

2.03 MISCELLANEOUS MATERIALS

- A. Miscellaneous Metal Subframing and Furring: ASTM C 645, cold-formed, metallic-coated steel sheet, ASTM A 653/A 653M, G90 coating designation or ASTM A 792/A 792M, 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; 1/8 inch thick.
 2. Joint Sealant: ASTM C 920; as recommended in writing by metal panel manufacturer.
 3. Butyl-Rubber-Based, Solvent-Release Sealant: ASTM C 1311.

2.04 FABRICATION

- A. General: Fabricate and finish metal panels and accessories at the factory, by manufacturer's standard procedures and processes, as necessary to fulfill indicated performance requirements demonstrated by laboratory testing. Comply with indicated profiles and with dimensional and structural requirements.
- B. Provide panel profile, including major ribs and intermediate stiffening ribs, if any, for full length of panel.
- C. 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.

2.05 FINISHES

- A. Panels and Accessories:
 1. Fluoropolymer: AAMA 620 (aluminum). 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. Concealed Finish: White or light-colored acrylic or polyester backer finish.

PART 3 EXECUTION

3.01 PREPARATION

- A. Miscellaneous Supports: Install subframing, furring, and other miscellaneous panel support members and anchorages according to ASTM C 754 and metal panel manufacturer's written recommendations.

3.02 METAL PANEL INSTALLATION

- A. Metal Soffit 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.
- B. Accessory Installation: Install accessories with positive anchorage to building and weathertight mounting, and provide for thermal expansion. Coordinate installation with flashings and other components.
- C. 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.

3.03 CLEANING

- 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.

END OF SECTION 074213.53

**SECTION 075300
ELASTOMERIC MEMBRANE ROOFING**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Elastomeric roofing membrane, adhered conventional application.
- B. Insulation, flat and tapered.
- C. Direct to concrete deck vapor barrier.
- D. Cover boards.
- E. Roofing cant strips, stack boots, roofing expansion joints, and walkway pads.

1.02 RELATED REQUIREMENTS

- A. Section 061000 - Rough Carpentry: Nailers, curbs and plywood sheathing.
- B. Section 07 62 00 - Sheet Metal Flashing and Trim: Copings, scuppers, counterflashing and trim.
- C. Section 07 90 05 - Sealants.

1.03 REFERENCE STANDARDS

- A. ASTM C1177/C1177M - Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing; 2024.
- B. ASTM C1289 - Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board; 2025.
- C. ASTM D412 - Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers--Tension; 2016 (Reapproved 2021).
- D. ASTM D2240 - Standard Test Method for Rubber Property--Durometer Hardness; 2015 (Reapproved 2021).
- E. ASTM D4263 - Standard Practice for Indicating Moisture in Concrete by the Plastic Sheet Method; 2024.
- F. ASTM F2170 - Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes; 2019a.
- G. NRCA (WM) - The NRCA Waterproofing Manual; 2021.

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Coordinate with installation of associated counterflashings installed under other sections.
- B. Preinstallation Meeting: Convene a preinstallation meeting two weeks before starting work of this section; require attendance by all affected installers; review preparation and installation procedures, phasing plan, and coordination and scheduling necessary for related work.

1.05 PERFORMANCE REQUIREMENTS

- A. All components of the roofing system shall be manufactured, supplied, or accepted by the manufacturer/supplier and be a part of an accepted or approved FM Global RoofNav Assembly.
 - 1. Roof system must meet the minimum rating requirements of FM Global Class 1-A-60-SH.
- B. General Performance: Installed membrane roofing and base flashings shall withstand specified uplift pressures, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Membrane roofing and base flashings shall remain watertight.
- C. Material Compatibility: Provide roofing materials that are compatible with one another under conditions of service and application required, as demonstrated by membrane roofing manufacturer based on testing and field experience. Additionally, provide surety that roofing materials are compatible with adjacent weather and water barrier membrane systems.

- D. Comply with all local code requirements.
- E. FM Global Compliance required
 - 1. Submit Roof Nav output <https://roofnav.fmglobal.com/RoofNav/Login.aspx>
 - 2. Roof System Design: In accordance with FM Global Property Loss Prevention Data Sheets 1-28, Wind Design; 1-29, Roof Deck Securement and Above Deck Roofing Components; and 1-54, Roof Loads for New Construction, should be used in the design of the new buildings.
- F. Prevent chemical contaminants from coming into direct contact with the roofing membrane. If resistance to specific chemicals is required, contact the manufacturer/supplier for recommendations.

1.06 SUBMITTALS

- A. Product Data: Provide data indicating membrane materials, flashing materials and sealants.
- B. Shop Drawings: Include plans, elevations, sections and details which indicate joint or termination detail conditions, setting plan for tapered insulation, mechanical fastener layout, and conditions of interface with other materials adjacent to the roofing system. Shop drawings must be signed and certified as meeting requirements of roofing warranty indicated, prior to beginning installation.
- C. Submit a letter of certification from the manufacturer which certifies the roofing contractor is authorized to install the manufacturer's roofing system and lists foremen who have received training from the manufacturer along with the dates training was received.
- D. Manufacturer's Installation Instructions: Indicate membrane seaming precautions and perimeter conditions requiring special attention.
- E. Manufacturer's Certification: Certify that project has been reviewed by roofing system manufacturer prior to installation and installation detailed in shop drawings is approved by manufacturer as meeting warranty requirements indicated.
- F. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

1.07 QUALITY ASSURANCE

- A. Installer Qualifications: A qualified firm that is approved, authorized, or licensed by membrane roofing system manufacturer to install manufacturer's product and that is eligible to receive manufacturer's special warranty.
- B. Source Limitations: Products used in the work included in this section shall be produced or supplied by the manufacturer and must have a history of successful production acceptable to the Owner.
- C. All products (including insulation, fasteners, fastening plates and edgings) must be manufactured and/or supplied by the roofing system manufacturer and covered by the warranty.
- D. Exterior Fire-Test Exposure: ASTM E 108, Class A; for application and roof slopes indicated, as determined by testing identical membrane roofing materials by a qualified testing agency. Materials shall be identified with appropriate markings of applicable testing agency.
- E. Preinstallation Roofing Conference: A pre-installation conference shall be held two weeks prior to commencement of field operations to establish procedures to maintain optimum working conditions and to coordinate this work with related and adjacent work. Attendance shall include the contractors of adjacent systems and substrates, and the roofing system manufacturer representative. Agenda for meeting shall include but not be limited to the following:
 - 1. Review of approved submittals.
 - 2. Review of surface preparation, minimum curing period and installation procedures.
 - 3. Review of special details and flashings.
 - 4. Sequence of construction, responsibilities and schedule for subsequent operations.

5. Review of mock-up requirements.
 6. Review of inspection, testing, protection and repair procedures.
- F. Manufacturer Account Reps must be notified at project initiation
1. Pre-Installation Notice (PIN) must be submitted

1.08 DELIVERY, STORAGE, AND HANDLING

- A. Deliver products in manufacturer's original containers, dry, undamaged, with seals and labels intact. Store in a dry location. Comply with insulation manufacturer's written instructions for handling, storing, and protecting during installation.
- B. Store products in weather protected environment, clear of ground and moisture, moisture, soiling, and other sources.
- C. Ensure storage and staging of materials does not exceed static and dynamic load-bearing capacities of roof decking.
- D. Protect foam insulation from direct exposure to sunlight.
- E. Handle and store roofing materials and place equipment in a manner to avoid overloading and /or permanent deflection of deck.

1.09 FIELD QUALITY CONTROL

- A. Pre-Installation Inspection: Arrange for roofing system manufacturer's technical personnel to inspect roof deck prior to installation and submit report to Architect.
 1. Notify Architect one week in advance of date and time of inspection.

1.10 FIELD CONDITIONS

- A. Do not apply roofing membrane during unsuitable weather.
- B. Do not apply roofing membrane when ambient temperature is below 40 degrees F without manufacturer's approval specific to this project.
- C. Do not apply roofing membrane to damp or frozen deck surface or when precipitation is expected or occurring.
- D. Only as much of the new roofing as can be made weather-tight each day including all flashings and detail work, shall be installed.
- E. Schedule applications so that no partially completed sections of roof are left exposed at end of workday.

1.11 WARRANTY

- A. Warranty: Total System Warranty, no dollar limit, in which manufacturer agrees to repair or replace components of membrane roofing system that fail in materials or workmanship within specified warranty period.
 1. Warranty includes roofing membrane, base flashings, roofing membrane accessories, roof insulation, fasteners, and other components of membrane roofing system.
 2. Warranty shall include peak wind speed of 72 mph.
 3. Warranty Period: 20 years from date of Substantial Completion.
 4. Warranty shall include labor and materials.
- B. Pro-rated System Warranties shall not be accepted.
- C. Upon completion of the installation, the applicator shall arrange for an inspection to be made by a non-sales technical representative of the membrane manufacturer in order to determine whether or not corrective work will be required before the warranty will be issued. Notify the Architect and building owner seventy-two (72) hours prior to the manufacturer's final inspection.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. EPDM Membrane Systems: Provide one of the following:
 1. Carlisle SynTec Systems: www.carlisle-syntec.com/#sle.

2. Holcim Elevate(formerly Firestone): www.holcimelevate.com.
3. Versico Roofing Systems: www.versico.com/#sle.
4. Substitutions: See Section 01 25 00 - Substitution Procedures.

2.02 ROOFING

- A. Elastomeric Membrane Roofing: One ply membrane, fully adhered, over insulation and coverboard.
- B. Acceptable Insulation Types - Constant Thickness Application: Any of types specified.
 1. Multiple layers of polyisocyanurate board.
 2. Provided by membrane manufacturer.
- C. Acceptable Insulation Types - Tapered Application: Any of types specified.
 1. Provide factory-tapered polyisocyanurate insulation boards fabricated to slope of 1/4 inch per 12 inches unless otherwise indicated.
 2. Provided by membrane manufacturer.

2.03 ROOFING MEMBRANE AND ASSOCIATED MATERIALS

- A. Membrane: Ethylene-propylene-diene-terpolymer (EPDM); non-reinforced; complying with minimum properties of ASTM D4637/D4637M.
 1. Thickness: 0.060 inch (____ mm).
 2. Color: Black.
 3. Tensile Strength: 1,300 psi (____ MPa), minimum, measured in accordance with ASTM D412.
 4. Durometer Hardness, Type A: 30, minimum, in accordance with ASTM D2240
 5. Tear Strength: 150 lbf/inch (26.3 kN/m), measured in accordance with ASTM D624.
- B. Seaming Materials: Manufacturer's standard pre-manufactured synthetic-rubber polymer primer and butyl splice tape with release film or as required by manufacturer's warranty.
- C. Vapor Barrier: SBS modified bitumen adhesive, factory-laminated to a tri-laminate woven, high-density polyethylene top surface with release liner protecting adhesive.
 1. Thickness: 30 mil.
 2. Moisture Vapor Permeance, 0.02 perms maximum, when tested in accordance with ASTM E 96.
 3. Air Permeability: 0.0011 ft³/min•ft² maximum, when tested in accordance with ASTM E 2178.
 4. Vapor barrier shall be provided by roofing manufacturer, or if not available from roofing manufacturer, obtained by roofing system installer by same manufacturer as water barrier membrane specified in Section 07 25 00 Weather Barriers. Coordinate interface of roof system vapor barrier with water barrier membrane installer to provide continuous vapor barrier plane.
- D. Base Flashings: 60 mil EPDM.
- E. Flexible Flashing Material: Same material as membrane.

2.04 COVER BOARDS

- A. Cover Boards: Glass-mat faced gypsum panels complying with ASTM C1177/C1177M, thickness as required by manufacturer's warranty, but not less than 1/2 inch, factory primed.

2.05 INSULATION

- A. Polyisocyanurate (ISO) Board Insulation: Rigid cellular foam, complying with ASTM C1289.
 1. Classifications:
 - a. Type II: Faced with either cellulosic facers or glass fiber mat facers on both major surfaces of the core foam.
 - 1) Class 2 - Faced with coated polymer-bonded glass fiber mat facers on both major surfaces of core foam.
 - 2) Compressive Strength: Classes 1-2-3, Grade 2 - 20 psi (138 kPa), minimum.

- 3) Thermal Resistance: R-30 minimum. : At thick; at .
2. Board Size: 48 by 96 inches (1220 by 2440 mm).
3. Board Thickness: 2.7 inch (69 mm), provide multiple layers as required to provide thicknesses required for R-value and thicknesses indicated on drawings.

2.06 ACCESSORIES

- A. Stack Boots: Prefabricated flexible boot and collar for pipe stacks through membrane; same material as membrane.
- B. Insulation Joint Tape: Glass fiber reinforced type as recommended by insulation manufacturer, compatible with roofing materials; 6 inches (150 mm) wide; self adhering.
- C. Membrane Adhesive: As recommended by membrane manufacturer for conditions at time of installation.
- D. Metal Termination Bars: Manufacturer's standard, predrilled stainless-steel or aluminum bars, approximately 1 by 1/8 inch thick; with anchors.
- E. Metal Battens: Manufacturer's standard, aluminum-zinc-alloy-coated or zinc-coated steel sheet, approximately 1 inch wide by 0.05 inch thick, prepunched.
- F. Fasteners: Factory-coated steel fasteners and 18-20 ga. metal plates complying with corrosion-resistance provisions in FM Approvals 4470, designed for fastening membrane to substrate, and acceptable to roofing system manufacturer to obtain specified warranty.
- G. Miscellaneous Accessories: Provide pourable sealers, preformed cone and vent sheet flashings, preformed inside and outside corner sheet flashings, reinforced EPDM securement strips, T-joint covers, in-seam sealants, termination reglets, cover strips, and other accessories.
- H. Insulation/Cover Board Adhesive: As recommended by insulation manufacturer for conditions at time of installation.
- I. Sealants: As recommended by membrane manufacturer.
- J. Walkway Pads: Suitable for maintenance traffic, contrasting color or otherwise visually distinctive from roof membrane.
 1. Composition: Roofing membrane manufacturer's standard.
 2. Surface Color: Grey or yellow.
 3. Products:
 - a. Roofing membrane manufacturer's standard.
- K. Walkway Pads: Factory-formed, nonporous, heavy-duty, solid-rubber, slip-resisting, surface-textured walkway pads or rolls, approximately 3/16 inch thick, and acceptable to membrane roofing system manufacturer.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that surfaces and site conditions are ready to receive work.
- B. Verify deck is supported and secure.
- C. Verify deck is clean and smooth, flat, free of depressions, waves, or projections, properly sloped and suitable for installation of roof system.
- D. Verify deck surfaces are dry and free of snow or ice.
- E. Verify that roof openings, curbs, and penetrations through roof are solidly set, and cant strips are in place.
- F. Verify that wood blocking, curbs, and nailers are securely anchored to roof deck at penetrations and terminations and that nailers match thicknesses of insulation.
- G. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION - CONCRETE DECK

- A. Fill surface honeycomb and variations with latex filler.

- B. Do not begin work until elevated concrete substrate has cured at least 28 days and moisture content is five percent or less.
 - 1. Test as Follows:
 - a. Concrete Moisture Content: No beading water under plastic after 16 hours when tested in accordance with ASTM D4263.
 - b. Relative Humidity in Concrete: Not greater than 75 percent when tested in accordance with ASTM F2170.

3.03 PREPARATION

- A. Clean substrate of dust, debris, moisture, and other substances detrimental to roofing installation according to roofing system manufacturer's written instructions. Remove sharp projections.
- B. Prevent materials from entering and clogging roof drains and conductors and from spilling or migrating onto surfaces of other construction. Remove roof-drain plugs when no work is taking place or when rain is forecast. Place temporary roof drain grates when roof drain plugs are not in place.
- C. Complete terminations and base flashings and provide temporary seals to prevent water from entering completed sections of roofing system at the end of the workday or when rain is forecast. Remove and discard temporary seals before beginning work on adjoining roofing.
- D. Install nailers as specified in Section 06 10 00 - Rough Carpentry and as required by manufacturer's approved shop drawings.
- E. Handle and store roofing materials and place equipment in a manner to avoid overloading and/or permanent deflection of deck.

3.04 SLOPE AND DRAINAGE

- A. The roof shall have a minimum design slope of 1/4 inch per foot. Provide tapered insulation as required to achieve required slope. Use crickets, saddles and edge strips (tapered at 2 times slope) to direct water from penetrations and parapet walls. Install crickets at upslope sides of curbs.
- B. Locate roof drains at projected low points. All roofs shall have overflow systems.

3.05 INSTALLATION - INSULATION, UNDER MEMBRANE

- A. Coordinate installing membrane roofing system components so insulation is not exposed to precipitation or left exposed at the end of the workday.
- B. Comply with membrane roofing system and insulation manufacturer's written instructions for installing roof insulation.
- C. Apply vapor barrier to substrate surface with in accordance with manufacturer's instructions.
 - 1. Extend vapor barrier under cant strips and blocking to deck edge.
 - 2. Install flexible flashing from vapor barrier to air seal material of wall construction, lap and seal to provide continuity of the air barrier plane.
- D. Ensure vapor barrier is clean and dry, continuous, and ready for application of insulation.
- E. Tapered Insulation:
 - 1. Install tapered insulation with slope direction as indicated on the approved shop drawings. Miter cut all panels at valleys for tight fit and alignment throughout valley length.
 - 2. Install tapered saddles in valleys, where indicated on the approved drawings in the sizes shown. End of saddle shall provide or slope into the sump at the drainage device. End of saddle shall be of sufficient width at sump such that flat spots do not occur in valley. Saddle slope shall be twice the field slope, unless otherwise noted on the drawings.
 - 3. Utilize tapered insulation panels and tapered edge strips to construct sumps at roof drains and scuppers, where detailed. Size shall be as shown in approved shop drawings. Delete thermal insulation within sumps, as required, for installation of tapered panels, so as to provide continuous slope to drainage device, without creating a sharp/steep sloped

- transition. At no time shall slope within drain sump exceed 1:12, unless otherwise noted in drawings.
4. Install tapered crickets on the upslope sides of all rectangular penetrations with a dimension greater than 18" perpendicular to slope. Cricket slope shall be twice the field's slope, unless otherwise noted on drawings.
 5. Utilize tapered edge strip at transitions in construction of more than 1/4 inch, and in other specified locations, to provide a smooth transition and proper support for the membrane system or subsequent insulation layer. Field cut and shape edge strip as required. Direct slope of edge strip so as to provide for proper drainage.
 6. Verify that tapered insulation is properly installed according to the approved shop drawings and that no irregularities exist that will result in ponding water in the finished roof system.
- F. Cover Boards: Fully adhere cover boards in accordance with roofing manufacturer's instructions.
- G. Lay subsequent layers of insulation with joints staggered minimum 6 inches (152 mm) from joints of preceding layer.
- H. Place tapered insulation to the required slope pattern in accordance with manufacturer's instructions.
- I. On metal deck, place boards parallel to flutes with insulation board edges bearing on deck flutes.
- J. Lay boards with edges in moderate contact without forcing. Cut insulation to fit neatly to perimeter blocking and around penetrations through roof.
- K. Tape joints of insulation in accordance with roofing and insulation manufacturers' instructions.
- L. At roof drains, use boards cut to slope to slope down to roof drains over a distance of not less than 18 inches (450 mm).
- M. Do not apply more insulation than can be covered with membrane in same day.

3.06 INSTALLATION - MEMBRANE

- A. Install elastomeric membrane roofing system in accordance with manufacturer's recommendations and NRCA (WM) applicable requirements.
- B. Roll out membrane, free from wrinkles or tears. Place sheet into place without stretching.
- C. Shingle joints on sloped substrate in direction of drainage.
- D. Fully Adhered Application: Apply adhesive to substrate at rate required by manufacturer. Fully embed membrane in adhesive except in areas directly over or within 3 inches of expansion joints. Fully adhere one roll before proceeding to adjacent rolls.
- E. In addition to adhering, mechanically fasten membrane roofing securely at terminations, penetrations, and perimeters as necessary to comply with uplift requirements and manufacturer's warranty requirements.
- F. Overlap edges and ends and seal seams by contact adhesive, minimum 3 inches (76 mm). Seal permanently waterproof. Apply uniform bead of sealant to joint edge.
- G. Base Flashing Installation:
1. Install sheet flashings and preformed flashing accessories and adhere to substrates according to membrane roofing system manufacturer's written instructions.
 2. Apply bonding adhesive to substrate and underside of sheet flashing at required rate and allow to partially dry. Do not apply bonding adhesive to seam area of flashing.
 3. Flash penetrations and field-formed inside and outside corners with cured or uncured sheet flashing.
 4. Clean splice areas, apply splicing cement, and firmly roll side and end laps of overlapping sheets to ensure a watertight seam installation. Apply lap sealant and seal exposed edges of sheet flashing terminations.

5. Terminate and seal top of sheet flashings and mechanically anchor to substrate through termination bars.
6. Termination bars to be covered with a reglet and counterflashing even if not required by manufacturer's warranty.
- H. At intersections with vertical surfaces:
 1. Extend membrane over cant strips and up a minimum of 4 inches (102 mm) onto vertical surfaces.
 2. Fully adhere flexible flashing over membrane and up to nailing strips.
 3. Install in accordance with manufacturer's warranty requirements.
- I. Around roof penetrations, seal flanges and flashings with flexible flashing.
 1. Install in accordance with manufacturer's warranty requirements.
- J. Install roofing expansion joints where indicated. Make joints watertight.
 1. Install in accordance with manufacturer's warranty requirements.
- K. Coordinate installation of roof drains and related flashings.
 1. Install in accordance with manufacturer's warranty requirements.
- L. Install walkway pads in accordance with manufacturer's instructions.

3.07 FIELD QUALITY CONTROL

- A. See Section 014000 - Quality Requirements for additional requirements.
- B. Pre-Installation Inspection: Arrange for roofing system manufacturer's technical personnel to inspect roof deck prior to installation and submit report to Architect.
 1. Notify Architect or Contracting Officer one week in advance of date and time of inspection.
- C. Final Roof Inspection: Arrange for roofing system manufacturer's technical personnel to inspect roofing installation on completion.
 1. Notify Architect or Owner a week in advance of date and time of inspection.
- D. Repair or remove and replace components of membrane roofing system where inspections indicate that they do not comply with specified requirements.
- E. Additional inspections, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

3.08 CLEANING

- A. See Section 017000 - Execution and Closeout Requirements for additional requirements.
- B. Remove bituminous markings from finished surfaces.
- C. In areas where finished surfaces are soiled by work of this section, consult manufacturer of surfaces for cleaning advice and comply with their documented instructions.
- D. Repair or replace defaced or damaged finishes caused by work of this section.

3.09 PROTECTION

- A. Protect installed roofing and flashings from construction operations.
- B. Where traffic must continue over finished roof membrane, protect surfaces using durable materials.

END OF SECTION

**SECTION 076200
SHEET METAL FLASHING AND TRIM**

PART 1 GENERAL

1.01 SECTION INCLUDES

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

1.02 REFERENCE STANDARDS

- A. ASTM C920 - Standard Specification for Elastomeric Joint Sealants; 2018 (Reapproved 2024).
- B. ASTM D4586/D4586M - Standard Specification for Asphalt Roof Cement, Asbestos-Free; 2007 (Reapproved 2024).
- C. CDA A4050 - Copper in Architecture - Handbook; current edition.
- D. SMACNA (ASMM) - Architectural Sheet Metal Manual; 2012.

1.03 SUBMITTALS

- A. Shop Drawings: Indicate material profile, jointing pattern, jointing details, fastening methods, flashings, terminations, and installation details.
- B. Samples for Verification: For each type of exposed finish required, prepared on samples of size below:
 - 1. Sheet Metal Flashing: 12 inches long. Include fasteners, closures, and other attachments.
 - 2. Trim: 12 inches long. Including fasteners and other exposed accessories.

1.04 QUALITY ASSURANCE

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

1.05 DELIVERY, STORAGE, AND HANDLING

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

PART 2 PRODUCTS

2.01 SHEET MATERIALS

- A. Pre-Finished Galvanized Steel: ASTM A653, with G90/Z275 zinc coating, thickness as indicated, shop pre-coated with PVDF coating.
 - 1. PVDF (Polyvinylidene Fluoride) Coating: Superior Performance Organic Finish, AAMA 2605; multiple coat, thermally cured fluoropolymer finish system.
 - 2. Color: As selected by architect
- B. Stainless Steel: ASTM A666, Type 304 alloy, soft temper, thickness as indicated; smooth No. 4 - Brushed finish.

2.02 FABRICATION, GENERAL

- A. Form sections true to shape, accurate in size, square, and free from distortion or defects.
- B. Form pieces in longest possible lengths.
- C. Hem exposed edges on underside 1/2 inch (13 mm); miter and seam corners.
- D. Form material with flat lock seams, except where otherwise indicated; at moving joints, use sealed lapped, bayonet-type or interlocking hooked seams.
- E. Fabricate corners from one piece with minimum 18-inch (450 mm) long legs; seam for rigidity, seal with sealant.

2.03 SHEET METAL FABRICATIONS

- A. Copings: Fabricate in minimum 96 inch long, but not exceeding 10 foot long sections. Fabricate joint plates of same thickness as copings. Furnish with continuous cleats to support edge of external leg. Miter corners, seal watertight. Fabricate from the following material:
 - 1. Pre-finished Galvanized Steel: 0.035 inch thick.
- B. Parapet Scuppers: Fabricate scuppers to dimensions required, with closure flange trim to exterior, minimum 4-inch-wide wall flanges to interior, and base extending 4 inches beyond cant or tapered strip into field of roof. Fabricate from the following materials:
 - 1. Pre-finished Galvanized Steel: 0.035 inch thick.
- C. Roof-Penetration Flashing: Fabricate from the following material:
 - 1. Stainless Steel: 0.025 inch.
- D. Roof-Drain Flashing: Fabricate from the following material:
 - 1. Stainless Steel: 0.025 inch.

2.04 ACCESSORIES

- A. General: Provide materials and types of fasteners, solder, welding rods, protective coatings, separators, sealants, and other miscellaneous items as required for complete sheet metal flashing and trim installation.
- B. Primer Type: Zinc chromate.
- C. Concealed Sealants: Non-curing butyl sealant.
- D. Exposed Sealants: ASTM C920; elastomeric sealant, with minimum movement capability as recommended by manufacturer for substrates to be sealed; color to match adjacent material.
- E. Asphalt Roof Cement: ASTM D4586/D4586M, Type I, asbestos-free.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify roof openings, curbs, pipes, sleeves, ducts, and vents through roof are solidly set, reglets in place, and nailing strips located.
- B. Verify roofing termination and base flashings are in place, sealed, and secure.

3.02 PREPARATION

- A. Install starter and edge strips, and cleats before starting installation.
- B. Back paint concealed metal surfaces with protective backing paint to a minimum dry film thickness of 15 mil, 0.015 inch (0.38 mm).

3.03 INSTALLATION

- A. General: Anchor sheet metal flashing and trim and other components of the Work securely in place, with provisions for thermal and structural movement and to comply with SMACNA's "Architectural Sheet Metal Manual". Use fasteners, protective coatings, separators, sealants, and other miscellaneous items as required to complete sheet metal flashing and trim system.
- B. Secure flashings in place using concealed fasteners, and use exposed fasteners only where permitted.
- C. Apply plastic cement compound between metal flashings and felt flashings.
- D. Metal Protection: Where dissimilar metals will contact each other or corrosive substrates, protect against galvanic action by painting contact surfaces with bituminous coating or by other permanent separation as recommended by fabricator or manufacturers of dissimilar materials.
- E. Install exposed sheet metal flashing and trim without excessive oil canning, buckling and tool marks.
- F. Install sheet metal flashing and trim true to line and levels indicated. Provide uniform, neat seams with minimum exposure of solder, welds and elastomeric sealant.

- G. 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 or bayonet-type expansion provisions cannot be used or would not be sufficiently watertight, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with elastomeric sealant concealed within joints.
- H. Copings: Anchor to resist uplift and outward forces according to recommendations in FMG Loss Prevention Data Sheet 1-49.
 - 1. Interlock exterior bottom edge of coping with continuous cleats anchored to substrate at 16 inch centers.
 - 2. Anchor interior leg of coping with screw fasteners at washers at 18 inch centers.
- I. Parapet Scuppers: Continuously support scupper, set to correct elevation, and seal flanges to interior wall face, over cants or tapered edge strips, and under roofing membrane.
 - 1. Anchor scupper closure trim flange to exterior wall and seal with elastomeric sealant to scupper.
 - 2. Loosely lock front edge of scupper with conductor head.
- J. Conductor Heads: Anchor securely to wall, with elevation of conductor head rim at minimum of 1 inch below scupper discharge.
- K. Roof-Penetration Flashing: Coordinate installation of roof-penetration flashing with installation of roofing and other items penetrating roof.
- L. Miscellaneous Trims: Install with concealed fastener. Install work with laps, joints and seams that will be permanently watertight.
- M. Fit flashings tight in place; make corners square, surfaces true and straight in planes, and lines accurate to profiles.

END OF SECTION

**SECTION 079200
JOINT SEALANTS**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Nonsag gunnable joint sealants.
- B. Self-leveling pourable joint sealants.
- C. Joint backings and accessories.

1.02 RELATED REQUIREMENTS

- A. Section 092116 - Gypsum Board Assemblies: Sealing acoustical and sound-rated walls and ceilings.

1.03 REFERENCE STANDARDS

- A. ASTM C794 - Standard Test Method for Adhesion-in-Peel of Elastomeric Joint Sealants; 2018 (Reapproved 2022).
- B. ASTM C920 - Standard Specification for Elastomeric Joint Sealants; 2018 (Reapproved 2024).
- C. ASTM C1087 - Standard Test Method for Determining Compatibility of Liquid-Applied Sealants with Accessories Used in Structural Glazing Systems; 2023.
- D. ASTM C1193 - Standard Guide for Use of Joint Sealants; 2025.
- E. ASTM C1248 - Standard Test Method for Staining of Porous Substrate by Joint Sealants; 2022.
- F. ASTM C1311 - Standard Specification for Solvent Release Sealants; 2022.

1.04 SUBMITTALS

- A. Product Data: Submit manufacturer's technical datasheets for each product to be used; include the following:
 - 1. Physical characteristics, including movement capability, VOC content, hardness, cure time, and color availability.
 - 2. List of backing materials approved for use with the specific product.
 - 3. Substrates that product is known to satisfactorily adhere to and with which it is compatible.
 - 4. Substrates the product should not be used on.
- B. Product Data for Accessory Products: Submit manufacturer's technical data sheet for each product to be used, including physical characteristics, installation instructions, and recommended tools.
- C. Color Cards for Selection: Where sealant color is not specified, submit manufacturer's color cards showing standard colors available for selection.
- D. Preconstruction Laboratory Test Reports: Submit at least four weeks prior to start of installation.
- E. Preinstallation Field Adhesion Test Reports: Submit filled out Preinstallation Field Adhesion Test Reports log within 10 days after completion of tests; include bagged test samples and photographic records.

1.05 QUALITY ASSURANCE

- A. Preconstruction Laboratory Testing: Arrange for sealant manufacturer(s) to test each combination of sealant, substrate, backing, and accessories.
 - 1. Adhesion Testing: In accordance with ASTM C794.
 - 2. Compatibility Testing: In accordance with ASTM C1087.
 - 3. Allow sufficient time for testing to avoid delaying the work.
 - 4. Deliver sufficient samples to manufacturer for testing.
 - 5. Report manufacturer's recommended corrective measures, if any, including primers or techniques not indicated in product data submittals.

1.06 WARRANTY

- A. Special Installer's Warranty: Contractor's standard letterhead form in which Installer agrees to repair or replace joint sealants and accessories that do not comply with performance and other requirements specified in this Section within specified warranty period.
- B. Special Installer's Warranty: Contractor's standard letterhead form in which Installer agrees to repair or replace joint sealants and accessories 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 unless longer duration is noted for individual sealant systems.

PART 2 PRODUCTS

2.01 JOINT SEALANT APPLICATIONS

- A. Scope:
 - 1. Exterior Joints: Seal open joints, whether or not the joint is indicated on drawings, unless specifically indicated not to be sealed. Exterior joints to be sealed include, but are not limited to, the following items.
 - a. Wall expansion and control joints.
 - b. Joints between door, window, and other frames and adjacent construction.
 - c. Joints between different exposed materials.
 - d. Openings below ledge angles in masonry.
 - e. Other joints indicated below.
 - 2. Interior Joints: Do not seal interior joints unless specifically indicated to be sealed. Interior joints to be sealed include, but are not limited to, the following items.
 - a. Joints between door, window, and other frames and adjacent construction.
 - b. In sound-rated wall and ceiling assemblies, gaps at electrical outlets, wiring devices, piping, and other openings; between wall/ceiling and other construction; and other flanking sound paths.
 - 1) Exception: Through-penetrations in sound-rated assemblies that are also fire-rated assemblies.
 - c. Other joints indicated below.
 - 3. Do Not Seal:
 - a. Intentional weep holes in masonry.
 - b. Joints indicated to be covered with expansion joint cover assemblies.
 - c. Joints where sealant installation is specified in other sections.
 - d. Joints between suspended ceilings and walls.
- B. Exterior Joints: Use non-sag non-staining silicone sealant, unless otherwise indicated.
 - 1. Lap Joints in Sheet Metal Fabrications: Butyl rubber, non-curing.
 - a. Thresholds.
 - b. Sheet metal flashings and trim joints, including scuppers and gutters.
 - 2. Control and Expansion Joints in Concrete Paving: Self-leveling polyurethane "traffic-grade" sealant.
- C. Interior Wet Areas: Bathrooms, restrooms, and kitchens; fixtures in wet areas include plumbing fixtures, food service equipment, countertops, cabinets, and other similar items.
- D. Sound-Rated Assemblies: Walls and ceilings identified as STC-rated, sound-rated, or acoustical.

2.02 JOINT SEALANTS - GENERAL

2.03 NONSAG JOINT SEALANTS

- A. Non-Staining Silicone Sealant: ASTM C920, Grade NS, Uses M and A; not expected to withstand continuous water immersion or traffic.
 - 1. Movement Capability: Plus and minus 50 percent, minimum.

2. Nonstaining to Porous Stone: Nonstaining to light-colored natural stone when tested in accordance with ASTM C1248.
 3. Color: Match adjacent finished surfaces.
 4. Products:
 - a. Dow; Dowsil 791/795 Silicone Sealant: www.dow.com.
 - b. Sika Corporation; Sikasil WS-290/WS-295; www.usa.sika.com.
 - c. Tremco Commercial Sealants & Waterproofing; Spectrem 1/Spectrem 2/Spectrem3.
 - d. Substitutions: See Section 01 25 00 - Substitution Procedures.
 5. Applications:
 - a. Exterior joints unless otherwise indicated, including, but not limited to, the following:
 - b. Exterior vertical and horizontal nontraffic joints in cast-in-place concrete.
 - c. Exterior vertical and horizontal nontraffic joints between plant-precast architectural concrete units.
 - d. Exterior vertical control and expansion joints in unit masonry.
 - e. Exterior horizontal pressure-relieving joints in unit masonry.
 - f. Exterior joints between flashing materials and unit masonry.
 - g. Exterior perimeter joints between different materials listed above.
- B. Mildew-Resistant Silicone Sealant: ASTM C920, Grade NS, Uses M and A; single component, mildew resistant; not expected to withstand continuous water immersion or traffic.
1. Color: White.
 2. Products:
 - a. Dow, Dowsil 786 Silicone Sealant.
 - b. Pecora Corporation; Pecora 898 NST (Non-Staining Technology): www.pecora.com/#sle.
 - c. Sika Corporation; Sikasil GP: www.usa.sika.com/#sle.
 - d. Tremco, Tremsil 200: www.tremcosealants.com.
 - e. Substitutions: See Section 01 25 00 - Substitutions Procedures.
 3. Applications:
 - a. Interior joints between plumbing fixtures and adjoining walls, floors, and counters.
 - b. Joints between counters and adjoining walls and floors at bathrooms, kitchens and other wet areas.
- C. Butyl Sealant: Solvent-based; ASTM C1311; single component, nonsag; not expected to withstand continuous water immersion or traffic.
1. Color: To be selected by Architect from manufacturer's standard range.
 2. Products:
 - a. Pecora Corporation; Pecora BC-158 Butyl Rubber Sealant: www.pecora.com/#sle.
 - b. Sherwin-Williams Company; Storm Blaster All Season Sealant: www.sherwin-williams.com/#sle.
 - c. Substitutions: See Section 01 25 00 - Substitution Procedures.
 3. Applications:
 - a. Lap Joints in Sheet Metal Fabrications.
 - b. Metal Panel Jambs Between Closure Trim at End of Panels and Jamb Trim Extending to Windows.
- D. Type ____ - Noncuring Butyl Sealant: Solvent-based, single component, nonsag, nonskinning, nonhardening, nonbleeding; nonvapor permeable; intended for fully concealed applications.

2.04 SELF-LEVELING JOINT SEALANTS

- A. Self-Leveling Polyurethane Sealant: ASTM C920, Grade P, Uses M and A; single or multi-component; explicitly approved by manufacturer for traffic exposure; not expected to withstand continuous water immersion .
1. Movement Capability: Plus and minus 25 percent, minimum.
 2. Color: To be selected by Architect from manufacturer's full range.

3. Products:
 - a. Pecora Corporation, Urexpan NR-200: www.pecora.com/#sle.
 - b. Sika Corporation; Sikaflex-1c SL: www.usa.sika.com/#sle.
 - c. Tremco, THC-900/THC-901; www.tremcosealants.com.
 - d. Substitutions: See Section 01 25 00 - Substitution Procedures.
 4. Applications:
 - a. Exterior horizontal nontraffic and traffic isolation and contraction joints in cast-in-place concrete slabs.
 - b. Interior expansion, control, contraction, and isolation joints in horizontal traffic surfaces in concrete, ceramic tile, dimension stone, dimension stone tile and brick, unless otherwise specified in individual specification sections.
- B. Refer to Civil drawings for additional exterior paving sealant systems.

2.05 ACCESSORIES

- A. Backer Rod: Cylindrical cellular foam rod with surface that sealant will not adhere to, compatible with specific sealant used, and recommended by backing and sealant manufacturers for specific application.
1. Closed Cell and Bi-Cellular: 25 to 33 percent larger in diameter than joint width.
- B. Backing Tape: Self-adhesive polyethylene tape with surface that sealant will not adhere to and recommended by tape and sealant manufacturers for specific application.
- C. Masking Tape: Self-adhesive, nonabsorbent, nonstaining, removable without adhesive residue, and compatible with surfaces adjacent to joints and sealants.
- D. Joint Cleaner: Noncorrosive and nonstaining type, type recommended by sealant manufacturer; compatible with joint forming materials.
- E. Primers: Type recommended by sealant manufacturer to suit application; nonstaining.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that joints are ready to receive work.
- B. Verify that backing materials are compatible with sealants.
- C. Verify that backer rods are of the correct size.

3.02 PREPARATION

- A. Remove loose materials and foreign matter that could impair adhesion of sealant.
1. Clean porous joint substrate surfaces by brushing, grinding, blast cleaning, 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, but are not limited to, the following:
 - a. Concrete.
 - b. Masonry.
 - c. Unglazed surfaces of ceramic tile.
 2. Clean nonporous 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, but are not limited to, the following:
 - a. Metal.
 - b. Porcelain enamel.
 - c. Glazed surfaces of ceramic tile.
- B. Clean joints, and prime as necessary, in accordance with manufacturer's instructions.
- C. Perform preparation in accordance with manufacturer's instructions and ASTM C1193.

- D. Mask elements and surfaces adjacent to joints from damage and disfigurement due to sealant work; be aware that sealant drips and smears may not be completely removable.

3.03 INSTALLATION

- A. Install this work in accordance with sealant manufacturer's requirements for preparation of surfaces and material installation instructions.
- B. Provide joint sealant installations complying with ASTM C1193.
- C. Precast Architectural Concrete Panel Joints: Install two-stage sealant joints and expansion joints in accordance with PCI Architectural Precast Concrete Design Manual, Section 4.7 and as detailed on drawings.
- D. Measure joint dimensions and size joint backers to achieve width-to-depth ratio, neck dimension, and surface bond area as recommended by manufacturer, except where specific dimensions are indicated.
- E. Install bond breaker backing tape where backer rod cannot be used.
- F. Install sealant free of air pockets, foreign embedded matter, ridges, and sags, and without getting sealant on adjacent surfaces.
- G. Do not install sealant when ambient temperature is outside manufacturer's recommended temperature range, or will be outside that range during the entire curing period, unless manufacturer's approval is obtained and instructions are followed.
- H. Nonsag Sealants: Tool surface concave, unless otherwise indicated; remove masking tape immediately after tooling sealant surface.

END OF SECTION

**SECTION 081113
HOLLOW METAL DOORS AND FRAMES**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Non-fire-rated hollow metal doors and frames.
- B. Thermally insulated hollow metal doors with frames.
- C. Hollow metal borrowed lites glazing frames.

1.02 RELATED REQUIREMENTS

- A. Section 087100 - Door Hardware.

1.03 REFERENCE STANDARDS

- A. ADA Standards - 2010 ADA Standards for Accessible Design; 2010.
- B. ANSI/ICC A117.1 - American National Standard for Accessible and Usable Buildings and Facilities; International Code Council; 2009.
- C. ANSI/SDI A250.8 - Specifications for Standard Steel Doors and Frames (SDI-100); 2023.
- D. ANSI/SDI A250.10 - Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames; 2025.
- E. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2023.
- F. ASTM A1008/A1008M - Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Required Hardness, Solution Hardened, and Bake Hardenable; 2024.
- G. ASTM A1011/A1011M - Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength; 2023.
- H. ASTM C143/C143M - Standard Test Method for Slump of Hydraulic-Cement Concrete; 2020.
- I. ASTM C476 - Standard Specification for Grout for Masonry; 2023.
- J. BHMA A156.115 - Hardware Preparation in Steel Doors and Frames; 2016.
- K. ICC A117.1 - Accessible and Usable Buildings and Facilities; 2017.
- L. NAAMM HMMA 830 - Hardware Selection for Hollow Metal Doors and Frames; 2002.
- M. NAAMM HMMA 831 - Hardware Locations for Hollow Metal Doors and Frames; 2024.
- N. NAAMM HMMA 840 - Guide Specifications for Receipt, Storage and Installation of Hollow Metal Doors and Frames; 2024.
- O. NAAMM HMMA 861 - Guide Specifications for Commercial Hollow Metal Doors and Frames; 2014.
- P. SDI 117 - Manufacturing Tolerances for Standard Steel Doors and Frames; 2023.

1.04 SUBMITTALS

- A. Product Data: Materials and details of design and construction, hardware locations, reinforcement type and locations, anchorage and fastening methods, and finishes.
- B. Shop Drawings: Details of each opening, showing elevations, glazing, frame profiles, and any indicated finish requirements.

1.05 QUALITY ASSURANCE

- A. Fire-Rated Door Assemblies: Assemblies complying with NFPA 80 that are listed and labeled by a qualified testing agency, for fire-protection ratings indicated, based on testing at positive pressure according to UL 10C.

- B. Fire-Rated, Borrowed-Light Frame Assemblies: Assemblies complying with NFPA 80 that are listed and labeled, by a testing and inspecting agency acceptance to authorities having jurisdiction, for fire-protection ratings indicated, based on testing according to NFPA 257 or UL 9. Label each individual glazed lite.
- C. Smoke-Control Door Assemblies: Comply with NFPA 105 or UL 1784.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Comply with NAAMM HMMA 840 or ANSI/SDI A250.8 (SDI-100) in accordance with specified requirements.
- B. Protect with resilient packaging; avoid humidity build-up under coverings; prevent corrosion and adverse effects on factory applied painted finish.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Hollow Metal Doors and Frames:
 - 1. Ceco Door, an Assa Abloy Group company: www.assaabloydss.com
 - 2. Curries, an Assa Abloy Group company: www.assaabloydss.com
 - 3. Steelcraft, an Allegion brand: www.allegion.com/#sle.

2.02 PERFORMANCE REQUIREMENTS

- A. Requirements for Hollow Metal Doors and Frames:
 - 1. Steel Sheet: Comply with one or more of the following requirements; galvanized steel complying with ASTM A653/A653M, cold-rolled steel complying with ASTM A1008/A1008M, or hot-rolled pickled and oiled (HRPO) steel complying with ASTM A1011/A1011M, commercial steel (CS) Type B, for each.
 - 2. Accessibility: Comply with ICC A117.1 and ADA Standards.
 - 3. Exterior Door Top Closures: Flush end closure channel, with top and door faces aligned.
 - 4. Door Edge Profile: Manufacturers standard for application indicated.
 - 5. Typical Door Face Sheets: Flush.
 - 6. Glazed Lights: Non-removable stops on non-secure side; sizes and configurations as indicated on drawings. Style: Manufacturer's standard.
 - 7. Hardware Preparations, Selections and Locations: Comply with NAAMM HMMA 830 and NAAMM HMMA 831 or BHMA A156.115 and ANSI/SDI A250.8 (SDI-100) in accordance with specified requirements.
 - 8. Zinc Coating for Typical Interior and/or Exterior Locations: Provide metal components zinc-coated (galvanized) and/or zinc-iron alloy-coated (galvanized) by the hot-dip process in accordance with ASTM A653/A653M, with manufacturer's standard coating thickness, unless noted otherwise for specific hollow metal doors and frames.
- B. Combined Requirements: If a particular door and frame unit is indicated to comply with more than one type of requirement, comply with the specified requirements for each type; for instance, an exterior door that is also indicated as being sound-rated must comply with the requirements specified for exterior doors and for sound-rated doors; where two requirements conflict, comply with the most stringent.

2.03 HOLLOW METAL DOORS

- A. Exterior Doors: Thermally insulated.
 - 1. Grade: ANSI A250.8 Level 3, physical performance Level A, Model 1, full flush (continuously welded with seams dressed smooth).
 - 2. Core Material: Mineral fiberboard insulation with 22-gauge vertical steel stiffener ribs, welded at both ends.
 - 3. Top Closures: Inverted steel channel closure, installed flush, filled and finished smooth.
 - 4. Door edges shall be fabricated using beveled edges on hinge and lock sides.
 - 5. All door seams shall have 1-inch welds every 6-inches on center, ground and finished smooth.

6. Insulating Value: R-value of not less than 6.0 deg F x h x sq. ft./Btu when tested according to ASTM C 1363.
 7. Weatherstripping: Refer to Section 087100.
 8. Door Finish: Factory primed for field finishing.
- B. Interior Doors, Non-Fire Rated:
1. Grade: ANSI A250.8 Level 3, physical performance Level A, Model 2, seamless.
 2. Core Material: Sound insulation core with 22-gauge vertical steel stiffener ribs, welded at both ends.
 3. Door Thickness: 1-3/4 inches (44.5 mm), nominal.
 4. Door Finish: Factory primed for field finishing.

2.04 HOLLOW METAL FRAMES

- A. Comply with standards and/or custom guidelines as indicated for corresponding door in accordance with applicable door frame requirements.
- B. Exterior Door Frames: Full profile/continuously welded type. "Timely" and "Redi-frames" are prohibited.
1. Galvanizing: Components hot-dipped zinc-iron alloy-coated (galvannealed) in accordance with ASTM A653/A653M, with A60/ZF180 coating.
 2. Frame Metal Thickness: 14 gage, 0.067 inch (1.7 mm), minimum.
 3. Weatherstripping: Integral, recessed into door edge or frame.
- C. Interior Door Frames, Non-Fire Rated: Fully welded type. "Timely" and "Redi-frames" are prohibited.
1. Frame Metal Thickness: 16 gage, 0.053 inch (1.3 mm), minimum.
- D. Borrowed Lites Glazing Frames: Construction and face dimensions to match door frames, and as indicated on drawings.
- E. Provide mortar guard boxes for hardware cut-outs in frames to be installed in masonry or to be grouted.
- F. Provide 6" styrofoam block with same profile as frame so as not to allow grout in the bottom 6" of frame.
- G. Frames in Masonry Walls: Size to suit masonry coursing with head member 4 inches high (100 mm high) to fill opening without cutting masonry units.
- H. Frame corner joints shall be mitered, interlocked, welded and ground smooth.
- I. Doors shall be template reinforced for hardware 7 ga. on hinges, 12 ga. everywhere else.

2.05 FINISHES

- A. Primer: Rust-inhibiting, complying with ANSI/SDI A250.10, door manufacturer's standard.
- B. Automotive Undercoating: Provide a field applied, non-flammable, low-VOC automotive undercoat layer to the inside of all frames that will be in contact with anti-freezing agents in plaster or mortar.

2.06 ACCESSORIES

- A. Glazing: As specified in Section 088000, factory installed.
- B. Grout for Frames: Mortar grout complying with ASTM C476 with maximum slump of 4 inches (102 mm) as measured in accordance with ASTM C143/C143M for hand troweling in place; plaster grout and thinner pumpable grout are prohibited.
1. Provide 6 inch polystyrene rigid insulation fillers cut to frame profile installed in bottoms of frames to keep grout out of bottom 6 inches of frame.
- C. Sound Batt Insulation for Frames: At all interior frames in metal framed walls, provide acoustic batt insulation as specified in Section 09 21 16.
- D. Silencers: Resilient rubber, fitted into drilled hole; provide three on strike side of single door, three on center mullion of pairs, and two on head of pairs without center mullions.

- E. Ceiling Struts: Minimum 1/4 inch thick by 1 inch wide steel.
- F. Temporary Frame Spreaders: Provide for factory- or shop-assembled frames.
- G. Jamb Anchors:
 - 1. Masonry Type: Adjustable strap-and stirrup or T-shaped anchors to suit frame size, not less than 0.042 inch thick, with corrugated or perforated straps not less than 2 inches wide by 10 inches long; or wire anchors not less than 0.177 inch thick.
 - 2. Stud-Wall Type: Designed to engage stud, welded to back of frames; not less than 0.042 inch thick.
 - 3. Postinstalled Expansion Type for In-Place Concrete or Masonry: Minimum 3/8 inch diameter bolts with expansion shields or inserts. Provide pipe spacer from frame to wall, with throat reinforcement plate, welded to frame at each anchor location.
- H. Floor Anchors: Formed from same material as frames, not less than 0.042 inch thick, and as follows:
 - 1. Monolithic Concrete Slabs: Clip-type anchors, with extension clips, allowing not less than 2-inch height adjustment. Terminate bottom of frames at finish floor surface.

2.07 STOPS AND MOLDINGS

- A. Moldings for Glazed Lites in Doors: Minimum 0.032 inch thick, same material as door face sheet.
- B. Fixed Frame Moldings: Formed integral with hollow metal frames, a minimum of 5/8 inch high unless otherwise indicated.
- C. Loose Stops for Glazed Lites in Frames: Minimum 0.032 inch thick, same material as frames.

2.08 FABRICATION

- A. Tolerances: Fabricate hollow metal work to tolerances indicated in SDI 117.
- B. Hollow Metal Doors:
 - 1. Exterior Doors: Provide weep-hole openings in bottom of exterior doors. Seal joints in top edges of doors against water penetration.
 - 2. Glazed Lites: Factory cut openings in door.
 - 3. Astragals: Provide overlapping astragal on one leaf of pairs of doors where required by NFPA 80 for fire-performance rating or where indicated.
 - 4. Steel-Stiffened Door Cores: Provide minimum thickness 0.026 inch, steel vertical stiffeners of same material as face sheets extending full-door height, with vertical webs spaced not more than 6 inches apart. Spot weld to face sheets no more than 5 inches o.c. Fill spaces between stiffeners with glass- or mineral-fiber insulation.
- C. Hollow Metal Frames: Where frames are fabricated in sections, provide alignment plates or angles at each joint, fabricated of same thickness metal as frames.
 - 1. Welded Frames: Weld flush face joints continuously; grind, fill, dress and make smooth, flush, and invisible.
 - 2. Sidelight 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 butt welding.
 - 3. Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated.
 - 4. Grout Guards: Weld guards to frame at back of hardware mortises in frames to be grouted.
 - 5. Floor Anchors: Weld anchors to bottom of jambs and mullions with at least four spot welds per anchor.
 - 6. Jamb Anchors: Provide number and spacing of anchor as follows:
 - a. Locate anchors not more than 18 inches from top and bottom of frame. Space anchors not more than 32 inches o.c. and as follows:
 - 1) Two anchors per jamb up to 60 inches high.

- 2) Three anchors per jamb from 60 to 90 inches high.
- 3) Four anchors per jamb from 90 to 96 inches high.
- 4) Five anchors per jamb plus 1 additional anchor per jamb for each 24 inches or fraction thereof above 96 inches high.
7. Door Silencers: Except on weather-stripped doors, drill stops to receive door silencers.
 - a. Single-Door Frames: Three door silencers.
 - b. Double-Door Frames: Two door silencers.
- D. Hardware Preparation: Factory prepare hollow metal work to receive templated mortised hardware according to the Door Hardware Schedule and templates furnished as specified in Division 08 Section "Door Hardware".
 1. Locate hardware as indicated, or if not indicated, according to ANSI/SDI A250.8.
 2. Reinforce doors and frames to receive nontemplated, mortised and surface-mounted door hardware.
 3. Comply with applicable requirements in ANSI/SDI A250.6 and ANSI/DHI A115 Series specifications for preparation of hollow metal work for hardware.
 4. Coordinate locations of conduit and wiring boxes for electrical connections with Division 26 electrical sections.
- E. Stops and Moldings: Provide stops and moldings around glazed lites where indicated. Form corners of stops and moldings with butted or mitered hairline joints.
 1. Single Glazed Lites: Provide fixed stops and moldings welded on secure side of hollow metal work.
 2. Provide fixed frame moldings on outside of exterior and on secure side of interior doors and frames.
 3. Provide loose stops and moldings on inside of hollow metal work.
 4. Coordinate rabbet width between fixed and removeable stops with type of glazing and type of installation indicated.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify existing conditions before starting work.
- B. Verify that opening sizes and tolerances are acceptable.
- C. Verify that finished walls are in plane to ensure proper door alignment.

3.02 INSTALLATION

- A. Install doors and frames in accordance with manufacturer's instructions and related requirements of specified door and frame standards or custom guidelines indicated.
- B. Coordinate frame anchor placement with wall construction.
- C. Set frames accurately in position, plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is complete, remove temporary braces, leaving surfaces smooth and undamaged.
- D. Grout frames in masonry construction, using hand trowel methods; brace frames so that pressure of grout before setting will not deform frames.
- E. Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor, and secure with postinstalled expansion anchors.
- F. Metal-Stud Partitions: Solidly pack batt insulation behind frames.
- G. Masonry Walls: Coordinate installation of frames to allow for solidly filling space between frames and masonry with grout.
- H. Ceiling Struts: Extend struts vertically from top of frame at each jamb to overhead structural support at each jamb. Bend top of struts to provide flush contact for securing to supporting construction. Provide adjustable wedged or bolted anchorage to frame jamb members.

- I. Hollow Metal Doors: Fit hollow metal doors accurately in frames, within clearances specified below. Shim as necessary.
- J. Glazing: Comply with installation requirements in Division 08 Section "Glazing" and with hollow metal manufacturer's written instructions.
 - 1. Secure stops with countersunk flat- or oval-head machine screws spaced uniformly not more than 9 inches o.c. and not more than 2 inches o.c. from each corner.
- K. Coordinate installation of hardware.

3.03 TOLERANCES

- A. Clearances Between Door and Frame: Comply with related requirements of specified frame standards or custom guidelines indicated in accordance with SDI 117 or NAAMM HMMA 861.
- B. Maximum Diagonal Distortion: 1/16 inch (1.6 mm) measured with straight edge, corner to corner.

3.04 ADJUSTING

- A. Adjust for smooth and balanced door movement.
- B. 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.
- C. Metallic-Coated Surfaces: Clean abraded areas and repair with galvanizing repair paint according to manufacturer's written instructions.

END OF SECTION

**SECTION 083100
ACCESS DOORS AND PANELS**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Wall and ceiling mounted access units.
- B. Ceiling mounted access units.

1.02 SUBMITTALS

- A. Product Data: Provide sizes, types, finishes, hardware, scheduled locations, and details of adjoining work.
- B. Shop Drawings: Indicate exact position and size of each access door and/or panel unit.
- C. Manufacturer's Installation Instructions: Indicate installation requirements.

PART 2 PRODUCTS

2.01 ACCESS PANELS ASSEMBLIES

- A. Wall-Mounted and Ceiling-Mounted Units:
 - 1. Location: As indicated on drawings.
 - 2. Size: As indicated on drawings.
 - 3. Gypsum Board Mounting Criteria: Provide drywall bead frame with door surface flush with wall surface.

2.02 CEILING MOUNTED ACCESS UNITS

- A. Manufacturers:
 - 1. Activar Construction Products Group, Inc. - JL Industries: www.activarcpvg.com.
 - 2. Babcock-Davis: www.babcockdavis.com.
 - 3. Milcor, Inc: www.milcorinc.com/#sle.
 - 4. Nystrom, Inc: www.nystrom.com/#sle.
- B. Ceiling Mounted Units: Factory fabricated door and frame, fully assembled units with corner joints welded, filled and ground flush; square and without rack or warp; coordinate requirements with type of installation assembly being used for each unit.
 - 1. Style: Exposed frame with door surface flush with frame surface.
 - a. Gypsum Board Mounting Criteria: Use drywall bead type frame.
 - b. Latch/Lock: Cylinder lock-operated cam latch. Mortise cylinder and core as specified in Section 08 71 00.
 - c. Access panels must accept mortise cylinders.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that rough openings are correctly sized and located.
- B. Begin installation only after substrates have been properly prepared, and if the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.02 PREPARATION

- A. Clean surfaces thoroughly prior to proceeding with this work.
- B. Prepare surfaces using methods recommended by manufacturer for applicable substrates in accordance with project conditions.

3.03 INSTALLATION

- A. Install units in accordance with manufacturer's instructions.
- B. Install frames plumb and level in openings, and secure units rigidly in place.

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C. Position units to provide convenient access to concealed equipment when necessary.

END OF SECTION

**SECTION 084313
ALUMINUM-FRAMED STOREFRONTS**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Aluminum-framed storefront, with vision glass.
- B. Aluminum doors and frames.
- C. Weatherstripping.
- D. Door hardware.

1.02 RELATED REQUIREMENTS

- A. Section 072500 - Weather Barriers: Sealing framing to water-resistive barrier installed on adjacent construction.
- B. Section 079200 - Joint Sealants: Sealing joints between frames and adjacent construction.
- C. Section 087100 - Door Hardware: Hardware items other than specified in this section.
- D. Section 088000 - Glazing: Glass and glazing accessories.

1.03 REFERENCE STANDARDS

- A. AAMA CW-10 - Care and Handling of Architectural Aluminum from Shop to Site; 2015.
- B. AAMA 501.2 - Quality Assurance and Diagnostic Water Leakage Field Check of Installed Storefronts, Curtain Walls, and Sloped Glazing Systems; 2025.
- C. AAMA 611 - Specification for Anodized Architectural Aluminum; 2024.
- D. AAMA 1503 - Voluntary Test Method for Thermal Transmittance and Condensation Resistance of Windows, Doors and Glazed Wall Sections; 2009.
- E. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2022.
- F. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2021.
- G. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric); 2021.
- H. ASTM E283/E283M - Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Skylights, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen; 2019.
- I. ASTM E330/E330M - Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference; 2014 (Reapproved 2021).
- J. ASTM E331 - Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference; 2000 (Reapproved 2023).

1.04 SUBMITTALS

- A. Product Data: Provide component dimensions, describe components within assembly, anchorage and fasteners, glass and infill, door hardware, and internal drainage details.
- B. Shop Drawings: Indicate system dimensions, framed opening requirements and tolerances, affected related work, expansion and contraction joint location and details, and field welding required.
 - 1. Include design engineer's stamp or seal on shop drawings for attachments and anchors.
- C. Manufacturer's Certificate: Certify that the products supplied meet or exceed the specified requirements.

- D. Design Data: Provide framing member structural and physical characteristics, engineering calculations, and dimensional limitations.
- E. Hardware Schedule: Complete itemization of each item of hardware to be provided for each door, cross-referenced to door identification numbers in Contract Documents.
- F. Field Quality Control Submittals: Report of field testing for water penetration and air leakage.
- G. Specimen warranty.

1.05 QUALITY ASSURANCE

- A. Designer Qualifications: Design structural support framing components under direct supervision of a Professional Structural Engineer experienced in design of this Work and licensed in the State in which the Project is located.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Handle products of this section in accordance with AAMA CW-10.
- B. Protect finished aluminum surfaces with wrapping. Do not use adhesive papers or sprayed coatings that bond to aluminum when exposed to sunlight or weather.

1.07 FIELD CONDITIONS

- A. Do not install sealants when ambient temperature is less than 40 degrees F (5 degrees C). Maintain this minimum temperature during and 48 hours after installation.

1.08 WARRANTY

- A. Correct defective Work within a five year period after Date of Substantial Completion.
- B. Provide five year manufacturer warranty against failure of glass seal on insulating glass units, including interpane dusting or misting. Include provision for replacement of failed units.
- C. Provide ten year manufacturer warranty against excessive degradation of exterior finish. Include provision for replacement of units with excessive fading, chalking, or flaking.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Aluminum-Framed Storefronts:
 - 1. Basis-of-Design:
 - a. Exterior Storefront: Kawneer, Trifab VersaGlaze 451T.
 - b. Interior/Vestibule Storefront: Kawneer, Trifab VersaGlaze 451.
 - c. Entrance Doors (Standard): Kawneer, 350 Standard Entrances.
 - d. Entrance Doors (Thermal): Kawneer, 350T Insulclad Thermal Entrances.
 - e. Entrance Doors (High Abuse): Kawneer, 350 Tuffline Entrances.
- B. Aluminum-Framed Storefront Manufacturers: Subject to compliance with specifications, provide the basis-of-design product, or a comparable product by one of the following:
 - 1. Oldcastle BuildingEnvelope: www.oldcastlebe.com.
 - 2. Pittco Architectural Metals Inc: www.pittcometals.com.
 - 3. Tubelite, Inc: www.tubeliteinc.com.
 - 4. YKK AP America, Inc: www.ykkap.com/commercial.

2.02 ALUMINUM-FRAMED STOREFRONT

- A. Aluminum-Framed Storefront: Factory fabricated, factory finished aluminum framing members with infill, and related flashings, anchorage and attachment devices.
 - 1. Glazing Position: Centered (front to back).
 - 2. Vertical Mullion Dimensions: 2 inches wide by 4-1/2 inches deep (50 mm wide by 114 mm deep).
 - 3. Finish: Class II color anodized.
 - a. Factory finish all surfaces that will be exposed in completed assemblies.
 - 4. Finish Color: As selected by Architect from manufacturer's standard line.

5. Fabrication: Joints and corners flush, hairline, and weatherproof, accurately fitted and secured; prepared to receive anchors and hardware; fasteners and attachments concealed from view; reinforced as required for imposed loads.
 6. Construction: Eliminate noises caused by wind and thermal movement, prevent vibration harmonics, and prevent "stack effect" in internal spaces.
 7. System Internal Drainage: Drain to the exterior by means of a weep drainage network any water entering joints, condensation occurring in glazing channel, and migrating moisture occurring within system.
 8. Expansion/Contraction: Provide for expansion and contraction within system components caused by cycling temperature range of 170 degrees F (95 degrees C) over a 12 hour period without causing detrimental effect to system components, anchorages, and other building elements.
 9. Movement: Allow for movement between storefront and adjacent construction, without damage to components or deterioration of seals.
 10. Perimeter Clearance: Minimize space between framing members and adjacent construction while allowing expected movement.
- B. Performance Requirements
1. Wind Loads: Design and size components to withstand the specified load requirements without damage or permanent set, when tested in accordance with ASTM E330/E330M, using loads 1.5 times the design wind loads and 10 second duration of maximum load.
 - a. Design Wind Loads: Comply with requirements of applicable code and as indicated on Structural Drawings.
 - b. Member Deflection: Limit member deflection to flexure limit of glass in any direction, with full recovery of glazing materials.
 2. Water Penetration Resistance on Manufactured Assembly: No uncontrolled water on interior face, when tested in accordance with ASTM E331 at pressure differential of 6.2 psf.
 3. Air Leakage: 0.06 cfm/sq ft (0.3 L/sec sq m) maximum leakage of storefront wall area when tested in accordance with ASTM E283/E283M at 1.57 psf (75 Pa) pressure difference.
 4. Condensation Resistance Factor of Framing: 70, minimum, measured in accordance with AAMA 1503.
 5. Overall U-value Including Glazing: 0.36 Btu/(hr sq ft deg F) (____ W/(sq m K)), maximum.

2.03 COMPONENTS

- A. Aluminum Framing Members: Tubular aluminum sections, thermally broken with interior section insulated from exterior, drainage holes and internal weep drainage system.
1. Framing members for interior applications need not be thermally broken.
 2. Glazing Stops: Flush.
 3. Structurally Reinforced Members: Extruded aluminum with internal reinforcement of structural steel member.
- B. Glazing: See Section 088000.
- C. Swing Doors: Glazed aluminum.
1. Thickness (Standard): 1-3/4 inches (43 mm).
 2. Thickness (Thermal): 2-1/4 inches.
 3. Thickness (High-Abuse): 2 inches.
 4. Top Rail: 4 inches (100 mm) wide, nominal.
 5. Vertical Stiles: 4 inches wide, nominal.
 6. Bottom Rail: 10 inches (254 mm) wide.
 7. Glazing Stops: Square.
 8. Finish: Same as storefront.

2.04 MATERIALS

- A. Extruded Aluminum: ASTM B221 (ASTM B221M).
- B. Fasteners: Stainless steel.
- C. Glazing Gaskets: Type to suit application to achieve weather, moisture, and air infiltration requirements.

2.05 FINISHES

- A. Class I Natural Anodized Finish: AAMA 611 AA-M12C22A41 Clear anodic coating not less than 0.7 mils (0.018 mm) thick.
- B. Class II Color Anodized Finish: AAMA 611 AA-M12C22A32 Integrally colored anodic coating not less than 0.4 mils (0.01 mm) thick.
 - 1. Color:
- C. Superior Performing Organic Coatings System: Manufacturer's standard multi-coat superior performing organic coatings system complying with AAMA 2605, including at least 70 percent polyvinylidene fluoride (PVDF) resin, and at least 80 percent of aluminum extrusion and panels surfaces having minimum total dry film thickness (DFT) of 1.2 mils, 0.0012 inch (0.030 mm).
 - 1. Color:

2.06 HARDWARE

- A. For each door, include weatherstripping, sill sweep strip, and threshold.
- B. Weatherstripping: Wool pile, continuous and replaceable; provide on all doors.
- C. Sill Sweep Strips: Resilient seal type, retracting, of neoprene; provide on all doors.
- D. Threshold: Extruded aluminum, one piece per door opening, ribbed surface; provide on all doors.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify dimensions, tolerances, and method of attachment with other work.
- B. Verify that storefront wall openings and adjoining water-resistive and/or air barrier seal materials are ready to receive work of this section.

3.02 INSTALLATION

- A. Install wall system in accordance with manufacturer's instructions.
- B. Attach to structure to permit sufficient adjustment to accommodate construction tolerances and other irregularities.
- C. Provide alignment attachments and shims to permanently fasten system to building structure.
- D. Align assembly plumb and level, free of warp or twist. Maintain assembly dimensional tolerances, aligning with adjacent work.
- E. Provide thermal isolation where components penetrate or disrupt building insulation.
- F. Install sill flashings. Turn up ends and edges; seal to adjacent work to form water tight dam.
- G. Where fasteners penetrate sill flashings, make watertight by seating and sealing fastener heads to sill flashing.
- H. Pack fibrous insulation in shim spaces at perimeter of assembly to maintain continuity of thermal barrier.
- I. Set thresholds in bed of sealant and secure.
- J. Install hardware using templates provided.
- K. Touch-up minor damage to factory applied finish; replace components that cannot be satisfactorily repaired.

3.03 TOLERANCES

- A. Maximum Variation from Plumb: 0.06 inch per 3 feet (1.5 mm per m) non-cumulative or 0.06 inch per 10 feet (1.5 mm per 3 m), whichever is less.
- B. Maximum Misalignment of Two Adjoining Members Abutting in Plane: 1/32 inch (0.8 mm).

3.04 FIELD QUALITY CONTROL

- A. Provide services of storefront manufacturer's field representative to observe for proper installation of system and submit report.
- B. Water-Spray Test: Provide water spray quality test of installed storefront components in accordance with AAMA 501.2 during construction process and before installation of interior finishes.
 - 1. Perform a minimum of two tests in each designated area as indicated on drawings.
 - 2. Conduct tests in each area prior to 10 percent, 50 percent, and 100 percent completion of this work.
- C. Optional Field Testing by Independent Agency: Owner may engage (at the Owner's discretion) a qualified independent AAMA certified testing agency to perform field quality control testing. Cost for the initial test shall be the responsibility of the Owner. Costs associated with any subsequent testing required due to failure to meet design criteria shall be paid by the Contractor. Testing Agency will report test results promptly to the Architect and Contractor.
 - 1. Air Infiltration: Test system performance requirements according to ASTM E 783. Employ Testing Method B with an exterior chamber after water, air, and vapor barrier application.
 - 2. Water Penetration: Test system performance requirements according to ASTM E 1105 at minimum differential pressure of 20 percent of inward acting wind-load design pressure as defined by ASCE 7, "Minimum Design Loads for Buildings and Other Structures"; but not less than 12 psf. Employ Testing Method B with an exterior chamber after water, air, and vapor barrier application.
 - 3. Repair or replace curtain wall components that have failed designated field testing, and retest to verify performance conforms to specified requirements.
 - 4. At Contractor's expense, retest areas that failed to meet the Project requirements upon completion of remedial work.

3.05 ADJUSTING

- A. Adjust operating hardware for smooth operation.

3.06 CLEANING

- A. Remove protective material from pre-finished aluminum surfaces.
- B. Wash down surfaces with a solution of mild detergent in warm water, applied with soft, clean wiping cloths, and take care to remove dirt from corners and to wipe surfaces clean.

3.07 PROTECTION

- A. Protect installed products from damage until Date of Substantial Completion.

END OF SECTION

SECTION 087100 - DOOR HARDWARE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes commercial door hardware for the following:
 - 1. Swinging doors.
- B. Door hardware includes, but is not necessarily limited to, the following:
 - 1. Mechanical door hardware.
 - 2. Electromechanical door hardware.
 - 3. Automatic operators.
 - 4. Cylinders specified for doors in other sections.
- C. Related Sections:
 - 1. Division 08 Section "Hollow Metal Doors and Frames".
 - 2. Division 08 Section "Interior Aluminum Doors and Frames".
 - 3. Division 08 Section "Aluminum-Framed Entrances and Storefronts".
 - 4. Division 08 Section "Automatic Door Operators".
- D. Codes and References: Comply with the version year adopted by the Authority Having Jurisdiction.
 - 1. ANSI A117.1 - Accessible and Usable Buildings and Facilities.
 - 2. ICC/IBC - International Building Code.
 - 3. NFPA 70 - National Electrical Code.
 - 4. NFPA 80 - Fire Doors and Windows.
 - 5. NFPA 101 - Life Safety Code.
 - 6. NFPA 105 - Installation of Smoke Door Assemblies.
 - 7. UL/ULC and CSA C22.2 - Standards for Automatic Door Operators Used on Fire and Smoke Barrier Doors and Systems of Doors.
 - 8. State Building Codes, Local Amendments.
- E. Standards: All hardware specified herein shall comply with the following industry standards as applicable. Any undated reference to a standard shall be interpreted as referring to the latest edition of that standard:
 - 1. ANSI/BHMA Certified Product Standards - A156 Series.
 - 2. UL10C - Positive Pressure Fire Tests of Door Assemblies.
 - 3. ANSI/UL 294 - Access Control System Units.

4. UL 305 - Panic Hardware.
5. ANSI/UL 437- Key Locks.

1.3 SUBMITTALS

- A. Product Data: Manufacturer's product data sheets including installation details, material descriptions, dimensions of individual components and profiles, operational descriptions and finishes.
- B. Door Hardware Schedule: Prepared by or under the supervision of supplier, detailing, fabrication and assembly of door hardware, as well as procedures and diagrams. Coordinate the final Door Hardware Schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of door hardware.
 1. Format: Comply with scheduling sequence and vertical format in DHI's "Sequence and Format for the Hardware Schedule."
 2. Organization: Organize the Door Hardware Schedule into door hardware sets indicating complete designations of every item required for each door or opening. Organize door hardware sets in same order as in the Door Hardware Sets at the end of Part 3. Submittals that do not follow the same format and order as the Door Hardware Sets will be rejected and subject to resubmission.
 3. Content: Include the following information:
 - a. Type, style, function, size, label, hand, and finish of each door hardware item.
 - b. Manufacturer of each item.
 - c. Fastenings and other pertinent information.
 - d. Location of door hardware set, cross-referenced to Drawings, both on floor plans and in door and frame schedule.
 - e. Explanation of abbreviations, symbols, and codes contained in schedule.
 - f. Mounting locations for door hardware.
 - g. Door and frame sizes and materials.
 - h. Warranty information for each product.
 4. Submittal Sequence: Submit the final Door Hardware Schedule at earliest possible date, particularly where approval of the Door Hardware Schedule must precede fabrication of other work that is critical in the Project construction schedule. Include Product Data, Samples, Shop Drawings of other work affected by door hardware, and other information essential to the coordinated review of the Door Hardware Schedule.
- C. 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. Elevation diagram of each unique access controlled opening showing location and interconnection of major system components with respect to their placement in the respective door openings.
 - b. Complete (risers, point-to-point) access control system block wiring diagrams.
 - c. Wiring instructions for each electronic component scheduled herein.

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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. Product Test Reports: Indicating compliance with cycle testing requirements, based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified independent testing agency.

1.4 CLOSEOUT SUBMITTALS

A. Operating and Maintenance Manuals: Provide manufacturers operating and maintenance manuals for each item comprising the complete door hardware installation in quantity as required in Division 01, Closeout Procedures.

B. Project Record Documents: Provide record documentation of as-built door hardware sets in digital format (.pdf, .docx, .xlsx, .csv) and as required in Division 01, Project Record Documents.

1.5 QUALITY ASSURANCE

A. Manufacturers Qualifications: Engage qualified manufacturers with a minimum 5 years of documented experience in producing hardware and equipment similar to that indicated for this Project and that have a proven record of successful in-service performance.

B. Certified Products: Where specified, products must maintain a current listing in the Builders Hardware Manufacturers Association (BHMA) Certified Products Directory (CPD).

C. Installer Qualifications: A minimum 3 years documented experience installing both standard and electrified door hardware similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.

D. Door Hardware Supplier Qualifications: Experienced commercial door hardware distributors with a minimum 5 years documented experience supplying both mechanical and electromechanical hardware installations comparable in material, design, and extent to that indicated for this Project. Supplier recognized as a factory direct distributor by the manufacturers of the primary materials with a warehousing facility in Project's vicinity. Supplier to have on staff a certified Architectural Hardware Consultant (AHC) available during the course of the Work to consult with Contractor, Architect, and Owner concerning both standard and electromechanical door hardware and keying.

E. Source Limitations: Obtain each type and variety of door hardware specified in this section from a single source unless otherwise indicated.

1. Electrified modifications or enhancements made to a source manufacturer's product line by a secondary or third party source will not be accepted.

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2. Provide electromechanical door hardware from the same manufacturer as mechanical door hardware, unless otherwise indicated.
- F. Each unit to bear third party permanent label indicating compliance with the referenced testing standards.
- G. Keying Conference: Conduct conference to comply with requirements in Division 01 Section "Project Meetings." Keying conference to incorporate the following criteria into the final keying schedule document:
1. Function of building, purpose of each area and degree of security required.
 2. Plans for existing and future key system expansion.
 3. Requirements for key control storage and software.
 4. Installation of permanent keys, cylinder cores and software.
 5. Address and requirements for delivery of keys.
- H. Pre-Submittal Conference: Conduct coordination conference in compliance with requirements in Division 01 Section "Project Meetings" with attendance by representatives of Supplier(s), Installer(s), and Contractor(s) to review proper methods and the procedures for receiving, handling, and installing door hardware.
1. Prior to installation of door hardware, conduct a project specific training meeting to instruct the installing contractors' personnel on the proper installation and adjustment of their respective products. Product training to be attended by installers of door hardware (including electromechanical hardware) for aluminum, hollow metal and wood doors. Training will include the use of installation manuals, hardware schedules, templates and physical product samples as required.
 2. Inspect and discuss electrical roughing-in, power supply connections, and other preparatory work performed by other trades.
 3. Review sequence of operation narratives for each unique access controlled opening.
 4. Review and finalize construction schedule and verify availability of materials.
 5. Review the required inspecting, testing, commissioning, and demonstration procedures
- I. At completion of installation, provide written documentation that components were applied according to manufacturer's instructions and recommendations and according to approved schedule.

1.6 DELIVERY, STORAGE AND HANDLING

- A. Inventory door hardware on receipt and provide secure lock-up and shelving for door hardware delivered to Project site. Do not store electronic access control hardware, software or accessories at Project site without prior authorization.
- B. Tag each item or package separately with identification related to the final Door Hardware Schedule, and include basic installation instructions with each item or package.
- C. Deliver, as applicable, permanent keys, cylinders, cores, access control credentials, software and related accessories directly to Owner via registered mail or overnight package service. Instructions for delivery to the Owner shall be established at the "Keying Conference".

1.7 COORDINATION

- A. Templates: Obtain and distribute to the parties involved templates for doors, frames, and other work specified to be factory prepared for installing standard and electrified hardware. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing hardware to comply with indicated requirements.
- B. Door and Frame Preparation: Doors and corresponding frames are to be prepared, reinforced and pre-wired (if applicable) to receive the installation of the specified electrified, monitoring, signaling and access control system hardware without additional in-field modifications.

1.8 WARRANTY

- A. General Warranty: Reference Division 01, General Requirements. Special warranties specified in this Article shall not deprive Owner of other rights Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.
- B. Warranty Period: Written warranty, executed by manufacturer(s), agreeing to repair or replace components of standard and electrified door hardware that fails in materials or workmanship within specified warranty period after final acceptance by the Owner. Failures include, but are not limited to, the following:
 - 1. Structural failures including excessive deflection, cracking, or breakage.
 - 2. Faulty operation of the hardware.
 - 3. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
 - 4. Electrical component defects and failures within the systems operation.
- C. Warranty Period: Unless otherwise indicated, warranty shall be one year from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Hardware shall not have any visible manufacturer names on exposed materials, except cylinders, when the door is in a closed position.

2.2 BUTT HINGES

- A. Hinges: ANSI/BHMA A156.1 butt hinges with number of hinge knuckles and other options as specified in the Door Hardware Sets.
 - 1. Quantity: Provide the following hinge quantity:
 - a. Two Hinges: For doors with heights up to 60 inches.
 - b. Three Hinges: For doors with heights 61 to 90 inches.
 - c. Four Hinges: For doors with heights 91 to 120 inches.
 - d. For doors with heights more than 120 inches, provide 4 hinges, plus 1 hinge for every 30 inches of door height greater than 120 inches.

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2. Hinge Size: Provide the following, unless otherwise indicated, with hinge widths sized for door thickness and clearances required:
 - a. Widths up to 3'0": 4-1/2" standard or heavy weight as specified.
 - b. Sizes from 3'1" to 4'0": 5" standard or heavy weight as specified.
3. Hinge Weight and Base Material: Unless otherwise indicated, provide the following:
 - a. Exterior Doors: Heavy weight, non-ferrous, ball bearing or oil impregnated bearing hinges unless Hardware Sets indicate standard weight.
 - b. Interior Doors: Standard weight, steel, ball bearing or oil impregnated bearing hinges unless Hardware Sets indicate heavy weight.
4. Hinge Options: Comply with the following:
 - a. Non-removable Pins: With the exception of electric through wire hinges, provide set screw in hinge barrel that, when tightened into a groove in hinge pin, prevents removal of pin while door is closed; for all out-swinging lockable doors.
5. Manufacturers:
 - a. Ives (IV) - 5BB Series, 5-knuckle.
 - b. McKinney (MK) - TA/T4A Series, 5-knuckle.

2.3 CONTINUOUS HINGES

- A. Continuous Geared Hinges: ANSI/BHMA A156.26 Grade 1-600 continuous geared hinge. with minimum 0.120-inch thick extruded 6063-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. Ives (IV).
 - b. Pemko (PE).

2.4 POWER TRANSFER DEVICES

- A. 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 (MK) - Electrical Connecting Kit: QC-R001.
 - b. McKinney (MK) - Connector Hand Tool: QC-R003.

2. Manufacturers:

- a. McKinney (MK) - QC-C Series.
- b. Von Duprin (VD) - Connect.

2.5 DOOR OPERATING TRIM

A. Door Push Plates and Pulls: ANSI/BHMA A156.6 door pushes and pull units 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. Door Pull and Push Bar Design: Size, shape, and material as indicated in the hardware sets. Minimum clearance of 2 1/2-inches from face of door unless otherwise indicated.
- 3. Offset Pull Design: Size, shape, and material as indicated in the hardware sets. Minimum clearance of 2 1/2-inches from face of door and offset of 90 degrees unless otherwise indicated.
- 4. Pulls shall be provided with a 10" clearance from the finished floor on the push side to accommodate wheelchair accessibility.
- 5. Fasteners: Provide manufacturer's designated fastener type as indicated in Hardware Sets. When through-bolt fasteners are in the same location as a push plate, countersink the fasteners flush with the door face allowing the push plate to sit flat against the door.
- 6. Manufacturers:
 - a. Rockwood (RO).
 - b. No Substitution.

2.6 CYLINDERS AND KEYING

A. General: Cylinder manufacturer to have minimum (10) years experience designing secured master key systems and have on record a published security keying system policy.

- 1. Manufacturers:
 - a. Sargent Manufacturing (SA).
 - b. Match Existing, Field Verify.
 - c. No Substitution.

B. Cylinder Types: Original manufacturer cylinders able to supply the following cylinder formats and types:

- 1. Threaded mortise cylinders with rings and cams to suit hardware application.
- 2. Rim cylinders with back plate, flat-type vertical or horizontal tailpiece, and raised trim ring.
- 3. Bored or cylindrical lock cylinders with tailpieces as required to suit locks.
- 4. Tubular deadlocks and other auxiliary locks.
- 5. Mortise and rim cylinder collars to be solid and recessed to allow the cylinder face to be flush and be free spinning with matching finishes.
- 6. Keyway: Match Facility Standard.

C. Keying System: Each type of lock and cylinders to be factory keyed.

1. Supplier shall conduct a "Keying Conference" to define and document keying system instructions and requirements.
2. Furnish factory cut, nickel-silver large bow permanently inscribed with a visual key control number as directed by Owner.
3. Existing System: Field verify and key cylinders to match Owner's existing system.

D. Key Quantity: Provide the following minimum number of keys:

1. Change Keys per Cylinder: Two (2)
2. Master Keys (per Master Key Level/Group): Five (5).
3. Construction Keys (where required): Ten (10).

E. Construction Keying: Provide construction master keyed cylinders.

F. Key Registration List (Bitting List):

1. Provide keying transcript list to Owner's representative in the proper format for importing into key control software.
2. Provide transcript list in writing or electronic file as directed by the Owner.

2.7 KEY CONTROL

A. Key Control Cabinet: Provide a key control system including envelopes, labels, and tags with self-locking key clips, receipt forms, 3-way visible card index, temporary markers, permanent markers, and standard metal cabinet. Key control cabinet shall have expansion capacity of 150% of the number of locks required for the project.

1. Manufacturers:
 - a. Lund Equipment (LU).
 - b. MMF Industries (MM).
 - c. Telkee (TK).

2.8 MORTISE LOCKS AND LATCHING DEVICES

A. Mortise Locksets, Grade 1 (Heavy Duty): Provide ANSI/BHMA A156.13, Series 1000, Operational Grade 1 Certified Products Directory (CPD) listed mortise locksets. Listed manufacturers shall meet all functions and features as specified herein.

1. Provide locksets with functions and features as follows:
 - a. Heavy duty 12-gauge wrought steel case.
 - b. Stainless steel 3/4" one-piece anti-friction reversible latchbolt with a one-piece hardened stainless steel 1" projection deadbolt.
 - c. Where required by code, provide knurling or abrasive coating on all levers leading to hazardous areas.
 - d. Meets UL and CUL Standard 10C Positive Pressure, Fire Test of Door Assemblies with levers that meet A117.1 Accessibility Code.
 - e. Meets UL Certification Directory ZHLL.R21744 for products used in windstorm rated assemblies.
 - f. Extended cycle test: Locks to have been cycle tested in ordinance with ANSI/BHMA 156.13 requirements to 16 million cycles or greater.

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- g. Status indicators inside, outside, or on both sides of doors as specified; available with wording for "locked/unlocked", "vacant/occupied" or custom wording options. Indicator to be located above the cylinder with the inside thumb-turn not blocking the visibility of the indicator status.
 - h. Ten-year limited warranty for mechanical functions.
 - 2. Manufacturers:
 - a. Sargent Manufacturing (SA) - 8200 Series.
 - b. Schlage (SC) - L9000 Series.
 - c. No Substitution. LOCK AND LATCH STRIKES
- B. 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.
- C. 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.

2.9 CONVENTIONAL EXIT DEVICES

- A. General Requirements: All exit devices specified herein shall meet or exceed the following criteria:
 - 1. Exit devices shall have a five-year warranty.
 - 2. 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.
 - 3. 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.
 - 4. 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.
 - 5. 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.
 - 6. Lever Operating Trim: Where exit devices require lever trim, furnish manufacturer's heavy duty escutcheon trim with threaded studs for thru-bolts.

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- 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.
- 7. 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.
 - 8. Narrow Stile Applications: At doors constructed with narrow stiles, or as specified in Hardware Sets, provide devices designed for maximum 2" wide stiles.
 - 9. Dummy Push Bar: Nonfunctioning push bar matching functional push bar.
 - 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.
- B. Conventional Push Rail Exit Devices (Heavy Duty): ANSI/BHMA A156.3, Grade 1 Certified Products Directory (CPD) listed exit devices. Listed manufacturers shall meet all functions and features as specified herein.
- 1. Provide exit devices with functions and features as follows:
 - a. Where required by code, provide knurling or abrasive coating on all levers leading to hazardous areas.
 - b. Meets UL and CUL Standard 10C Positive Pressure, Fire Test of Door Assemblies with levers that meet A117.1 Accessibility Code.
 - c. Extended cycle test: Exit devices to have been cycle tested in ordinance with ANSI/BHMA 156.3 requirements to 5 million cycles or greater.
 - d. Five-year limited warranty for mechanical features.
 - 2. Electromechanical exit devices shall have the following functions and features:
 - a. Universal Molex plug-in connectors that have standardized color-coded wiring and are field configurable in fail safe or fail secure and operate from 12vdc to 24vdc regulated.
 - b. EcoFlex or equivalent technology that reduces energy consumption up to 92% as certified by GreenCircle.
 - c. Options to be available for request-to-exit or enter signaling, latchbolt and touchbar monitoring.
 - d. Field configurable electrified trim to fail-safe or fail-secure that operates from 12-24VDC.
 - e. Five-year limited warranty for electromechanical features.
 - 3. Manufacturers:
 - a. Sargent Manufacturing (SA) - 80 Series.
 - b. Von Duprin (VD) - 35A/98 XP Series.
 - c. No Substitution.
- C. Extruded Aluminum Removable Mullions: ANSI/BHMA A156.3 anodized, removable mullions with malleable-iron top and bottom retainers. Mullions to be provided standard with stabilizers and imbedded weatherstrip.

- 1. Manufacturers:

- a. Same as exit device manufacturer.

2.10 SURFACE DOOR CLOSERS

A. All door closers specified herein shall meet or exceed the following criteria:

1. General: Door closers to be from one manufacturer, matching in design and style, with the same type door preparations and templates regardless of application or spring size. Closers to be non-handed with full sized covers.
2. Standards: Closers to comply with UL-10C for Positive Pressure Fire Test and be U.L. listed for use of fire rated doors.
3. Cycle Testing: Provide closers which have surpassed 15 million cycles.
4. 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.
5. Closer Arms: Provide heavy duty, forged steel closer arms unless otherwise indicated in Hardware Sets.
6. Closers shall not be installed on exterior or corridor side of doors; where possible install closers on door for optimum aesthetics.
7. 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 (Large Body Cast Iron): ANSI/BHMA A156.4, Grade 1 Certified Products Directory (CPD) listed surface mounted, heavy duty door closers with complete spring power adjustment, sizes 1 thru 6; and fully operational adjustable according to door size, frequency of use, and opening force. Closers to be rack and pinion type, one piece cast iron body construction, with adjustable backcheck and separate non-critical valves for closing sweep and latch speed control.

1. Large body cast iron surface mounted door closers shall have a 30-year warranty.
2. Manufacturers:
 - a. LCN Closers (LC) - 4040XP Series.
 - b. Sargent Manufacturing (SA) - 281 Series.
 - c. No Substitution.

2.11 ELECTROMECHANICAL DOOR OPERATORS

A. Electromechanical Door Operators (High Traffic): Provide ANSI/BHMA A156.19 Certified Products Directory (CPD) listed low energy operators that are UL325/991 and UL10C certified and comply with requirements for the Americans with Disabilities Act (ADA). Operators shall accommodate openings up to 250 pounds and 48" wide. Provide accessories such as custom templates, special mounting brackets, spacers and drop plates as needed for proper installation. Operators shall accommodate openings up to 200 pounds and 48" wide. Listed manufacturers shall meet all functions and features as specified herein.

1. Provide operators with features as follows:
 - a. Non-handed with push and pull side mounting.
 - b. Activation by push button, hands-free or radio frequency devices.

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- c. Adjustable opening force and closing power.
 - d. Two-year limited warranty.
 - e. Wi-Fi interface where the operator is a secure, password protected WiFi hot spot with no connection to building's IT required.
 - 1) Simple setup with no app required.
 - 2) View status and make adjustments without removing the cover.
 - 3) Built-in logic to support single use restroom applications with no external relay boards, logic modules, position switches required.
 - f. Mounting backplate to simplify and speed up installation.
 - g. Integration with access control systems.
2. Operators shall have the following functionality:
- a. Adjustable Hold Open: Amount of time a door will stay in the full open position after an activation.
 - b. Blow Open for Smoke Ventilation: Door opens when signal is received from alarm system allowing air or smoke to flow through opening. Door will stay open until signal from alarm system is stopped.
 - c. Emergency Interface Relay: Door closes and ignores any activation input until signal is discontinued.
 - d. Infinite Hold Open: Door will hold open at set position until power is turned off.
 - e. Latch Assist: At closed position, after an activation, the door is pulled in. After the door has closed, the door is pulled in to assist with latch release/engagement.
 - f. Obstruction Detection: Door closes if it hits an obstruction while opening; door will reverse to open position if it hits an obstruction while closing. Door will stop once it hits an obstruction and will rest against the obstruction until removed.
 - g. Open Delay: Delays operator opening for locking hardware.
 - h. Outside Wall Switch Disable: When contact is closed, outside wall switch is disabled.
 - i. Power Assist: Senses the door is being opened manually and applies small amount of power to assist the user in opening the door with force less than 5 lbs. The door opens only as far as it is moved manually, then closes once released.
 - j. Power Close: Additional force to assist door closing between 7° and 2°.
 - k. Presence Detector Input: Input for external sensor to detect presence at door open or close position only.
 - l. Push & Go: As the door is manually opened, the operator "senses" movement and opens door to the full-open position.
 - m. Selector Mode Switch: Off disables the signal inputs unless Blow Open is activated, on activates the signal inputs, hold open activates the unit (unless Blow Closed is activated) to the hold open position.
 - n. Vestibule Delay: When the wall switch is pressed, first door in vestibule will open. Second door will open once vestibule door delay has expired. Delay is adjustable.
 - o. Executive Mode Feature: When the door receives an activation signal it opens and remains open until either a second signal is received, or the door is manually moved in closing direction.
3. Manufacturers:
- a. Norton Rixson (NO) - 6300 Series.

2.12 ARCHITECTURAL TRIM AND ACCESSORIES

A. Door Protective Trim:

1. General: Door protective trim units to be of type and design as specified below or in the Hardware Sets.
2. Size: Fabricate protection plates (kick, armor, or mop) not more than 2" less than door width (LDW) on stop side of single doors and 1" LDW on stop side of pairs of doors, and not more than 1" less than door width on pull side. Coordinate and provide proper width and height as required where conflicting hardware dictates. Height to be as specified in the Hardware Sets.
3. Where plates are applied to fire rated doors with the top of the plate more than 16" above the bottom of the door, provide plates complying with NFPA 80. Consult manufacturer's catalog and template book for specific requirements for size and applications.
4. Protection Plates: ANSI/BHMA A156.6 protection plates (kick, armor, or mop), fabricated from the following:
 - a. Stainless Steel: 300 grade, 050-inch thick.
5. Options and fasteners: Provide manufacturer's designated fastener type as specified in the Hardware Sets. Provide countersunk screw holes.
6. Manufacturers:
 - a. Rockwood (RO).
 - b. No Substitution.

2.13 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. 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. Norton Rixson (RF).
 - b. No Substitution.

2.14 ARCHITECTURAL SEALS

- A. General: Thresholds, weatherstripping, and gasket seals to be of type and design as specified below or in the Hardware Sets. Provide continuous weatherstrip gasketing on exterior doors and provide smoke, light, or sound gasketing on interior doors where indicated. At exterior applications provide non-corrosive fasteners and elsewhere where indicated.
- B. Smoke Labeled Gasketing: Assemblies complying with NFPA 105 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for smoke control ratings indicated, based on testing according to UL 1784.
 1. Provide smoke labeled perimeter gasketing at all smoke labeled openings.

- C. Fire Labeled Gasketing: Assemblies complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire ratings indicated, based on testing according to UL-10C.
1. Provide intumescent seals as indicated to meet UL10C Standard for Positive Pressure Fire Tests of Door Assemblies, and NFPA 252, Standard Methods of Fire Tests of Door Assemblies.
- D. Sound-Rated Gasketing: Assemblies that are listed and labeled by a testing and inspecting agency, for sound ratings indicated.
- E. Replaceable Seal Strips: Provide only those units where resilient or flexible seal strips are easily replaceable and readily available from stocks maintained by manufacturer.
- F. Manufacturers:
1. Pemko (PE).
 2. No Substitution.

2.15 ELECTRONIC ACCESSORIES

- A. Key Switches: Key switches furnished standard with stainless steel single gang face plate with a 12/24VDC bi-color LED indicator. Integral backing bracket permits integration with any 1 1/4" or 1 1/2" mortise type cylinder. Key switches available as momentary or maintained action and in narrow face plate options.
1. Manufacturers:
 - a. Alarm Controls (AK) - MCK Series.
 - b. Securitron (SU) - MK Series.
 - c. No Substitution.
- B. Door Position Switches: Door position magnetic reed contact switches specifically designed for use in commercial door applications. On recessed models the contact and magnetic housing snap-lock into a 1" diameter hole. Surface mounted models include wide gap distance design complete with armored flex cabling. Provide SPDT, N/O switches with optional Rare Earth Magnet installation on steel doors with flush top channels.
1. Manufacturers:
 - a. Alarm Controls (AK) - CP1-1026 Series.
 - b. Securitron (SU) - DPS Series.
 - c. No Substitution.
- C. Intelligent Switching Power Supplies: Provide the least number of power supplies at the appropriate amperage level sufficient to exceed the required total draw for the specified electrified hardware and access control equipment.
1. Power supplies shall meet all functions and features as specified herein.
 - a. UL listed dual voltage 12 or 24 VDC field selectable continuous output.

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- b. Dedicated fast charger to prolong battery life with low battery cutoff to protect batteries from deep discharge.
- c. Enhanced surge immunity for input/output protection
- d. Separate, dedicated battery charging circuit to keep locks cooler.
- e. Dual-color LED visual notification to prevent applying incorrect voltages to the power supply.
- f. Instant auto-switch to battery on AC loss.
- g. Expandable up to 16 outputs in the standard enclosure
- h. Integrated fire alarm interface to allow main output shutdown or disconnect on a per output basis when using an R8 output module.
- i. Network ready and remotely manage locks and connected devices when using an M8 managed output module on network models.
- j. Lifetime replacement, no-fault, no questions asked warranty.

2. Manufacturers:

- a. Altronix (AS) – Maximal 11F.
- b. Life Safety Power (LP).
- c. Securitron (SU) - AQL Series.
- d. No Substitution.

2.16 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.

2.17 FINISHES

- A. Standard: Designations used in the Hardware Sets and elsewhere indicate hardware finishes complying with ANSI/BHMA A156.18, including coordination with traditional U.S. finishes indicated by certain manufacturers for their products.
- B. Provide quality of finish, including thickness of plating or coating (if any), composition, hardness, and other qualities complying with manufacturer's standards, but in no case less than specified by referenced standards for the applicable units of hardware
- C. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine scheduled openings, with Installer present, for compliance with requirements for installation tolerances, labeled fire door assembly construction, wall and floor construction, and other conditions affecting performance.

- B. Notify architect of any discrepancies or conflicts between the door schedule, door types, drawings and scheduled hardware. Proceed only after such discrepancies or conflicts have been resolved in writing.

3.2 PREPARATION

- A. Hollow Metal Doors and Frames: Comply with ANSI/DHI A115 series.
- B. Wood Doors: Comply with ANSI/DHI A115-W series.

3.3 INSTALLATION

- A. Install each item of mechanical and electromechanical hardware and access control equipment to comply with manufacturer's written instructions and according to specifications.
1. Installers are to be trained and certified by the manufacturer on the proper installation and adjustment of fire, life safety, and security products including: hanging devices; locking devices; closing devices; and seals.
- B. Mounting Heights: Mount door hardware units at heights indicated in following applicable publications, unless specifically indicated or required to comply with governing regulations:
1. Standard Steel Doors and Frames: DHI's "Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames."
 2. DHI TDH-007-20: Installation Guide for Doors and Hardware.
 3. Where indicated to comply with accessibility requirements, comply with ANSI A117.1 "Accessibility Guidelines for Buildings and Facilities."
 4. Provide blocking in drywall partitions where wall stops or other wall mounted hardware is located.
- C. Retrofitting: Install door hardware to comply with manufacturer's published templates and written instructions. Where cutting and fitting are required to install door hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation of surface protective trim units with finishing work specified in Division 9 Sections. Do not install surface-mounted items until finishes have been completed on substrates involved.
- D. Push Plates and Door Pulls: When through-bolt fasteners are in the same location as a push plate, countersink the fasteners flush with the door face allowing the push plate to sit flat against the door.
- E. Thresholds: Set thresholds for exterior and acoustical doors in full bed of sealant complying with requirements specified in Division 7 Section "Joint Sealants."
- F. Storage: Provide a secure lock up for hardware delivered to the project but not yet installed. Control the handling and installation of hardware items so that the completion of the work will not be delayed by hardware losses before and after installation.

3.4 FIELD QUALITY CONTROL

- A. Field Inspection (Punch Report): Reference Division 01 Sections "Closeout Procedures". Produce project punch report for each installed door opening indicating compliance with approved

submittals and verification hardware is properly installed, operating and adjusted. Include list of items to be completed and corrected, indicating the reasons or deficiencies causing the Work to be incomplete or rejected.

1. Organization of List: Include separate Door Opening and Deficiencies and Corrective Action Lists organized by Mark, Opening Remarks and Comments, and related Opening Images and Video Recordings.

3.5 ADJUSTING

- A. Initial Adjustment: Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.

3.6 CLEANING AND PROTECTION

- A. Protect all hardware stored on construction site in a covered and dry place. Protect exposed hardware installed on doors during the construction phase. Install any and all hardware at the latest possible time frame.
- B. Clean adjacent surfaces soiled by door hardware installation.
- C. Clean operating items as necessary to restore proper finish. Provide final protection and maintain conditions that ensure door hardware is without damage or deterioration at time of owner occupancy.

3.7 DEMONSTRATION

- A. Instruct Owner's maintenance personnel to adjust, operate, and maintain mechanical and electromechanical door hardware.

3.8 DOOR HARDWARE SETS

- A. The hardware sets represent the design intent and direction of the owner and architect. They are a guideline only and should not be considered a detailed hardware schedule. Discrepancies, conflicting hardware and missing items should be brought to the attention of the architect with corrections made prior to the bidding process. Omitted items not included in a hardware set should be scheduled with the appropriate additional hardware required for proper application and functionality.
 1. Quantities listed are for each pair of doors, or for each single door.
 2. The supplier is responsible for handing and sizing all products.
 3. Where multiple options for a piece of hardware are given in a single line item, the supplier shall provide the appropriate application for the opening.
 4. At existing openings with new hardware the supplier shall field inspect existing conditions prior to the submittal stage to verify the specified hardware will work as required. Provide alternate solutions and proposals as needed.
- B. Manufacturer's Abbreviations:

1. MK - McKinney
2. PE - Pemko
3. SA - SARGENT
4. RO - Rockwood
5. RF - Rixson
6. NO - Norton
7. OT - Other
8. SU - Securitron

Hardware Sets

Set: 1.0

Doors: 144-2

1 Continuous Hinge	_FM_SLF-HD1 x Length Required		PE
1 Mullion	L980	US10B	SA
1 Rim Exit Device, Storeroom	16 AD8504 Less Pull	US10BE	SA
1 Mortise Cylinder	As Required	US10BE	SA
1 Cylinder	980C1	US10B	SA
1 Pull	RM201	US10B	RO
1 Conc Overhead Stop	1 Series	690	RF
1 Automatic Opener	6300 Series	690	NO
1 Gasketing	Provided By Door/Frame Supplier		OT
1 Rain Guard	346_ x Width of Frame Head		PE
1 Mullion Gasketing	5110BL		PE
1 Sweep	345_V x Length Required		PE
1 Threshold	171_		PE
1 Position Switch	DPS - M / W-BK (SPDT)		SU
1 Door Switch	503		NO
1 Keyswitch	MK2		SU
1 Wiring Diagram	Elevation and Point to Point as Specified		OT

Notes: Coordinate mullion, cylinder, and mullion gasketing with opening 144-1.

Operational Narrative:

1. Door normally keyed dogged and unsecure during business hours. After hours door is locked and secure.
2. Authorized access by key. Exit device latch can be dogged for open access.
3. ADA access by actuator switch. In locked condition, actuator not energized.
4. Egress free for immediate exit. ADA egress by actuator switch during business hours.
5. Door position switch monitors open/closed status.

Set: 2.0

Doors: 144-1

1 Continuous Hinge	_FM_SLF-HD1 x Length Required		PE
1 Mullion	L980	US10B	SA
1 Rim Exit Device, Exit Only	16 AD8510 EO	US10BE	SA
1 Mortise Cylinder	As Required	US10BE	SA
1 Cylinder	980C1	US10B	SA
1 Pull	RM201	US10B	RO
1 Surface Closer	281 CPS	EB	SA
1 Gasketing	Provided By Door/Frame Supplier		OT
1 Rain Guard	346_ x Width of Frame Head		PE
1 Mullion Gasketing	5110BL		PE
1 Sweep	345_V x Length Required		PE
1 Threshold	171_		PE
1 Position Switch	DPS - M / W-BK (SPDT)		SU

Notes: Coordinate mullion, cylinder, and mullion gasketing with opening 144-2.

Set: 3.0

Doors: 101, 125

3 Hinge, Full Mortise, Hvy Wt	T4A3386	US10B (SS)	MK
1 Hinge, Full Mortise, Hvy Wt	T4A3386 QC	US10B (SS)	MK
1 Rim Exit Device, Storeroom	55 56 8804 ETL	US10BE	SA
1 Surface Closer	281 CPS	EB	SA
1 Kick Plate	K1050 10" high CSK BEV	US10B	RO
1 Gasketing	303_S (Head & Jambs)		PE
1 Rain Guard	346_ x Width of Frame Head		PE
1 Sweep	345_V x Length Required		PE
1 Threshold	171_		PE
1 Card Reader	Provided By Security Supplier		OT
1 ElectroLynx Harness	QC-C**** x Length Required		MK
1 ElectroLynx Harness	QC-C1500P		MK
1 Position Switch	DPS - M / W-BK (SPDT)		SU
1 Power Supply	AQL-R_ (Size & Type as required)		SU
1 Wiring Diagram	Elevation and Point to Point as Specified		OT

Notes: Operational Narrative:

1. Doors normally closed and secure.
2. Authorized access by card reader retracting exit device latch for predetermined time limit. Exit device

latch can be electrically held retracted for open access.

3. Egress free for immediate exit.

4. REX switch in push rail allows authorized exit without alarm condition.

5. Door position switch monitor open/closed status.

6. Exit device latch releases (fail secure) in event of power loss. Keyed cylinder override for emergency access.

Set: 4.0

Doors: [STB-1](#)

3 Hinge, Full Mortise	TA2314	US10B (SS)	MK
1 Double Locking Lock	8259 LNL	US10BE	SA
1 Surface Closer	281 CPS	EB	SA
1 Kick Plate	K1050 10" high CSK BEV	US10B	RO
1 Gasketing	303_S (Head & Jambs)		PE
1 Rain Guard	346_ x Width of Frame Head		PE
1 Sweep	345_V x Length Required		PE
1 Threshold	171_		PE
1 Position Switch	DPS - M / W-BK (SPDT)		SU

Set: 5.0

Doors: 144-4

1 Continuous Hinge	_FM_SLF-HD1 x Length Required		PE
1 Mullion	L980	US10B	SA
1 Rim Exit Device, Storeroom	16 AD8504 Less Pull	US10BE	SA
1 Mortise Cylinder	As Required	US10BE	SA
1 Cylinder	980C1	US10B	SA
1 Pull	RM201	US10B	RO
1 Conc Overhead Stop	1 Series	690	RF
1 Automatic Opener	6300 Series	690	NO
1 Gasketing	Provided By Door/Frame Supplier		OT
1 Mullion Gasketing	5110BL		PE
2 Door Switch	503		NO
1 Wiring Diagram	Elevation and Point to Point as Specified		OT

Notes: Coordinate mullion, cylinder, and mullion gasketing with opening 144-3.
Coordinate auto opener sequencing with opening 144-2.

Operational Narrative:

1. Door normally keyed dogged and unsecure during business hours. After hours door is locked and secure.

2. Authorized access by key. Exit device latch can be dogged for open access.

3. ADA access by actuator switch. In locked condition, actuator not energized.

4. Egress free for immediate exit. ADA egress by actuator switch during business hours.
5. Door position switch monitors open/closed status.

Set: 6.0

Doors: 144-3

1 Continuous Hinge	_FM_SLF-HD1 x Length Required		PE
1 Mullion	L980	US10B	SA
1 Rim Exit Device, Exit Only	16 AD8510 EO	US10BE	SA
1 Mortise Cylinder	As Required	US10BE	SA
1 Cylinder	980C1	US10B	SA
1 Pull	RM201	US10B	RO
1 Surface Closer	281 PS	EB	SA
1 Gasketing	Provided By Door/Frame Supplier		OT
1 Mullion Gasketing	5110BL		PE

Notes: Coordinate mullion, cylinder, and mullion gasketing with opening 144-3.

END OF SECTION 087100

**SECTION 088000
GLAZING**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Laminated insulating glass units.
- B. Laminated glazing units.
- C. Laminated glass interlayers.
- D. Glazing compounds.

1.02 RELATED REQUIREMENTS

- A. Section 081113 - Hollow Metal Doors and Frames: Glazed lites in doors and borrowed lites.
- B. Section 081416 - Flush Wood Doors: Glazed lites in doors.
- C. Section 084313 - Aluminum-Framed Storefronts: Glazing provided as part of storefront assembly.
- D. Section 084413 - Glazed Aluminum Curtain Walls: Glazing provided as part of wall assembly.

1.03 REFERENCE STANDARDS

- A. 16 CFR 1201 - Safety Standard for Architectural Glazing Materials; Current Edition.
- B. ANSI Z97.1 - American National Standard for Safety Glazing Materials Used in Buildings - Safety Performance Specifications and Methods of Test; 2015 (Reaffirmed 2020).
- C. ASTM C864 - Standard Specification for Dense Elastomeric Compression Seal Gaskets, Setting Blocks, and Spacers; 2005 (Reapproved 2019).
- D. ASTM C1036 - Standard Specification for Flat Glass; 2025.
- E. ASTM C1048 - Standard Specification for Heat-Strengthened and Fully Tempered Flat Glass; 2025.
- F. ASTM C1172 - Standard Specification for Laminated Architectural Flat Glass; 2024.
- G. ASTM C1376 - Standard Specification for Pyrolytic and Vacuum Deposition Coatings on Flat Glass; 2021a.
- H. ASTM E2190 - Standard Specification for Insulating Glass Unit Performance and Evaluation; 2019.
- I. GANA (GM) - GANA Glazing Manual; 2022.
- J. GANA (SM) - GANA Sealant Manual; 2008.
- K. ITS (DIR) - Directory of Listed Products; Current Edition.
- L. UL (DIR) - Online Certifications Directory; Current Edition.

1.04 SUBMITTALS

- A. Product Data on Insulating Glass Unit, Glazing Unit, and Plastic Film Glazing Types: Provide structural, physical and environmental characteristics, size limitations, special handling and installation requirements.
- B. Product Data on Glazing Compounds and Accessories: Provide chemical, functional, and environmental characteristics, limitations, special application requirements, and identify available colors.
- C. Samples: Submit two samples 12 by 12 inch (___ by ___ mm) in size of glass units.
- D. Certificate: Certify that products of this section meet or exceed specified requirements.
- E. Warranty Documentation: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

1.05 QUALITY ASSURANCE

- A. Perform Work in accordance with GANA (GM) and GANA (SM) for glazing installation methods.
- B. Installer Qualifications: Company specializing in performing work of the type specified and with at least three years documented experience.

1.06 PRECONSTRUCTION TESTING

- A. Preconstruction Adhesion and Compatibility Testing: Test each glazing material type, tape sealant, gasket, glazing accessory, and glass-framing member for adhesion to and compatibility with elastomeric glazing sealants.
 - 1. Testing will not be required if data are submitted based on previous testing of current sealant products and glazing materials matching those submitted.

1.07 WARRANTY

- A. Insulating Glass Units: Provide a ten (10) year manufacturer warranty to include coverage for seal failure, interpane dusting or misting, including replacement of failed units.
- B. Laminated Glass: Provide a five (5) year manufacturer warranty to include coverage for delamination, including providing products to replace failed units.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Float Glass Manufacturers:
 - 1. Cardinal Glass Industries: www.cardinalcorp.com.
 - 2. Guardian Industries Corp: www.sunguardglass.com.
 - 3. Pilkington North America Inc: www.pilkington.com/na.
 - 4. Oldcastle Buidling Envelope: www.obe.com
 - 5. Vitro Architectural Glass: www.vitroglazing.com.

2.02 GLASS MATERIALS

- A. Float Glass: Provide float glass based glazing unless otherwise indicated.
 - 1. Annealed Type: ASTM C1036, Type I - Transparent Flat, Class 1 - Clear, Quality - Q3.
 - 2. Kind HS - Heat-Strengthened Type: Complies with ASTM C1048.
 - 3. Fully Tempered Safety Glass: Complies with ANSI Z97.1 or 16 CFR 1201 criteria for safety glazing used in hazardous locations.
- B. Laminated Glass: Float glass laminated in accordance with ASTM C1172.
 - 1. Laminated Safety Glass: Complies with ANSI Z97.1 - Class B or 16 CFR 1201 - Category I impact test requirements.
 - 2. Polyvinyl Butyral (PVB) Interlayer: 0.060 inch (1.524 mm) thick, minimum.

2.03 INSULATING GLASS UNITS

- A. Manufacturers:
 - 1. Cardinal Glass Industries: www.cardinalcorp.com.
 - 2. Guardian Industries Corp: www.sunguardglass.com.
 - 3. Pilkington North America Inc: www.pilkington.com/na.
 - 4. Viracon, Apogee Enterprises, Inc: www.viracon.com/#sle.
 - 5. Oldcastle Buidling Envelope: www.obe.com
 - 6. Vitro Architectural Glass: www.vitroglazings.com
- B. Insulating Glass Units: Types as indicated.
 - 1. Durability: Certified by an independent testing agency to comply with ASTM E2190.
 - 2. Coated Glass: Comply with requirements of ASTM C1376 for pyrolytic (hard-coat) or magnetic sputter vapor deposition (soft-coat) type coatings on flat glass; coated vision glass, Kind CV; coated overhead glass, Kind CO; or coated spandrel glass, Kind CS.
 - 3. Metal-Edge Spacers: Aluminum, bent and soldered corners.

4. Spacer Color: Aluminum.
5. Edge Seal:
 - a. Dual-Sealed System: Provide polyisobutylene sealant as primary seal applied between spacer and glass panes, and silicone, polysulfide, or polyurethane sealant as secondary seal applied around perimeter.
6. Color: Black.
7. Purge interpane space with dry air, hermetically sealed.

2.04 LAMINATED INSULATING GLASS UNITS

- A. Type [IGU-1] Laminated Insulating Glass Units: Vision glazing, with Low-E coating.
 1. Applications: Exterior insulating glass glazing unless otherwise indicated.
 2. Space between lites filled with argon.
 3. Total Thickness: 1 5/16 inch (33 mm).
 4. Thermal Transmittance (U-Value), Winter - Center of Glass: 0.24, nominal.
 5. Visible Light Transmittance (VLT): 70 percent, nominal.
 6. Solar Heat Gain Coefficient (SHGC): 0.39, nominal.
 7. Basis of Design - Vitro Architectural Glass (formerly PPG Glass): www.vitroglazings.com
 8. Outboard Lite: 1/4 inch thick heat-strengthened float glass / .060 PVB / 1/4 in thick heat-strengthened float glass.
 - a. Low-E Coating: Vitro Architectural Glass (formerly PPG Glass) Solarban 60 on #4 surface.
 - b. Color: Clear.
 9. Inboard Lite: Heat-strengthened float glass, 1/4 inch thick. Provide fully tempered units where safety glass is required.
 - a. Coating: No coating on inboard lite.
 - b. Color: Clear.

2.05 LAMINATED GLAZING UNITS

- A. Type LG-1 - Interior Vision Glazing:
 1. Applications: Interior glazing unless otherwise indicated.
 2. Glass Type: Heat-strengthened float glass.
 3. Tint: Clear.
 4. Thickness: 9/16" inch (14 mm), nominal.
 - a. 1/4" Heat strengthened float glass / .060 PVB / 1/4" heat-strengthened float glass

2.06 ACCESSORIES

- A. Setting Blocks: Silicone, with 80 to 90 Shore A durometer hardness; ASTM C864 Option II. Length of 0.1 inch for each square foot (25 mm for each square meter) of glazing or minimum 4 inch (100 mm) by width of glazing rabbet space minus 1/16 inch (1.5 mm) by height to suit glazing method and pane weight and area.
- B. Spacer Shims: Silicone, 50 to 60 Shore A durometer hardness; ASTM C864 Option II. Minimum 3 inch (75 mm) long x one half the height of the glazing stop x thickness to suit application, self adhesive on one face.
- C. Glazing Tape, Back Bedding Mastic Type: Preformed, butyl-based, 100 percent solids compound with integral resilient spacer rod applicable to application indicated; 5 to 30 cured Shore A durometer hardness; coiled on release paper; black color.
- D. Glazing Splines: Resilient silicone extruded shape to suit glazing channel retaining slot; ASTM C864 Option II; color black.
- E. Glazing Clips: Manufacturer's standard type.
- F. U-Channels: Clear anodized aluminum.
 1. Basis-of-Design: CR Laurence, CRL U-Channel UC0RB3812CL.
- G. Shallow Depth U-Channels: Clear anodized aluminum.
 1. Basis-of-Design: CR Laurence, CRL Shallow U-Channels SC0RB3812CL.

- H. Header Channel: Recessed in ceiling surface. Sized for glass thickness.
 - 1. Basis-of-Design: CR Laurence, CRL- Blumcraft Head Channel.

PART 3 EXECUTION

3.01 PREPARATION

- A. Clean contact surfaces with appropriate solvent and wipe dry within maximum of 24 hours before glazing. Remove coatings that are not tightly bonded to substrates.
- B. Seal porous glazing channels or recesses with substrate compatible primer or sealer.
- C. Prime surfaces scheduled to receive sealant where required for proper sealant adhesion.

3.02 INSTALLATION, GENERAL

- A. Install glazing in compliance with written instructions of glass, gaskets, and other glazing material manufacturers, unless more stringent requirements are indicated, including those in glazing referenced standards.
- B. Do not exceed edge pressures around perimeter of glass lites as stipulated by glass manufacturer.
- C. Set glass lites of system with uniform pattern, draw, bow, and similar characteristics.
- D. Set glass lites in proper orientation so that coatings face exterior or interior as indicated.
- E. Prevent glass from contact with any contaminating substances that may be the result of construction operations such as, and not limited to the following; weld splatter, fire-safing, plastering, mortar droppings, and paint.

3.03 INSTALLATION - DRY GLAZING METHOD (TAPE AND TAPE)

- A. Application - Interior Glazed: Set glazing infills from the interior of the building.
- B. Cut glazing tape to length and set against permanent stops, projecting 1/16 inch (1.6 mm) above sight line.
- C. Place setting blocks at 1/4 points with edge block no more than 6 inch (152 mm) from corners.
- D. Rest glazing on setting blocks and push against tape for full contact at perimeter of pane or unit.
- E. Place glazing tape on free perimeter of glazing in same manner described above.
- F. Install removable stop without displacement of tape. Exert pressure on tape for full continuous contact.
- G. Carefully trim protruding tape with knife.

3.04 INSTALLATION - PRESSURE GLAZED SYSTEMS

- A. Application - Exterior Glazed: Set glazing infills from exterior side of building.
- B. Place setting blocks at 1/4 points with edge block no more than 6 inch (152 mm) from corners.
- C. Rest glazing on setting blocks and push against fixed stop with sufficient pressure on gasket to attain full contact.
- D. Install pressure plates without displacing glazing gasket; exert pressure for full continuous contact.

3.05 INSTALLATION - STRUCTURAL SILICONE GLAZING

- A. Follow basic guidelines of structural silicone glazing for glazing application.
 - 1. Two-Sided Structural: Glass structurally adhered to vertical mullions with horizontal sides captured in glazing pockets.
- B. Provide design review of the glazing system and project details, adhesion testing, proper surface preparation, training and a quality service program.
- C. Provide only structural silicone sealant, tested and manufactured for structural glazing.

3.06 INSTALLATION - PLASTIC FILM

- A. Examination:
 - 1. Verify that existing conditions are adequate for proper application and performance of film.
 - 2. Verify glass is not cracked, chipped, broken, or damaged.
 - 3. Do not begin installation until substrates have been properly prepared.
 - 4. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.
- B. Preparation:
 - 1. Clean surfaces thoroughly prior to installation.
 - 2. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
 - 3. Layout pattern/characters indicated on drawings and shop drawings.
- C. Installation:
 - 1. Install plastic film with adhesive, applied in accordance with film manufacturer's instructions.
 - 2. Place without air bubbles, creases, tears, gaps or visible distortion.
 - 3. Fit tight to glass perimeter with razor cut edge.
 - 4. Clean newly installed film and window frames after installation.
 - 5. Clean up cleaning solutions, run-off cleaning water and adhesive mounting solution.
- D. Protection:
 - 1. Protect installed products until completion of project.
 - 2. Where installed film could be damaged by subsequent construction provide tape warning strips or barricades to prevent contact.
- E. Install plastic film with adhesive, applied in accordance with film manufacturer's instructions.
- F. Place without air bubbles, creases or visible distortion.
- G. Install film tight to perimeter of glass and carefully trim film with razor sharp knife. Provide 1/16 inch (1.6 mm) to 1/8 inch (3.2 mm) gap at perimeter of glazed panel unless otherwise required. Do not score the glass.

3.07 CLEANING

- A. Remove excess glazing materials from finish surfaces immediately after application using solvents or cleaners recommended by manufacturers.
- B. Remove nonpermanent labels immediately after glazing installation is complete.
- C. Clean glass and adjacent surfaces after sealants are fully cured.
- D. Clean glass on both exposed surfaces not more than 4 days prior to Date of Substantial Completion in accordance with glass manufacturer's written recommendations.

3.08 PROTECTION

- A. After installation, mark pane with an 'X' by using removable plastic tape or paste; do not mark heat absorbing or reflective glass units.
- B. Remove and replace glass that is damaged during construction period prior to Date of Substantial Completion.

END OF SECTION

**SECTION 099123
INTERIOR PAINTING**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Surface preparation.
- B. Field application of paints.
- C. Scope: Finish interior surfaces exposed to view, unless fully factory-finished and unless otherwise indicated.
 - 1. Both sides and edges of plywood backboards for electrical and telecom equipment before installing equipment.
 - 2. Elevator pit ladders.
 - 3. Prime surfaces to receive wall coverings.
 - 4. Mechanical and Electrical:
 - a. In finished areas, paint insulated and exposed pipes, conduit, boxes, insulated and exposed ducts, hangers, brackets, collars and supports, mechanical equipment, and electrical equipment, unless otherwise indicated.
- D. Do Not Paint or Finish the Following Items:
 - 1. Items factory-finished unless otherwise indicated; materials and products having factory-applied primers are not considered factory finished.
 - 2. Items indicated to receive other finishes.
 - 3. Items indicated to remain unfinished.
 - 4. Fire rating labels, equipment serial number and capacity labels, bar code labels, and operating parts of equipment.
 - 5. Floors, unless specifically indicated.
 - 6. Ceramic and other tiles.
 - 7. Glass.
 - 8. Concealed pipes, ducts, and conduits.
 - 9. Data cable.
 - a. Painter shall be aware that any amount of paint or overspray of paint on data cable will void the warranty of the data cable. Attempts to remove paint by chemical or physical means from data cable is not allowed. All data cable with paint/overspray shall be required to be fully replaced. Entire run of cable will be replaced. No splicing is allowed.

1.02 REFERENCE STANDARDS

- A. SSPC-SP 1 - Solvent Cleaning; 2015, with Editorial Revision (2016).
- B. SSPC-SP 3 - Power Tool Cleaning; 2018.
- C. SSPC-SP 6 - Commercial Blast Cleaning; 2007.
- D. SSPC-SP 13 - Surface Preparation of Concrete; 2018.

1.03 SUBMITTALS

- A. Product Data: Provide complete list of products to be used, with the following information for each:
 - 1. Manufacturer's name, product name and/or catalog number, and general product category (e.g., "alkyd enamel").
 - 2. Cross-reference to specified paint system products to be used in project; include description of each system.
 - 3. Manufacturer's installation instructions.
- B. Samples: Submit two paper "draw down" samples, 8-1/2 by 11 inches (216 by 279 mm) in size, illustrating range of colors available for each finishing product specified.
 - 1. Where sheen is specified, submit samples in only that sheen.

- C. Manufacturer's Instructions: Indicate special surface preparation procedures.
- D. Maintenance Data: Submit data including finish schedule showing where each product/color/finish was used, product technical data sheets, care and cleaning instructions, touch-up procedures, repair of painted and finished surfaces, and color samples of each color and finish used.
- E. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
 - 1. Extra Paint and Finish Materials: 1 gal (4 L) of each color; from the same product run, store where directed.
 - 2. Label each container with color in addition to the manufacturer's label.

1.04 QUALITY ASSURANCE

- A. Properly Painted Surface: Paints on the interior surfaces of structures shall be that of a properly painted surface as defined by PCA Standard P1. "A "properly painted surface" is defined as uniform in appearance, color, texture, hiding and sheen. It is also free of foreign material, lumps, skins, runs, sags, holidays, misses, or insufficient coverage. It is also a surface free of drips, spatters, spills or overspray caused by the painting and decorating contractor's workforce. In order to determine whether a surface has been "properly painted" it shall be examined without magnification at a distance of thirty-nine (39) inches or one (1) meter, or more, under finished lighting conditions and from a normal viewing position."
- B. Painter shall not move onto next step of coating until previous step has been approved by Design Professional (@ primer and 1st coats) for each surface being painted.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Deliver products to site in sealed and labeled containers; inspect to verify acceptability.
- B. Container Label: Include manufacturer's name, type of paint, brand name, lot number, brand code, coverage, surface preparation, drying time, cleanup requirements, color designation, and instructions for mixing and reducing.
- C. Paint Materials: Store at minimum ambient temperature of 45 degrees F (7 degrees C) and a maximum of 90 degrees F (32 degrees C), in ventilated area, and as required by manufacturer's instructions.

1.06 FIELD CONDITIONS

- A. Do not apply materials when surface and ambient temperatures are outside the temperature ranges required by the paint product manufacturer.
- B. Follow manufacturer's recommended procedures for producing best results, including testing of substrates, moisture in substrates, and humidity and temperature limitations.
- C. Provide lighting level of 80 fc (860 lux) measured mid-height at substrate surface.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Provide paints and finishes used in any individual system from the same manufacturer; no exceptions.

2.02 PAINTS AND FINISHES - GENERAL

- A. Paints and Finishes: Ready-mixed, unless intended to be a field-catalyzed paint.
 - 1. Provide paints and finishes of a soft paste consistency, capable of being readily and uniformly dispersed to a homogeneous coating, with good flow and brushing properties, and capable of drying or curing free of streaks or sags.
 - 2. Supply each paint material in quantity required to complete entire project's work from a single production run.
 - 3. Do not reduce, thin, or dilute paint or finishes or add materials unless such procedure is specifically described in manufacturer's product instructions.
- B. Colors: As indicated on drawings.

1. In finished areas, finish pipes, ducts, conduit, and equipment the same color as the wall/ceiling under which they are mounted.

2.03 PAINT SYSTEMS - INTERIOR

- A. Interior Gypsum Board Surfaces to be Painted:
 1. Two top coats and one coat primer.
 2. Top Coats for Walls: Interior Eggshell Latex.
 - a. Products:
 - 1) Benjamin Moore Super Hide Zero VOC Eggshell 0357.
 - 2) Diamond Vogel, Vantage Plus Interior Latex Eggshell Enamel
 - 3) Pittsburgh Paints Speedhide Interior Latex, 6-411 Series, Eggshell. (MPI #44)
 - 4) Pratt & Lambert Pro-Hide Gold Ultra Interior Latex, Eggshell.
 - 5) Sherwin-Williams ProMar 200 Zero VOC Interior Latex, Eg-Shel.
 3. Top Coats for Ceilings: Interior Flat Latex.
 - a. Products:
 - 1) Benjamin Moore Super Hide Zero VOC Flat 0355.
 - 2) Diamond Vogel, Vantage Plus Interior Latex Flat Enamel.
 - 3) PPG Paints Speedhide Interior Latex, Flat.
 - 4) Pratt & Lambert Pro-Hide Gold Ultra Interior Latex, Flat.
 - 5) Sherwin-Williams ProMar 200 Zero VOC Interior Latex, Flat.
 4. Primer: As recommended by top coat manufacturer for specific substrate.
- B. Concrete and Concrete Masonry Units: Interior Semi-Gloss Latex.
 1. One coat block filler and two top coats.
 2. Products:
 - a. Benjamin Moore Super Hide Zero VOC Semi-Gloss 0358.
 - b. Diamond Vogel, Vantage Plus interior Latex Semi-Gloss Enamel.
 - c. PPG Paints Speedhide Interior Latex, Semi-Gloss.
 - d. Pratt & Lambert Pro-Hide Gold Interior Latex, Semi-Gloss.
 - e. Sherwin-Williams ProMar 200 Zero VOC Interior Latex, Semi-Gloss.
 3. Block Filler: Provide the block filler or block surfacer product recommended by manufacturer for CMU cure length, pH levels and moisture content present at time of application.
- C. Ferrous and Galvanized Metal Surfaces to be Painted: For surfaces subject to frequent contact by occupants, including metals:
 1. Two top coats and one coat primer.
 2. Top Coat(s): Interior Epoxy-Modified Latex.
 - a. Applications: Railings, handrails and guardrails.
 - b. Products:
 - 1) Benjamin Moore COROTECH Pre-Catalyzed Waterborne Epoxy Semi-Gloss V341.
 - 2) Diamond Vogel, Eas-E-Poxy Pre-Catalyzed Waterborne Semi-Gloss Epoxy
 - 3) PPG Paints Aquapon WB EP Two-Component Waterborne Epoxy Coating, 98E-1/98E-100 Series, Semi-Gloss.
 - 4) PPG Paints Aquapon WB EP Two-Component Waterborne Epoxy Coating, 98E-1/98E-98 Series, Gloss.
 - 5) Sherwin-Williams Waterbased Catalyzed Epoxy, Semi-Gloss.
 3. Top Coat(s): Interior Light Industrial Coating, Water Based.
 - a. Applications: Doors, door frames, miscellaneous metals.
 - b. Products:
 - 1) Benjamin Moore COROTECH Acrylic DTM Enamel Semi-Gloss V331.
 - 2) Diamond Vogel, Finium DTM-AT Acrylic Semi-Gloss.
 - 3) Pittsburgh Paints Pitt-Tech Plus EP WB DTM Industrial Enamel. 90-1610 Series, Semi-Gloss. (MPI #153)

- 4) Sherwin-Williams Pro Industrial Acrylic Coating, Semi-Gloss.
- D. Interior Epoxy Coating: Including gypsum board and concrete masonry units.
 1. Primer for gypsum wallboard: As recommended by manufacturer.
 2. Primer for concrete masonry: Masonry filler.
 3. Finish Coatings: Two coats. Provide one of the following:
 - a. Benjamin Moore COROTECH Pre-Catalyzed Waterborne Epoxy Semi-Gloss V341.
 - b. Diamond Vogel, Eas-E-Poxy Pre-Catalyzed Waterborne Epoxy Semi-Gloss.
 - c. Pittsburgh Paints; PITT-GLAZE WB-1 Pre-Catalyzed Acrylic Water Based Epoxy, Semi-Gloss.
 - d. Pratt & Lambert Acrylic Waterborne Epoxy, Semi-Gloss.
 - e. Sherwin-Williams Pro Industrial Pre-Catalyzed Waterbased Epoxy, Semi-Gloss.
- E. Dry Fall: Metals; exposed structure and overhead-mounted services, including shop primed steel deck, structural steel, metal fabrications, galvanized ducts, galvanized conduit, and galvanized piping.
 1. Remove all shop/field applied markings/labels from steel surfaces.
 2. Field prime steel items that have shop/field applied markings/labels that can not be removed so that markings do not show through finished painted surfaces..
 3. One top coat, dry film thickness of 2.0 mil, minimum.
 4. Top Coat: Latex Dry Fall.
 - a. Products:
 - 1) Benjamin Moore Latex Dry Fall Flat 395.
 - 2) Diamond Vogel, Luminance 300 Latex Dri-Mist Flat.
 - 3) PPG Paints Speedhide Super Tech Water Based Interior Dry-Fog, 6-725XI, Flat. (MPI #118)
 - 4) Pratt & Lambert Waterborne Dry Fall, Flat.
 - 5) Sherwin-Williams Waterborne Acrylic Dryfall, Flat.
- F. Transparent Finish on Concrete Floors.
 1. 2 coats sealer.
 2. Sealer: Water Based for Concrete Floors.
 - a. Products:
 - 1) Tamms; Clearseal WB 300.
 - 2) L & M Construction Chemicals; Dress & Seal WB
 - 3) W.R. Meadows; VOCOMP - 25.

2.04 ACCESSORY MATERIALS

- A. Accessory Materials: Provide primers, sealers, cleaning agents, cleaning cloths, sanding materials, and clean-up materials as required for final completion of painted surfaces.
- B. Patching Material: Latex filler.
- C. Fastener Head Cover Material: Latex filler.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that surfaces are ready to receive work as instructed by the product manufacturer.
- B. Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially affect proper application.
- C. Test shop-applied primer for compatibility with subsequent cover materials.
- D. Measure moisture content of surfaces using an electronic moisture meter. Do not apply finishes unless moisture content of surfaces is below the following maximums:
 1. Gypsum Wallboard: 12 percent.
 2. Concrete Floors and Traffic Surfaces: 8 percent.

3.02 PREPARATION

- A. Clean surfaces thoroughly and correct defects prior to application.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
- C. Remove or mask surface appurtenances, including electrical plates, hardware, light fixture trim, escutcheons, and fittings, prior to preparing surfaces or finishing.
- D. Seal surfaces that might cause bleed through or staining of topcoat.
- E. Concrete:
 - 1. Remove release agents, curing compounds, efflorescence, and chalk. Do not coat surfaces if moisture content or alkalinity of surfaces to be coated exceeds that permitted in manufacturer's written instructions.
 - 2. Prepare surface as recommended by top coat manufacturer and according to SSPC-SP 13.
- F. Masonry:
 - 1. Remove efflorescence and chalk. Do not coat surfaces if moisture content, alkalinity of surfaces, or if alkalinity of mortar joints exceed that permitted in manufacturer's written instructions. Allow to dry.
 - 2. Prepare surface as recommended by top coat manufacturer.
- G. Concrete Floors and Traffic Surfaces: Remove contamination, acid etch and rinse floors with clear water. Verify required acid-alkali balance is achieved. Allow to dry.
- H. Gypsum Board: Fill minor defects with filler compound. Spot prime defects after repair.
- I. Galvanized Surfaces:
 - 1. Prepare surface according to SSPC-SP 3.
- J. Ferrous Metal:
 - 1. Solvent clean according to SSPC-SP 1.
 - 2. Shop-Primed Surfaces: Sand and scrape to remove loose primer and rust. Feather edges to make touch-up patches inconspicuous. Clean surfaces with solvent. Prime bare steel surfaces. Re-prime entire shop-primed item.
 - 3. Remove rust, loose mill scale, and other foreign substances using methods recommended in writing by paint manufacturer and blast cleaning according to SSPC-SP 6 Commercial Blast Cleaning. Protect from corrosion until coated.
 - 4. Remove all shop/field applied markings/labels made with markers, wax pencils, paint, etc. Prime paint items with markings/labels that are still visible prior to finish painting.

3.03 APPLICATION

- A. Remove unfinished louvers, grilles, covers, and access panels on mechanical and electrical components and paint separately.
- B. Apply products in accordance with manufacturer's written instructions.
- C. Do not apply finishes to surfaces that are not dry. Allow applied coats to dry before next coat is applied.
- D. Apply each coat to uniform appearance in thicknesses specified by manufacturer.
- E. Include areas visible when permanent or built-in fixtures, grilles, convactor covers, covers for finned-tube radiation, and similar components are in place. Extend coatings in these areas, as required, to maintain system integrity and provide desired protection.
 - 1. Paint surfaces behind movable equipment and furniture the same as similar exposed surfaces. Before final installation of equipment, paint surfaces behind permanently fixed equipment or furniture with prime coat only.
 - 2. Paint interior surfaces of ducts with a flat, nonspecular black paint where visible through registers or grilles.

3. Paint back sides of access panels and removable or hinged covers to match exposed surfaces.
 4. Finish doors on tops, bottoms, and side edges the same as exterior faces.
- F. Minimum Coating Thickness: Apply paint materials no thinner than manufacturer's recommended spreading rate. Provide total dry film thickness of the entire system as recommended by manufacturer.
- G. Block Fillers: Apply block fillers to concrete masonry block at a rate to ensure complete coverage with pores filled.
- H. Dark Colors and Deep Clear Colors: Regardless of number of coats specified, apply as many coats as necessary for complete hide.
- I. Sand wood and metal surfaces lightly between coats to achieve required finish.
- J. Vacuum clean surfaces of loose particles. Use tack cloth to remove dust and particles just prior to applying next coat.
- K. Reinstall electrical cover plates, hardware, light fixture trim, escutcheons, and fittings removed prior to finishing.
- L. Concrete Floor Sealer: Follow manufacturer's instructions for preparation and installation.

3.04 INSPECTION

- A. Design Professional shall inspect final surfaces to confirm that they are properly painted. Surfaces that are not properly painted shall be prepared and re-painted until deemed properly painted. Properly painted surfaces are defined in Part 1 paragraph Quality Assurance.

3.05 TOUCH UP

- A. For touch-ups, use same application technique as original application. Use paint from same batch as original application, if possible.

3.06 CLEANING

- A. Collect waste material that could constitute a fire hazard, place in closed metal containers, and remove daily from site.
- B. At end of each workday, remove empty cans, rags, rubbish, and other discarded paint materials from Project site.
- C. Protect work of other trades, whether being painted or not, against damage from painting. Correct damage by cleaning, repairing or replacing, and repainting
- D. Provide "Wet Paint" signs to protect newly painted finishes.

3.07 PROTECTION

- A. Protect finishes until completion of project.
- B. Touch-up damaged finishes after Substantial Completion.

END OF SECTION

**SECTION 099600
HIGH-PERFORMANCE COATINGS**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. High performance coatings.
- B. Surface preparation.

1.02 REFERENCE STANDARDS

- A. MPI (APSM) - Master Painters Institute Architectural Painting Specification Manual; Current Edition.
- B. SSPC-SP 1 - Solvent Cleaning; 2015, with Editorial Revision (2016).
- C. SSPC-SP 6 - Commercial Blast Cleaning; 2007.

1.03 SUBMITTALS

- A. Product Data: Provide complete list of all products to be used, with the following information for each:
 - 1. Manufacturer's name, product name and/or catalog number, and general product category (e.g. "alkyd enamel").
 - 2. Cross-reference to specified coating system(s) product is to be used in; include description of each system.
 - 3. Manufacturer's installation instructions.
- B. Samples: Submit two samples 8 by 8 inch (203 by 203 mm) in size illustrating colors available for selection.
- C. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
- D. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
 - 1. Extra Coating Materials: 1 gallon (4 liters) of each type and color.
 - 2. Label each container with manufacturer's name, product number, color number, and room names and numbers where used.

1.04 QUALITY ASSURANCE

- A. Benchmark Samples (Mockups): Provide a full-coat benchmark finish sample for each type of coating and substrate required.
 - 1. Wall Surfaces: Provide samples on at least 100 sq. ft.
 - 2. Final approval of colors will be from benchmark samples.

1.05 MOCK-UPS

- A. Powder Coat Mockup: Powder Coat Provider shall provide mockup of one locker section. Mockup shall illustrate finish coating, in color selected for approval by Architect.
 - 1. Approve mockup shall remain as part of the finished work.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Deliver products to site in sealed and labeled containers; inspect to verify acceptability.
- B. Container Label: Include manufacturer's name, type of coating, brand name, lot number, brand code, coverage, surface preparation, drying time, cleanup requirements, color designation, and instructions for mixing and reducing.
- C. Coating Materials: Store at minimum ambient temperature of 45 degrees F (7 degrees C) and a maximum of 90 degrees F (32 degrees C), in ventilated area, and as required by manufacturer's instructions.

1.07 FIELD CONDITIONS

- A. Do not install materials when temperature is below 55 degrees F (13 degrees C) or above 90 degrees F (32 degrees C).

- B. Maintain this temperature range, 24 hours before, during, and 72 hours after installation of coating.
- C. Restrict traffic from area where coating is being applied or is curing.

1.08 WARRANTY

- A. Correct defective Work within a five year period after Date of Substantial Completion.
- B. Warranty: Include coverage for bond to substrate.

PART 2 PRODUCTS

2.01 HIGH-PERFORMANCE COATINGS

- A. 4-Step Paint Process: Provide at all exterior exposed steel and metal fabrications indicated.
 - 1. Surface Preparation: SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
 - 2. Primer:
 - a. Benjamin Moore: COROTECH Epoxy Primer V150.
 - b. PPG Paints, Metal-Hide Zinc Rich primer, applied in shop.
 - c. Tnemec, Series 94-H2O Hydro-Zinc, zinc-rich primer, applied in shop.
 - d. S-W, Corothane I, GalvaPac Zinc Primer, applied in shop.
 - 3. Intermediate Coat:
 - a. Benjamin Moore: COROTECH Epoxy Mastic V 160.
 - b. PPG Paints, Pitt-Guard 95-245 HB Fast-Cure polyamide epoxy coating,
 - c. Tnemec, Epoxoline WB Series 1224 epoxy coating.
 - d. S-W, Macropoxy 646, epoxy-polamide coating.
 - 4. Finish Coat:
 - a. Benjamin Moore: COROTECH Aliphatic Acrylic Urethane Semi-Gloss V510.
 - b. PPG Paints, Pitt-Thane Ultra, 95-8000 Series, aliphatic polyurethane coating.
 - c. Tnemec, Series 1095 Endura-Shield, aliphatic acrylic polyurethane coating.
 - d. S-W, Acrolon 218, polyester modified, aliphatic, acrylic polyurethane.

2.02 ACCESSORY MATERIALS

- A. Accessory Materials: Provide primers, sealers, cleaning agents, cleaning cloths, sanding materials, and clean-up materials as required for final completion of coated surfaces.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify existing conditions before starting work.
- B. Do not begin application of coatings until substrates have been properly prepared.
- C. Verify that substrate surfaces are ready to receive work as instructed by the coating manufacturer. Obtain and follow manufacturer's instructions for examination and testing of substrates.
- D. Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially affect proper application.

3.02 PREPARATION

- A. Clean surfaces of loose foreign matter.
- B. Remove substances that would bleed through finished coatings. If unremovable, seal surface with shellac.
- C. Remove finish hardware, fixture covers, and accessories and store.
- D. Ferrous Metal:
 - 1. Solvent clean according to SSPC-SP 1.
 - 2. Remove rust, loose mill scale, and other foreign substances using methods recommended in writing by paint manufacturer and blast cleaning according to SSPC-SP 6 "Commercial Blast Cleaning", and protect from corrosion until coated.

3.03 PRIMING

- A. Apply primer to all surfaces, unless specifically not required by coating manufacturer. Apply in accordance with coating manufacturer's instructions.

3.04 COATING APPLICATION

- A. Apply coatings in accordance with manufacturer's written instructions, to thicknesses specified and recommendations in MPI - Architectural Painting and Specification Manual.
- B. Apply in uniform thickness coats, without runs, drips, pinholes, brush marks, or variations in color, texture, or finish. Finish edges, crevices, corners, and other changes in dimension with full coating thickness.

3.05 CLEANING

- A. Collect waste material that could constitute a fire hazard, place in closed metal containers, and remove daily from site.
- B. Clean surfaces immediately of overspray, splatter, and excess material.
- C. After coating has cured, clean and replace finish hardware, fixtures, and fittings previously removed.

3.06 PROTECTION

- A. Protect finished work from damage.

END OF SECTION

SECTION 22 0010 PLUMBING GENERAL PROVISIONS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. This section applies to all work under the plumbing contract. This shall include, but not necessarily be limited to, the following:
 - 1. Waste and Vent Systems
 - 2. Hot and Cold Water Distribution System
 - 3. Plumbing Fixtures
 - 4. Water Heating Systems
 - 5. Sanitary Sewer
 - 6. Piping Insulation
 - 7. Natural Gas System
- B. The work shall include all materials, equipment and labor required for complete and properly functioning plumbing systems.
- C. Drawings for plumbing work are in part diagrammatic, intended to convey the scope of work and indicate general arrangement of equipment, piping and approximate sizes and locations of equipment and materials.
- D. Where job conditions require reasonable changes in indicated locations and arrangements, make such changes without additional cost to Owner.
- E. Because of the scale of the drawings, certain piping or items such as unions or fittings may not be shown, but where such items are required by other sections of the specifications, or where they are required by the nature of the work, they shall be furnished and installed.
- F. All elements of the construction shall be performed by workmen skilled in the particular craft involved, and regularly employed in that particular craft.
- G. All work shall be performed in a neat, workmanlike manner in keeping with the highest standards of the craft.

1.2 CODES AND STANDARDS

- A. All work shall be done in accordance with the applicable portion of the following codes and standards:
 - 1. State of Iowa Mechanical Code, International Mechanical Code
 - 2. State of Iowa Plumbing Code, Uniform Plumbing Code
 - 3. International Building Code
 - 4. International Fire Code
 - 5. National Electric Code (NEC)
 - 6. National Fire Protection Association Standards (NFPA)
 - 7. Local Utility Company Requirements
 - 8. Local Codes, all trades
 - 9. Standards of ASME, ASHRAE, NEMA, IEEE, AGA, SMACNA
 - 10. Occupational Safety and Health Administration (OSHA)
 - 11. Underwriters Laboratories, Inc. (U.L.)
 - 12. Americans With Disabilities Act (ADA)
 - 13. ANSI/NSF 372
- B. Contractors shall familiarize themselves with all codes and standards applicable to their work and shall notify Design Professional of any discrepancies between the design and applicable code requirements so that any conflicts can be resolved. Where two or more codes or standards are in conflict, that requiring the highest order of workmanship shall take precedence, but such questions shall be referred to Design Professional for final decision.

- C. Where drawings or specifications call for workmanship or materials in excess of code requirements, a lower grade of construction will not be permitted.

1.3 REQUIREMENTS & FEES OF REGULATORY AGENCIES

- A. Contractor shall comply with the rules and regulations of the authorities having jurisdiction and local utility companies. Contractor shall check with each utility company providing service to this project and determine or verify their requirements regarding incoming services.
- B. Meters for incoming services shall be selected based on the project requirements. Any questions concerning this shall be referred to Design Professional prior to bidding. Contractor shall provide the appropriate meter and associated materials if not furnished by the utility company.
- C. Secure all required permits and pay for all inspections, licenses and fees required in connection with the plumbing work. Contractor shall post all bonds and obtain all licenses required by the State, City, County and Utility.
- D. Contractor shall make all arrangements with each utility company and pay all service charges associated with new service.

1.4 PLUMBING DRAWINGS

- A. The plumbing drawings indicate in general the building arrangement only, Contractor shall examine construction drawings to familiarize himself with the specific type of building construction, i.e., type of structural system, floors, walls, ceilings, room finishes and elevations.
- B. Drawings are intended to convey the scope of the work and to indicate the general arrangement and locations of piping and equipment.
- C. Contractor shall layout his own work and shall be responsible for determining the exact locations for equipment and rough-ins and the exact routing of piping so as to best fit the layout of the work.
- D. Contractor shall take his own field measurements for verifying locations and dimensions: scaling of the drawings will not be sufficient for laying out the work.
- E. Because of the scale of the drawings, certain basic items such as pipe fittings and valves may not be shown, but where such items are required by code or by other sections of the specifications, such items shall be furnished and installed.

1.5 ACTIVE SERVICES

- A. Contractor shall be responsible for verifying exact location of all existing services prior to beginning work in that area.
- B. Existing active services, i.e., water, gas, sewer, electric, when encountered, shall be protected against damage. Do not prevent or disturb operation of active services which are to remain.
- C. When active services are encountered which require relocation, Contractor shall make request to authorities with jurisdiction for determination of procedures.
- D. Where existing services are to be abandoned, they shall be terminated in conformance with requirements of the authorities having jurisdiction.

1.6 SITE INSPECTION

- A. Contractor shall inspect the site prior to submitting bid for work to familiarize himself with the conditions of the site which will affect his work and shall verify points of connection with utilities, routing of outside piping to include required clearances from any existing structures, trees or other obstacles.
- B. Extra payment will not be allowed for changes in the work required because of Contractor's failure to make this inspection.

1.7 COORDINATION AND COOPERATION

- A. It shall be Contractor's responsibility to schedule and coordinate his work with the schedule of the General Contractor so as to progress the work expeditiously, and to avoid unnecessary delays.
- B. Contractor shall fully examine the drawings and specifications for other trades and shall coordinate the installation of his work with the work of the other contractors. Contractor shall

consult and cooperate with the other contractors for determining space requirements and for determining that adequate clearance is allowed with respect to his equipment, other equipment and the building. Design Professional reserves the right to determine space priority of the contractors in the event of interference between piping, conduit, ducts and equipment of the various contractors.

- C. Drawings and specifications are intended to be complimentary. Any work shown in either of them, whether in the other or not, shall be executed according to the true intent and meaning thereof, the same as if set forth in all. Conflicts between the drawings and the specifications or between the requirements set forth for the various contractors shall be called to the attention of Design Professional. If clarification is not asked for prior to the taking of bids, it will be assumed that none is required and that Contractor is in agreement with the drawings and specifications as issued. If clarification is required after the contract is awarded, such clarification will be made by Design Professional and his decision will be final.
- D. Special care shall be taken for protection for all equipment. All equipment and material shall be completely protected from weather elements, painting and plaster until the project is substantially completed. Damage from rust, paint and scratches shall be repaired as required to restore equipment to original condition.
- E. Protection of all equipment during the painting of the building shall be the responsibility of the Painting Contractor, but this shall not relieve Contractor of the responsibility for checking to assure that adequate protection is being provided.
- F. Where the final installation or connection of equipment in the building requires Contractor to work in finished areas of the building, Contractor shall be responsible that such areas are protected and are not marred, soiled or otherwise damaged during the course of such work. Contractor shall arrange with the General Contractor for patching and refinishing of such areas which may be damaged in this respect.

1.8 OPENINGS, CUTTING AND PATCHING

- A. Piping and sleeves passing through all fire or smoke rated floors, roofs, walls, and partitions shall be provided with firestopping. Space between wall/floor and pipe and/or sleeve shall be sealed with UL listed intumescent fire barrier material equivalent to rating of wall/floor. Where piping and sleeves pass through floors, roofs, walls and partitions that are not fire or smoke rated, penetrations shall be sealed with grout or caulk.
- B. New structure:
 - 1. Contractor will coordinate the placing of openings and lintels in the new structure as required for the installation of the plumbing work with the General Contractor.
 - 2. Contractor shall furnish to General Contractor the accurate locations and sizes for required openings, but this shall not relieve Contractor of the responsibility of checking to assure that proper size openings are provided. When additional cutting and patching is required due to Contractor's failure to coordinate this work, Contractor shall make arrangements for the cutting, patching, and painting required.

1.9 EXCAVATING AND BACKFILLING

- A. Contractor shall do all excavating necessary for sanitary sewers, storm sewers, water piping, gas piping, etc., and shall backfill trenches and excavations after work has been inspected. Care shall be taken in excavating that walls and footings and adjacent load bearing soils are not disturbed in any way, except where lines must cross under a wall footing. Where a line must pass under a footing, the crossing shall be made by the smallest possible trench to accommodate the pipe. Excavation shall be kept free from water by pumping if necessary.
- B. Backfill about the structure shall be placed, when practical, as the work of construction progresses. Backfilling on or against concrete work shall be done only when directed. Backfilling of trenches shall progress as rapidly as the testing and acceptance of the finished sections of the work will permit. Backfill shall be in accordance with Division 31 Specifications.

1.10 MATERIALS AND EQUIPMENT

- A. All materials and equipment shall be the standard product of a reputable U.S.A. manufacturer regularly engaged in the manufacture of the specified item. Where two or more units are

required of the same item, they shall be furnished by the same manufacturer except where specified otherwise.

- B. All material and equipment shall be installed in strict accordance with the manufacturer's recommendations.
- C. The equipment specifications cannot deal individually with any minute items such as parts, controls, devices, etc., which may be required to produce the equipment performance and function as specified, or as required to meet the equipment guarantees. Such items, when required, shall be furnished as part of the equipment, whether or not specifically called for.

1.11 SUBMITTALS

- A. Contractor shall furnish, to Design Professional, complete sets of shop drawings and other submittal data. Contractor shall review and sign shop drawings before submittal. Refer to Division 01 specifications for additional requirements.
- B. Shop drawings shall be bound into sets and cover related items for a complete system as much as practical and shall be identified with symbols or "plan marks" used on drawings. Incomplete, piecemeal or unbound submittals will be rejected.
- C. Submittals required by the various sections of the Project Manual include, but are not necessarily limited to those identified in the submittal schedule below.
- D. After award of contract, Contractor shall provide a completed submittal schedule including dates that the submittals will be to Design Professional for review.
- E. Submit required information on the following items:
- F. Design Professional will review shop drawings solely to assist contractors in correctly interpreting the plans and specifications.
- G. Contract requirements cannot be changed by shop drawings which differ from contract drawings and specifications.

1.12 OPERATION AND MAINTENANCE MANUALS

- A. Operation and maintenance manuals shall be submitted to Design Professional in electronic format for review and approval. Refer to Division 01 specifications for additional information.

1.13 TESTS AND DEMONSTRATIONS

- A. Tests Required: Piping shall be tested and proved tight under the following static pressures. Pressure shall be maintained for four (4) hours.

System	Pressure
Domestic Water Piping Systems	Refer to Section 22 1116 – Domestic Water Piping
Soil, Waste Piping Below Grade	10 feet waterhead or fill to top of vent outlet above roof.
Soil, Waste Piping Above Grade	Fill piping with water to top of vent outlet above roof, or 10 feet waterhead.
Gas Piping	10 psi air pressure, liquid soap test around all joints.

- 1. TESTING NOTE: All rubber gasket joints for cast iron soil pipe and fittings should be properly restrained if test pressures exceed 10 feet of head.
- B. All systems shall be tested by Contractor and placed in proper working order prior to demonstrating systems to Owner. Contractor shall submit a report to Design Professional citing dates, times, pressures, and results of all tests performed.

1.14 TRAINING AND DEMONSTRATIONS

- A. Prior to acceptance of the plumbing installation, Contractor shall provide to Owner, or his designated representatives, all comprehensive training on essential features and functions of all systems installed, and shall instruct Owner in the proper operation and maintenance of such systems.

1. Provide adequate notice to Owner as to when instruction will be conducted so appropriate personnel can be present.
2. Prepare the instruction format for a minimum of four Owner Representatives.
- B. Equipment training:
 1. Manufacturer's representatives shall provide instruction on each major piece of equipment. Contractor shall provide instruction on all other equipment.
 2. Training sessions shall use the printed installation, operation and maintenance instruction materials included in the O&M manuals and emphasize preventative maintenance and safe operating procedures.
 3. Training shall be performed by qualified factory trained technicians.
 4. Plumbing Contractor shall attend all sessions performed by the manufacturer's representative and shall add to each session any special information relating to the details of installation of the equipment as it might impact the operation and maintenance.
 5. Equipment training shall occur as soon as possible after start up of the equipment and shall include hands-on operation. Training shall be provided for equipment listed in the table below.
- C. System training:
 1. These sessions shall include hands-on demonstrations of system wide start-up, operation in all possible modes, shut-down and emergency procedures.
- D. Contractor shall submit to Design Professional a certificate, signed by Owner stating the date, time and persons instructed and that the instruction has been completed to Owner's satisfaction.

1.15 SUBSTITUTIONS

- A. Refer to Divisions 00 and 01.
- B. Where substitutions are approved, Contractor assumes all responsibility for physical dimensions and all other resulting changes. This responsibility extends to cover all extra work necessitated by other trades as a result of the substitution.

1.16 ACCEPTABLE MANUFACTURERS

- A. In most cases, equipment specifications are based on a specific manufacturer's type, style, dimensional data, catalog number, etc. Listed with the base specification, either in the manual or on the plan schedules are acceptable manufacturers approved to bid products of equal quality. These manufacturers are encouraged to submit to Design Professional at least 8 days prior to the bid due date drawings and catalog numbers of products to be bid as equals.
- B. Manufacturers who do not submit prior to bidding, run the risk of having the product rejected at time of shop drawing submittal. Extra costs associated with replacing the rejected product shall be the responsibility of Contractor and/or the manufacturer.
- C. If Contractor chooses to use a manufacturer listed as an equal, it shall be his responsibility to assure that the manufacturer has complied with the requirements in 'A' above. Contractor shall assume all responsibility for physical dimensions (including accessibility for maintenance), operating characteristics, and all other resulting changes. This responsibility extends to cover all extra work necessitated by other trades as a result of using the alternate manufacturer.
- D. Where a model or catalog number is provided, it may not be inclusive of all product requirements. Refer to additional requirements provided on the plans or in the specifications as required. Similarly, there may be additional requirements included in the model or catalog number that are not specifically stated. These requirements shall also be met.

1.17 WARRANTY

- A. Refer to Divisions 00 and 01 for information on warranties and correction of work within the warranty period.
 1. If a warranty or warranty period are not defined in Division 00 or 01, then the start of all warranty periods shall be the date of Substantial Completion and the length of the warranty shall be for one year.

- a. If construction is phased with distinct and separate Substantial Completion dates for portions of the building and/or systems, separate warranties shall be provided for each of these phased areas and/or systems.
- b. The entire Plumbing system, including all sub-systems, shall be guaranteed against defect in materials and installation for the duration of the warranty period. Any malfunctions or defects which occur within the warranty period shall be promptly corrected without cost to the Owner. This guarantee shall not limit or void any manufacturer's express or implied warranty.
- B. Refer to other Division 22 sections for systems, equipment, or material requiring extended warranties beyond one year.
- C. The date of systems/equipment startup or equipment/material shipment to the site shall not be considered the notable date with relation to the warranty of that item. All systems, equipment, material, etc., shall have the same start date with respect to the warranty period.
- D. Systems, equipment or material put into use to facilitate construction activities (e.g. testing and balancing, commissioning, temporary conditioning, etc.) prior to the start of the warranty period shall not impact the length of the warranty in any way.

1.18 COMPLETION

- A. Systems, at time of completion, shall be complete, efficiently operating, non-hazardous and ready for normal use by Owner.
- B. Contractor shall clean up and remove from the site all debris, excess material and equipment left during the progress of this contract at job completion.

1.19 CLEANING

- A. At the conclusion of the construction, the entire system of piping and equipment shall be cleaned internally.
- B. All temporary labels, stickers, etc., shall be removed from all fixtures and equipment. Name plates, ratings, instruction plates, etc., shall not be obscured by paint, insulation, or placement of units.
- C. Before being placed in service, all domestic water distribution systems, including those for cold water and hot water shall be chlorinated as required per Section 22 1116 - Domestic Water Piping.

1.20 ELECTRICAL WORK

- A. Electrical work and equipment provided by Contractor shall include the following:
 - 1. Starters and disconnects for motors of plumbing equipment, but only where specifically indicated to be furnished integrally with equipment.
 - 2. Wiring from motors to disconnect switches or junction boxes for motors of plumbing equipment, but only where specifically indicated to be furnished integrally with equipment.
 - 3. All control wiring in accordance with the requirements of Division 26.
- B. Electrical Contractor shall provide all power wiring for plumbing equipment, including services for motors and equipment furnished by the plumbing contractor. Motor and equipment locations are shown on the electrical drawings.
- C. Electrical Contractor shall make final connections for all motors and equipment furnished by the plumbing contractor.
- D. Electrical Contractor shall furnish safety disconnects and starters for all motors and equipment furnished by the plumbing contractor (unless specifically indicated to be furnished integrally with the equipment), so as to make service complete to each item of equipment.
- E. Contractor shall consult with Electrical Contractor prior to conduit rough-in and shall verify with him the exact locations for rough-ins, and the exact size and characteristics of the services required, and shall provide Electrical Contractor a schedule of electrical loads for the equipment furnished by him. These schedules will be used for sizing services, disconnects, fuses, starters and overload protection.

1.21 TEMPORARY UTILITIES

- A. Refer to Division 01 for specific requirements concerning temporary utilities.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

**SECTION 22 0500
COMMON WORK RESULTS FOR PLUMBING**

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Sleeves

PART 2 PRODUCTS

2.1 DEMOLITION MATERIALS

- A. All materials removed shall be the property of the removing contractor and shall be removed from the site by him, unless otherwise specified.

2.2 SLEEVES

- A. Sleeves passing through non-load bearing walls and partitions shall be galvanized sheet steel with lock seam joints of minimum gauges as follows:
 - 1. For pipes 2-1/2" and smaller - 24 gauge
 - 2. For pipes 3" to 6" - 22 gauge
 - 3. For pipes over 6" - 20 gauge
- B. Sleeves passing through load bearing walls, concrete beams, fireproof walls, foundations, footings and waterproof floors shall be Schedule 40 steel pipe or cast-iron pipe.
- C. Sleeves are not required in masonry walls which are core drilled or walls of drywall construction, except where partition is a firestop, smokestop, or side of air plenum.
- D. Sleeves for insulated piping shall be of sufficient internal diameter to take pipe and insulation and to allow for free movement of pipe. Waterproof sleeves shall be of sufficient internal diameter to take pipe and waterproofing material.
- E. In finished areas where pipes are exposed, sleeves shall be terminated flush with wall, partitions and ceilings, and shall extend 1/2" above finished floors. Extend sleeves 1" above finished floors in areas likely to entrap water and fill space between sleeves and pipe with graphite packing and caulking compound.
- F. Sleeves passing through membrane waterproofing or lead safe shall be provided with flashing, furnished and installed by General Contractor, extending 12" beyond sleeve in all directions; flashing shall be secured and sealed to membrane or lead safe and shall be sealed to sleeve and caulked watertight. Sleeves passing through roof shall be installed in same manner except sleeves shall extend to 6" above roof.
- G. For exterior walls below grade, sleeves shall be cast iron. Space between sleeve and pipe shall be sealed with modular rubber links tightened with bolts (Link-Seal or equal). Waterproofing of pipe penetrations in exterior walls shall be coordinated with waterproofing contractor.

PART 3 EXECUTION

3.1 SLEEVES

- A. Install sleeves for all piping passing through floors, roof, walls, concrete beams and foundations as required by this section.

END OF SECTION

SECTION 22 0529 HANGERS AND SUPPORTS

PART 1 GENERAL

1.1 SECTION INCLUDES:

- A. Metal pipe hangers and supports.
- B. Non-penetrating pillow block pipe roof supports.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.

PART 2 PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Structural Performance: Hangers and supports for plumbing piping and equipment shall withstand the effects of gravity loads and stresses within limits and under conditions indicated according to ASCE/SEI 7.
 - 1. Design supports for multiple pipes, including pipe stands, capable of supporting combined weight of supported systems, system contents, and test water.

2.2 METAL PIPE HANGERS AND SUPPORTS

- A. Carbon-Steel Pipe Hangers and Supports:
 - 1. Description: MSS SP-58, Types 1 through 58, factory-fabricated components.
 - 2. Galvanized Metallic Coatings: Pregalvanized, hot-dip galvanized, or electro-galvanized.
 - 3. Nonmetallic Coatings: Plastic coated or epoxy powder coated.
 - 4. Padded Hangers: Hanger with fiberglass or other pipe insulation pad or cushion to support bearing surface of piping.
 - 5. Hanger Rods: Continuous-thread rod, nuts, and washer made of carbon steel.
- B. Copper Pipe and Tube Hangers:
 - 1. Description: MSS SP-58, Types 1 through 58, copper-coated-steel, factory-fabricated components.
 - 2. Hanger Rods: Continuous-thread rod, nuts, and washer made of copper-coated steel.

2.3 NON-PENETRATING PILLOW BLOCK PIPE ROOF SUPPORTS

- A. Acceptable Manufacturers
 - 1. MIRO Industries
 - 2. Design Professional approved equivalent
- B. Pillow Block: Pipe support for roof-mounted gas pipes with the following properties:
 - 1. Base Material: Polycarbonate.
 - 2. Deck Base: 6 inch square
 - 3. Pipe Clearance: Fixed height of 3.5 inch. Each 3.0 spacer increases the clearance of the pipe by 1-1/2 inches.
 - 4. Maximum Load Weight: 72 pounds per pipe stand.
 - 5. Pipe Rest: "U" shaped cradle in a polycarbonate resin seat.
 - 6. Support is designed to carry up to a 1-1/2 inch pipe with a max outside diameter of 1.9 inches.
 - 7. Spacing: Horizontal support spacing per pipe specification, or horizontal pipe support intervals per the appropriate code or standard. Manufacturer's suggested spacing shall not exceed 8-foot centers, as loading permits.
- C. Pipe Support Surface Bonding
 - 1. Pillow block pipe supports shall be bonded to the roofing surface without causing penetrations through roofing material

2. Bonding shall be accomplished by use of double-stick microsealant putty tape.
 - a. Eternabond, Design Basis
3. Bond seal shall be waterproof.
4. Adhesion: 19 lbs/in. width.
5. 30 mil thickness.

2.4 MATERIALS

- A. Carbon Steel: ASTM A 1011/A 1011M.
- B. Stainless Steel: ASTM A 240/A 240M.
- C. Grout: ASTM C 1107/C 1107M, factory-mixed and -packaged, dry, hydraulic-cement, nonshrink and nonmetallic grout; suitable for interior and exterior applications.
 1. Properties: Nonstaining, noncorrosive, and nongaseous.
 2. Design Mix: 5000-psi, 28-day compressive strength.

PART 3 EXECUTION

3.1 APPLICATION

- A. Strength of Support Assemblies: Where not indicated, select sizes of components, so strength will be adequate to carry present and future static loads within specified loading limits. Minimum static design load used for strength determination shall be weight of supported components plus 200 lb.

3.2 HANGER AND SUPPORT INSTALLATION

- A. Metal Pipe-Hanger Installation: Comply with MSS SP-58. Install hangers, supports, clamps, and attachments as required to properly support piping from building structure.
- B. Install hangers and supports complete with necessary attachments, inserts, bolts, rods, nuts, washers, and other accessories.
- C. Install lateral bracing with pipe hangers and supports to prevent swaying.
- D. Load Distribution: Install hangers and supports, so that piping live and dead loads and stresses from movement will not be transmitted to connected equipment.
- E. Pipe Slopes: Install hangers and supports to provide indicated pipe slopes and to not exceed maximum pipe deflections allowed by ASME B31.9 for building services piping.
- F. Insulated Piping:
 1. Attach clamps and spacers to piping.
 - a. Piping Operating Above Ambient Air Temperature: Clamp may project through insulation.
 - b. Piping Operating Below Ambient Air Temperature: Use thermal hanger-shield insert with clamp sized to match OD of insert.
 - c. Do not exceed pipe stress limits allowed by ASME B31.9 for building services piping.
 2. Install MSS SP-58, Type 39 protection saddles if insulation without vapor barrier is indicated. Fill interior voids with insulation that matches adjoining insulation.
 3. Install MSS SP-58, Type 40 protective shields on cold piping with vapor barrier. Shields shall span an arc of 180 degrees.
 4. Shield Dimensions for Pipe: Not less than the following:
 - a. NPS 1/4 to NPS 3-1/2: 12 inches long and 0.048 inch thick.
 5. Thermal Hanger Shields: Install with insulation of same thickness as piping insulation.
- G. Non-penetrating pillow support:
 1. Install an additional sheet of roofing material, a support pad, or a deck plate beneath the base of each stand.
 2. Place the supports:
 3. Center each stand beneath the component so supports are aligned.
 4. If more than one pipe is being supported, adjust for even weight distribution.
 5. Set pipe in support without dropping or causing undue impact.

H. Non-penetrating support bonding:

1. Remove one side of the release liner and apply to the surface to be protected or bonded (roofing material).
2. Rub or roll with pressure using hand or steel roller to activate bonding process.
3. Remove the second release liner and apply second surface to tape (pillow block pipe support base).

3.3 ADJUSTING

- A. Hanger Adjustments: Adjust hangers to distribute loads equally on attachments and to achieve indicated slope of pipe.
- B. Trim excess length of continuous-thread hanger and support rods to 1-1/2 inches.

3.4 HANGER AND SUPPORT SCHEDULE

- A. Comply with MSS SP-58 for pipe-hanger selections.
- B. Use powder-actuated fasteners or mechanical-expansion anchors instead of building attachments where required in concrete construction.

END OF SECTION

SECTION 22 1423 STORM PIPING SPECIALTIES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Metal roof drains.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.

PART 2 PRODUCTS

2.1 METAL ROOF DRAINS

- A. Provide roof drains as shown and specified on the drawings as well as required by code.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Roof Drains:
 - 1. Roof drains shall have bearing pans.
 - 2. Provide auxiliary support steel under drains as required to prevent movement of the drain.
 - 3. All roof drains shall have underdeck clamps.
 - 4. Drains in built-up roofing systems shall have a 36" x 36", 3 lb density lead sheet flashing.
 - 5. Position roof drains for easy access and maintenance.

3.2 CONNECTIONS

- A. Comply with requirements for piping specified in Section 22 1413 "Storm Drainage Piping." Drawings indicate general arrangement of piping, fittings, and specialties.

3.3 FLASHING INSTALLATION

- A. Fabricate flashing from single piece of metal unless large pans, sumps, or other drainage shapes are required.
- B. Install sheet flashing on pipes, sleeves, and specialties passing through or embedded in floors and roofs with waterproof membrane.
- C. Set flashing on floors and roofs in solid coating of bituminous cement.
- D. Secure flashing into sleeve and specialty clamping ring or device.

3.4 PROTECTION

- A. Protect drains during remainder of construction period to avoid clogging with dirt or debris and to prevent damage from traffic or construction work.
- B. Place plugs in ends of uncompleted piping at end of each day or when work stops.

END OF SECTION

**SECTION 22 1516
FACILITY NATURAL GAS PIPING**

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Contractor shall furnish all equipment, materials, tools, labor and supervision necessary to fabricate and install complete piping system as required by the drawings and this section.
 - 1. Extent of natural gas piping work is indicated on drawings and schedules, and by requirements of this section.
 - 2. Installation of valves for natural gas piping system is specified in other Division-22 sections and is included as work of this section.
- B. Trenching and Backfill: Trenching and backfill required in conjunction with gas service piping is specified in applicable Division-22 sections and is included as work of this section.

1.2 QUALITY ASSURANCE

- A. NFPA Compliance: Fabricate and install natural gas systems in accordance with NFPA 54 "National Fuel Gas Code".
- B. Utility Compliance: Fabricate and install natural gas systems in accordance with local gas utility company requirements.
- C. UPC Compliance: Fabricate and install natural gas systems in accordance with IAPMO "Uniform Plumbing Code".

PART 2 PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Pressure Regulator:
 - 1. Cashco
 - 2. Fisher
 - 3. Maxitrol
 - 4. Or approved equal
- B. Plug Valves
 - 1. Homestead
 - 2. Nordstrum
- C. Ball Valves
 - 1. Watts
 - 2. Nibco
 - 3. Apollo
 - 4. Milwaukee
- D. Or approved equal

2.2 BASIC MATERIALS AND PRODUCTS

- A. General: Provide piping materials and factory-fabricated piping products of sizes, types, pressure ratings, temperature ratings and capacities as indicated. Where not indicated, provide proper selection as determined by Installer to comply with installation requirements. Provide materials and products complying with NFPA 54 where applicable; base pressure rating on natural gas piping system's maximum design pressures. Provide sizes and types matching piping and equipment connections; provide fittings of materials which match pipe materials used in natural gas piping systems. Where more than one type of materials or products are indicated, selection is Installer's option.
- B. Piping Specialties: Refer to Section - 22 0500 - Common Work Results for Plumbing.
- C. Supports, Anchors and Seals: Refer to Section 22 0529 - Hangers and Supports for Plumbing Piping.

2.3 PIPE:

Material	Service
A. Black steel pipe Schedule 40, ASTM A53	Interior natural gas.
B. Painted black steel pipe Schedule 40, ASTM A53	Exterior natural gas.
C. High Density Polyethylene (PE), PE3408 ASTM D2837, ASTM D3035	Exterior below grade gas piping.

2.4 FITTINGS:

- A. Steel Pipe:
 - 1. Threaded pipe (2" dia and smaller): Malleable iron fittings, 125 pound standard flat band water pattern.
 - 2. Welded pipe (2 1/2" dia and larger): Standard radius weld fittings and weld neck or slip-on flanges, same material and strength as pipe.
- B. Heat fusion fittings, provide fittings produced and recommended for the service indicated by manufacturer of piping.

2.5 JOINTS

- A. Steel Pipe:
 - 1. Threaded pipe (2" dia and smaller): Make joints using Teflon tape applied to male threads only. Cut pipe square, cut threads clean, remove burrs and ream ends to full size of bore. For fuel piping and lubricating oil piping, joint sealing material shall be resistant to petroleum products.
- B. Polyethylene pipe fittings (gas service): Heat fusion joints made in accordance with practices for the pipe service as recommended by manufacturer of piping.

2.6 NIPPLES AND UNIONS

- A. All nipples shall conform to size, weight and strength of adjoining pipe. When length of unthreaded portion of nipple is less than 1-1/2", use extra strong nipple; do not use close nipples.
- B. For pipe 2" and smaller, use screwed unions, for pipe 2-1/2" and over use flanged unions. For steel pipe use black or galvanized malleable iron unions, to conform to pipe with ground joint. Cast iron flanged unions gasket type. For threaded brass pipe, use bronze ground joint unions with octagon ends.
- C. Install unions in the following locations so that a minimum amount of pipe need be disassembled:
 - 1. In by-pass around equipment, valves, and controls.
 - 2. In connections to equipment.
 - 3. Where indicated on drawings.

2.7 VALVES

- A. Natural Gas: 2" and smaller: Two-piece full-port bronze ball valve, suitable for natural gas service, threaded ends.
- B. Natural Gas: 2 1/2" to 6": Carbon steel or cast-iron plug valve MSS SP-78, WOG (suitable for natural gas service) with flanged ends.
- C. Natural Gas Meter Valve: Provide with tamper-proof operator.

PART 3 EXECUTION

3.1 INSPECTION

- A. General: Examine areas and conditions under which natural gas piping systems materials and products are to be installed. Do not proceed with work until unsatisfactory conditions have been corrected in a manner acceptable to Installer.

3.2 INSTALLATION OF BASIC MATERIALS AND PRODUCTS

- A. General: Install basic materials and products as per manufacturer's recommendations, Uniform Plumbing Code, local code requirements, Utility Company requirements and as required to meet the intent of the document.
- B. Natural Gas
 - 1. Install pipe for all natural gas systems as indicated on drawings, as called for in other sections, and as specified herein.
 - 2. Arrange and install piping approximately as indicated; straight, plumb, and as direct as possible; form right angles on parallel lines with building walls. Keep pipes close to walls and avoid interference with other natural gas items. Locate groups of pipes parallel to each other; space at a distance to permit applying full insulation and to permit access for servicing valves. Most piping to be run in concealed locations unless indicated exposed, or in equipment rooms. Locate piping to avoid ductwork.
 - 3. Install horizontal piping as high as possible without sags or humps so that proper grades can be maintained for drainage.
 - 4. Check all piping for interference with other trades; avoid placing pipes over electrical equipment.
 - 5. Where rough-in is required for equipment furnished by others, verify exact rough-in dimension with owner or equipment supplier before roughing-in.
 - 6. Piping up to 2" diameter shall be screwed, piping 2-1/2" diameter and over shall be welded. Concealed gas piping shall be welded or otherwise installed as required per NFPA 54 and local code.
 - 7. Plug each gas outlet, including valves, with threaded plug or cap immediately after installation and retain until continuing piping, or equipment connections are completed.
 - 8. Install "Tee" fitting with bottom outlet plugged or capped, at bottom of pipe risers.
 - 9. Install piping with 1/64" per foot (1/8%) downward slope in direction of flow.
 - 10. Exposed outside pipe: Prime coat with appropriate lead oxide paint and apply finish enamel coat to match color of adjacent building material.
- C. Valves
 - 1. Locate valves for easy access and operation. Do not locate valves with stems below horizontal.
 - 2. Sectional Valves: Install on each branch and riser, close to main, where branch or riser serves 2 or more natural gas terminals or equipment connections, and elsewhere as indicated.
 - 3. Shutoff Valves: Install on inlet and outlet of each natural gas equipment item, and on inlet of each natural gas terminal, and elsewhere as indicated.
 - 4. Drain Valves: Install on each natural gas equipment item located to completely drain equipment for service or repair. Install at base of each riser, at base of each rise or drop in piping system, and elsewhere where indicated or required to completely drain natural gas piping system.
- D. Piping Specialties: Refer to Section 22 0500 - Common Work Results for Plumbing.
- E. Supports, Anchors and Seals: Refer to Section 22 0529 - Hangers and Supports.
- F. Install specialties and accessories as indicated on drawings and in accordance with manufacturer's recommendations and applicable codes and standards.

3.3 INSTALLATION OF GAS SERVICE

- A. General: Arrange with utility company to provide gas service to indicated location with shutoff at terminus. Consult with utility as to extent of its work, costs, fees, and permits involved. Pay such costs and fees; obtain permits.
- B. Extend service pipe from utility's terminus to inside building wall, under utility's direction.

3.4 INSTALLATION OF EQUIPMENT CONNECTIONS

- A. General: Connect gas piping to each gas-fired equipment item, with drip leg and shutoff gas cock. Comply with equipment manufacturer's instructions.

3.5 FIELD QUALITY CONTROL

- A. Piping Tests: Inspect, test, and purge natural gas systems in accordance with NFPA 54, and local utility company requirements.

3.6 ADJUSTING AND CLEANING

- A. Cleaning and Inspecting: Clean and inspect natural gas systems in accordance with requirements of Section 22 0010 - Plumbing General Provisions.

END OF SECTION

SECTION 23 0010 HVAC GENERAL PROVISIONS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. This section applies to all work under the HVAC contract. This shall include, but not necessarily be limited to, the following:
 - 1. Piping Insulation
 - 2. Ductwork for Air Distribution
 - 3. Grilles, Registers, Diffusers and Dampers
 - 4. Exhaust Fans and Ducts
 - 5. Thermostats and Control Wiring
 - 6. Insulation of Ducts and Plenums
 - 7. Furnaces and Condensing Units and Refrigerant Piping
 - 8. Packaged HVAC Equipment
- B. The work shall include all materials, equipment and labor required for complete and properly functioning HVAC systems.
- C. Drawings for HVAC work are in part diagrammatic, intended to convey the scope of work and indicate general arrangement of equipment, piping and approximate sizes and locations of equipment and materials.
- D. Where job conditions require reasonable changes in indicated locations and arrangements, make such changes without additional cost to Owner.
- E. Because of the scale of the drawings, certain piping or items such as unions or fittings may not be shown, but where such items are required by other sections of the specifications, or where they are required by the nature of the work, they shall be furnished and installed.
- F. All elements of the construction shall be performed by workmen skilled in the particular craft involved, and regularly employed in that particular craft.
- G. All work shall be performed in a neat, workmanlike manner in keeping with the highest standards of the craft.

1.2 CODES AND STANDARDS

- A. All work shall be done in accordance with the applicable portion of the following codes and standards:
 - 1. State of Iowa Mechanical Code, International Mechanical Code
 - 2. State of Iowa Plumbing Code, Uniform Plumbing Code
 - 3. International Building Code
 - 4. National Electric Code (NEC)
 - 5. National Fire Protection Association Standards (NFPA)
 - 6. Local Utility Company Requirements
 - 7. Local Codes, all trades
 - 8. Standards of ASME, ASHRAE, NEMA, IEEE, AGA, SMACNA
 - 9. Occupational Safety and Health Administration (OSHA)
 - 10. Underwriters Laboratories, Inc. (U.L.)
 - 11. Americans With Disabilities Act (ADA)
 - 12. Iowa Administrative Codes
- B. Contractors shall familiarize themselves with all codes and standards applicable to their work and shall notify Design Professional of any discrepancies between the design and applicable code requirements so that any conflicts can be resolved. Where two or more codes or standards are in conflict, that requiring the highest order of workmanship shall take precedence, but such questions shall be referred to Design Professional for final decision.
- C. Where drawings or specifications call for workmanship or materials in excess of code requirements, a lower grade of construction will not be permitted.

1.3 REQUIREMENTS & FEES OF REGULATORY AGENCIES

- A. Secure all required permits and pay for all inspections, licenses and fees required in connection with the HVAC work. Contractor shall post all bonds and obtain all licenses required by the State, City, County and Utility.

1.4 HVAC DRAWINGS

- A. The HVAC drawings indicate in general the building arrangement only, Contractor shall examine construction drawings to familiarize himself with the specific type of building construction, i.e., type of structural system, floors, walls, ceilings, room finishes and elevations.
- B. Drawings are intended to convey the scope of the work and to indicate the general arrangement and locations of ducts, piping and equipment.
- C. Contractor shall layout his own work and shall be responsible for determining the exact locations for equipment and rough-ins and the exact routing of piping and ducts so as to best fit the layout of the work.
- D. Contractor shall take his own field measurements for verifying locations and dimensions: scaling of the drawings will not be sufficient for laying out the work.
- E. Because of the scale of the drawings, certain basic items such as pipe fittings and valves may not be shown, but where such items are required by code or by other sections of the specifications, such items shall be furnished and installed.

1.5 ACTIVE SERVICES

- A. Contractor shall be responsible for verifying exact location of all existing services prior to beginning work in that area.
- B. Existing active services, i.e., water, gas, sewer, electric, when encountered, shall be protected against damage. Do not prevent or disturb operation of active services which are to remain.
- C. When active services are encountered which require relocation, Contractor shall make request to authorities with jurisdiction for determination of procedures.
- D. Where existing services are to be abandoned, they shall be terminated in conformance with requirements of the authorities having jurisdiction.

1.6 SITE INSPECTION

- A. Contractor shall inspect the site prior to submitting bid for work to familiarize himself with the conditions of the site which will affect his work and shall verify points of connection with utilities, routing of outside piping to include required clearances from any existing structures, trees or other obstacles.
- B. Extra payment will not be allowed for changes in the work required because of Contractor's failure to make this inspection.

1.7 COORDINATION AND COOPERATION

- A. It shall be Contractor's responsibility to schedule and coordinate his work with the schedule of the General Contractor so as to progress the work expeditiously, and to avoid unnecessary delays.
- B. Contractor shall fully examine the drawings and specifications for other trades and shall coordinate the installation of his work with the work of the other contractors. Contractor shall consult and cooperate with the other contractors for determining space requirements and for determining that adequate clearance is allowed with respect to his equipment, other equipment and the building. Design Professional reserves the right to determine space priority of the contractors in the event of interference between piping, conduit, ducts and equipment of the various contractors.
- C. Drawings and specifications are intended to be complimentary. Any work shown in either of them, whether in the other or not, shall be executed according to the true intent and meaning thereof, the same as if set forth in all. Conflicts between the drawings and the specifications or between the requirements set forth for the various contractors shall be called to the attention of Design Professional. If clarification is not asked for prior to the taking of bids, it will be assumed that none is required and that Contractor is in agreement with the drawings and specifications

as issued. If clarification is required after the contract is awarded, such clarification will be made by Design Professional and his decision will be final.

- D. Special care shall be taken for protection for all equipment. All equipment and material shall be completely protected from weather elements, painting and plaster until the project is substantially completed. Damage from rust, paint and scratches shall be repaired as required to restore equipment to original condition.
- E. Protection of all equipment during the painting of the building shall be the responsibility of the Painting Contractor, but this shall not relieve Contractor of the responsibility for checking to assure that adequate protection is being provided.
- F. Where the final installation or connection of equipment in the building requires Contractor to work in finished areas of the building, Contractor shall be responsible that such areas are protected and are not marred, soiled or otherwise damaged during the course of such work. Contractor shall arrange with the General Contractor for patching and refinishing of such areas which may be damaged in this respect.

1.8 OPENINGS, CUTTING AND PATCHING

- A. Piping, sleeves and ducts passing through all fire or smoke rated floors, roofs, walls, and partitions shall be provided with firestopping. Space between wall/floor and pipe, sleeve, and/or duct shall be sealed with UL listed intumescent fire barrier material equivalent to rating of wall/floor. Where piping, sleeves and ducts pass through floors, roofs, walls and partitions that are not fire or smoke rated, penetrations shall be sealed with grout or caulk.
- B. New structure:
 - 1. Contractor will coordinate the placing of openings and lintels in the new structure as required for the installation of the HVAC work with the General Contractor.
 - 2. Contractor shall furnish to General Contractor the accurate locations and sizes for required openings, but this shall not relieve Contractor of the responsibility of checking to assure that proper size openings are provided. When additional cutting and patching is required due to Contractor's failure to coordinate this work, Contractor shall make arrangements for the cutting, patching, and painting required.

1.9 EXCAVATING AND BACKFILLING

- A. Contractor shall do all excavating necessary for hydronic piping, gas piping, etc., and shall backfill trenches and excavations after work has been inspected. Care shall be taken in excavating that walls and footings and adjacent load bearing soils are not disturbed in any way, except where lines must cross under a wall footing. Where a line must pass under a footing, the crossing shall be made by the smallest possible trench to accommodate the pipe. Excavation shall be kept free from water by pumping if necessary.
- B. Backfill about the structure shall be placed, when practical, as the work of construction progresses. Backfilling on or against concrete work shall be done only when directed. Backfilling of trenches shall progress as rapidly as the testing and acceptance of the finished sections of the work will permit. Backfill shall be in accordance with Division 31 Specifications.

1.10 MATERIALS AND EQUIPMENT

- A. All materials and equipment shall be the standard product of a reputable U.S.A. manufacturer regularly engaged in the manufacture of the specified item. Where two or more units are required of the same item, they shall be furnished by the same manufacturer except where specified otherwise.
- B. All material and equipment shall be installed in strict accordance with the manufacturer's recommendations.
- C. The equipment specifications cannot deal individually with any minute items such as parts, controls, devices, etc., which may be required to produce the equipment performance and function as specified, or as required to meet the equipment guarantees. Such items, when required, shall be furnished as part of the equipment, whether or not specifically called for.

1.11 SUBMITTALS

- A. Contractor shall furnish, to Design Professional, complete sets of shop drawings and other submittal data. Contractor shall review and sign shop drawings before submittal. Refer to Division 01 specifications for additional requirements.
- B. Shop drawings shall be bound into sets and cover related items for a complete system as much as practical and shall be identified with symbols or "plan marks" used on drawings. Incomplete, piecemeal or unbound submittals will be rejected.
- C. Submittals required by the various sections of the Project Manual include, but are not necessarily limited to those identified in the submittal schedule below.
- D. After award of contract, Contractor shall provide a completed submittal schedule including dates that the submittals will be to Design Professional for review.
- E. Design Professional will review shop drawings solely to assist contractors in correctly interpreting the plans and specifications.
- F. Contract requirements cannot be changed by shop drawings which differ from contract drawings and specifications.

1.12 OPERATION AND MAINTENANCE MANUALS

- A. Operation and maintenance manuals shall be submitted to Design Professional in electronic format for review and approval. Refer to Division 01 specifications for additional information.

1.13 TESTS AND DEMONSTRATIONS

- A. Tests Required: Piping shall be tested and proved tight under the following static pressures. Pressure shall be maintained for four (4) hours.

System	Pressure
Fuel Piping	100 psi air pressure or 150% of operating pressure (whichever is greater)

- B. All systems shall be tested by Contractor and placed in proper working order prior to demonstrating systems to Owner. Contractor shall submit a report to Design Professional citing dates, times, pressures, and results of all tests performed.

1.14 TRAINING AND DEMONSTRATIONS

- A. Prior to acceptance of the HVAC installation, Contractor shall provide to Owner, or his designated representatives, all comprehensive training on essential features and functions of all systems installed, and shall instruct Owner in the proper operation and maintenance of such systems.
 - 1. Provide adequate notice to Owner as to when instruction will be conducted so appropriate personnel can be present.
 - 2. Prepare the instruction format for a minimum of four Owner Representatives.
- B. Equipment training for Owner:
 - 1. Manufacturer's representatives shall provide instruction on each major piece of equipment. Contractor shall provide instruction on all other equipment.
 - 2. Training sessions shall use the printed installation, operation and maintenance instruction materials included in the O&M manuals and emphasize preventative maintenance and safe operating procedures.
 - 3. Training shall be performed by qualified factory trained technicians.
 - 4. HVAC Contractor shall attend all sessions performed by the manufacturer's representative and shall add to each session any special information relating to the details of installation of the equipment as it might impact the operation and maintenance.
 - 5. Equipment training shall occur as soon as possible after start up of the equipment and shall include hands-on operation. Training shall be provided for equipment listed in the table below.
- C. System training for Owner:
 - 1. HVAC and Temperature Controls Contractors shall jointly conduct system operating training. These sessions shall include:

- a. HVAC system overview.
 - b. System wide start-up.
 - c. Operation of control system.
 - d. Function of each component.
 - e. System operating procedures in all possible modes.
 - f. Programming procedures.
 - g. Shut-down and maintenance procedures.
 - h. Emergency procedures.
- D. Contractor shall submit to Design Professional a certificate, signed by Owner stating the date, time and persons instructed and that the instruction has been completed to Owner's satisfaction.

1.15 SUBSTITUTIONS

- A. Refer to Divisions 00 and 01.
- B. To obtain approval to use unspecified equipment, submit written requests to the Design Professional at least 10 days prior to bid due date. Requests shall clearly describe the equipment for which approval is being requested. Include all data necessary to demonstrate that equipment's capacities, features and performance are equivalent to include a cost comparison between specified equipment and equipment for which approval is being requested. If the equipment is acceptable, Design Professional will approve it in an addendum. Design Professional will, under no circumstances, be required to prove that an item proposed for substitution is or is not of equal quality to the specified item.
- C. Where substitutions are approved, Contractor assumes all responsibility for physical dimensions and all other resulting changes. This responsibility extends to cover all extra work necessitated by other trades as a result of the substitution.

1.16 ACCEPTABLE MANUFACTURERS

- A. In most cases, equipment specifications are based on a specific manufacturer's type, style, dimensional data, catalog number, etc. Listed with the base specification, either in the manual or on the plan schedules are acceptable manufacturers approved to bid products of equal quality. These manufacturers are encouraged to submit to Design Professional at least 8 days prior to the bid due date drawings and catalog numbers of products to be bid as equals.
- B. Manufacturers who do not submit prior to bidding, run the risk of having the product rejected at time of shop drawing submittal. Extra costs associated with replacing the rejected product shall be the responsibility of Contractor and/or the manufacturer.
- C. If Contractor chooses to use a manufacturer listed as an equal, it shall be his responsibility to assure that the manufacturer has complied with the requirements in 'A' above. Contractor shall assume all responsibility for physical dimensions (including accessibility for maintenance), operating characteristics, and all other resulting changes. This responsibility extends to cover all extra work necessitated by other trades as a result of using the alternate manufacturer.
- D. Where a model or catalog number is provided, it may not be inclusive of all product requirements. Refer to additional requirements provided on the plans or in the specifications as required. Similarly, there may be additional requirements included in the model or catalog number that are not specifically stated. These requirements shall also be met.

1.17 WARRANTY

- A. Refer to Divisions 00 and 01 for information on warranties and correction of work within the warranty period.
 - 1. If a warranty or warranty period are not defined in Division 00 or 01, then the start of all warranty periods shall be the date of Substantial Completion and the length of the warranty shall be for one year.
 - a. If construction is phased with distinct and separate Substantial Completion dates for portions of the building and/or systems, separate warranties shall be provided for each of these phased areas and/or systems.

- b. The entire HVAC system, including all sub-systems, shall be guaranteed against defect in materials and installation for the duration of the warranty period. Any malfunctions or defects which occur within the warranty period shall be promptly corrected without cost to the Owner. This guarantee shall not limit or void any manufacturer's express or implied warranty.
- B. Refer to other Division 23 sections for systems, equipment, or material requiring extended warranties beyond one year.
- C. The date of systems/equipment startup or equipment/material shipment to the site shall not be considered the notable date with relation to the warranty of that item. All systems, equipment, material, etc., shall have the same start date with respect to the warranty period.
- D. Systems, equipment or material put into use to facilitate construction activities (e.g. testing and balancing, commissioning, temporary conditioning, etc.) prior to the start of the warranty period shall not impact the length of the warranty in any way.

1.18 CHANGES IN THE WORK

- A. A contract change order is a written order to Contractor signed by Owner and Contractor, issued after the execution of the contract, authorizing a change in the work or an adjustment in the contract sum or the contract time. The contract sum and the contract time may be changed only by contract change order.
- B. Owner, without invalidating the contract, may order changes in the work within the general scope of the contract consisting of additions, deletions or other revisions, with the contract sum and the contract time being adjusted accordingly. All such changes in the work shall be authorized by contract change order and shall be performed under the applicable conditions of the contract documents.
- C. The cost or credit to Owner resulting from a change in the work shall be determined by mutual acceptance of a lump sum properly itemized and supported by sufficient substantial data to permit evaluation. A change order in excess of \$300.00 shall be submitted with each item listed individually with a material cost and labor unit extension. Overhead and profit, as mutually agreed upon between Owner and Contractor shall be added to material and labor cost figures.
- D. It shall be the responsibility of Contractor before proceeding with any change to satisfy himself that the change has been properly authorized in behalf of Owner.

1.19 COMPLETION

- A. Systems, at time of completion, shall be complete, efficiently operating, non-hazardous and ready for normal use by Owner.
- B. Contractor shall clean up and remove from the site all debris, excess material and equipment left during the progress of this contract at job completion.

1.20 CLEANING

- A. Prior to assembly of pipe and piping components, all loose dirt, scale, oil, and other foreign matter on internal and exterior surfaces shall be removed by means consistent with good piping practices. During fabrication and assembly, slug and weld splatter shall be removed from both internal and external pipe joints by preening, chipping, and wire brushing.
- B. At the conclusion of the construction, the entire system of piping and equipment shall be cleaned internally. Prior to flushing erected piping surfaces, Contractor shall disconnect all instrumentation and equipment and open wide all valves.
- C. All temporary labels, stickers, etc., shall be removed from all fixtures and equipment. Name plates, ratings, instruction plates, etc., shall not be obscured by paint, insulation, or placement of units.
- D. Heating and air conditioning equipment shall be thoroughly cleaned and clean filters installed.

1.21 ELECTRICAL WORK

- A. Electrical work and equipment provided by HVAC Contractor shall include the following:
 - 1. Starters and disconnects for motors of HVAC equipment, but only where specifically indicated to be furnished integrally with equipment.

2. Wiring from motors to disconnect switches or junction boxes for motors of HVAC equipment, but only where specifically indicated to be furnished integrally with equipment.
3. Electrical heating coils and similar elements in HVAC equipment.
4. All control wiring in accordance with the requirements of Division 26.
- B. Electrical Contractor shall provide all power wiring for HVAC equipment, including services for motors and equipment furnished by the HVAC contractor. Motor and equipment locations are shown on the electrical drawings.
- C. Electrical Contractor shall make final connections for all motors and equipment furnished by the HVAC contractor.
- D. Electrical Contractor shall furnish safety disconnects and starters for all motors and equipment furnished by the HVAC contractor (unless specifically indicated to be furnished integrally with the equipment), so as to make service complete to each item of equipment.
- E. Contractor shall consult with Electrical Contractor prior to conduit rough-in and shall verify with him the exact locations for rough-ins, and the exact size and characteristics of the services required, and shall provide Electrical Contractor a schedule of electrical loads for the equipment furnished by him. These schedules will be used for sizing services, disconnects, fuses, starters and overload protection.
- F. Refer to Division 23 Controls section for control system wiring. Control wiring shall be done in accordance with the requirements of Division 26.
- G. All conduit installed for control wiring shall be blue. Labeled conduit will not be accepted.
- H. Control wiring, where not exposed, may be installed without conduit. Wiring in ducts, plenums and other air handling spaces shall be specifically listed for the use. All exposed control wiring and wiring behind inaccessible construction (such as in walls and above drywall ceilings) shall be routed in blue conduit. All wall penetrations shall be sleeved with blue conduit. Installation shall comply with all code requirements.
- I. All control wiring shall be in blue conduit.

1.22 TEMPORARY UTILITIES

- A. Refer to Division 01 for specific requirements concerning temporary utilities.
- B. Under no circumstances shall the building HVAC equipment be used for temporary heat, cooling or ventilation during construction prior to Owner acceptance of the building at substantial completion.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 23 0548
VIBRATION CONTROLS FOR HVAC DUCTWORK AND EQUIPMENT

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Extent of vibration isolation work required by this section is indicated on drawings and schedules, and/or specified in other Division-23 sections.
- B. All HVAC equipment over one horsepower, unless otherwise noted shall be isolated from the structure by means of vibration and noise isolators.
- C. Types of vibration isolation products specified in this section include the following:
 - 1. Precompressed Molded Fiberglass Isolators.
 - 2. Elastomeric Isolators.
 - 3. Spring Isolators, Free Standing.
 - 4. Spring Isolators, Vertically-Restrained.
 - 5. Isolation Hangers.
 - 6. Structural Steel Bases.
 - 7. Concrete Inertia Bases.
 - 8. Isolation Rail Systems.
 - 9. Flexible Duct Connectors.
- D. Vibration isolation products furnished as part of factory-fabricated equipment are specified as part of the equipment assembly in other Division-23 sections.
- E. Refer to other sections of these specifications for equipment foundations, hangers, sealants, gaskets and other work related to vibration isolation work.

1.2 QUALITY ASSURANCE

- A. Product Qualification: Provide each type of vibration isolation unit produced by specialized manufacturer, with not less than 5 years' successful experience in production of units similar to those required for project.
 - 1. The materials and systems specified in this Section shall all be provided by the Contractor, from a single vibration isolation materials manufacturer to assure single responsibility for the performance of all isolation materials.

1.3 SUBMITTALS

- A. The isolator manufacturer's submittal shall include the complete design for required isolation and bases, and a tabulation of the design data including O.D., free and operating heights of the isolators.

PART 2 PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Vibration Isolation Products
 - 1. Kinetics Noise Control, Inc.
 - 2. Vibration Eliminator Co., Inc.
 - 3. Mason Industries
- B. The following item specifications apply to the corresponding Type numbers used in the Vibration Isolation Schedule.

2.2 ISOLATION MATERIALS AND SUPPORT UNITS

- A. Springs: All springs shall have a minimum additional travel to solid equal to 50% of the rated deflection. All springs except internal nested springs shall have an outside diameter not less than 0.8 of the compressed height of the spring. Ends of springs shall be square and ground for stability. Laterally stable springs shall have k_x/k_y ratios of at least 0.9. All springs shall be fully color-coded to indicate capacity – color striping is not considered adequate.

- B. Corrosion Protection: All springs shall be powder-coated enamel. Housings shall be galvanized, powder-coated enamel, or painted with rust-resistant paint. Hot-dipped galvanized housings shall be provided as indicated on the Schedule.
- C. Base Types
 - 1. Type A Bases - no base required. Isolators may be attached directly to the supported equipment.
 - 2. Type B Bases - Steel Equipment Bases: Bases shall be of welded construction with cross members to form an integral support platform. Structural steel members shall be designed to match supported equipment.
 - a. Vibration bases for fans shall have adjustable motor slide rails as indicated on their Schedule, and shall accommodate motor overhang.
 - b. Bases for exterior use shall be painted or hot-dipped galvanized for complete corrosion resistance.
 - c. Minimum clearance under steel equipment bases shall be 1-inch.
 - 3. Type C Bases - Concrete Inertia Bases: Inertia bases shall be of welded steel construction with concrete in-fill supplied by the installing contractor on site and shall incorporate reinforcing bars, spaced 12-inch maximum on centers each way.
 - a. Inertia bases for pumps shall be of sufficient size to accommodate supports for pipe elbows at pump suction and discharge connections (if this information has been provided for configuration).
 - b. Inertia bases for fans shall include motor slide rails as indicated on their Schedule.
 - c. The weight of each inertia base shall be at least (1.5 times(x)) to the weight of the equipment mounted thereon or sufficient to lower the center of gravity to or below the isolator support plane.
 - d. Inertia bases shall be a minimum of 6-inch thick.
 - 4. Type D Bases: Isolation Rail System, consisting of two parallel aluminum rail systems with continuous neoprene air and water seal, incorporating steel spring isolators designed for one-inch static deflection, all fabricated to be installed over the roof curb system, and provide continuous support for the isolated equipment.
- D. Isolator Types
 - 1. Type 1 Isolator - Rubber Pads and Glass Fiber Pads:
 - a. Isolation pads shall be single ribbed or crossed, double ribbed elastomer-in-shear pads, in combination with steel shims when required, having minimum static deflections as tabulated. All pads shall be true elastomer-in-shear using alternately higher and lower ribs to provide effective vibration isolation, and shall be molded using 2500 PSI tensile strength, oil resistant compounds with no color additives. Pads shall be 45 to 65 durometer and designed to permit 60 or 120 PSI loading at maximum rated deflections. When two isolation pads are laminated, they shall be separated by, and bonded to, a galvanized steel shim plate. Neoprene vibration isolators shall have minimum operating static deflections as shown on the Vibration Isolation Schedule or as indicated on the project bid documents, not exceeding published load capabilities.
 - b. Fiberglass continuous support material shall be high-density matrix of compressed molded fiberglass; individually coated with a flexible, moisture-impervious elastomeric membrane, designed to allow controlled air movement in the fiber media. It shall be manufactured in such a way that the pumping action of air between fibers provides viscous damping, reducing motion caused by transient shock and vibration. The material shall be non-corrosive, non-combustible, non-absorbent, and resists rust, ozone, mildew and fungus, vermin proof and it shall not shrink, swell, or decompose. Isolation characteristics of the media shall be constant over a temperature range of - 40°F to 250°F.
 - 2. Type 2 Isolators - Rubber Mounts and Hangers:

- a. Vibration isolators shall be neoprene, molded from oil-resistant compounds, with cast-in-top steel load transfer plate for bolting to supported equipment, and a bolt-down plate with holes provided for anchoring to supporting structure. Top and bottom surfaces shall have non-skid ribs. Neoprene vibration isolators shall have minimum operating static deflections as shown on the Vibration Isolation Schedule or as indicated on the project documents but not exceeding published load capabilities.
- b. Vibration isolators with maximum static deflection requirements under the operating load conditions not exceeding 0.40-inch shall be hangers consisting of an elastomer-in-shear insert encased in a welded steel bracket and provided with a stamped load transfer cap. The elastomer insert shall be neoprene, molded from oil-resistant compounds and shall be color-coded to indicate load capacity and selected to operate within its published load range. The hanger bracket shall be designed to carry a 500% overload without failure and to allow a support rod misalignment through a 30-degree arc without metal-to-metal contact or other short circuit.
3. Type 3 Isolators - Spring Isolators and Hangers:
 - a. Vibration isolators shall be free standing, un-housed, laterally stable springs wound from high strength spring steel. Springs shall have a lateral stiffness greater than 0.8 times the rated vertical stiffness and shall be designed to provide up to 50% overload capacity. Springs shall be supported either with a neoprene cup or a metal base plate complete with a ribbed neoprene pad, minimum 0.25-inch thick, bonded to the base plate. Springs shall be selected to provide operating static deflections as required. Springs shall be color-coded or otherwise identified to indicate load capacity. In capacities up to 5,000 lbs., springs shall be replaceable. In capacities over 5,000 lbs., springs shall be welded to the top and bottom load plate assemblies. Springs shall be assembled between a top and bottom steel load plate. The upper load plate shall be provided with a steel leveling bolt lock nut and washer for attachment to the supported equipment. The lower load plate shall have a non-skid noise isolation pad bonded to the bottom and have provisions for bolting the isolator to the supporting structure.
 - b. Vibration isolators for suspended equipment, with minimum static deflection requirement exceeding 0.40-inch, shall be hangers consisting of a free-standing, laterally stable steel spring and elastomeric washer in series, assembled in a stamped or welded steel bracket. The spring element shall meet all the specified characteristics described in above. The stamped or welded hanger bracket shall meet all the specified characteristics described above. Shall also be fitted with a self-centering load cap for the hanger rod.
4. Type 4 Isolators - Restrained Spring Isolators: Vibration isolators for equipment which is subject to load variations and large external or torquing forces shall consist of large diameter laterally stable steel springs assembled into formed or welded steel housing assemblies designed to limit vertical movement of the supported equipment. Springs shall be supported either with a neoprene cup or a metal base plate complete with a ribbed neoprene pad, minimum 0.25-inch thick, bonded to the base plate. Housing assembly shall be formed or fabricated steel members and shall consist of a top-load plate complete with adjusting and leveling bolts, vertical restraints, isolation washers and a bottom plate with non-skid noise stop pads and holes provided for anchoring to supporting structure. Housing shall be hot dipped galvanized. Spring elements shall meet all the specified characteristics described above.
5. Type 5 Isolators - Thrust Restraints: Provide in pairs. Locate on centerline of fan if possible. Bridge the flexible duct connector. Spring elements shall meet all the specified characteristics described above.
- E. Flexible Ductwork Connectors:
 1. Flexible neoprene or heavy glass fabric duct connector with minimum material thickness of 0.024-inch and weight of 30 oz/sq. yard.
 2. Minimum temperature range shall be 30 to 200 deg F.

3. The materials shall have a flame spread rating below 25 and smoke development rating below 50.
4. The minimum static pressure rating shall be 10-inch.

PART 3 EXECUTION

3.1 PERFORMANCE OF ISOLATORS

- A. General: Comply with minimum static deflections recommended by the American Society of Heating, Refrigerating and Air-Conditioning Engineers, including definitions of critical and noncritical locations, for selection and application of vibration isolation materials and units as indicated.
- B. Manufacturer's Recommendations: Except as otherwise indicated, comply with manufacturer's recommendations for selection and application of vibration isolation materials and units.

3.2 APPLICATIONS

- A. General: Apply types of vibration isolation materials and units indicated at locations shown or scheduled. Selection is Installer's option where more than one type is indicated.
- B. Duct Isolation:
 1. Minimum deflection shall be equal to the deflection of the equipment the ductwork connects to for the first three supports near the equipment; all other isolators shall be 1.00-inch.
 2. Flexible ductwork connectors shall be incorporated in the ductwork adjacent to all air moving units, unless noted otherwise.

3.3 INSTALLATION

- A. General: Except as otherwise indicated, comply with manufacturer's instructions for installation and load application to vibration isolation materials and units. Adjust to ensure that units do not exceed rated operating deflections or bottom out under loading and are not short-circuited by other contacts or bearing points. Remove space blocks and similar devices (if any) intended for temporary protection against overloading during installation.
- B. Anchor and attach units to substrate and equipment as required for secure operation and to prevent displacement by normal forces, and as indicated.
- C. Adjust leveling devices as required to distribute loading uniformly onto isolators. Shim units as required where leveling devices cannot be used to distribute loading properly.
- D. Locate isolation hangers as near overhead support structure as possible.
- E. Bond flanges of flexible duct connectors to ducts and housings to provide airtight connections. Seal seams and penetrations to prevent air leakage.

3.4 EXAMINATION OF RELATED WORK

- A. Installer of vibration isolation work shall observe installation of other work related to vibration isolation work, including work connected to vibration isolation work; and, after completion of other related work (but before equipment startup), shall furnish written report to Contractor listing observed inadequacies for proper operation and performance of vibration isolation work. Report shall cover, but not necessarily be limited to the following:
 1. Installations (performed as work of other sections) on vibration isolators.
 2. Ductwork Connections including provisions for flexible connections.
 3. Passage of ductwork which is to be isolated through walls and floors.
- B. Do not start up equipment until inadequacies have been corrected in manner acceptable to vibration isolation Installer.

END OF SECTION

**SECTION 23 0593
TESTING, ADJUSTING, AND BALANCING FOR HVAC SYSTEMS**

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Air Systems:
 - 1. Rooftop Units.
 - 2. Exhaust Fan.
 - 3. Ductwork Systems.
 - 4. DRGs.
 - 5. Evaporative Cooler.
- B. Sound tests.

1.2 ACTION SUBMITTALS

- A. Submit copies of report forms, balancing procedures, and the name and qualifications of testing and balancing agency for approval within 30 days after award of Contract.
- B. Submit electronic copy of TAB reports to the Architect/Engineer for approval. Report shall consist of information described in Part 4 below.

1.3 QUALITY ASSURANCE

- A. Agency shall be a company specializing in the adjusting and balancing of systems specified in this section with minimum three years experience. Perform work under supervision of AABC Certified Test and Balance Engineer, NEBB Certified Testing, Balancing and Adjusting Supervisor, SMARTA Certified Air and Hydronic Balancer, or TABB Certified Supervisor.
- B. Work shall be performed in accordance with the requirements of the references listed at the start of this section.
- C. Test and balance contractors shall be approved prior to bidding the Work on the project.

1.4 WARRANTY/GUARANTEE

- A. The TAB Contractor shall include an extended warranty of 90 days after owner receipt of a completed balancing report, during which time the Owner may request a recheck of terminals, or resetting of any outlet, coil, or device listed in the test report. This warranty shall provide a minimum of 24 manhours of on-site service time. If it is determined that the new test results are not within the design criteria, the balancer shall rebalance the system according to design criteria.
- B. Warranty/Guarantee must meet one of the following programs: TABB International Quality Assurance Program, AABC National Project Performance Guarantee, NEBB's Conformance Certification.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.1 GENERAL REQUIREMENTS

- A. All procedures must conform to a published standard listed in the References article of this section. All equipment shall be adjusted in accordance with the manufacturer's recommendations. Any system not listed in this specification but installed under the contract documents shall be balanced using a procedure from a published standard listed in the References article.
- B. Recorded data shall represent actual measured or observed conditions.
- C. Cut insulation, ducts, pipes, and equipment cabinets for installation of test probes to the minimum extent necessary to allow adequate performance of procedures. After testing and

balancing is complete, close probe holes and patch insulation with new materials as specified. Restore vapor barrier and finish as specified.

- D. Permanently mark setting of valves, dampers, and other adjustment devices allowing for settings to be restored. Set and lock memory stops.
- E. Leave systems in proper working order, replacing belt guards, closing access doors, closing doors to electrical switch boxes, plugging test holes, and restoring thermostats to specified settings.
- F. Installations with systems consisting of multiple components shall be balanced with all system components operating.

3.2 EXAMINATION

- A. Before beginning work, verify that systems are complete and operable. Ensure the following:
 - 1. General Equipment Requirements:
 - a. Equipment is safe to operate and in normal condition.
 - b. Equipment with moving parts is properly lubricated.
 - c. Proper thermal overload protection is in place for electrical equipment.
 - d. Direction of rotation of all fans and pumps is correct.
 - e. Access doors are closed and end caps are in place.
 - 2. Duct System Requirements:
 - a. All filters are clean and in place. If required, install temporary media.
 - b. Duct systems are clean and free of debris.
 - c. Manual volume dampers are in place, functional and open.
 - d. Air outlets are installed and connected.
 - e. Duct system leakage has been minimized.
- B. Report any defects or deficiencies to Engineer.
- C. Promptly report items that are abnormal or prevent proper balancing.
- D. If, for design reasons, system cannot be properly balanced, report as soon as observed.
- E. Beginning of work means acceptance of existing conditions.
- F. Examine strainers. Verify that startup screens have been replaced by permanent screens with indicated perforations.
- G. Examine control valves for proper installation for their intended function of throttling, diverting, or mixing fluid flows.
- H. Examine system pumps to ensure absence of entrained air in the suction piping.
- I. Examine operating safety interlocks and controls on HVAC equipment.

3.3 PREPARATION

- A. Provide instruments required for testing, adjusting, and balancing operations. Make instruments available to the Architect/Engineer for spot checks during testing.
- B. Instruments shall be calibrated within six months of testing performed for project, or more recently if recommended by the instrument manufacturer.
- C. Perform system-readiness checks of HVAC systems and equipment to verify system readiness for TAB work. Include, at a minimum, the following:
 - 1. Airside:
 - a. Verify that leakage and pressure tests on air distribution systems have been satisfactorily completed.
 - b. Volume, smoke, and fire dampers are open and functional.
 - c. Clean filters are installed.
 - d. Fans are operating, free of vibration, and rotating in correct direction.
 - e. Variable-frequency controllers' startup is complete and safeties are verified.
 - f. Automatic temperature-control systems are operational.
 - g. Ceilings are installed.
 - h. Windows and doors are installed.

- i. Suitable access to balancing devices and equipment is provided.

3.4 INSTALLATION TOLERANCES

- A. $\pm 10\%$ of scheduled values:
 - 1. Adjust air inlets and outlets to $\pm 10\%$ of scheduled values.
 - a. B. $+ 5\%$ of scheduled values
 - 1) Adjust outdoor air intakes to within $+ 5\%$ of scheduled values.
 - 2) Adjust exhaust air through energy recovery equipment to within $+5\%$ of scheduled values.
- B. C. Adjust supply, return, and exhaust air-handling systems to $+10\%$ / -5% of scheduled values.

3.5 ADJUSTING

- A. After adjustment, take measurements to verify balance has not been disrupted or that disruption has been rectified.
- B. After testing, adjusting and balancing are complete, operate each system and randomly check measurements to verify system is operating as reported in the report. Document any discrepancies.
- C. Contractor responsible for each motor shall also be responsible for replacement sheaves. Coordinate with contractor.

3.6 SUBMISSION OF REPORTS

- A. Fill in test results on appropriate forms.

PART 4 – SYSTEMS TO BE TESTED, ADJUSTED AND BALANCED

4.1 TEST AND BALANCE (TAB) REPORT CONTENTS

- A. Air Systems - RTU, EF
 - 1. Location
 - 2. Manufacturer and Model
 - 3. Supply, return and exhaust, air flow, design and actual
 - 4. Outside air flow, design and actual (where applicable)
 - 5. Inlet, discharge, and total static pressure, design and actual
 - 6. Full static pressure profile with measurements between all components through unit.
 - 7. Fan RPM, design and actual
 - 8. Static pressure across the coil section with the face and bypass damper in both the face and bypass positions (where face and bypass dampers are provided).
- B. Duct Traverse
 - 1. System zone/branch
 - 2. Duct size
 - 3. Velocity and airflow, design and actual
 - 4. Duct static pressure
 - 5. Air temperature and correction factor (if applicable)
- C. Room Air Distribution
 - 1. Air terminal number
 - 2. Room number/location
 - 3. Terminal type and size
 - 4. Area factor
 - 5. Velocity, design and actual
 - 6. Airflow, design and actual
 - 7. Percent of design air flow
- D. Air Handling System Coils - RTU
 - 1. Identification/number
 - 2. Location and service

3. Air flow, design and actual
4. Entering and leaving air DB and WB temperatures, design and actual
5. Air pressure drop, design and actual.

4.2 PROCEDURES FOR EVAPORATIVE COOLING TOWERS

- A. Balance total condenser-water flows to towers. Measure and record the following data:
 1. Condenser-water flow to each cell of the cooling tower.
 2. Entering- and leaving-water temperatures.
 3. Wet- and dry-bulb temperatures of entering air.
 4. Wet- and dry-bulb temperatures of leaving air.
 5. Condenser-water flow rate recirculating through the cooling tower.
 6. Cooling-tower spray pump discharge pressure.
 7. Condenser-water flow through bypass.
 8. Fan and motor operating data.

4.3 SOUND TESTS

- A. After the systems are balanced and construction is Substantially Complete, measure and record sound levels at 15 locations as designated by the Architect.
- B. Instrumentation:
 1. The sound-testing meter shall be a portable, general-purpose testing meter consisting of a microphone, processing unit, and readout.
 2. The sound-testing meter shall be capable of showing fluctuations at minimum and maximum levels, and measuring the equivalent continuous sound pressure level (LEQ).
 3. The sound-testing meter must be capable of using 1/3 octave band filters to measure mid-frequencies from 31.5 Hz to 8000 Hz.
 4. The accuracy of the sound-testing meter shall be plus or minus one decibel.
- C. Test Procedures:
 1. Perform test at quietest background noise period. Note cause of unpreventable sound that affects test outcome.
 2. Equipment should be operating at design values.
 3. Calibrate the sound-testing meter prior to taking measurements.
 4. Use a microphone suitable for the type of noise levels measured that is compatible with meter. Provide a windshield for outside or in-duct measurements.
 5. Record a set of background measurements in dBA and sound pressure levels in the eight un-weighted octave bands 31.5 Hz to 8000 Hz (NC) with the equipment off.
 6. Take sound readings in dBA and sound pressure levels in the eight un-weighted octave bands 31.5 Hz to 8000 Hz (NC) with the equipment operating.
 7. Take readings no closer than 36 inches from a wall or from the operating equipment and approximately 60 inches from the floor, with the meter held or mounted on a tripod.
 8. For outdoor measurements, move sound-testing meter slowly and scan area that has the most exposure to noise source being tested. Use A-weighted scale for this type of reading.
- D. Reporting:
 1. Report shall record the following:
 - a. Location.
 - b. System tested.
 - c. dBA reading.
 - d. Sound pressure level in each octave band with equipment on and off.
 2. Plot sound pressure levels on NC worksheet with equipment on and off.

END OF SECTION

SECTION 23 0713 DUCT INSULATION

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Duct Wrap

1.2 SUBMITTALS

- A. Product Data: Provide product description, thermal characteristics, list of materials and thickness for each service, and locations.

1.3 DELIVERY, STORAGE, AND HANDLING

- A. Accept materials on site in original factory packaging, labelled with manufacturer's identification, including product density and thickness.
- B. Protect insulation from weather and construction traffic, dirt, water, chemical, and mechanical damage, by storing in original wrapping.

PART 2 PRODUCTS

2.1 REGULATORY REQUIREMENTS

- A. Surface Burning Characteristics: Flame spread index/Smoke developed index of 25/50, maximum, when tested in accordance with ASTM E84 or UL 723.

2.2 FIBERGLASS DUCT WRAP

- A. Acceptable Manufacturers
 - 1. John's Manville
 - 2. Owens Corning
 - 3. CertainTeed
- B. Duct Covering: Fiberglass duct wrap with factory applied Foil Scrim Kraft (FSK) vapor barrier jacket, 1.0 pound per cubic foot density.
- C. Products shall not contain asbestos, lead, mercury, or mercury compounds.
- D. Products that come in contact with stainless steel shall have a leachable chloride content of less than 50 ppm when tested according to ASTM C 871.

2.3 ADHESIVES

- A. Materials shall be compatible with insulation materials, jackets, and substrates and for bonding insulation to itself and to surfaces to be insulated unless otherwise indicated.
- B. Mineral-Fiber Adhesive: Comply with MIL-A-3316C, Class 2, Grade A.
- C. ASJ Adhesive, and FSK Jacket Adhesive: Comply with MIL-A-3316C, Class 2, Grade A for bonding insulation jacket lap seams and joints.

2.4 TAPES

- A. FSK Tape: Foil-face, vapor-retarder tape matching factory-applied jacket with acrylic adhesive; complying with ASTM C 1136.
 - 1. Width: 3 inches.
 - 2. Thickness: 6.5 mils.
 - 3. Adhesion: 90 ounces force/inch in width.
 - 4. Elongation: 2 percent.
 - 5. Tensile Strength: 40 lbf/inch in width.
 - 6. FSK Tape Disks and Squares: Precut disks or squares of FSK tape.

2.5 CORNER ANGLES

- A. Aluminum Corner Angles: 0.040-inch-thick, minimum 1 inch by 1 inch, aluminum according to ASTM B 209.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that ducts have been tested before applying insulation materials.
- B. Verify that surfaces are clean, foreign material removed, and dry.

3.2 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Install insulation materials, accessories, and finishes with smooth, straight, and even surfaces; free of voids throughout the length of ducts and fittings.
- C. Install insulation materials, vapor barriers or retarders, jackets, and thicknesses required for each item of duct system as specified in insulation system schedules.
- D. Install accessories compatible with insulation materials and suitable for the service. Install accessories that do not corrode, soften, or otherwise attack insulation or jacket in either wet or dry state.
- E. Install insulation with longitudinal seams at top and bottom of horizontal runs.
- F. Keep insulation materials dry during application and finishing.
- G. Install insulation with tight longitudinal seams and end joints. Bond seams and joints with adhesive recommended by insulation material manufacturer.
- H. Install insulation with least number of joints practical.
- I. Cut insulation in a manner to avoid compressing insulation more than 75 percent of its nominal thickness.
- J. Finish installation with systems at operating conditions. Repair joint separations and cracking due to thermal movement.
- K. Repair damaged insulation facings by applying same facing material over damaged areas. Extend patches at least 4 inches beyond damaged areas. Adhere, staple, and seal patches similar to butt joints.

3.3 PENETRATIONS

- A. Insulation Installation at Interior Wall and Partition Penetrations (That Are Not Fire Rated):
Install insulation continuously through walls and partitions.

3.4 FIELD QUALITY CONTROL

- A. All insulation applications will be considered defective Work if sample inspection reveals noncompliance with requirements.

3.5 DUCT INSULATION SCHEDULE, GENERAL

- A. Ducts Requiring Insulation:
 - 1. Indoor, rectangular and spiral, concealed supply-air, return-air, exhaust-air, relief air and outside-air.
 - 2. Indoor, exposed, rectangular and spiral, supply-air, return-air, relief air and outside air.
- B. Items Not Insulated:
 - 1. Flexible connectors.
 - 2. Vibration-control devices.

3.6 INDOOR DUCT INSULATION SCHEDULE

- A. Rectangular supply-air duct insulation shall be the following
 - 1. Fiberglass Duct Wrap: 2 inches thick and 0.75-lb/cu. ft. nominal density.
- B. Rectangular return-air duct insulation shall be the following
 - 1. Fiberglass Duct Wrap: 1-1/2 inches thick and 0.75-lb/cu. ft. nominal density.

END OF SECTION

SECTION 23 0719 HVAC EQUIPMENT AND PIPING INSULATION

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Insulation for chilled water piping.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated. Include thermal conductivity, water-vapor permeance thickness, and jackets (both factory and field applied if any).

1.3 QUALITY ASSURANCE

- A. Installer Qualifications: Skilled mechanics who have successfully completed an apprenticeship program or another craft training program certified by the Department of Labor, Bureau of Apprenticeship and Training.
- B. Surface-Burning Characteristics: For insulation and related materials, as determined by testing identical products according to ASTM E 84, by a testing and inspecting agency acceptable to authorities having jurisdiction. Factory label insulation and jacket materials and adhesive, mastic, tapes, and cement material containers, with appropriate markings of applicable testing agency.
 - 1. Insulation Installed Indoors: Flame-spread index of 25 or less, and smoke-developed index of 50 or less.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Packaging: Insulation material containers shall be marked by manufacturer with appropriate ASTM standard designation, type and grade, and maximum use temperature.

1.5 SCHEDULING

- A. Schedule insulation application after pressure testing systems and, where required, after installing and testing heat tracing. Insulation application may begin on segments that have satisfactory test results.

PART 2 PRODUCTS

2.1 EQUIPMENT INSULATION

- A. Rigid fiberglass insulation board with factory applied all service jacket. Suitable for operating temperatures of 0 to +850 deg. F. Water vapor permeance of .02 perms. Equal to Owens Corning Series 700 with 25 ASJ facing.

2.2 CHILLED WATER PIPING INSULATION MATERIALS

- A. Flexible elastomeric extruded pipe covering, 6 pound density, 0.27 K factor, water vapor permeance of 0.20 perms. Suitable for temperature from -40 deg. F to +220 deg. F. Joints sealed with adhesive as recommended by insulation manufacturer.
 - 1. Where insulation is exposed in indoor occupied space and within 8 feet of finished floor, it shall be covered with 30 mil PVC jacket.
- B. Fittings: Insulate fittings, valve bodies, strainer bodies, etc., with miter cut pipe insulation, preformed insulated fitting covers, or sheet insulation of same material as pipe covering.

2.3 FIELD APPLIED JACKETING

- A. PVC Jacket: High-impact-resistant, UV-resistant PVC complying with ASTM D 1784, Class 16354-C; thickness as scheduled; roll stock ready for shop or field cutting and forming. Thickness is indicated in field-applied jacket schedules.
 - 1. Adhesive: As recommended by jacket material manufacturer.
 - 2. Color: White.
 - 3. Factory-fabricated fitting covers to match jacket if available; otherwise, field fabricate.

- a. Shapes: 45- and 90-degree, short- and long-radius elbows, tees, valves, flanges, unions, reducers, end caps, soil-pipe hubs, traps, mechanical joints, and P-trap and supply covers for lavatories.

2.4 ADHESIVES

- A. Mastics and adhesives as recommended by insulation manufacturer.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions for compliance with requirements for installation tolerances and other conditions affecting performance of insulation application.
 1. Verify that systems to be insulated have been tested and are free of defects.
 2. Verify that surfaces to be insulated are clean and dry.
 3. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Surface Preparation: Clean and dry surfaces to receive insulation. Remove materials that will adversely affect insulation application.

3.3 GENERAL INSTALLATION REQUIREMENTS

- A. Install insulation materials, accessories, and finishes with smooth, straight, and even surfaces; free of voids throughout the length of piping including fittings, valves, and specialties.
- B. Install insulation materials, forms, vapor barriers or retarders, jackets, and thicknesses required for each item of pipe system as specified in insulation system schedules.
- C. Install insulation with longitudinal seams at bottom of horizontal runs.
- D. Install multiple layers of insulation with longitudinal and end seams staggered.
- E. Do not weld brackets, clips, or other attachment devices to piping, fittings, and specialties.
- F. Keep insulation materials dry during application and finishing.
- G. Install insulation with tight longitudinal seams and end joints. Bond seams and joints with adhesive recommended by insulation material manufacturer.
- H. Install insulation with least number of joints practical.
- I. Apply adhesives, mastics, and sealants at manufacturer's recommended coverage rate and wet and dry film thicknesses.
- J. Cut insulation in a manner to avoid compressing insulation more than 75 percent of its nominal thickness.
- K. Finish installation with systems at operating conditions. Repair joint separations and cracking due to thermal movement.
- L. Repair damaged insulation facings by applying same facing material over damaged areas. Extend patches at least 4 inches beyond damaged areas. Adhere, staple, and seal patches similar to butt joints.
- M. For above-ambient services, do not install insulation to the following:
 1. Vibration-control devices.
 2. Testing agency labels and stamps.
 3. Nameplates and data plates.
 4. Manholes.
 5. Handholes.
 6. Cleanouts.
- N. cement and finish with finishing cement, mastic, and flashing sealant.

3.4 INSTALLATION OF FIBERGLASS INSULATION

- A. Insulation Installation on Straight Pipes and Tubes:
 1. Secure each layer of preformed pipe insulation to pipe with wire or bands and tighten bands without deforming insulation materials.

2. Where vapor barriers are indicated, seal longitudinal seams, end joints, and protrusions with vapor-barrier mastic and joint sealant.
3. For insulation with factory-applied jackets on below-ambient surfaces, do not staple longitudinal tabs. Instead, secure tabs with additional adhesive as recommended by insulation material manufacturer and seal with vapor-barrier mastic and flashing sealant.
- B. Insulation Installation on Pipe Fittings and Elbows:
 1. Install preformed sections of same material as straight segments of pipe insulation when available.
 2. When preformed insulation elbows and fittings are not available, install mitered sections of pipe insulation, to a thickness equal to adjoining pipe insulation. Secure insulation materials with wire or bands.
- C. Insulation Installation on Valves and Pipe Specialties:
 1. Install preformed sections of same material as straight segments of pipe insulation when available.
 2. When preformed sections are not available, install mitered sections of pipe insulation to valve body.
 3. Arrange insulation to permit access to packing and to allow valve operation without disturbing insulation.
 4. Install insulation to flanges as specified for flange insulation application.

3.5 INSTALLATION OF FLEXIBLE ELASTOMERIC INSULATION

- A. Seal longitudinal seams and end joints with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.
- B. Insulation Installation on Pipe Flanges:
 1. Install pipe insulation to outer diameter of pipe flange.
 2. Make width of insulation section same as overall width of flange and bolts, plus twice the thickness of pipe insulation.
 3. Fill voids between inner circumference of flange insulation and outer circumference of adjacent straight pipe segments with cut sections of sheet insulation of same thickness as pipe insulation.
 4. Secure insulation to flanges and seal seams with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.
- C. Insulation Installation on Pipe Fittings and Elbows:
 1. Install mitered sections of pipe insulation.
 2. Secure insulation materials and seal seams with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.
- D. Insulation Installation on Valves and Pipe Specialties:
 1. Install preformed valve covers manufactured of same material as pipe insulation when available.
 2. When preformed valve covers are not available, install cut sections of pipe and sheet insulation to valve body. Arrange insulation to permit access to packing and to allow valve operation without disturbing insulation.
 3. Install insulation to flanges as specified for flange insulation application.
 4. Secure insulation to valves and specialties and seal seams with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.

3.6 FIELD-APPLIED JACKET INSTALLATION

- A. Where PVC jackets are indicated, install with 1-inch overlap at longitudinal seams and end joints; for horizontal applications. Seal with manufacturer's recommended adhesive.
 1. Apply two continuous beads of adhesive to seams and joints, one bead under lap and the finish bead along seam and joint edge.

3.7 FIELD QUALITY CONTROL

- A. Perform tests and inspections.
- B. All insulation applications will be considered defective Work if sample inspection reveals noncompliance with requirements.

3.8 EXTERIOR PIPING INSULATION SCHEDULE

- A. Chilled Water:
 - 1. NPS 6 and Smaller and Fittings: Flexible Elastomeric, 1 inch thick.
 - 2. Field Applied Jacket: PVC 20 mils
- B. Condensate
 - 1. All sizes: Fiberglass, 1-inch thick.
 - 2. Field Applied Jacket: PVC 20 mils

END OF SECTION

SECTION 23 2113 HYDRONIC PIPING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Copper tube and fittings.
- B. Steel pipe and fittings.

1.2 SUBMITTALS

- A. Manufacturer's product data cut sheets, material and product specifications.

PART 2 PRODUCTS

2.1 COPPER TUBE AND FITTINGS

- A. Copper Tubing: ASTM B 88:
 - 1. Type K copper water tube, hard temper.
 - 2. Type L copper water tube, hard temper.
- B. Copper Fittings:
 - 1. Copper water tube cast bronze or wrought copper:
 - a. Solder joint type. ANSI B16.18 and B16.22-63.
 - b. Pressure-Seal pipe joining system, copper press fittings, 1/2" to 4" in diameter. ASME B16.18, ASME B16.22. O-rings for copper press fittings shall be EPDM. Installation per manufacturer's recommendations.
 - c. Mechanical grooved and roll-groove copper piping system and fittings: may be used as approved by code for copper piping. Grooved piping shall not be used in areas where piping is routed above finished ceilings (drywall or lay-in) for chilled water systems unless fittings and joints are insulated using preformed insulation designed specifically for that type of fitting. All components shall be by one manufacturer. System installation shall be in accordance with the manufacturer's recommendations.

2.2 STEEL PIPE AND FITTINGS

- A. Black Steel Pipe: ASTM A 53
 - 1. Black Steel, Schedule 40
 - 2. Black Steel, Schedule 80
- B. Black Steel Fittings:
 - 1. Threaded pipe (2" dia and smaller): Malleable iron fittings, 125 pound standard flat band water pattern.
 - 2. Welded pipe (2-1/2" dia and larger): Standard radius weld fittings and weld neck or slip-on flanges, same material and strength as pipe.
 - 3. Mechanical grooved and roll-groove steel piping system and fittings: May be used as approved by code for black steel, stainless steel and galvanized steel. Grooved piping shall not be used in areas where piping is routed above finished ceilings (drywall or lay-in) for chilled water systems unless fittings and joints are insulated using preformed insulation designed specifically for that type of fitting. Gasket type to be used shall be appropriate for intended service. All components shall be by one manufacturer. System installation shall be in accordance with the manufacturer's recommendations.

2.3 JOINING MATERIALS

- A. Copper Tube
 - 1. Use non-corrosive 95-5 tin-antimony solder, cut pipe square, clean, ream and polish tube ends and inner surfaces of fittings, apply flux and solder joint as recommended by manufacturer of solder type fittings.

2. Pressure-Seal pipe joining system, copper press fittings, 1/2" to 4" in diameter. ASME B16.18, ASME B16.22. O-rings for copper press fittings shall be EPDM.
 3. Mechanical grooved and roll grooved couplings: Grooved couplings may be used as approved by code for copper piping. Gasket type to be used shall be appropriate for intended service. All components shall be by one manufacturer. System installation shall be in accordance with the manufacturer's recommendations.
- B. Steel Pipe
1. Threaded pipe (2" dia and smaller): Make joints using Teflon tape applied to male threads only. Cut pipe square, cut threads clean, remove burrs and ream ends to full size of bore. For fuel piping and lubricating oil piping, joint sealing material shall be resistant to petroleum products.
 2. Welded pipe (2 1/2" dia and larger): Welding shall conform to welding section of ANSI-B31.3 "Code for Power Piping."
 3. Mechanical grooved and roll grooved couplings: Grooved couplings may be used as approved by code for black steel, stainless steel and galvanized steel piping. Gasket type to be used shall be appropriate for intended service. All components shall be by one manufacturer. System installation shall be in accordance with the manufacturer's recommendations.

2.4 NIPPLES AND UNIONS

- A. All nipples shall conform to size, weight and strength of adjoining pipe. When length of unthreaded portion of nipple is less than 1-1/2", use extra strong nipple; do not use close nipples.
- B. For pipe 2" and smaller, use screwed unions, for pipe 2-1/2" and over use flanged unions. For steel pipe use black or galvanized malleable iron unions, to conform to pipe with ground joint. Cast iron flanged unions gasket type.
- C. Install unions in the following locations so that a minimum amount of pipe need be disassembled:
 1. Long runs, at intervals of 80 feet.
 2. In by-pass around equipment, valves, and controls.
 3. In connections to equipment.
 4. Where indicated on drawings.
- D. Dielectric unions shall be installed between any connection of copper pipe and ferrous piping or equipment. In grooved piping systems, provide Clearflo by Victaulic.

PART 3 EXECUTION

3.1 PIPING APPLICATIONS

- A. Chilled-water piping:
 1. Type L, copper tubing.
 2. Black steel pipe, schedule 40.
- B. Makeup-water piping:
 1. Type L, drawn-temper copper tubing, wrought-copper fittings, and soldered joints.
- C. Condensate-Drain Piping
 1. Above slab
 - a. Type L, copper tubing

3.2 PIPING INSTALLATIONS

- A. Install pipe for all hydronic systems as indicated on drawings, as called for in other sections, and as specified herein.
- B. Arrange and install piping approximately as indicated; straight, plumb, and as direct as possible; form right angles on parallel lines with building walls. Keep pipes close to walls and avoid interference with other trades. Locate groups of pipes parallel to each other; space at a distance to permit applying full insulation and to permit access for servicing valves. Most piping

to be run in concealed locations unless indicated exposed, or in equipment rooms. Locate piping to avoid ductwork.

- C. Install horizontal piping as high as possible without sags or humps so that proper grades can be maintained for drainage.
- D. Check all piping for interference with other trades, avoid placing water pipes over electrical equipment.
- E. Where rough-in is required for equipment furnished by others, verify exact rough-in dimension with owner or equipment supplier before roughing-in.
- F. Install piping to permit valve servicing.
- G. Install fittings for changes in direction and branch connections.
- H. Install piping to allow application of insulation.
- I. Select system components with pressure rating equal to or greater than system operating pressure.
- J. Install groups of pipes parallel to each other, spaced to permit applying insulation and servicing of valves.
- K. Install drains, consisting of a tee fitting, NPS 3/4 ball valve, and short NPS 3/4 threaded nipple with cap, at low points in piping system mains and elsewhere as required for system drainage.
- L. Reduce pipe sizes using eccentric reducer fitting installed with level side up.
- M. Install branch connections to mains off the top of the main pipe.
- N. Install unions in piping, NPS 2 and smaller, adjacent to valves, at final connections of equipment, and elsewhere as indicated.
- O. Install shutoff valve immediately upstream of each dielectric fitting.
- P. Provide air vents at all high points in the system and capped drain valves at all low points in the system.
- Q. Supports, Anchors and Seals: Refer to Section 23 05 29 – Hangers and Supports for HVAC Piping and Equipment.

3.3 HYDRONIC SPECIALTIES

- A. Refer to Section 23 2116 - Hydronic Piping Specialties for requirements.

3.4 DIELECTRIC FITTING INSTALLATION

- A. Install dielectric fittings in piping at connections of dissimilar metal piping and tubing.
- B. Dielectric Fittings for NPS 2 and Smaller: Use dielectric unions.

3.5 PIPE JOINT CONSTRUCTION

- A. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.
- B. Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly.
- C. Press-Connect Joints for Copper Tubing: Join copper tube and pressure-connect fittings with tools recommended by fitting manufacturer.
- D. Mark proper insertion depth prior to making press connection.

3.6 EQUIPMENT CONNECTIONS

- A. General: Connect hydronic piping system to mechanical equipment as indicated, and comply with equipment manufacturer's instructions where not otherwise indicated. Install shutoff valve and union on supply and return, drain valve on drain connection.
- B. Hydronic Terminals: Install hydronic terminals with valve and union on outlet; union, shutoff valve on inlet. Install manual air vent on element in accordance with manufacturer's instructions. Locate valves and balancing cocks behind valve access doors for ease of maintenance. Where indicated, install automatic temperature control valve with unions between valve and element on supply line.
- C. Install ports for pressure gages and thermometers at coil inlet and outlet connections.

3.7 FIELD QUALITY CONTROL

- A. Prepare hydronic piping according to ASME B31.9 and as follows:

1. Leave joints, including welds, uninsulated and exposed for examination during test.
 2. Provide temporary restraints for expansion joints that cannot sustain reactions due to test pressure. If temporary restraints are impractical, isolate expansion joints from testing.
 3. Flush hydronic piping systems with clean water; then remove and clean or replace strainer screens.
 4. Isolate equipment from piping. If a valve is used to isolate equipment, its closure shall be capable of sealing against test pressure without damage to valve. Install blinds in flanged joints to isolate equipment.
 5. Install safety valve, set at a pressure no more than one-third higher than test pressure, to protect against damage by expanding liquid or other source of overpressure during test.
- B. Perform the following tests on hydronic piping:
1. Use ambient temperature water as a testing medium unless there is risk of damage due to freezing. Another liquid that is safe for workers and compatible with piping may be used.
 2. While filling system, use vents installed at high points of system to release air. Use drains installed at low points for complete draining of test liquid.
 3. Isolate expansion tanks and determine that hydronic system is full of water.
 4. Subject piping system to hydrostatic test pressure that is not less than 1.5 times the system's working pressure. Test pressure shall not exceed maximum pressure for any vessel, pump, valve, or other component in system under test. Verify that stress due to pressure at bottom of vertical runs does not exceed 90 percent of specified minimum yield strength or 1.7 times the "SE" value in Appendix A in ASME B31.9, "Building Services Piping."
 5. After hydrostatic test pressure has been applied for at least 10 minutes, examine piping, joints, and connections for leakage. Eliminate leaks by tightening, repairing, or replacing components, and repeat hydrostatic test until there are no leaks.
 6. Prepare written report of testing.
- C. Perform the following before operating the system:
1. Open manual valves fully.
 2. Inspect pumps for proper rotation.
 3. Set makeup pressure-reducing valves for required system pressure.
 4. Inspect air vents at high points of system and determine if all are installed and operating freely (automatic type), or bleed air completely (manual type).
 5. Set temperature controls so all coils are calling for full flow.
 6. Inspect and set operating temperatures of hydronic equipment, such as boilers, chillers, cooling towers, to specified values.
 7. Verify lubrication of motors and bearings.

3.8 ADJUSTING AND CLEANING

- A. Cleaning, Flushing and Inspecting: Clean, flush and inspect hydronic piping systems in accordance with requirements of Section 23 00 10 - HVAC General Provisions.
- B. Circulate and relieve air from high points in the entire system (both new and existing portions for renovation projects) for minimum of 48 hours to ensure all air is removed from the system prior to startup of connected equipment.

END OF SECTION

SECTION 23 2116 HYDRONIC PIPING SPECIALTIES

PART 1 GENERAL

1.1 SECTION INCLUDES:

- A. Manual Balancing Valves.
- B. Air Control Devices.
- C. Strainers.

1.2 SUBMITTALS

- A. Product Data: For each type of product:
 - 1. Include construction details and material descriptions for hydronic piping specialties.
 - 2. Include rated capacities, operating characteristics, and furnished specialties and accessories.
 - 3. Include flow and pressure drop curves based on manufacturer's testing for calibrated-orifice balancing valves and automatic flow-control valves.

1.3 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For hydronic piping specialties to include in emergency, operation, and maintenance manuals.

PART 2 PRODUCTS

2.1 MANUAL BALANCING VALVES

- A. Provide calibrated manual balancing valves where indicated on the plans.
- B. Construction:
 - 1. 1/2" to 2" ball type valve with brass body and stainless-steel ball construction, glass and carbon fitted TFE seat rings, extended readout ports with integral check valves and gasketed caps, drain port, calibrated nameplate and position indicator, memory stops, and NPT connectors, rated for 300 psig at 250°F.
 - 2. 2-1/2" to 12" butterfly valve with cast iron or carbon steel body, bronze seat, stainless steel stem, readout ports with integral check valves and gasketed caps, drain port, calibrated nameplate and position indicator, memory stops, and flanged connection rated for 175 psig at 250°F
- C. Valves to seal leak-tight at maximum rated working pressure.
- D. Provide identification, providing zone identification and balanced flow rate (GPM).

2.2 AIR-CONTROL DEVICES

- A. Manual Air Vents: Bronze body, rated for 150-psig working pressure.

2.3 STRAINERS

- A. Y-Pattern Strainers:
 - 1. Body: ASTM A 126, Class B, cast iron with bolted cover and bottom drain connection.
 - 2. End Connections: Threaded ends for NPS 2 and smaller; flanged ends for NPS 2-1/2 and larger.
 - 3. Strainer Screen: Stainless-steel, 20-mesh strainer, or perforated stainless-steel basket.
 - 4. CWP Rating: 125 psig.

PART 3 EXECUTION

3.1 VALVE APPLICATIONS

- A. Install calibrated-orifice, balancing valves at each branch connection to return main.
- B. Locate valves for easy access and operation. Do not locate valves with stems below horizontal.

- C. Shutoff Valves: Install on inlet and outlet of each mechanical equipment item.
- D. Drain Valves: Install on each mechanical equipment item located to completely drain equipment for service or repair. Install at base of each riser, at base of each rise or drop in piping system, and elsewhere where indicated or required to completely drain hydronic piping system.

3.2 HYDRONIC SPECIALTIES INSTALLATION

- A. Install air vents at high points of system piping. Install for each terminal unit coil and at other points likely to entrap air.

END OF SECTION

SECTION 23 3113 METAL DUCTS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Low velocity ductwork

1.2 QUALITY ASSURANCE

- A. Duct and plenum construction, metal gauges, reinforcing, methods of supporting and hanging and other sheet metal work as called for shall be in accordance with "SMACNA HVAC Duct Construction Standards", most recent Edition, by the Sheet Metal and Air Conditioning Contractors National Association (SMACNA).
- B. Unless noted otherwise, all ductwork shall be provided with pressure class and leakage class as indicated and scheduled on the plans. If pressure or seal class is not indicated, ductwork shall be provided to meet the pressure class based on the scheduled capacity of the equipment it is served by or connected to and with seal class A.
- C. NFPA Compliance: All liner and covering materials shall have maximum UL Flame Spread Index of 25, and maximum Smoke Developed Index of 50, and shall meet all requirements of NFPA-90A.

1.3 SUBMITTALS

- A. Product Data: Submit manufacturer's specifications and installation instructions for each type of mechanical insulation. Submit schedule showing manufacturer's product number, thickness, and furnished accessories for each mechanical system requiring insulation. Submit product data for each accessory/component for ducts/fittings including, but not limited to turning vanes, tie rods, sealants and balancing dampers.
- B. Duct Leakage Test Results.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Protect shop-fabricated ductwork, accessories and purchased products from damage during shipping, storage and handling.
 - 1. Stored materials subject to rejection due to damage.
- B. Deliver insulation, coverings, cements, adhesives, and coatings to site in containers with manufacturer's stamp or label, affixed showing fire hazard ratings of products.
- C. Protect insulation against dirt, water, and chemical and mechanical damage. Do not install damaged insulation; remove from project site.

PART 2 PRODUCTS

2.1 LOW VELOCITY DUCTWORK

- A. General: Provide factory-fabricated or shop fabricated duct and fittings.
- B. Materials:
 - 1. Galvanized sheet steel complying with ANSI/ASTM A527, lockforming quality, with ANSI/ASTM A525, G90 zinc coatings, mill phosphatized.
 - 2. Aluminum sheet complying with ASTM B 209 Alloy 3003, H14 temper with mill finish. Where ductwork is exposed and not designated to be painted, provide one-side bright finish.
- C. Gauge: Comply with code requirements for minimum gauge thickness for various sizes.
- D. Fittings:
 - 1. Construct branches, bends, and elbows with centerline radius of not less than duct 1.0 times the width (diameter), where space conditions will not permit this radius or where indicated on drawings, square elbows with air turns shall be used.
 - 2. Slopes for transitions or other changes in dimension shall be minimum 1:3.

3. Longitudinal seams shall be Pittsburgh Lock or snaplock equal per SMACNA. Lateral seams shall be slip drive or standing. Slip seams and sheet metal screws not permitted.

2.2 FLEXIBLE DUCTWORK

- A. Acceptable Manufacturers
 1. Flexmaster: Type 3
 2. Genflex: IHPL (1-1/2" thick insulation)
 3. Thermaflex: M-KC (1-1/2" thick insulation)
- B. Flexible Ductwork, Insulated: Suitable for -20°F to 220°F temperature range and minimum 12 inches w.c. working pressure.
 1. Inner Liner: Glass fiber, PVC coating, factory-clinched in cold-rolled galvanized steel spiral, or with spiral wire permanently bonded to fabric, UL listed, complying with NFPA 90.
 2. Outer Jacket: 1-1/2" thick, 3/4 lb. fibrous glass, with flame-resistant PVC vapor barrier.
- C. Access Panels: Shall be of same material as ducts in which they are installed, fabricated of tw

2.3 DUCT SEALING – LOW VELOCITY

- A. All joints and seams shall be sealed with pressure sensitive fire resisting duct tape complying with UL-181A or UL-181-B (equal to Hardcast Foil Grip A.F.G. – 1402). (SMACNA pressure classes 1/2" - 6" w.g.).
- B. All joints in low velocity duct work shall be sealed with Foster 32-14 or DuctMate ProSeal. Apply and install joint sealer per manufacturer's recommendations. In general, apply to male end of coupling and/or interior of female fitting. After connection, brush sealant over the assembled joint and screws with a 2" to 3" wide band. Sealant shall be allowed to set for 48 hours before any air pressure is put on system. All tie bars, bolts and rivets shall be sealed with the specified sealant. Sealant as manufactured by 3M No. 800 or United Sheet Metal will be considered equal.
- C. Alternate Sealing System:
 1. Transverse duct joints may be made with the Ductmate System or an approved equal.
 2. The installation of the Ductmate System shall be in accordance with the manufacturer's printed instruction and installation manuals.
 3. The standard Ductmate System joint is the equivalent of a SMACNA "J" connection. The Ductmate-JR System joint is the equivalent of a SMACNA "E" connection. Construction of the duct, such as gauge, reinforcing, etc. shall be as indicated in the addendum to the SMACNA manuals as provided by the manufacturer and as tested by Pittsburgh Testing Laboratory.
- D. Duct Sealing Requirements: SMACNA Seal Class A.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Assemble and install ductwork in accordance with recognized industry practices which will achieve airtight and quiet systems, capable of performing each indicated service.
 1. Install each run with minimum joints.
 2. Align ductwork accurately at connections and with internal surfaces smooth.
 3. Support ducts rigidly with suitable ties, braces, hangers and anchors of type which will hold ducts true-to-shape and prevent buckling and vibration.
- B. Ducts shall be installed following essentially lines indicated on drawings, install offsets, angles and transitions as may be required to avoid interferences with other work. Maintain full capacity of ducts at offsets, angles and transitions except where drawings indicate use of reducing or increasing transitions.
 1. General: Each duct section shall be rigidly supported from structure. Attach hangers to structure with expansion plugs, concrete inserts, beam clamps or other approved means.

Rubber in-shear isolators shall be installed in hangers for all ducts in equipment rooms, to prevent vibration transmission to the structure.

- C. Install hangers and supports in accordance with SMACNA Standards general locations:
 - 1. Install hangers close to transverse joints of main ducts and branches, clinch collar branch connections and the first branch elbows after nested splits.
 - 2. Locate hangers of duct penetrating walls or partitions as though the walls will contribute no support to the duct.
 - 3. Install hangers in pairs on exact opposite sides of duct.
 - 4. Maintain hanger spacing intervals less than, equal to, but not greater than the specified maximums.
 - 5. Install hangers at the midpoint of small and medium size horizontal vaned square elbows. On wide vaned square elbows, install additional hangers at maximum allowable intervals or less measured along the heel lines of the elbows.
 - 6. Provide a set of hangers at the midpoint of small and medium size horizontal radius elbows. Install one or more supplementary hangers, as necessary, along the inside and outside arcs of large radius elbows of any angle whenever the lengths of these arcs exceed the maximum hanger spacing length for that particular size duct.
 - 7. Provide at least one set of hangers for short duct branches 3 feet or less in length.
 - 8. Provide each duct riser with a minimum of two supports completely spanning the shaft opening at each floor. One pair of supports may be used to support more than one duct riser, provided that the strength of the supports is increased appropriately and proper additional supplementary steel is used at the extra risers.
 - 9. Support duct risers, located between floors that are more than 15 feet high, at each floor and halfway points between floors. The distance between intermediate supports on very high floors should not exceed 12 feet. Intermediate hangers may be supported from an adjacent wall or hung by rods from supports on the floor above.
 - 10. Provide one or more sets of hangers for equipment in duct runs such as heating coils, heat pumps, etc., as recommended by their manufacturers.
 - 11. Hangers shall not be attached to metal roof deck.
- D. Maximum permitted hanger spacing:
 - 1. Ducts with areas up to 4 square feet may have their hangers spaced up to 8 feet apart.
 - 2. Ducts with areas 4.1 to 10 square feet may have their hangers spaced not more than 6 feet apart.
 - 3. Ducts with areas over 10 square feet may have their hangers located up to 4 feet apart.
- E. Provide and install locking manual volume dampers in all duct systems as required for controlling air volumes to trunk ducts, branch ducts, outlets and inlets. Provide and install additional volume dampers as required by Testing and Balancing Contractor for balancing of system.
- F. All connections shall be sealed, including but not limited to branch connections, spin-ins, taps, access doors, access panels and connections to equipment. Openings for rotating shafts shall be sealed with bushings or other devices that seal off air leakage.
- G. Duct sizes shown on drawings are net inside dimensions and sheet metal size shall be increased to allow for duct linings.
- H. Install as indicated on the drawings all duct mounted equipment as specified in other sections.
- I. Install eccentric reducers with tops of both duct sizes flush to maintain maximum ceiling space below ducts.
- J. Openings:
 - 1. Provide in ductwork to accommodate access doors, temperature control components and fire dampers.
 - 2. Install access panels for inspection and servicing of all duct mounted equipment including, but not limited to: reheat coils, sound attenuators, motorized dampers, airflow measuring stations, smoke and fire dampers.

3. Provide pitot tube openings for testing of systems, complete with metal cap, with spring device or screw to ensure against air leakage.
 4. Where openings are provided in insulated ductwork, install insulation materials inside metal collar.
 5. For kitchen exhaust hood grease ductwork, provide cleanouts as required by code. In general, for horizontal ducts cleanouts shall be spaced not more than 20 feet apart and be located not more than 10 feet from changes in direction that are greater than 45 degrees. For vertical ducts, provide a cleanout on each floor level. Provide a cleanout at the inlet of sidewall and roof mounted exhaust fans and at inlet and outlet of in-line fans.
- K. Locate ducts with sufficient space around equipment to allow normal operating and maintenance activities.
- L. Connections:
1. Connect duct to equipment with flexible fabric, sheet metal clips, screws and washers.
 2. At each point where ducts pass through partitions, provide sleeve with space between duct and sleeve packed with insulation and sealed.

3.2 ADJUSTING AND CLEANING

- A. Cleaning:
1. Clean ductwork internally, as it is installed, of dust and debris.
 2. Clean external surfaces of foreign substances which might cause corrosive deterioration of metal or where ductwork is to be painted.
- B. Temporary Closure:
1. At ends of ducts which are not connected to equipment or air distribution devices at time of ductwork installation or that are on-site but not yet installed, provide temporary closure of polyethylene film or other covering until time connections are to be completed.

END OF SECTION

SECTION 23 3300 AIR DUCT ACCESSORIES

PART 1 GENERAL

1.1 SECTION INCLUDES:

- A. Manual volume dampers.
- B. Turning vanes.
- C. Flexible connectors.
- D. Duct accessory hardware.

1.2 SUBMITTALS

- A. Product Data: For each type of product.

PART 2 PRODUCTS

2.1 ASSEMBLY DESCRIPTION

- A. Comply with NFPA 90A, "Installation of Air Conditioning and Ventilating Systems."
- B. Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" for acceptable materials, material thicknesses, and duct construction methods unless otherwise indicated. Sheet metal materials shall be free of pitting, seam marks, roller marks, stains, discolorations, and other imperfections.

2.2 MATERIALS

- A. Galvanized Sheet Steel: Comply with ASTM A 653/A 653M.
 - 1. Galvanized Coating Designation: G60.
 - 2. Exposed-Surface Finish: Mill phosphatized.
- B. Reinforcement Shapes and Plates: Galvanized-steel reinforcement where installed on galvanized sheet metal ducts; compatible materials for aluminum and stainless-steel ducts.
- C. Tie Rods: Galvanized steel, 1/4-inch minimum diameter for lengths 36 inches or less; 3/8-inch minimum diameter for lengths longer than 36 inches.

2.3 MANUAL VOLUME DAMPERS

- A. Standard, Steel, Manual Volume Dampers:
 - 1. Standard leakage rating.
 - 2. Suitable for horizontal or vertical applications.
 - 3. Frames:
 - a. Frame: Hat-shaped, 0.094-inch- thick, galvanized sheet steel.
 - b. Mitered and welded corners.
 - c. Flanges for attaching to walls and flangeless frames for installing in ducts.
 - 4. Blades:
 - a. Multiple or single blade.
 - b. Parallel- or opposed-blade design.
 - c. Stiffen damper blades for stability.
 - d. Galvanized-steel, 0.064 inch thick.
 - 5. Blade Axles: Galvanized steel.
 - 6. Bearings:
 - a. Molded synthetic.
 - b. Dampers in ducts with pressure classes of 3-inch wg or less shall have axles full length of damper blades and bearings at both ends of operating shaft.
 - 7. Tie Bars and Brackets: Galvanized steel.
- B. Jackshaft:
 - 1. Size: 0.5-inch diameter.

2. Material: Galvanized-steel pipe rotating within pipe-bearing assembly mounted on supports at each mullion and at each end of multiple-damper assemblies.
3. Length and Number of Mountings: As required to connect linkage of each damper in multiple-damper assembly.
- C. Damper Hardware:
 1. Zinc-plated, die-cast core with dial and handle made of 3/32-inch- thick zinc-plated steel, and a 3/4-inch hexagon locking nut.
 2. Include center hole to suit damper operating-rod size.
 3. Include elevated platform for insulated duct mounting.

2.4 TURNING VANES

- A. Manufactured Turning Vanes for Metal Ducts: Curved blades of galvanized sheet steel; support with bars perpendicular to blades set; set into vane runners suitable for duct mounting.
 1. Acoustic Turning Vanes: Fabricate airfoil-shaped aluminum extrusions with perforated faces and fibrous-glass fill.
- B. General Requirements: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible"; Figures 4-3, "Vanes and Vane Runners," and 4-4, "Vane Support in Elbows."
- C. Vane Construction: Single wall.

2.5 FLEXIBLE CONNECTORS

- A. Materials: Flame-retardant or noncombustible fabrics.
- B. Coatings and Adhesives: Comply with UL 181, Class 1.
- C. Metal-Edged Connectors: Factory fabricated with a fabric strip 3-1/2 inches wide attached to two strips of 2-3/4-inch- wide, 0.028-inch- thick, galvanized sheet steel or 0.032-inch- thick aluminum sheets. Provide metal compatible with connected ducts.
- D. Indoor System, Flexible Connector Fabric: Glass fabric double coated with neoprene.
 1. Minimum Weight: 26 oz./sq. yd..
 2. Tensile Strength: 480 lbf/inch in the warp and 360 lbf/inch in the filling.
 3. Service Temperature: Minus 40 to plus 200 deg F.

2.6 DUCT ACCESSORY HARDWARE

- A. Instrument Test Holes: Cast iron or cast aluminum to suit duct material, including screw cap and gasket. Size to allow insertion of pitot tube and other testing instruments and of length to suit duct-insulation thickness.
- B. Adhesives: High strength, quick setting, neoprene based, waterproof, and resistant to gasoline and grease.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install duct accessories according to applicable details in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" for metal ducts and in NAIMA AH116, "Fibrous Glass Duct Construction Standards," for fibrous-glass ducts.
- B. Install duct accessories of materials suited to duct materials; use galvanized-steel accessories in galvanized-steel and fibrous-glass ducts, stainless-steel accessories in stainless-steel ducts, and aluminum accessories in aluminum ducts.
- C. Install volume dampers at points on supply, return, and exhaust systems where branches extend from larger ducts.
 1. Install steel volume dampers in steel ducts.
- D. Set dampers to fully open position before testing, adjusting, and balancing.
- E. Install test holes at fan inlets and outlets and elsewhere as indicated.
- F. Install access doors with swing against duct static pressure.
- G. Install flexible connectors to connect ducts to equipment.
- H. Install duct test holes where required for testing and balancing purposes.

3.2 FIELD QUALITY CONTROL

A. Tests and Inspections:

1. Operate dampers to verify full range of movement.
2. Inspect locations of access doors and verify that purpose of access door can be performed.
3. Operate remote damper operators to verify full range of movement of operator and damper.
4. Inspect turning vanes for proper and secure installation.

END OF SECTION

SECTION 23 3713 DIFFUSERS, REGISTERS, AND GRILLES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Diffusers, Registers, and Grilles.

1.2 SUBMITTALS

- A. Product Data: For each product indicated, include the following:
 - 1. Data Sheet: Indicate performance data including throw and drop, static-pressure drop, and noise ratings.
 - 2. Schedule: Indicate room location, quantity, model number, size, and accessories.

PART 2 PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Acceptable Manufacturers
 - 1. Greenheck
 - 2. Carnes
 - 3. Titus
 - 4. Price
 - 5. Krueger
 - 6. Nailor
- B. Diffusers, registers, and grilles shall be of the type and style as scheduled.

PART 3 – EXECUTION

3.1 INSTALLATION

- A. Install diffusers, registers and grilles level and plumb.
- B. Outlets and Inlets Locations: Drawings indicate general arrangement of ducts, fittings, and accessories. Air outlet and inlet locations have been indicated to achieve design requirements for air volume, noise criteria, airflow pattern, throw, and pressure drop. Make final locations where indicated, as much as practical. For units installed in lay-in ceiling panels, locate units in the center of panel. Where architectural features or other items conflict with installation, notify Architect for a determination of final location.
- C. Install diffusers, registers and grilles with airtight connections to ducts and to allow service and maintenance of dampers.
- D. Install wall mounted grilles and registers plumb and level and flush to surface. Locations may be altered slightly, as acceptable to the Design Professional, so as to fit masonry portions of the structure.
- E. In grid panel type ceilings, lay-in metal pan, acoustical, etc., grilles, registers and diffusers shall be located in the center of the panel.
- F. Coordinate locations of ceiling diffusers and registers with Design Professional's reflected ceiling plan. Where architectural features or other items conflict with installation, notify Design Professional for determination of final location.
- G. Adjust blow pattern as indicated on plans and as scheduled, prior to balancing.

END OF SECTION

SECTION 23 6500 CLOSED CIRCUIT COOLERS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. factory assembled and tested, closed circuit mechanical forced-draft vertical discharge closed circuit cooler.

1.2 SUBMITTALS

- A. Submit manufacturer's catalog cuts for each type of device to be used.
- B. Product Data: For each product indicated, include the following:
 - 1. Data Sheet: Indicate materials of construction, finish, and mounting details; and performance data including throw and drop, static-pressure drop, and noise ratings.
 - 2. Diffuser, Register, and Grille Schedule: Indicate drawing designation, room location, quantity, model number, size, and accessories furnished.
- C. Operation and Maintenance Data: Each unit to include operation and maintenance manual.

1.3 WARRANTY

- A. Submit a written warranty executed by the manufacturer, agreeing to repair or replace components of the unit that fail in materials and workmanship within the specified warranty period.
 - 1. The Entire Unit shall have a comprehensive one (1) year warranty against defects in materials and workmanship from startup, not to exceed eighteen (18) month from shipment of the unit.
 - 2. Fan Motor/Drive System: Warranty Period shall be Five (5) years from date of unit shipment from Factory (fan motor(s), fan(s), fan shaft(s), bearings, mechanical support, sheaves, bushings and belt(s)).
 - 3. Heat Transfer Coil: Warranty Period shall be One (1) year from date of unit shipment from Factory.

PART 2 PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Acceptable Manufacturers
 - 1. EvapCo
 - 2. Design Professional approved equivalent.

2.2 THERMAL PERFORMANCE

- A. Each unit shall be capable to cool 100.0 GPM of water entering at 103.0° F leaving at 90.0° F at a design entering wet bulb of 79.2° F with a pressure drop across the coil not to exceed 6.83 psi.

2.3 COMPONENTS

- A. Description: Factory assembled and tested, forced draft counter flow closed circuit cooler.
- B. Materials of Construction
 - 1. All panels including the fan snouts, housings and supports shall be constructed of heavy gauge mill hot-dip galvanized steel. All galvanized steel shall be coated with a minimum of 2.35 ounces of zinc per square foot of zinc per square foot of area (G-235 Hot-Dip Galvanized Steel designation). During fabrication, all galvanized steel panel edges shall be coated with a 95% pure zinc-rich compound.
All evaporative cooling equipment utilizing galvanized construction require initial passivation to maximize the service life of the equipment. The site's water treatment vendor should be contacted several weeks prior to adding any water to the system to provide a passivation plan along with associated passivation plan costs.

- C. Fan(s):
 - 1. Fans shall be forward curved centrifugal of hot dipped galvanized construction. The fans shall be factory installed, and statically and dynamically balanced for vibration free operation.
- D. Drift Eliminators
 - 1. Drift eliminators shall be constructed entirely of Polyvinyl Chloride (PVC) in easily handled sections. Design shall incorporate three changes in air direction and limit the water carryover to a maximum of 0.001% of the recirculating water rate. Drift eliminators shall be self-extinguishing, have a flame spread of less than 25 under ASTM E84, and shall be resistant to rot, decay and biological attack.
- E. Water Distribution System
 - 1. Spray nozzles shall be precision molded ABS with large orifice threaded into branch piping with internal sludge ring to eliminate clogging. Spray header and branches shall be schedule 40 Polyvinyl Chloride (PVC) for corrosion resistance.
- F. Heat Transfer Media
 - 1. Heat transfer coil shall be elliptical tubes of prime surface steel, encased in steel framework with entire assembly hot-dip galvanized after fabrication. All coil rows shall feature extended surface fins designed with sloping tubes for liquid drainage. Coil shall have design pressure of 300 psi and shall be in compliance with ASME/ANSI B31.5, Refrigeration Piping and Heat Transfer Components. The coil assembly shall be strength tested in accordance with ASME/ANSI B31.5 and subsequently leak tested using air under water.
All evaporative cooling equipment utilizing galvanized construction require initial passivation to maximize the service life of the equipment. The site's water treatment vendor should be contacted several weeks prior to adding any water to the system to provide a passivation plan along with associated passivation plan costs.
- G. Pump
 - 1. Unit shall have EISA close-coupled centrifugal pump with mechanical seal. The pump shall be installed in a vertical position so that water will drain from the pump when the cold water basin is emptied. Pump motor shall be totally enclosed with protective canopy for outdoor operation.
- H. Bleed-off
 - 1. Unit shall have a waste water bleed line with a manual adjustable valve provided.
- I. Air Inlet Screens
 - 1. Protective screens shall be provided over air inlet
- J. Electronic Water Level Control
 - 1. Electronic water level control package shall have five (5) stainless steel water level sensors (one (1) high level, one (1) high level alarm, one (1) low level, one (1) low level alarm and one (1) ground) with a NEMA 4x enclosure mounted in a cleanable Schedule 40 PVC external standpipe with slow closing solenoid valve(s) and "y" strainer(s). Wiring is not included and components must be field mounted. Valves shall be sized for 25 psi minimum to 125 psi maximum pressure. Standpipe may require heat tracing by others in cold weather applications.
- K. Pan Strainer
 - 1. Pan Strainer(s) shall be all Type 304 Stainless Steel construction with large area removable perforated screens.
- L. Pipe Connection Type
 - 1. Any connections provided with a Groove (GVD) or Beveled for Welding/Grooved (BFW/GVD) shall conform to standard groove specification (SGS).

2.4 MOTORS AND DRIVES

- A. Fan Motor
 - 1. Fan motor(s) shall be totally enclosed, ball bearing type electric motor(s) suitable for moist air service. Motor(s) are Premium Efficient, Class F insulated, 1.15 service factor design.

- Inverter rated per NEMA MG1 Part 31.4.4.2 and suitable for variable torque applications and constant torque speed range with properly sized and adjusted variable frequency drives.
2. Fan motor(s) shall include strip-type space heaters with separate leads brought to the motor conduit box.
- B. Fan Drive
1. The fan drive shall be V-belt type with QD tapered bushings designed for 150% of the motor nameplate power. The belt material shall be neoprene reinforced with polyester cord and specifically designed for evaporative equipment service. Belt adjustment shall be accomplished from the exterior of the unit.
- C. Fan Shaft
1. Fan shaft shall be solid, ground and polished steel. Exposed surface shall be coated with rust preventative.
- D. Fan Shaft Bearings
1. Fan Shaft Bearings shall be heavy-duty, self-aligning ball type bearings with extended lubrication lines to grease fittings located on exterior of unit.
- E. Vibration Switch
1. Unit shall be provided with a Vibration Cutout Switch, operating on 125 VAC feed, to protect the fan and drive assembly from damage in the event of excess vibration. Vibration switch shall be DPDT.

2.5 MAINTENANCE ACCESS

- A. Fan Section
1. Fan screens shall be removable for fan motor and drive access at grade.
- B. Basin Section
1. Circular access door shall be located above the basin to allow for easy access to pan interior

2.6 ACCESSORIES

- A. Basin Heater Package
1. Cold water basin shall be fitted with copper element, electric immersion heater(s) with a separate thermostat and low water protection device. Heaters shall be selected to maintain +40° F pan water at -40 °F ambient temperature.
 2. Electric immersion heater package shall include a factory-supplied NEMA 4x enclosure containing a magnetic contactor with 125 VAC control circuit, transformer, and main power disconnect. Control package wired by others.

2.7 WATER TREATMENT SYSTEM

- A. Tie into the County Jail's existing water treatment system. Confirm with Owner on chemistry if any makeup is needed with new equipment tie-in.

PART 3 EXECUTION

3.1 GENERAL

- A. Installation of water system will include:
1. All components shall be mounted by the evaporative equipment manufacturer during unit construction and prior to shipment from the factory.
 2. Supply all components (coils, transformers, conductivity meters, blow down valves etc.) necessary for a completely automated stand-alone system. Blow down valves shall be motorized ball valves power open, spring return factory mounted during unit construction.
 3. Immediately after hydrostatic testing of piping is completed the mechanical contractor shall drain, flush, clean and passivate all systems. Subsequent to the cleaning process, each system shall be re-filled with clean water prior to the system being placed into

- operation. Once filled the condenser water pump and cooling tower fans shall be operated until conductivity set point is achieved.
4. Mechanical contractor shall pipe all bleed and drain lines to sanitary sewer.
 5. If the working height of the water treatment system will be elevated, there shall be a safe way to service the system provided.
- B. Provide all consulting services, for a period of 1-year from start-up of the cooling system, which will include:
1. Installation and system start-up procedure recommendations.
 2. Pre-operation system clean-out procedure supervision.
 3. Initial water analysis and recommendations.
 4. Training of operating personnel on proper feeding and control techniques.
 5. Monthly field service visits during wet operation.
 6. Any necessary log sheets and record forms
- C. All services will be provided by a factory authorized service provider of the evaporative closed-circuit cooler manufacturer.

END OF SECTION

SECTION 23 7416 PACKAGED ROOFTOP UNITS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Packaged Rooftop air conditioners

1.2 ACTION SUBMITTALS

- A. Shop Drawings: Indicate assembly, unit dimensions, weight loading, required clearances, construction details, field connection details, electrical characteristics, and connection requirements.
- B. Product Data:
 - 1. Provide literature that indicates dimensions, weight loading, required clearances, construction details, field connection details, electrical characteristics, and connection requirements.
 - 2. Provide computer generated fan curves with specified operating point clearly plotted.
 - 3. Manufacturer's installation instructions.

1.3 OPERATION AND MAINTENANCE DATA

- A. Maintenance Data: Provide instructions for installation, maintenance, and service

1.4 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing the Products specified in this section with minimum five years documented experience, who issues complete catalog data on total product.
- B. Startup must be done by trained personnel experienced with rooftop equipment.
- C. Do not operate units for any purpose, temporary or permanent, until ductwork is clean, filters and remote controls are in place, bearings lubricated, and manufacturers' installation instructions have been followed.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, protect and handle products to site.
- B. Accept products on site and inspect for damage.
- C. Store in clean dry place and protect from weather and construction traffic. Handle carefully to avoid damage to components, enclosures, and finish.

PART 2 PRODUCTS

2.1 PACKAGED ROOFTOP AIR CONDITIONERS

- A. Manufacturers
 - 1. Trane – Design Basis.
 - 2. Design Professional Approved Equivalent
- B. General Description
 - 1. The complete unit shall be cETLus listed.
 - 2. The unit shall be ASHRAE 90.1-2016 compliant and labeled.
 - 3. Unit shall be specifically designed for outdoor rooftop application and include a weatherproof cabinet. Each unit shall be completely factory assembled and shipped in one piece. Packaged units shall be shipped fully charged with R-454B (or equivalent refrigerant approved for use by EPA and all Federal Regulations) Refrigerant and oil.
 - 4. The unit shall undergo a complete factory run test prior to shipment. The factory test shall include a refrigeration circuit run test, a unit control system operations checkout, a unit refrigerant leak test and a final unit inspection.

5. All units shall have decals and tags to indicate caution areas and aid unit service. Unit nameplates shall be fixed to the main control panel door. Electrical wiring diagrams shall be attached to the control panels. Installation, operating and maintenance bulletins and start-up forms shall be supplied with each unit.
 6. Performance: All scheduled EER, IEER, capacities and face areas are minimum accepted values. All scheduled amps, kW, and HP are maximum accepted values that allow scheduled capacity to be met.
 7. Warranty: The manufacturer shall provide 12-month parts only warranty. Defective parts shall be repaired or replaced during the warranty period at no charge. The warranty period shall commence at startup or six months after shipment, whichever occurs first.
- C. Cabinet, Casing, And Frame
1. Panel construction shall be single-wall construction for all panels. All floor panels shall have a solid galvanized steel inner liner on the air stream side of the unit to protect insulation during service and maintenance. Insulation shall be a minimum of 1/8" thick closed-cell insulation or equivalent to deliver an R-value of 7.0. Panel design shall include no exposed insulation edges. Unit cabinet shall be designed to operate at total static pressures up to 5.0 inches w.g.
 2. Exterior surfaces shall be constructed of zinc coated galvanized steel, for long-term durability. Finished, unabraded panel surfaces shall be exposed to an ASTM B117 salt spray environment and exhibit no visible red rust at a minimum of 3,000 hours exposure. Finished, abraded surfaces shall be tested per ASTM D1654, having a mean scribe creepage not exceeding 1/16" at 1,000 hours minimum exposure to an ASTM B117 salt spray environment. Measurements of results shall be quantified using ASTM D1654 in conjunction with ASTM D610 and ASTM D714 to evaluate blister and rust ratings.
 3. Service doors shall be provided on the fan section, filter section, control panel section, and heating vestibule in order to provide user access to unit components. All service access doors shall have handles and gasket sealed to prevent water leakage.
 4. The unit base shall overhang the roof curb for positive water runoff and shall seat on the roof curb gasket to provide a positive, weathertight seal. Lifting brackets shall be provided on the unit base to accept cable or chain hooks for rigging the equipment.
- D. Outdoor/Return Air Section
1. Unit shall be provided with an outdoor air economizer section. The economizer section shall include outdoor, return, exhaust air dampers and powered exhaust fan(s). The outdoor air hood shall be factory installed and constructed from galvanized steel finished with the same durable coating finish as the main unit. The damper shall be parallel blade design. Damper blades shall be gasketed with side seals to provide an air leakage rate of 1.5 cfm / square foot of damper area at 1-inch differential pressure according to testing defined in AMCA 500.
- E. Filters
1. Unit shall be provided with a draw-through filter section. The filter rack shall be designed to accept a 2" filter. The unit design shall have an access door for the filter section. The manufacturer shall ship the rooftop unit with 2-inch MERV8 construction filters. The contractor shall furnish and install, at building occupancy, the final set of 2-inch MERV13 filters per the contract documents.
- F. Supply Fan
1. Supply fan shall be direct driven, backward-curved, plenum fans with external rotor direct drive variable speed motor. The supply fan motors shall be circuit breaker protected.
 2. All fan assemblies shall be statically and dynamically balanced at the factory, including a final trim balance, prior to shipment.
 3. The fan motor shall be a totally enclosed EC motor that is speed controlled by the rooftop unit controller. The motor shall include thermal overload protection and protect the motor in the case of excessive motor temperatures. The motor shall have phase failure protection and prevent the motor from operation in the event of a loss of phase. Motors shall be premium efficiency.

G. Cooling Section - Cooling Coil

1. Standard Aluminum Fin-Copper Tube Coils:
 - a. Standard evaporator and condenser coils shall have aluminum lanced plate fins mechanically bonded to seamless internally grooved copper tubes with all joints brazed.
 - b. Evaporator coils shall be leak tested to 150 psig, pressure tested to 450 psig, and qualified to UL 1995 burst test at 1775 psig.
 - c. Condenser coils shall be leak tested to 150 psig, pressure tested to 650 psig, and qualified to UL 60335-2-40 burst test at 1980 psig.
2. Refrigerant Components:
 - a. Refrigerant circuit shall include the following control, safety, and maintenance features:
 - 1) Thermostatic Expansion Valve (TXV) shall help provide optimum performance across the entire operating range. Shall contain removable power element to allow change out of power element and bulb without removing the valve body.
 - 2) Refrigerant filter drier — Solid core design with pre and post filter service gauge connections for filter diagnostics and maintenance.
 - 3) Service gauge connections on suction and discharge lines.
 - 4) Pressure gauge access through a specially designed access port in the unit.
 - b. There shall be gauge line access port in the skin of the rooftop, covered by a black, removable plug.
 - 1) The plug shall be easy to remove and replace.
 - 2) When the plug is removed, the gauge access port shall enable maintenance personnel to route their pressure gauge lines.
 - 3) This gauge access port shall facilitate correct and accurate condenser pressure readings by enabling the reading with the compressor access panel on.
 - 4) The plug shall be made of leak proof, UV-resistant, composite material.
3. Compressors:
 - a. Unit shall use tandem scroll compressor assembly on single independent refrigeration circuit with two stages of cooling for efficient comfort cooling operation.
 - b. Evaporator coils shall be a full active design to help better control comfort latent removal and minimize unconditioned bypass air.
 - c. Compressor motors shall be cooled by refrigerant gas passing through motor windings.
 - d. Compressors shall be internally protected from high discharge temperature conditions.
 - e. Compressors shall be protected from an over-temperature and over-amperage conditions by an internal, motor overload device.
 - f. Compressor shall be factory-mounted on rubber grommets.
 - g. Compressor motors shall have internal line break thermal, current overload and high-pressure differential protection.
 - h. Crankcase heaters shall not be required for normal operating range, unless required by the manufacturer due to refrigerant charge limits

H. Evaporator Fan and Motor:

1. Direct Drive Evaporator Fan Motor:
 - a. Shall be a ECM motor design.
 - b. Shall be direct drive design for all static options.
 - c. Shall have permanently lubricated bearings.
 - d. Shall have inherent automatic-reset thermal overload protection.
 - e. Shall have slow ramp up to speed capabilities.
 - f. Shall require no fan/motor belts for operation, adjustments and or initial fan speed set up.

- g. Fan DC voltage set up on Unit Control Board shall eliminate the need of removal of blower access door, required on conventional belt drive systems.
 - h. Shall be internally protected from electrical phase reversal.
 - 2. Evaporator Fan:
 - a. Shall be easily set with dedicated selection switch and adjustment pot on unit control board.
 - b. Shall provide 2 stage cooling capacity control, the indoor fan speed is automatically controlled to meet the code-compliant low fan speed and 100% at full fan speed operation.
 - c. Blower fans shall be a Vane Axial fan design with fan assembly secured directly to ECM motor. Additional shafts, belts, pulleys/sheaves, and bearing blocks to drive fan shall not be permitted or necessary.
 - d. Additional variable frequency drive to control fan motor speed shall not be permitted or necessary. All speed control electronics must be onboard fan motor assembly.
 - e. Shall be constructed of a cast aluminum stator and high impact composite material on rotor and air inlet casing.
 - f. Shall be a patented / pending design with a corrosion resistant material.
 - g. Fan assembly design shall be integrated to fan deck, dynamically balanced, and require no additional vibration isolation for normal operation.
 - h. Shall have slow ramp up to speed capabilities to help reduce sound and comfort issues typically associated with single speed belt drive systems.
 - i. Units shall contain 2 separate vane axial fan assemblies.
 - j. Shall be a slide out design with removal of a few support brackets.
 - 3. Shall include an easily accessible Unit Control Board to conveniently and safely provide connection points for vital control functions such as: smoke detectors, phase monitor, gas controller, economizer, thermostat, DDC control options, and low and high pressure switches. Controller shall also provide an intuitive means to adjust the indoor fan speed through a simple switch and pot adjustment design.
 - I. Condenser Fans and Motors:
 - 1. Condenser Fan Motors:
 - a. Shall be a totally enclosed motor.
 - b. Shall use permanently lubricated bearings.
 - c. Shall have inherent thermal overload protection with an automatic reset feature.
 - d. Shall use a shaft-down design on all sizes.
 - 2. Condenser Fans:
 - a. Shall be a direct-driven propeller type fan.
 - b. Shall have galvalum blades riveted to steel spider that have corrosion-resistant properties and shall be dynamically balanced.
 - J. Hot Gas Reheat (HGRH)
 - 1. The unit shall be equipped with a hot gas reheat coil with hot gas supplied from the unit condenser.
 - 2. The unit shall have a space mounted humidity sensor/humidistat with a deadband between 40% and 60%.
 - K. Natural Gas Heating Section
 - 1. General:
 - a. Heat exchanger shall be an induced draft design. Positive pressure heat exchanger designs shall not be allowed.
 - b. Shall incorporate a direct-spark ignition system and redundant main gas valve.
 - c. Gas supply pressure at the inlet to the roof-top unit gas valve must match that required by the manufacturer.
 - 2. The heat exchanger shall be controlled by an integrated gas controller (IGC) microprocessor.

- a. IGC board shall notify users of fault using an LED (light-emitting diode).
 - b. The LED shall be visible without removing the control box access panel.
 - c. IGC board shall contain algorithms that modify evaporator fan operation to prevent future cycling on high temperature limit switch.
 - d. Unit shall be equipped with anti-cycle protection with one short cycle on unit flame rollout switch or 4 continuous short cycles on the high temperature limit switch. Fault indication shall be made using an LED.
 3. Stainless Steel Heat Exchanger Construction:
 - a. Use energy saving, direct-spark ignition system.
 - b. Use a redundant main gas valve.
 - c. Burners shall be of the in-shot type constructed of aluminum-coated steel.
 - d. All gas piping shall enter the unit cabinet at a single location on side of unit (horizontal plane).
 - e. The optional stainless steel heat exchanger shall be of the tubular-section type, constructed of a minimum of 20 gauge type 409 stainless steel.
 - f. Type 409 stainless steel shall be used in heat exchanger tubes and vestibule plate.
 - g. Complete stainless steel heat exchanger allows for greater application flexibility.
 4. Induced Draft Combustion Motor and Blower
 - a. Shall be a direct-drive, single inlet, forward-curved centrifugal type.
 - b. Shall be made from steel with a corrosion resistant finish.
 - c. Shall have permanently lubricated sealed bearings.
 - d. Shall have inherent thermal overload protection.
 - e. Shall have an automatic reset feature.
 5. The natural gas heating section shall be fully modulating providing a minimum 10:1 turndown.
- L. Electrical
1. Unit wiring shall comply with NEC requirements and with all applicable UL standards. All electrical components shall be UL recognized where applicable. All wiring and electrical components provided with the unit shall be number and color-coded and labeled according to the electrical diagram provided for easy identification. The unit shall be provided with a factory wired weatherproof control panel. Unit shall have a single point power terminal block for main power connection. A terminal board shall be provided for low voltage control wiring. Branch short circuit protection, 115-volt control circuit transformer and fuse, system switches, and a high temperature sensor shall also be provided with the unit. Each compressor and condenser fan motor shall be furnished with contactors and inherent thermal overload protection. Supply fan motors shall have contactors and external overload protection. Knockouts shall be provided in the bottom of the main control panels for field wiring entrance.
 2. A single non-fused disconnect switch shall be provided for disconnecting electrical power at the unit. Disconnect switches shall be mounted internally to the control panel and operated by an externally mounted handle.
- M. Roof Curb
1. Provide curb adapter to house the packaged rooftop unit.
 2. Materials: Galvanized steel with corrosion-protection coating, watertight gaskets, and factory-installed wood nailer; complying with NRCA standards.
 - a. Curb Insulation and Adhesive: Comply with NFPA 90A or NFPA 90B.
 - 1) Materials: ASTM C 1071, Type I or II.
 - 2) Thickness: 1 inch.
 - b. Application: Factory applied with adhesive and mechanical fasteners to the internal surface of curb.
 - 1) Liner Adhesive: Comply with ASTM C 916, Type I.
 - 2) Mechanical Fasteners: Galvanized steel, suitable for adhesive attachment, mechanical attachment, or welding attachment to duct without damaging liner

- when applied as recommended by manufacturer and without causing leakage in cabinet.
- 3) Liner materials applied in this location shall have airstream surface coated with a temperature-resistant coating or faced with a plain or coated fibrous mat or fabric depending on service air velocity.
- 4) Liner Adhesive: Comply with ASTM C 916, Type I.
- 3. Curb Dimensions: Height of 20-inch.
- N. Controls
 - 1. Provide terminal strip for integration into Johnson Control building automation system. Do not provide packaged rooftop units with factory controls.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of RTUs.
- B. Examine roughing-in for RTUs to verify actual locations of piping and duct connections before equipment installation.
- C. Examine roofs for suitable conditions where RTUs will be installed.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Roof Curb: Install on roof structure, level and secure, according to NRCA's "NRCA Roofing Manual: Membrane Roof Systems." Install RTUs on curbs and coordinate roof penetrations and flashing with roof construction specified in Section 077200 "Roof Accessories." Secure RTUs to upper curb rail, and secure curb base to roof framing or concrete base with anchor bolts.
- B. Unit Support: Install unit level on structural curbs. Coordinate wall penetrations and flashing with wall construction. Secure RTUs to structural support with anchor bolts.

3.3 CONNECTIONS

- A. Comply with duct installation requirements specified in other HVAC Sections. Drawings indicate general arrangement of ducts. The following are specific connection requirements:
 - 1. Install ducts to termination at top of roof curb.
 - 2. Remove roof decking only as required for passage of ducts. Do not cut out decking under entire roof curb.
 - 3. Connect supply ducts to RTUs with flexible duct connectors specified in Section 23 3300 "Air Duct Accessories."
 - 4. Install return-air duct continuously through roof structure.
- B. Install condensate drain, minimum connection size, with trap and indirect connection to nearest roof drain or area drain.
- C. Connect electrical wiring according to Section 26 0519 "Low-Voltage Electrical Power Conductors and Cables."
- D. Ground equipment according to Section 26 0526 "Grounding and Bonding for Electrical Systems."

3.4 FIELD QUALITY CONTROL

- A. Manufacturer's Field Service: Test and inspect components, assemblies, and equipment installations, including connections.
- B. Perform tests and inspections with the assistance of a factory-authorized service representative.
- C. Tests and Inspections:
 - 1. After installing RTUs and after electrical circuitry has been energized, test units for compliance with requirements.
 - 2. Inspect for and remove shipping bolts, blocks, and tie-down straps.

3. Operational Test: After electrical circuitry has been energized, start units to confirm proper motor rotation and unit operation.
 4. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
- D. RTU will be considered defective if it does not pass tests and inspections.
E. Prepare test and inspection reports.

3.5 STARTUP SERVICE BY EQUIPMENT MANUFACTURER

- A. Startup must be done by trained personnel experienced with rooftop equipment.

3.6 CLEANING AND ADJUSTING

- A. Occupancy Adjustments: When requested within 12 months from date of Substantial Completion, provide on-site assistance in adjusting system to suit actual occupied conditions. Provide up to two visits to Project during other-than-normal occupancy hours for this purpose.
- B. After completing system installation and testing, adjusting, and balancing RTU and air-distribution systems, clean filter housings and install new filters.

END OF SECTION

SECTION 23 8126 MINI-SPLIT AIR CONDITIONERS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Wall-hung unit ventilator and air-cooled condensing unit heat pump.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated. Include rated capacities, operating characteristics, and furnished specialties and accessories. Include performance data in terms of capacities, outlet velocities, static pressures, sound power characteristics, motor requirements, and electrical characteristics.

1.3 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For split-system air-conditioning units to include in emergency, operation, and maintenance manuals.

1.4 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Filters: One set(s) for each unit ventilator.

1.5 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of split-system air-conditioning units that fail in materials or workmanship within specified warranty period.
 - 1. Warranty Period:
 - a. For Compressor: Seven years from date of Substantial Completion.
 - b. For Parts: One year from date of Substantial Completion.
 - c. For Labor: One year from date of Substantial Completion from installing contractor.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Mitsubishi
- B. Engineer approved equivalent

2.2 INDOOR WALL MOUNT UNITS

- A. Description: Factory-assembled complete unit with components, piping, wiring, and controls required for mating to ductwork, piping, power, and controls field connections.
- B. Cabinet:
 - 1. Material: Painted steel, or coated steel frame covered by a plastic cabinet, with an architectural acceptable finish suitable for tenant occupancy on exposed surfaces.
 - 2. Insulation: Manufacturer's standard internal insulation, complying with ASHRAE 62.1, to provide thermal resistance and prevent condensation.
 - 3. Mounting: Manufacturer-designed provisions for field installation.
 - 4. Internal Access: Removable panels of adequate size for field access to internal components for inspection, cleaning, service, and replacement.
- C. DX Coil Assembly:
 - 1. Coil Casing: Aluminum, galvanized, or stainless steel.
 - 2. Coil Fins: Aluminum, mechanically bonded to tubes, with arrangement required by performance.
 - 3. Coil Tubes: Copper, of diameter and thickness required by performance.
 - 4. Expansion Valve: Electronic modulating type with linear or proportional characteristics.

5. Internal Tubing: Copper tubing with brazed joints.
6. Internal Tubing Insulation: Manufacturer's standard insulation, of thickness to prevent condensation.
7. Field Piping Connections: Manufacturer's standard.
8. Factory Charge: Dehydrated air or nitrogen.
9. Testing: Factory pressure tested and verified to be without leaks.
- D. Drain Assembly:
 1. Pan: Non-ferrous material, with bottom sloped to low point drain connection.
 2. Condensate Removal: Unit-mounted pump or other integral lifting mechanism, capable of lifting drain water to an elevation above top of cabinet.
 3. Field Piping Connection: Non-ferrous material.
- E. Fan and Motor Assembly:
 1. Fan(s):
 - a. Direct-drive arrangement.
 - b. Single or multiple fans connected to a common motor shaft and driven by a single motor.
 - c. Fabricated from non-ferrous components or ferrous components with corrosion protection finish.
 - d. Wheels statically and dynamically balanced.
 2. Motor: Brushless dc or electronically commutated with permanently lubricated bearings.
 3. Motor Protection: Integral protection against thermal, overload, and voltage fluctuations.
 4. Speed Settings and Control: Two (low, high), three (low, medium, high), or more than three speed settings or variable speed with a speed range of least 50 percent.
 5. Vibration Control: Integral isolation to dampen vibration transmission.
- F. Filter Assembly:
 1. Access: Bottom, to accommodate filter replacement without the need for tools.
 2. Efficiency: MERV 8.
 3. Media:
 - a. Replaceable: Extended surface, panel, or cartridge with antimicrobial treatment fiber media.
- G. Discharge-Air Grille Assembly: Mounted in bottom of unit cabinet.
 1. Motorized Vanes: Modulating up and down flow pattern for uniform room air distribution.
 2. Additional Branch Supply Duct Connection for Ceiling Mounted Units: Sheet metal knockout for optional connection to one additional supply branch duct.
- H. Return-Air Grille Assembly: Manufacturer's standard grille mounted in bottom of unit cabinet.
- I. Unit Accessories:
 1. Remote Room Temperature Sensor Kit: Wall-mounted, hardwired room temperature sensor kit for use in rooms that do not have room temperature measurement.
- J. Unit Controls:
 1. Enclosure: Manufacturer's standard, and suitable for indoor locations.
 2. Factory-Installed Controller: Configurable digital control.
 3. Features and Functions: Self-diagnostics, time delay, auto-restart, auto operation mode, manual operation mode, drain assembly high water level safety shutdown and notification.
 4. Communication: Network communication with other indoor units and outdoor unit(s).
 5. Cable and Wiring: Manufacturer's standard with each connection labeled and corresponding to a unit-mounted wiring diagram.
 6. Field Connection: Manufacturer's standard with each connection labeled and corresponding to a unit-mounted wiring diagram.
- K. Unit Electrical:
 1. Enclosure: Manufacturer's standard, and suitable for indoor locations.
 2. Field Connection: Single point connection to power entire unit and integral controls.

3. Disconnecting Means: Factory-mounted circuit breaker or switch, complying with NFPA 70.
4. Control Transformer: Manufacturer's standard. Coordinate requirements with field power supply.
5. Wiring: Manufacturer's standard with each connection labeled and corresponding to a unit-mounted wiring diagram.
6. Raceways: Enclose line voltage wiring in metal raceways to comply with NFPA 70.

2.3 OUTDOOR UNITS

- A. Air-Cooled, Compressor-Condenser Components:
 1. Casing: Steel, finished with baked enamel in color selected by Architect, with removable panels for access to controls, weep holes for water drainage, and mounting holes in base. Provide brass service valves, fittings, and gage ports on exterior of casing.
 2. Compressor: Hermetically sealed with crankcase heater and mounted on vibration isolation device. Compressor motor shall have thermal- and current-sensitive overload devices, start capacitor, relay, and contactor.
 - a. Compressor Type: Scroll.
 - b. Two-speed compressor motor with manual-reset high-pressure switch and automatic-reset low-pressure switch.
 - c. Refrigerant: R-410A.
 - d. Refrigerant Coil: Copper tube, with mechanically bonded aluminum fins and liquid subcooler. Comply with ARI 206/110.
 3. Heat-Pump Components: Reversing valve and low-temperature-air cutoff thermostat.
 4. Fan: Aluminum-propeller type, directly connected to motor.
 5. Motor: Permanently lubricated, with integral thermal-overload protection.
 6. Low Ambient Kit: Permits operation down to -20 deg F.
 7. Mounting Bracket for wall.

2.4 ACCESSORIES

- A. Thermostat: Low voltage with subbase to control compressor and evaporator fan.
- B. Automatic-reset timer to prevent rapid cycling of compressor.
- C. Refrigerant Line Kits: Soft-annealed copper suction and liquid lines factory cleaned, dried, pressurized, and sealed; factory-insulated suction line with flared fittings at both ends.
- D. Condensate lift mechanism.

2.5 REFRIGERANT PIPING

- A. Refrigerant shall be type R-545B.
- B. Copper Tube and Fittings
 1. Copper Tube: ASTM B 88, Type K or L.
 2. Wrought-Copper Fittings: ASME B16.22.
 3. Wrought-Copper Unions: ASME B16.22.
 4. Solder Filler Metals: ASTM B 32. Use 95-5 tin antimony or alloy HB solder to join copper socket fittings on copper pipe.
 5. Brazing Filler Metals: AWS A5.8/A5.8M.
- C. Valves and Specialties
 1. Diaphragm Packless Valves:
 - a. Body and Bonnet: Forged brass or cast bronze; globe design with straight-through or angle pattern.
 - b. Diaphragm: Phosphor bronze and stainless steel with stainless-steel spring.
 - c. Operator: Rising stem and hand wheel.
 - d. Seat: Nylon.
 - e. End Connections: Socket, union, or flanged.
 - f. Working Pressure Rating: 500 psig.

- g. Maximum Operating Temperature: 275 deg F.
- 2. Check Valves:
 - a. Body: Ductile iron, forged brass, or cast bronze; globe pattern.
 - b. Bonnet: Bolted ductile iron, forged brass, or cast bronze; or brass hex plug.
 - c. Piston: Removable polytetrafluoroethylene seat.
 - d. Closing Spring: Stainless steel.
 - e. End Connections: Socket, union, threaded, or flanged.
 - f. Maximum Opening Pressure: 0.50 psig.
 - g. Working Pressure Rating: 500 psig.
 - h. Maximum Operating Temperature: 275 deg F.
- 3. Service Valves:
 - a. Body: Forged brass with brass cap including key end to remove core.
 - b. Core: Removable ball-type check valve with stainless-steel spring.
 - c. Seat: Polytetrafluoroethylene.
 - d. End Connections: Copper spring.
 - e. Working Pressure Rating: 500 psig.
- 4. Straight-Type Strainers:
 - a. Body: Welded steel with corrosion-resistant coating.
 - b. Screen: 100-mesh stainless steel.
 - c. End Connections: Socket or flare.
 - d. Working Pressure Rating: 500 psig.
 - e. Maximum Operating Temperature: 275 deg F.
- 5. Moisture/Liquid Indicators:
 - a. Body: Forged brass.
 - b. Window: Replaceable, clear, fused glass window with indicating element protected by filter screen.
 - c. Indicator: Color coded to show moisture content in parts per million (ppm).
 - d. Minimum Moisture Indicator Sensitivity: Indicate moisture above 60 ppm.
 - e. End Connections: Socket or flare.
 - f. Working Pressure Rating: 500 psig.
 - g. Maximum Operating Temperature: 240 deg F.
- 6. Replaceable-Core Filter Dryers: Comply with AHRI 730.
 - a. Body and Cover: Painted-steel shell with ductile-iron cover, stainless-steel screws, and neoprene gaskets.
 - b. Filter Media: 10 micron, pleated with integral end rings; stainless-steel support.
 - c. Desiccant Media: Activated alumina.
 - d. Designed for reverse flow (for heat-pump applications).
 - e. End Connections: Socket.
 - f. Access Ports: NPS 1/4 connections at entering and leaving sides for pressure differential measurement.
 - g. Maximum Pressure Loss: 2 psig.
 - h. Working Pressure Rating: 500 psig.
 - i. Maximum Operating Temperature: 240 deg F.

2.6 REFRIGERANT PIPING OR TUBING INSULATION

- A. Flexible Elastomeric Insulation: Closed-cell, sponge- or expanded-rubber materials. Comply with ASTM C 534, Type I for tubular materials.
- B. Vapor-Barrier Mastic: Solvent based; suitable for outdoor use on below-ambient services.

2.7 CONDENSATE PIPING

- A. Schedule 40 PVC plastic pipe and fittings and solvent-welded joints.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Examine products before installation. Reject products that are wet, moisture damaged, or mold damaged.
- C. Examine roughing-in for piping and tubing to verify actual locations of connections before equipment installation.
- D. Examine roughing-in for ductwork to verify actual locations of connections before equipment installation.
- E. Examine roughing-in for wiring and conduit to verify actual locations of connections before equipment installation.
- F. Examine walls, ceilings, and exterior walls for suitable conditions where equipment will be installed.
- G. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 EQUIPMENT INSTALLATION, GENERAL

- A. Clearance:
 - 1. Maintain manufacturer's recommended clearances for service and maintenance.
 - 2. Maintain clearances required by governing code.
- B. Loose Components: Install components, devices, and accessories furnished by manufacturer, with equipment, that are not factory mounted.

3.3 INSTALLATION OF INDOOR UNITS

- A. Install units to be level and plumb while providing a neat and finished appearance.
- B. Unless otherwise noted, support ceiling-mounted units from structure above using threaded rods; minimum rod size of 3/8 inch.
- C. Adjust supports of exposed and recessed units to draw units tight to adjoining surfaces.
- D. Protect finished surfaces of ceilings, floors, and walls that come in direct contact with units. Refinish or replaced damaged areas after units are installed.
- E. In rooms with ceilings, conceal piping and tubing, controls, and electrical power serving units above ceilings.
- F. In rooms without ceiling, arrange piping and tubing, controls, and electrical power serving units to provide a neat and finished appearance.
- G. Provide lateral bracing if needed to limit movement of suspended units to not more than 0.25 inch.
- H. Attachment: Install hardware for proper attachment to supported equipment.

3.4 INSTALLATION OF OUTDOOR UNITS

- A. Install units to be level and plumb while providing a neat and finished appearance.
- B. Install outdoor units on support structures indicated on Drawings. Supports for outdoor units shall be 12" roof stand.

3.5 GENERAL REQUIREMENTS FOR PIPING INSTALLATION

- A. Drawing plans, schematics, and diagrams indicate general location and arrangement of piping and tubing systems. Install piping and tubing as indicated unless deviations to layout are approved on coordination drawings.
- B. Install piping and tubing in concealed locations unless otherwise indicated and except in equipment rooms and service areas.
- C. Install piping and tubing at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.
- D. Install piping and tubing above accessible ceilings to allow sufficient space for ceiling panel removal.
- E. Install piping and tubing to permit valve servicing.

- F. Install piping and tubing at indicated slopes.
- G. Install piping and tubing free of sags.
- H. Install fittings for changes in direction and branch connections.
- I. Install piping and tubing to allow application of insulation.
- J. Install groups of pipes and tubing parallel to each other, spaced to permit applying insulation with service access between insulated piping and tubing.
- K. Install sleeves for piping and tubing penetrations of walls, ceilings, and floors. Comply with requirements for sleeves specified in Section 230517 "Sleeves for HVAC Piping."

3.6 INSTALLATION OF SYSTEM CONDENSATE DRAIN PIPING

- A. Condensate piping
 - 1. Cellular-Core PVC Pipe: ASTM F 891, Schedule 40.
 - 2. PVC Socket Fittings: ASTM D 2665, made to ASTM D 3311, drain, waste, and vent patterns and to fit Schedule 40 pipe.
- B. General Requirements for Drain Piping and Tubing:
 - 1. Install a union in piping at each threaded unit connection.
 - 2. If required for unit installation, provide a trap assembly in drain piping to prevent air circulated through unit from passing through drain piping. Comply with more stringent of the following:
 - a. Details indicated on Drawings.
 - b. Manufacturer's requirements.
 - c. Governing codes.
 - d. In the absence of requirements, comply with requirements of ASHRAE handbooks.
 - 3. Extend drain piping from units with drain connections to drain receptors as indicated on Drawings. If not indicated on Drawings, terminate drain connection at nearest accessible location that is not exposed to view by occupants.
 - 4. Provide each 90-degree change in direction with a Y- or T-fitting. Install a threaded plug connection in the dormant side of fitting or future use as a service cleanout.
- C. Pumped Drains:
 - 1. If unit condensate pump or lift mechanism is not included with an integral check valve, install a full-size check valve in each branch pipe near unit connection to prevent backflow into unit.

3.7 INSTALLATION OF REFRIGERANT PIPING

- A. Refrigerant Tubing Kits:
 - 1. Unroll and straighten tubing to suit installation. Deviations in straightness of exposed tubing shall be unnoticeable to observer.
 - 2. Support tubing using hangers and supports indicated at intervals not to exceed 5 feet. Minimum rod size, 1/4 inch.
 - 3. Prepare tubing ends and make mating connections to provide a pressure tight and leak-free installation.
- B. Install refrigerant piping according to ASHRAE 15 and governing codes.
- C. Select system components with pressure rating equal to or greater than system operating pressure.
- D. Install piping as short and direct as possible, with a minimum number of joints and fittings.
- E. Install refrigerant piping and tubing in rigid or flexible conduit in locations where exposed to mechanical damage.
- F. Slope refrigerant piping and tubing as follows:
 - 1. Install horizontal hot-gas discharge piping and tubing with a uniform slope downward away from compressor.
 - 2. Install horizontal suction lines with a uniform slope downward to compressor.
 - 3. Install traps to entrain oil in vertical runs.
 - 4. Liquid lines may be installed level.

- G. When brazing, remove or protect components that could be damaged by heat.
- H. Before installation, clean piping, tubing, and fittings to cleanliness level required by VRF HVAC system manufacturer.
- I. Joint Construction:
 - 1. Ream ends of tubes and remove burrs.
 - 2. Remove scale, slag, dirt, and debris from inside and outside of tube and fittings before assembly.
 - 3. Construct joints according to AWS's "Brazing Handbook," "Pipe and Tube" Chapter.
 - a. Use Type BCuP (copper-phosphorus) alloy for joining copper fittings with copper tubing.

3.8 INSTALLATION OF PIPING AND TUBING INSULATION

- A. Seal longitudinal seams and end joints with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated. Installation to maintain a continuous vapor barrier.
- B. Insulation Installation on Pipe Fittings and Elbows:
 - 1. Install mitered sections of pipe insulation.
 - 2. Secure insulation materials and seal seams with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.
- C. Insulation Installation on Valves and Pipe Specialties:
 - 1. Install preformed valve covers manufactured of same material as pipe insulation when available.
 - 2. When preformed valve covers are unavailable, install cut sections of pipe and sheet insulation to valve body. Arrange insulation to permit access to packing and to allow valve operation without disturbing insulation.
 - 3. Secure insulation to valves and specialties and seal seams with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.

3.9 ELECTRICAL INSTALLATION

- A. Comply with requirements indicated on Drawings and in applicable Division 26 Sections.
- B. Connect field electrical power source to each separate electrical device requiring field electrical power. Coordinate termination point and connection type with Installer.
- C. Comply with requirements in Section 26 0519 "Low-Voltage Electrical Power Conductors and Cables" for wiring connections.
- D. Comply with requirements in Section 26 0526 "Grounding and Bonding for Electrical Systems" for grounding connections.
- E. Install nameplate or acrylic label with self-adhesive back for each electrical connection indicating electrical equipment designation and circuit number feeding connection.
 - 1. Nameplate shall be laminated phenolic layers of black with engraved white letters. Letters at least 1/2 inch high.
 - 2. Locate nameplate or label where easily visible.
- F. Comply with requirements in Section 26 0533 "Raceways and Boxes for Electrical Systems" for raceway selection and installation requirements for boxes, conduits, and wireways as supplemented or revised in this Section.
 - 1. Outlet boxes shall be no smaller than 2 inches wide, 3 inches high, and 2-1/2 inches deep.
 - 2. Outlet boxes for cables shall be no smaller than 4 inches square by 1-1/2 inches deep with extension ring sized to bring edge of ring to within 1/8 inch of the finished wall surface.
 - 3. Flexible metal conduit shall not be used.
- G. Comply with TIA-569-D for pull-box sizing and length of conduit and number of bends between pull points.
- H. Install manufactured conduit sweeps and long-radius elbows if possible.

- I. Install metal conduits with grounding bushings and connect with grounding conductor to grounding system.

3.10 CONNECTIONS

- A. Piping installation requirements are specified in other Sections. Drawings indicate general arrangement of piping, fittings, and specialties.
- B. Where piping is installed adjacent to unit, allow space for service and maintenance of unit.

3.11 FIELD QUALITY CONTROL

- A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust components, assemblies, and equipment installations, including connections.
- B. Perform tests and inspections.
 1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installations, including connections, and to assist in testing.
- C. Tests and Inspections:
 1. Leak Test: After installation, charge system and test for leaks. Repair leaks and retest until no leaks exist.
 2. Operational Test: After electrical circuitry has been energized, start units to confirm proper motor rotation and unit operation.
 3. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
- D. Remove and replace malfunctioning units and retest as specified above.
- E. Prepare test and inspection reports.

3.12 STARTUP SERVICE

- A. Perform startup service.
 1. Complete installation and startup checks according to manufacturer's written instructions.

END OF SECTION

SECTION 26 0010 ELECTRICAL GENERAL PROVISIONS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Refer to Division 00 – Procurement, Contracting and Warranty Requirements and Division 01 - General Requirements, which all apply to work under this section.

1.2 DESCRIPTION OF WORK

- A. Work includes furnishing all systems, equipment, and materials specified in this division and as called for on the electrical drawings and specifications. This includes supervision, operations, methods, and labor for the fabrication, installation, start-up, and tests for the complete electrical installation. All elements of the construction shall be performed by skilled worker regularly employed in their craft. All work shall meet the highest standards of the craft.

1.3 CODES AND STANDARDS

- A. All work shall be done in accordance with the applicable portion of the following codes and standards:
 - 1. National Electrical Code 2020
 - 2. National Fire Protection Association
 - 3. National Electrical Manufacturers Association
 - 4. Standards of Institute of Electrical and Electronic Engineers
 - 5. International Building Code
 - 6. Occupational Safety and Health Act
 - 7. Iowa Administrative Code
 - 8. NECA Standards
 - 9. Americans With Disabilities Act (ADA)
 - 10. Cedar Rapids Municipal Code and all local ordinances
- B. All Contractors shall familiarize themselves with all codes and standards applicable to their work and shall notify Design Professional of any discrepancies between the design and applicable code requirements so that any conflicts can be resolved. Where two or more codes or standards are in conflict, that requiring the highest order of workmanship shall take precedence, but such questions shall be referred to Design Professional for final decision.

1.4 REQUIREMENTS & FEES OF REGULATORY AGENCIES

- A. Contractor shall comply with the rules and regulations of local utility companies, secure all required permits, and pay for all inspections, licenses, and fees, including State of Iowa Electrical Inspections. Contractor shall make all arrangements with utility companies and pay all associated charges for temporary and permanent services.

1.5 ELECTRICAL DRAWINGS

- A. The electrical drawings indicate the general building arrangement. Contractor shall examine construction drawings to become familiar with the specific type of building construction. Drawings are diagrammatic and intended to convey the scope of the work and indicate the general location of equipment. Contractor shall determine the exact locations for equipment and conduits and take field measurements for verifying locations and dimensions.

1.6 SITE INSPECTION

- A. The contractor shall inspect the site before bidding to understand all conditions affecting the work and verify utility connection points and conduit routing, ensuring proper clearances from structures, trees, or obstacles. No extra payment will be provided for changes due to failure to inspect the site.

1.7 COORDINATION AND COOPERATION

- A. The Contractor shall coordinate with the General Contractor to prevent delays and ensure efficient progress. They must review all relevant drawings and specifications, collaborate with other contractors to resolve space and clearance issues, and seek clarification on any conflicts.
- B. All equipment and materials must be protected from damage, weather, and construction debris until project completion; any resulting damage must be repaired. The Painting Contractor is responsible for protection during painting, but the Contractor must verify that this protection is sufficient (see Division 09). When installation work affects areas already finished by the General Contractor, the Electrical Contractor must prevent damage and arrange for any necessary repairs.

1.8 OPENINGS, CUTTING AND PATCHING

- A. Install firestopping on conduits and sleeves passing through rated floors, roofs, walls, and partitions, using UL listed intumescent material matching the wall/floor rating. Non-rated penetrations shall be sealed with grout or caulk.
- B. The Contractor shall coordinate all floor, wall, and roof penetrations with the General Contractor prior to construction. The Electrical Contractor (EC) is responsible for verifying that all required sleeves are in place before any concrete or masonry work begins and shall bear full responsibility for any omissions and the associated costs of corrective work.
- C. Apply firestopping to conduits and wireways in rated assemblies as above. For non-rated areas, seal with grout or caulk.
- D. For below-grade exterior walls, use PVC Schedule 80 sleeves; seal gaps with modular mechanical rubber links (Thunderland Corp). Coordinate waterproofing of penetrations with the waterproofing contractor. For precast walls, provide sleeves at the facility or coordinate site drilling as needed.

1.9 MATERIALS AND EQUIPMENT

- A. All materials and equipment shall be standard products manufactured in the United States by reputable companies regularly engaged in producing the specified items, unless written approval is obtained from the Design Professional. Where multiple units of the same system are required, they shall be provided by the same manufacturer unless otherwise specified.
- B. All materials and equipment shall be installed strictly in accordance with the manufacturer's published recommendations.
- C. Specifications may not detail every component (e.g., parts, controls, or devices) necessary for proper operation or to meet performance guarantees. Such components, whether or not explicitly listed, shall be provided as part of the complete equipment.

1.10 SUBMITTALS

- A. The contractor is responsible for providing the Design Professional with complete sets of shop drawings and other relevant submittal data. Prior to submission, these shop drawings should be reviewed and signed by the contractor. Additional requirements can be found in the Division 01 specifications.
- B. Shop drawings are to be organized into bound sets that address related items for a comprehensive system where feasible, and should be clearly identified using symbols or "plan marks" consistent with the construction drawings. Submittals that are incomplete, submitted in parts, or not bound will not be accepted.
- C. Required submittals are specified in individual specification sections.
- D. The Design Professional's review of shop drawings serves to assist contractors in understanding the plans and specifications. Shop drawings that differ from contract documents do not alter the original contract requirements.

1.11 OPERATION AND MAINTENANCE MANUALS

- A. Submit manuals in electronic format upon completion of the project. Operation and maintenance manuals shall be submitted to Design Professional. Refer to Division 01 specifications for additional information.

1.12 TESTS AND DEMONSTRATIONS

- A. The Contractor must test all systems and ensure proper operation before demonstrating them to the Owner. Before accepting the electrical installation, the Contractor will demonstrate system features and train the Owner on their use and maintenance. Any unused training hours may be used by the Owner within the first year of occupancy. Refer to individual specification sections for all required tests. The Contractor must provide the Design Professional with a certificate, signed by the Owner, confirming completion of instruction, including date, time, and attendees.

1.13 SUBSTITUTIONS

- A. Refer to Divisions 00 and 01 for substitution information. Clearly describe equipment to be approved and provide data showing it matches specified capacities, features, and performance. The Design Professional will approve acceptable substitutions via addendum but is not required to prove equivalency.
- B. If a substitution is approved, the Contractor is responsible for all dimensions and resulting changes, including extra work needed by other trades.

1.14 ACCEPTABLE MANUFACTURERS

- A. Equipment specifications typically reference a specific manufacturer's type, style, dimensions, or catalog numbers. Acceptable manufacturers listed in the base specification should submit their drawings and product details to the Design Professional at least 8 days before the bid date to be considered equal. Manufacturers who do not pre-submit risk having their products rejected during shop drawing review, with replacement costs falling on the Contractor or manufacturer.
- B. If the Contractor selects an alternate listed manufacturer, they are responsible for ensuring all requirements are met and assume liability for any resulting changes or extra work across trades. Provided models or catalog numbers may not cover all requirements; refer to plans and specifications for additional obligations. Any extra requirements included by model or catalog number must also be satisfied.

1.15 WARRANTY

- A. Refer to Divisions 00 and 01 for warranty and correction period information. If not specified there, warranties begin at Substantial Completion and last one year. For phased construction with multiple Substantial Completion dates, provide separate warranties for each phase or system.
- B. The entire Electrical system, including all sub-systems, is warranted against defects in materials and workmanship for the full warranty period; any issues must be corrected at no cost to the Owner. This does not limit manufacturer warranties.
- C. See other Division 26 sections for items requiring extended warranties. The warranty start date is always Substantial Completion, regardless of equipment shipment or startup. Use of systems or equipment before this date for construction purposes shall not affect warranty duration.

1.16 CHANGES IN THE WORK

- A. Refer to Divisions 00 and 01 for information on changed work.

1.17 COMPLETION

- A. Upon completion, systems shall be fully operational, safe, and ready for use by the Owner. Once all electrical work is finished, the Contractor is to clean all materials and equipment installed under this contract, ensuring that everything is left in new condition. The Contractor is also responsible for removing all debris, surplus materials, and equipment from the site at the end of the project.

1.18 CLEANING

- A. Before assembly, remove all dirt, oil, and debris from electrical equipment surfaces using proper methods. Take off temporary labels and stickers, ensuring name plates and instruction plates remain visible and unobstructed. Clean both the interior and exterior of equipment,

including wiring trimmings and debris in panels and boxes. Wipe all light fixtures to remove dust and fingerprints.

1.19 ACCESS DOORS

- A. If the Electrical Contractor installs equipment that requires periodic servicing and will be concealed by non-accessible architectural construction, a flush access door should be provided
- B. Access doors in fire rated construction shall be fire rated and have U.L. label.

1.20 TEMPORARY UTILITIES

- A. Refer to Specification Division 01 for specific requirements concerning temporary utilities.

1.21 EQUIPMENT PADS AND STANDS

- A. Provide equipment stand for rooftop mounted equipment. Rooftop mounted equipment stand shall be selected as to not void roofing warranty. Basis of Design is Anchor Products EBK-0900 sized for panel selected as part of this work. Support structure shall be provided with U-Anchor 3000 series attachments. Material for support system shall be hot dipped galvanized steel. A working stand shall be provided as part of this package.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

**SECTION 26 0505
SELECTIVE DEMOLITION FOR ELECTRICAL**

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Electrical demolition.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that abandoned wiring and equipment serve only abandoned facilities.
- B. Demolition drawings are based on casual field observation.
- C. Report discrepancies to Engineer before disturbing existing installation.
- D. Beginning of demolition means installer accepts existing conditions.

3.2 PREPARATION

- A. Disconnect electrical systems in walls, floors, and ceilings to be removed.
- B. Coordinate utility service outages with utility company.
- C. Provide temporary wiring and connections to maintain existing systems in service during construction. When work must be performed on energized equipment or circuits, use personnel experienced in such operations.
- D. Existing Electrical Distribution: Maintain existing systems in service until new system is complete and ready for cutover. Disable system only to make switchovers and connections. Minimize outage duration.
 - 1. Obtain permission from Owner at least 24 hours before partially or completely disabling system.
 - 2. Make temporary connections to maintain service in areas adjacent to work area.

3.3 DEMOLITION AND EXTENSION OF EXISTING ELECTRICAL WORK

- A. Remove, relocate, and extend existing installations to accommodate new construction.
- B. Remove abandoned wiring to source of supply.
- C. Remove exposed abandoned conduit, including abandoned conduit above accessible ceiling finishes. Cut conduit flush with walls and floors, and patch surfaces.
- D. Disconnect abandoned outlets and remove devices. Remove abandoned outlets if conduit servicing them is abandoned and removed. Provide blank cover for abandoned outlets that are not removed.
- E. Disconnect and remove abandoned panelboards and distribution equipment.
- F. Disconnect and remove electrical devices and equipment serving utilization equipment that has been removed.
- G. Disconnect and remove abandoned luminaires. Remove brackets, stems, hangers, and other accessories.
- H. Repair adjacent construction and finishes damaged during demolition and extension work.
- I. Maintain access to existing electrical installations that remain active. Modify installation or provide access panel as appropriate.

END OF SECTION

SECTION 26 0519
LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Single conductor building wire.
- B. Wiring connectors.
- C. Electrical tape.
- D. Heat shrink tubing.
- E. Oxide inhibiting compound.
- F. Wire pulling lubricant.
- G. Cable ties.
- H. Firestop sleeves.

PART 2 PRODUCTS

2.1 CONDUCTOR AND CABLE APPLICATIONS

- A. Do not use conductors and cables for applications other than as permitted by NFPA 70 and product listing.
- B. Provide single conductor building wire installed in suitable raceway unless otherwise indicated, permitted, or required.
- C. Nonmetallic-sheathed cable is not permitted.
- D. Armored cable is not permitted.
- E. Metal-clad cable is not permitted.

2.2 CONDUCTOR AND CABLE GENERAL REQUIREMENTS

- A. Provide products that comply with requirements of NFPA 70.
- B. Provide products listed, classified, and labeled as suitable for the purpose intended.
- C. Unless specifically indicated to be excluded, provide all required conduit, boxes, wiring, connectors, etc. as required for a complete operating system.
- D. Comply with NEMA WC 70.
- E. Thermoplastic-Insulated Conductors and Cables: Listed and labeled as complying with UL 83.
- F. Thermoset-Insulated Conductors and Cables: Listed and labeled as complying with UL 44.
- G. Conductors for Grounding and Bonding: Also comply with Section 26 0526.
- H. Conductor Material:
 - 1. Provide copper conductors only. Aluminum conductors are not acceptable for this project. Conductor sizes indicated are based on copper.
 - 2. Copper Conductors: Soft drawn annealed, 98 percent conductivity, uncoated copper conductors complying with ASTM B3, ASTM B8, or ASTM B787/B787M unless otherwise indicated.
- I. Minimum Conductor Size:
 - 1. Branch Circuits: 12 AWG.
 - a. Exceptions:
 - 1) 20 A, 120 V circuits longer than 75 feet: 10 AWG, for voltage drop.
 - 2) 20 A, 120 V circuits longer than 150 feet: 8 AWG, for voltage drop.
 - 2. Control Circuits: 14 AWG.
- J. Conductor Color Coding:
 - 1. Color code conductors as indicated unless otherwise required by the authority having jurisdiction. Maintain consistent color coding throughout project.
 - 2. Color Coding Method: Integrally colored insulation.
 - 3. Color Code:

- a. 208Y/120 V, 3 Phase, 4 Wire System:
 - 1) Phase A: Black.
 - 2) Phase B: Red.
 - 3) Phase C: Blue.
 - 4) Neutral/Grounded: White.
- b. Equipment Ground, All Systems: Green.

2.3 SINGLE CONDUCTOR BUILDING WIRE

- A. Description: Single conductor insulated wire.
- B. Conductor Stranding:
 - 1. Feeders and Branch Circuits:
 - a. Size 10 AWG and Smaller: Solid.
 - b. Size 8 AWG and Larger: Stranded.
- C. Insulation Voltage Rating: 600 V.
- D. Insulation:
 - 1. Copper Building Wire: Type THHN/THWN or THHN/THWN-2, except as indicated below.
 - a. Size 4 AWG and Larger: Type XHHW-2.

2.4 WIRING CONNECTORS

- A. Description: Wiring connectors appropriate for the application, suitable for use with the conductors to be connected, and listed as complying with UL 486A-486B or UL 486C as applicable.
- B. Connectors for Grounding and Bonding: Comply with Section 26 0526.
- C. Wiring Connectors for Splices and Taps:
 - 1. Copper Conductors Size 8 AWG and Smaller: Use twist-on insulated spring connectors.
 - 2. Copper Conductors Size 6 AWG and Larger: Use mechanical connectors or compression connectors.
- D. Wiring Connectors for Terminations:
 - 1. Provide terminal lugs for connecting conductors to equipment furnished with terminations designed for terminal lugs.
 - 2. Copper Conductors Size 8 AWG and Larger: Use mechanical connectors or compression connectors where connectors are required.
- E. Twist-on Insulated Spring Connectors: Rated 600 V, 221 degrees F for standard applications and 302 degrees F for high temperature applications; pre-filled with sealant and listed as complying with UL 486D for damp and wet locations.
- F. Mechanical Connectors: Provide bolted type or set-screw type.
- G. Compression Connectors: Provide circumferential type or hex type crimp configuration.

2.5 ACCESSORIES

- A. Electrical Tape:
 - 1. Vinyl Color Coding Electrical Tape: Integrally colored to match color code indicated; listed as complying with UL 510; minimum thickness of 7 mil; resistant to abrasion, corrosion, and sunlight; suitable for continuous temperature environment up to 221 degrees F.
 - 2. Vinyl Insulating Electrical Tape: Complying with ASTM D3005 and listed as complying with UL 510; minimum thickness of 7 mil; resistant to abrasion, corrosion, and sunlight; conformable for application down to 0 degrees F and suitable for continuous temperature environment up to 221 degrees F.
 - 3. Rubber Splicing Electrical Tape: Ethylene Propylene Rubber (EPR) tape, complying with ASTM D4388; minimum thickness of 30 mil; suitable for continuous temperature environment up to 194 degrees F and short-term 266 degrees F overload service.
 - 4. Electrical Filler Tape: Rubber-based insulating moldable putty, minimum thickness of 125 mil; suitable for continuous temperature environment up to 176 degrees F.

5. Moisture Sealing Electrical Tape: Insulating mastic compound laminated to flexible, all-weather vinyl backing; minimum thickness of 90 mil.
- B. Heat Shrink Tubing: Heavy-wall, split-resistant, with factory-applied adhesive; rated 600 V; suitable for direct burial applications; listed as complying with UL 486D.
- C. Oxide Inhibiting Compound: Listed; suitable for use with the conductors or cables to be installed.
- D. Wire Pulling Lubricant:
 1. Listed and labeled as complying with UL 267.
 2. Suitable for use with conductors/cables and associated insulation/jackets to be installed.
 3. Suitable for use at installation temperature.
- E. Sealing Systems for Roof Penetrations: Premanufactured components and accessories as required to preserve integrity of roofing system and maintain roof warranty; suitable for cables and roofing system to be installed; designed to accommodate existing penetrations where applicable.
- F. Firestop Sleeves: Listed; provide as required to preserve fire resistance rating of building elements.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Circuiting Requirements:
 1. Unless dimensioned, circuit routing indicated is diagrammatic.
 2. When circuit destination is indicated without specific routing, determine exact routing required.
 3. Arrange circuiting to minimize splices.
- B. Install products in accordance with manufacturer's instructions.
- C. Perform work in accordance with NECA 1 (general workmanship).
- D. Installation in Raceway:
 1. Tape ends of conductors and cables to prevent infiltration of moisture and other contaminants.
 2. Pull all conductors and cables together into raceway at same time.
 3. Do not damage conductors and cables or exceed manufacturer's recommended maximum pulling tension and sidewall pressure.
 4. Use suitable wire pulling lubricant where necessary, except when lubricant is not recommended by the manufacturer.
- E. Secure and support conductors and cables in accordance with NFPA 70 using suitable supports and methods approved by the authority having jurisdiction. Provide independent support from building structure. Do not provide support from raceways, piping, ductwork, or other systems.
 1. Installation Above Suspended Ceilings: Do not provide support from ceiling support system. Do not provide support from ceiling grid or allow conductors and cables to lay on ceiling tiles.
- F. Install conductors with a minimum of 12 inches of slack at each outlet.
- G. Neatly train and bundle conductors inside boxes, wireways, panelboards and other equipment enclosures.
- H. Group or otherwise identify neutral/grounded conductors with associated ungrounded conductors inside enclosures in accordance with NFPA 70.
- I. Make wiring connections using specified wiring connectors.
 1. Make splices and taps only in accessible boxes. Do not pull splices into raceways or make splices in conduit bodies or wiring gutters.
 2. Remove appropriate amount of conductor insulation for making connections without cutting, nicking or damaging conductors.

3. Do not remove conductor strands to facilitate insertion into connector.
 4. Clean contact surfaces on conductors and connectors to suitable remove corrosion, oxides, and other contaminates. Do not use wire brush on plated connector surfaces.
 5. Mechanical Connectors: Secure connections according to manufacturer's recommended torque settings.
 6. Compression Connectors: Secure connections using manufacturer's recommended tools and dies.
- J. Insulate splices and taps that are made with uninsulated connectors using methods suitable for the application, with insulation and mechanical strength at least equivalent to unspliced conductors.
1. Dry Locations: Use insulating covers specifically designed for the connectors, electrical tape, or heat shrink tubing.
 - a. For taped connections, first apply adequate amount of rubber splicing electrical tape or electrical filler tape, followed by outer covering of vinyl insulating electrical tape.
 2. Damp Locations: Use insulating covers specifically designed for the connectors, electrical tape, or heat shrink tubing.
 - a. For connections with insulating covers, apply outer covering of moisture sealing electrical tape.
 - b. For taped connections, follow same procedure as for dry locations but apply outer covering of moisture sealing electrical tape.
 3. Wet Locations: Use heat shrink tubing.
- K. Insulate ends of spare conductors using vinyl insulating electrical tape.
- L. Install firestopping to preserve fire resistance rating of partitions and other elements, using materials and methods specified in Section 07 8400.
- M. Unless specifically indicated to be excluded, provide final connections to all equipment and devices, including those furnished by others, as required for a complete operating system.

3.2 FIELD QUALITY CONTROL

- A. Correct deficiencies and replace damaged or defective conductors and cables.

END OF SECTION

SECTION 26 0526
GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Grounding and bonding requirements.
- B. Conductors for grounding and bonding.
- C. Connectors for grounding and bonding.

PART 2 PRODUCTS

2.1 GROUNDING AND BONDING REQUIREMENTS

- A. Do not use products for applications other than as permitted by NFPA 70 and product listing.
- B. Unless specifically indicated to be excluded, provide all required components, conductors, connectors, conduit, boxes, fittings, supports, accessories, etc. as necessary for a complete grounding and bonding system.
- C. Where conductor size is not indicated, size to comply with NFPA 70 but not less than applicable minimum size requirements specified.
- D. Bonding and Equipment Grounding:
 - 1. Provide bonding for equipment grounding conductors, equipment ground busses, metallic equipment enclosures, metallic raceways and boxes, device grounding terminals, and other normally non-current-carrying conductive materials enclosing electrical conductors/equipment or likely to become energized as indicated and in accordance with NFPA 70.
 - 2. Provide insulated equipment grounding conductor in each feeder and branch circuit raceway. Do not use raceways as sole equipment grounding conductor.
 - 3. Where circuit conductor sizes are increased for voltage drop, increase size of equipment grounding conductor proportionally in accordance with NFPA 70.
 - 4. Unless otherwise indicated, connect wiring device grounding terminal to branch circuit equipment grounding conductor and to outlet box with bonding jumper.
 - 5. Terminate branch circuit equipment grounding conductors on solidly bonded equipment ground bus only. Do not terminate on neutral (grounded) or isolated/insulated ground bus.
 - 6. Provide bonding jumper across expansion or expansion/deflection fittings provided to accommodate conduit movement.
 - 7. Provide bonding for new interior metal air ducts.
- E. Cable Tray Systems: Also comply with Section 26 0536.

2.2 GROUNDING AND BONDING COMPONENTS

- A. General Requirements:
 - 1. Provide products listed, classified, and labeled as suitable for the purpose intended.
 - 2. Provide products listed and labeled as complying with UL 467 where applicable.
- B. Conductors for Grounding and Bonding, in Addition to Requirements of Section 26 0526:
 - 1. Use insulated copper conductors unless otherwise indicated.
- C. Connectors for Grounding and Bonding:
 - 1. Description: Connectors appropriate for the application and suitable for the conductors and items to be connected; listed and labeled as complying with UL 467.
 - 2. Unless otherwise indicated, use mechanical connectors or compression connectors for accessible connections.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install products in accordance with manufacturer's instructions.
- B. Perform work in accordance with NECA 1 (general workmanship).
- C. Make grounding and bonding connections using specified connectors.
 - 1. Remove appropriate amount of conductor insulation for making connections without cutting, nicking or damaging conductors. Do not remove conductor strands to facilitate insertion into connector.
 - 2. Remove nonconductive paint, enamel, or similar coating at threads, contact points, and contact surfaces.
 - 3. Mechanical Connectors: Secure connections according to manufacturer's recommended torque settings.
 - 4. Compression Connectors: Secure connections using manufacturer's recommended tools and dies.
- D. Identify grounding and bonding system components in accordance with Section 26 0553.

END OF SECTION

**SECTION 26 0529
HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS**

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Support and attachment requirements and components for equipment, conduit, cable, boxes, and other electrical work.

1.2 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
 - 1. Coordinate sizes and arrangement of supports and bases with actual equipment and components to be installed.
 - 2. Coordinate work to provide additional framing and materials required for installation.
 - 3. Coordinate compatibility of support and attachment components with mounting surfaces at installed locations.
 - 4. Coordinate arrangement of supports with ductwork, piping, equipment and other potential conflicts.
 - 5. Notify Engineer of conflicts with or deviations from Contract Documents. Obtain direction before proceeding with work.

PART 2 PRODUCTS

2.1 SUPPORT AND ATTACHMENT COMPONENTS

- A. General Requirements:
 - 1. Comply with the following. Where requirements differ, comply with most stringent.
 - a. NFPA 70.
 - b. Requirements of authorities having jurisdiction.
 - 2. Provide required hangers, supports, anchors, fasteners, fittings, accessories, and hardware as necessary for complete installation of electrical work.
 - 3. Provide products listed, classified, and labeled as suitable for purpose intended, where applicable.
 - 4. Do not use products for applications other than as permitted by NFPA 70 and product listing.
 - 5. Steel Components: Use corrosion-resistant materials suitable for environment where installed.
 - a. Indoor Dry Locations: Use zinc-plated steel or approved equivalent unless otherwise indicated.
 - b. Outdoor and Damp or Wet Indoor Locations: Use galvanized steel unless otherwise indicated.
 - c. Zinc-Plated Steel: Electroplated in accordance with ASTM B633.
 - d. Galvanized Steel: Hot-dip galvanized after fabrication in accordance with ASTM A123/A123M or ASTM A153/A153M.
- B. Conduit and Cable Supports: Straps and clamps suitable for conduit or cable to be supported.
 - 1. Conduit Straps: One-hole or two-hole type; steel or malleable iron.
 - 2. Conduit Clamps: Bolted type unless otherwise indicated.
- C. Outlet Box Supports: Hangers and brackets suitable for boxes to be supported.
- D. Metal Channel/Strut Framing Systems:
 - 1. Description: Factory-fabricated, continuous-slot, metal channel/strut and associated fittings, accessories, and hardware required for field assembly of supports.
 - 2. Channel Material:
 - a. Indoor Dry Locations: Use painted steel, zinc-plated steel, or galvanized steel.

- b. Outdoor and Damp or Wet Indoor Locations: Use galvanized steel.
- E. Hanger Rods: Threaded, zinc-plated steel unless otherwise indicated.
 - 1. Minimum Size, Unless Otherwise Indicated or Required:
 - a. Single Conduit up to 1-inch (27 mm) Trade Size: 1/4-inch diameter.
 - b. Single Conduit Larger than 1-inch (27 mm) Trade Size: 3/8-inch diameter.
 - c. Trapeze Support for Multiple Conduits: 3/8-inch diameter.
 - d. Outlet Boxes: 1/4-inch diameter.
- F. Nonpenetrating Rooftop Supports for Low-Slope Roofs:
 - 1. Manufacturers:
 - a. Miro Industries: www.miroind.com
 - b. Design Professional approved equivalent.
 - 2. Strut Supports: A pipestand with a strut and clamp pipe support system used for supporting roof mounted electrical conduit. Pipes rest on a specified length of channel which is mounted on the bases. The pipes can be fastened using typical clamps locked to the strut.
 - 3. Base Material: Polycarbonate
 - 4. Deck Base: 7 inch by 10 inch bases with channel.
 - 5. Maximum Load Weight: 172.5 lbs/ft.
 - 6. Mounting Height: Adjustable support height from 4.125 inch to 5.5 inch.
 - 7. Spacing: Not to exceed 10 feet.
- G. Pipe Support Surface Bonding
 - 1. Pillow block pipe supports shall be bonded to the roofing surface without causing penetrations through roofing material
 - 2. Bonding shall be accomplished by use of double-stick microsealant putty tape.
 - a. Eternabond, Design Basis
 - 3. Bond seal shall be waterproof.
 - 4. Adhesion: 19 lbs/in. width.
 - 5. 30 mil thickness.
- H. Anchors and Fasteners:
 - 1. Unless otherwise indicated and where not otherwise restricted, use anchor and fastener types indicated for specified applications.
 - 2. Solid or Grout-Filled Masonry: Use expansion anchors or screw anchors.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install products in accordance with manufacturer's instructions.
- B. Install hangers and supports in accordance with NECA 1.
- C. Provide independent support from building structure. Do not provide support from piping, ductwork, or other systems.
- D. Unless specifically indicated or approved by Engineer, do not provide support from suspended ceiling support system or ceiling grid.
- E. Unless specifically indicated or approved by Structural Engineer, do not provide support from roof deck.
- F. Do not penetrate or otherwise notch or cut structural members without approval of Structural Engineer.
- G. Equipment Support and Attachment:
 - 1. Use metal, fabricated supports or supports assembled from metal channel/strut to support equipment as required.
 - 2. Use metal channel/strut secured to studs to support equipment surface mounted on hollow stud walls when wall strength is not sufficient to resist pull-out.

3. Use metal channel/strut to support surface-mounted equipment in wet or damp locations to provide space between equipment and mounting surface.
 4. Securely fasten floor-mounted equipment. Do not install equipment such that it relies on its own weight for support.
- H. Secure fasteners in accordance with manufacturer's recommended torque settings.
- I. Remove temporary supports.

END OF SECTION

SECTION 26 0533.13 CONDUIT FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Galvanized steel rigid metal conduit (RMC).
- B. Flexible metal conduit (FMC).
- C. Liquidtight flexible metal conduit (LFMC).
- D. Galvanized steel electrical metallic tubing (EMT).

1.2 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
 - 1. Coordinate minimum sizes of conduits with actual type and quantity of conductors to be installed, including adjustments for conductor sizes increased for voltage drop.
 - 2. Coordinate arrangement of conduits with structural members, ductwork, piping, equipment, and other potential conflicts.
 - 3. Verify exact conduit termination locations required for boxes, enclosures, and equipment.
 - 4. Coordinate work to provide roof penetrations that preserve integrity of roofing system and do not void roof warranty.
 - 5. Notify Engineer of conflicts with or deviations from Contract Documents. Obtain direction before proceeding with work.
- B. Sequencing:
 - 1. Do not begin installation of conductors and cables until installation of conduit between termination points is complete.

PART 2 PRODUCTS

2.1 CONDUIT APPLICATIONS

- A. Do not use conduit and associated fittings for applications other than as permitted by NFPA 70, manufacturer's instructions, and product listing.
- B. Unless otherwise indicated and where not otherwise restricted, use conduit types indicated for specified applications. Where more than one listed application applies, comply with most restrictive requirements. Where conduit type for particular application is not specified, use galvanized steel rigid metal conduit.
- C. Concealed Above Accessible Ceilings: Use galvanized steel rigid metal conduit (RMC), stainless steel rigid metal conduit (RMC), or galvanized steel electrical metallic tubing (EMT).
- D. Exposed, Exterior, Not Subject to Severe Physical Damage: Use galvanized steel rigid metal conduit (RMC).
- E. Flexible Connections to Vibrating Equipment:
 - 1. Damp, Wet, or Corrosive Locations: Use liquidtight flexible metal conduit with a sunlight-resistant rating (LFMC-SR).
 - 2. Maximum Length: 6 feet unless otherwise indicated.
 - 3. Vibrating equipment includes, but is not limited to:
 - a. Motors.
- F. Fished in Existing Walls, Where Necessary: Use flexible metal conduit (FMC) or galvanized steel electrical metallic tubing (EMT).

2.2 CONDUIT - GENERAL REQUIREMENTS

- A. Comply with NFPA 70.
- B. Provide conduit, fittings, supports, and accessories required for complete raceway system.
- C. Provide products listed, classified, and labeled as suitable for purpose intended.
- D. Minimum Conduit Size, Unless Otherwise Indicated:

1. Branch Circuits: 3/4-inch trade size.
 2. Branch Circuit Homeruns: 3/4-inch trade size.
 3. Control Circuits: 1/2-inch trade size.
- E. Where conduit size is not indicated, size to comply with NFPA 70 but not less than applicable minimum size requirements specified.

2.3 GALVANIZED STEEL RIGID METAL CONDUIT (RMC)

- A. Description: NFPA 70, Type RMC galvanized steel rigid metal conduit complying with ANSI C80.1 and listed and labeled as complying with UL 6.
- B. Fittings:
1. Nonhazardous Locations: Use fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B or UL 6.
 2. Material: Use steel or malleable iron.
 3. Connectors and Couplings: Use threaded type fittings only. Threadless fittings, including set screw and compression/gland types, are not permitted.

2.4 FLEXIBLE METAL CONDUIT (FMC)

- A. Description: NFPA 70, Type FMC standard-wall steel flexible metal conduit listed and labeled as complying with UL 1, and listed for use in classified firestop systems.
- B. Fittings:
1. Description: Fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B.
 2. Material: Use steel or malleable iron.

2.5 LIQUIDTIGHT FLEXIBLE METAL CONDUIT (LFMC)

- A. Description: NFPA 70, Type LFMC polyvinyl chloride (PVC) jacketed steel flexible metal conduit listed and labeled as complying with UL 360.
- B. Fittings:
1. Description: Fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B.
 2. Material: Use steel or malleable iron.

2.6 GALVANIZED STEEL ELECTRICAL METALLIC TUBING (EMT)

- A. Description: NFPA 70, Type EMT galvanized steel electrical metallic tubing complying with ANSI C80.3 and listed and labeled as complying with UL 797.
- B. Fittings:
1. Description: Fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B.
 2. Material: Use steel or malleable iron.
 3. Connectors and Couplings: Use compression/gland or set-screw type.
 - a. Do not use indenter type connectors and couplings.

2.7 ACCESSORIES

- A. Conduit Joint Compound: Corrosion-resistant, electrically conductive compound listed as complying with UL 2419; suitable for use with conduit to be installed.
- B. Pull Strings: Use nylon or polyester tape with average breaking strength of not less than 1,250 lbf.
- C. Sealing Systems for Roof Penetrations: Premanufactured components and accessories as required to preserve integrity of roofing system and maintain roof warranty; suitable for conduits and roofing system to be installed; designed to accommodate existing penetrations where applicable.
- D. Firestop Sleeves: Listed; provide as required to preserve fire resistance rating of building elements.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install products in accordance with manufacturer's instructions.
- B. Install conduit in accordance with NECA 1.
- C. Galvanized Steel Rigid Metal Conduit (RMC): Install in accordance with NECA 101.
- D. Conduit Routing:
 - 1. Unless dimensioned, conduit routing indicated is diagrammatic.
 - 2. When conduit destination is indicated without specific routing, determine exact routing required.
- E. Conduit Support:
 - 1. Secure and support conduits in accordance with NFPA 70 using suitable supports and methods approved by authorities having jurisdiction; see Section 26 0529.
 - 2. Provide independent support from building structure. Do not provide support from piping, ductwork, or other systems.
 - 3. Installation Above Suspended Ceilings: Do not provide support from ceiling support system. Do not provide support from ceiling grid or allow conduits to lay on ceiling tiles.
 - 4. Use conduit strap to support single surface-mounted conduit.
 - a. Use clamp back spacer with conduit strap for damp and wet locations to provide space between conduit and mounting surface.
 - 5. Use conduit clamp to support single conduit from beam clamp or threaded rod.
 - 6. Use trapeze hangers assembled from threaded rods and metal channel/strut with accessory conduit clamps to support multiple parallel suspended conduits.
 - 7. Use nonpenetrating rooftop supports to support conduits routed across rooftops, where approved.
- F. Connections and Terminations:
 - 1. Use approved zinc-rich paint or conduit joint compound on field-cut threads of galvanized steel conduits prior to making connections.
 - 2. Where two threaded conduits must be joined and neither can be rotated, use three-piece couplings or split couplings. Do not use running threads.
 - 3. Use suitable adapters where required to transition from one type of conduit to another.
 - 4. Provide drip loops for liquidtight flexible conduit connections to prevent drainage of liquid into connectors.
 - 5. Terminate threaded conduits in boxes and enclosures using threaded hubs or double lock nuts for dry locations and raintight hubs for wet locations.
 - 6. Provide insulating bushings, insulated throats, or listed metal fittings with smooth, rounded edges at conduit terminations to protect conductors.
 - 7. Secure joints and connections to provide mechanical strength and electrical continuity.
- G. Penetrations:
 - 1. Do not penetrate or otherwise notch or cut structural members, including footings and grade beams, without approval of Structural Engineer.
 - 2. Make penetrations perpendicular to surfaces unless otherwise indicated.
 - 3. Provide sleeves for penetrations as indicated or as required to facilitate installation. Set sleeves flush with exposed surfaces unless otherwise indicated or required.
 - 4. Conceal bends for conduit risers emerging above ground.
 - 5. Where conduits penetrate waterproof membrane, seal as required to maintain integrity of membrane.
 - 6. Make penetrations for roof-mounted equipment within associated equipment openings and curbs where possible to minimize roofing system penetrations. Where penetrations are necessary, seal as indicated or as required to preserve integrity of roofing system and maintain roof warranty.
 - 7. Install firestopping to preserve fire resistance rating of partitions and other elements.

- H. Conduit Movement Provisions: Where conduits are subject to movement, provide expansion and expansion/deflection fittings to prevent damage to enclosed conductors or connected equipment. This includes, but is not limited to:
 - 1. Where conduits cross structural joints intended for expansion, contraction, or deflection.
- I. Conduit Sealing:
 - 1. Use foam conduit sealant to prevent entry of moisture and gases. This includes, but is not limited to:
 - a. Where conduits enter building from outside.
 - b. Where conduits may transport moisture to contact live parts.
 - 2. Where conduits cross barriers between areas of potential substantial temperature differential, use foam conduit sealant at accessible point near penetration to prevent condensation. This includes, but is not limited to:
 - a. Where conduits pass from outdoors into conditioned interior spaces.
 - b. Where conduits pass from unconditioned interior spaces into conditioned interior spaces.
- J. Provide pull string in each empty conduit and in conduits where conductors and cables are to be installed by others. Leave minimum slack of 12 inches at each end.
- K. Provide grounding and bonding; see Section 26 0526.

END OF SECTION

SECTION 26 0533.16 BOXES FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Outlet and device boxes up to 100 cubic inches, including those used as junction and pull boxes.
- B. Cabinets and enclosures, including junction and pull boxes larger than 100 cubic inches.
- C. Boxes and enclosures for integrated power, data, and audio/video.
- D. Accessories.

1.2 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
 - 1. Coordinate the work with other trades to avoid placement of ductwork, piping, equipment, or other potential obstructions within the dedicated equipment spaces and working clearances for electrical equipment required by NFPA 70.
 - 2. Coordinate arrangement of electrical equipment with the dimensions and clearance requirements of the actual equipment to be installed.
 - 3. Coordinate minimum sizes of boxes with the actual installed arrangement of conductors, clamps, support fittings, and devices, calculated according to NFPA 70.
 - 4. Coordinate minimum sizes of pull boxes with the actual installed arrangement of connected conduits, calculated according to NFPA 70.
 - 5. Coordinate the placement of boxes with millwork, furniture, devices, equipment, etc. installed under other sections or by others.
 - 6. Coordinate the work with other trades to preserve insulation integrity.
 - 7. Coordinate the work with other trades to provide walls suitable for installation of flush-mounted boxes where indicated.
 - 8. Notify Engineer of any conflicts with or deviations from Contract Documents. Obtain direction before proceeding with work.

PART 2 PRODUCTS

2.1 BOXES

- A. General Requirements:
 - 1. Do not use boxes and associated accessories for applications other than as permitted by NFPA 70 and product listing.
 - 2. Provide all boxes, fittings, supports, and accessories required for a complete raceway system and to accommodate devices and equipment to be installed.
 - 3. Provide products listed, classified, and labeled as suitable for the purpose intended.
 - 4. Where box size is not indicated, size to comply with NFPA 70 but not less than applicable minimum size requirements specified.
 - 5. Provide grounding terminals within boxes where equipment grounding conductors terminate.
- B. Outlet and Device Boxes Up to 100 cubic inches, Including Those Used as Junction and Pull Boxes:
 - 1. Use sheet-steel boxes for dry locations unless otherwise indicated or required.
 - 2. Use cast iron boxes or cast aluminum boxes for damp or wet locations unless otherwise indicated or required; furnish with compatible weatherproof gasketed covers.
 - 3. Boxes for Ganged Devices: Use multigang boxes of single-piece construction. Do not use field-connected gangable boxes unless specifically indicated or permitted.
 - 4. Minimum Box Size, Unless Otherwise Indicated:

- a. Wiring Devices (Other Than Communications Systems Outlets): 4 inch square by 1-1/2 inch deep (100 by 38 mm) trade size.
 - b. Communications Systems Outlets: 4 inch square by 2-1/8 inch (100 by 54 mm) trade size.
5. Wall Plates: Comply with Section 26 2726.
- C. Cabinets and Enclosures, Including Junction and Pull Boxes Larger Than 100 cubic inches:
 1. Comply with NEMA EN 10250, and list and label as complying with UL 50 and UL 50E, or UL 508A.
 2. NEMA EN 10250 Environment Type, Unless Otherwise Indicated:
 - a. Indoor Clean, Dry Locations: Type 1, painted steel.
 - b. Outdoor Locations: Type 3R, painted steel.
 3. Junction and Pull Boxes Larger Than 100 cubic inches:
 - a. Provide screw-cover or hinged-cover enclosures unless otherwise indicated.
 4. Finish for Painted Steel Enclosures: Manufacturer's standard grey unless otherwise indicated.
- D. Boxes and Enclosures for Integrated Power, Data, and Audio/Video: Size and configuration as indicated or as required with partitions to separate services; field-connected gangable boxes may be used.

2.2 ACCESSORIES

- A. Flashing Panels for Exterior Wall Penetrations: Premanufactured components and accessories as required to preserve integrity of building envelope; suitable for boxes and facade materials to be installed.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install products in accordance with manufacturer's instructions.
- B. Install boxes in accordance with NECA 1 (general workmanship) and, where applicable, NECA 130, including mounting heights specified in those standards where mounting heights are not indicated.
- C. Arrange equipment to provide minimum clearances in accordance with manufacturer's instructions and NFPA 70.
- D. Unless otherwise indicated, provide dividers in boxes for line voltage and low voltage systems.
- E. Unless otherwise indicated, boxes may be surface-mounted where exposed conduits are indicated or permitted.
- F. Box Locations:
 1. Locate boxes to be accessible. Provide access panels in accordance with Section 08 3100 as required where approved by the Engineer.
 2. Locate boxes as required for devices installed under other sections or by others.
 - a. Communications Systems Outlets: Comply with Section 27 1000.
 3. Locate boxes so that wall plates do not span different building finishes.
 4. Locate boxes so that wall plates do not cross masonry joints.
 5. Locate junction and pull boxes as indicated, as required to facilitate installation of conductors, and to limit conduit length and/or number of bends between pulling points in accordance with Section 26 0533.13.
- G. Box Supports:
 1. Secure and support boxes in accordance with NFPA 70 and Section 26 0529 using suitable supports and methods approved by the authority having jurisdiction.
 2. Provide independent support from building structure except for cast metal boxes (other than boxes used for fixture support) supported by threaded conduit connections in accordance with NFPA 70. Do not provide support from piping, ductwork, or other systems.

- H. Install boxes plumb and level.
- I. Install permanent barrier between ganged wiring devices when voltage between adjacent devices exceeds 300 V.
- J. Install firestopping to preserve fire resistance rating of partitions and other elements, using materials and methods s
- K. Close unused box openings.
- L. Install blank wall plates on junction boxes and on outlet boxes with no devices or equipment installed or designated for future use.
- M. Provide grounding and bonding in accordance with Section 26 0526.

END OF SECTION

SECTION 26 0533.23

SURFACE RACEWAYS FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Surface raceway systems.

1.2 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
 - 1. Coordinate the placement of raceways with millwork, furniture, equipment, etc. installed under other sections or by others.
 - 2. Coordinate rough-in locations of outlet boxes provided under Section 26 0533.16 and conduit provided under Section 26 0533.13 as required for installation of raceways provided under this section.
 - 3. Verify minimum sizes of raceways with the actual conductors and components to be installed.
- B. Sequencing:
 - 1. Do not install raceways until final surface finishes and painting are complete.
 - 2. Do not begin installation of conductors and cables until installation of raceways is complete between outlet, junction and splicing points.

1.3 SUBMITTALS

- A. Product Data: Provide manufacturer's standard catalog pages and data sheets including dimensions, knockout sizes and locations, materials, fabrication details, finishes, service condition requirements, and accessories.
 - 1. Surface Raceway Systems: Include information on fill capacities for conductors and cables.

PART 2 PRODUCTS

2.1 RACEWAY REQUIREMENTS

- A. Provide all components, fittings, supports, and accessories required for a complete raceway system.
- B. Provide products listed, classified, and labeled as suitable for the purpose intended.
- C. Do not use raceways for applications other than as permitted by NFPA 70 and product listing.

2.2 SURFACE RACEWAY SYSTEMS

- A. Surface Metal Raceways: Listed and labeled as complying with UL 5.
- B. Multioutlet Assemblies: Listed and labeled as complying with UL 111.
- C. Surface Raceway System:
 - 1. Raceway Type: Two channel, painted steel.
 - 2. Length: As indicated on the drawings.
 - 3. Color: Match adjacent finish.
 - 4. Accessory Device Boxes: Suitable for the devices to be installed; color to match raceway.
 - 5. Integrated Device Provisions:
 - a. Receptacles:
 - 1) Configuration: As indicated on the drawings.
 - 2) Color: Match raceway.
 - b. Communications Outlets:
 - 1) Voice and Data Jacks: Include provisions for jacks furnished by others.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that field measurements are as indicated.
- B. Verify that outlet boxes and conduit terminations are installed in proper locations and are properly sized in accordance with NFPA 70 to accommodate raceways.
- C. Verify that mounting surfaces are ready to receive raceways and that final surface finishes are complete, including painting.
- D. Verify that conditions are satisfactory for installation prior to starting work.

3.2 INSTALLATION

- A. Install products in accordance with manufacturer's instructions.
- B. Perform work in accordance with NECA 1 (general workmanship).
- C. Install raceways plumb and level.
- D. Secure and support raceways in accordance with Section 26 0529 at intervals complying with NFPA 70 and manufacturer's requirements.
- E. Close unused raceway openings.
- F. Provide grounding and bonding in accordance with Section 26 0526.

END OF SECTION

SECTION 26 0553 IDENTIFICATION FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Electrical identification requirements.
- B. Identification nameplates and labels.
- C. Wire and cable markers.

PART 2 PRODUCTS

2.1 IDENTIFICATION REQUIREMENTS

- A. Identification for Equipment:
 - 1. Use identification nameplate to identify each piece of electrical distribution and control equipment and associated sections, compartments, and components.
 - a. Panelboards:
 - 1) Identify ampere rating.
 - 2) Identify voltage and phase.
 - 3) Identify power source and circuit number. Include location when not within sight of equipment.
 - 4) Identify main overcurrent protective device. Use identification label for panelboards with a door. For power distribution panelboards without a door, use identification nameplate.
 - 5) Use typewritten circuit directory to identify load(s) served for panelboards with a door. Identify spares and spaces using pencil.
 - b. Enclosed switches, circuit breakers, and motor controllers:
 - 1) Identify voltage and phase.
 - 2) Identify power source and circuit number. Include location when not within sight of equipment.
 - 3) Identify load(s) served. Include location when not within sight of equipment.
 - 2. Use identification nameplate to identify disconnect location for equipment with remote disconnecting means.
 - 3. Use identification label or handwritten text using indelible marker on inside of door at each fused switch to identify required NEMA fuse class and size.
- B. Identification for Conductors and Cables:
 - 1. Color Coding for Power Conductors 600 V and Less: Comply with Section 26 0519.
 - 2. Use wire and cable markers to identify circuit number or other designation indicated for power, control, and instrumentation conductors and cables at the following locations:
 - a. At each source and load connection.
 - b. Within boxes when more than one circuit is present.
 - c. Within equipment enclosures when conductors and cables enter or leave the enclosure.
 - d. In cable tray, at maximum intervals of 20 feet.
- C. Identification for Cable Tray: Comply with Section 26 0536.
- D. Identification for Boxes:
 - 1. Use identification labels or handwritten text using indelible marker to identify circuits enclosed.
 - a. For exposed boxes in public areas, use handwritten text on inside surface of cover. .
- E. Identification for Devices:
 - 1. Use identification label or engraved wallplate to identify serving branch circuit for all receptacles.

- a. For receptacles in public areas or in areas as directed by Engineer, provide identification on inside surface of wallplate.

2.2 IDENTIFICATION NAMEPLATES AND LABELS

- A. Identification Nameplates:
 1. Materials:
 - a. Indoor Clean, Dry Locations: Use plastic nameplates.
 - b. Outdoor Locations: Use stainless steel nameplates suitable for exterior use.
 2. Plastic Nameplates: Two-layer or three-layer laminated acrylic or electrically non-conductive phenolic with beveled edges; minimum thickness of 1/16 inch; engraved text.
 3. Stainless Steel Nameplates: Minimum thickness of 1/32 inch; engraved or laser-etched text.
 4. Mounting Holes for Mechanical Fasteners: Two, centered on sides for sizes up to 1 inch high; Four, located at corners for larger sizes.
- B. Identification Labels:
 1. Materials: Use self-adhesive laminated plastic labels; UV, chemical, water, heat, and abrasion resistant.
 2. Text: Use factory pre-printed or machine-printed text. Do not use handwritten text unless otherwise indicated.
- C. Format for Equipment Identification:
 1. Minimum Size: 1 inch by 2.5 inches.
 2. Legend:
 - a. Equipment designation or other approved description.
 3. Text: All capitalized unless otherwise indicated.
 4. Minimum Text Height:
 - a. Equipment Designation: 1/2 inch.
 5. Color:
 - a. Normal Power System: White text on black background.
- D. Format for Receptacle Identification:
 1. Minimum Size: 3/8 inch by 1.5 inches.
 2. Legend: Power source and circuit number or other designation indicated.
 3. Text: All capitalized unless otherwise indicated.
 4. Minimum Text Height: 3/16 inch.
 5. Color: Black text on clear background.

2.3 WIRE AND CABLE MARKERS

- A. Markers for Conductors and Cables: Use wrap-around self-adhesive vinyl cloth or wrap-around self-adhesive vinyl self-laminating type markers suitable for the conductor or cable to be identified.
- B. Markers for Conductor and Cable Bundles: Use plastic marker tags secured by nylon cable ties.
- C. Legend: Power source and circuit number or other designation indicated.
- D. Text: Use factory pre-printed or machine-printed text, all capitalized unless otherwise indicated.
- E. Minimum Text Height: 1/8 inch.
- F. Color: Black text on white background unless otherwise indicated.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install products in accordance with manufacturer's instructions.
- B. Install identification products to be plainly visible for examination, adjustment, servicing, and maintenance. Unless otherwise indicated, locate products as follows:

1. Free-Standing Equipment: Enclosure front; also enclosure rear for equipment with rear access.
 2. Interior Components: Legible from the point of access.
 3. Boxes: Outside or inside face of cover depending on location.
 4. Conductors and Cables: Legible from the point of access.
 5. Devices: Outside face of cover.
- C. Install identification products centered, level, and parallel with lines of item being identified.
- D. Secure nameplates to exterior surfaces of enclosures using stainless steel screws and to interior surfaces using self-adhesive backing or epoxy cement.
- E. Install self-adhesive labels and markers to achieve maximum adhesion, with no bubbles or wrinkles and edges properly sealed.
- F. Mark all handwritten text, where permitted, to be neat and legible.

END OF SECTION

SECTION 26 2416 PANELBOARDS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Power distribution panelboards.
- B. Overcurrent protective devices for panelboards.

1.2 SUBMITTALS

- A. Product Data: Provide manufacturer's standard catalog pages and data sheets for panelboards, enclosures, overcurrent protective devices, and other installed components and accessories.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Schneider Electric: www.se.com/#sle.
- B. Source Limitations: Provide panelboards and associated components produced by same manufacturer as other electrical distribution equipment used for project and obtained from a single supplier.

2.2 PANELBOARDS - GENERAL REQUIREMENTS

- A. Provide products listed, classified, and labeled as suitable for the purpose intended.
- B. Unless otherwise indicated, provide products suitable for continuous operation under the following service conditions:
 - 1. Altitude: Less than 6,600 feet.
 - 2. Ambient Temperature:
 - a. Panelboards Containing Circuit Breakers: Between 23 degrees F and 104 degrees F.
- C. Short Circuit Current Rating:
 - 1. Provide panelboards with listed short circuit current rating not less than the available fault current at the installed location as indicated on the drawings.
- D. Mains: Configure for top or bottom incoming feed as indicated or as required for the installation.
- E. Branch Overcurrent Protective Devices: Replaceable without disturbing adjacent devices.
- F. Bussing: Sized in accordance with UL 67 temperature rise requirements.
 - 1. Provide fully rated neutral bus unless otherwise indicated, with a suitable lug for each feeder or branch circuit requiring a neutral connection.
 - 2. Provide solidly bonded equipment ground bus in each panelboard, with a suitable lug for each feeder and branch circuit equipment grounding conductor.
- G. Conductor Terminations: Suitable for use with the conductors to be installed.
- H. Enclosures: Comply with NEMA EN 10250, and list and label as complying with UL 50 and UL 50E.
 - 1. Environment Type per NEMA EN 10250: Unless otherwise indicated, as specified for the following installation locations:
 - a. Outdoor Locations: Type 3R.
 - 2. Boxes: Galvanized steel unless otherwise indicated.
 - a. Provide wiring gutters sized to accommodate the conductors to be installed.
 - 3. Fronts:
 - a. Fronts for Surface-Mounted Enclosures: Same dimensions as boxes.
 - 4. Lockable Doors: All locks keyed alike unless otherwise indicated.
- I. Future Provisions: Prepare all unused spaces for future installation of devices including bussing, connectors, mounting hardware and all other required provisions.

2.3 POWER DISTRIBUTION PANELBOARDS

- A. Description: Panelboards complying with NEMA PB 1, power and feeder distribution type, circuit breaker type, and listed and labeled as complying with UL 67; ratings, configurations and features as indicated on the drawings.
- B. Conductor Terminations:
 - 1. Main and Neutral Lug Material: Aluminum, suitable for terminating aluminum or copper conductors.
 - 2. Main and Neutral Lug Type: Mechanical.
- C. Bussing:
 - 1. Phase and Neutral Bus Material: Aluminum.
 - 2. Ground Bus Material: Aluminum.
- D. Circuit Breakers:
 - 1. Provide bolt-on type or plug-in type secured with locking mechanical restraints.
 - 2. Provide thermal magnetic circuit breakers unless otherwise indicated.
- E. Enclosures:
 - 1. Provide surface-mounted enclosures unless otherwise indicated.
 - 2. Fronts: Provide lockable hinged door with concealed hinges for access to overcurrent protective device handles without exposing live parts.
 - 3. Provide clear plastic circuit directory holder mounted on inside of door.

2.4 OVERCURRENT PROTECTIVE DEVICES

- A. Molded Case Circuit Breakers:
 - 1. Description: Quick-make, quick-break, over center toggle, trip-free, trip-indicating circuit breakers listed and labeled as complying with UL 489, and complying with FS W-C-375 where applicable; ratings, configurations, and features as indicated on the drawings.
 - 2. Interrupting Capacity:
 - a. Provide circuit breakers with interrupting capacity as required to provide the short circuit current rating indicated, but not less than:
 - 1) 10,000 rms symmetrical amperes at 240 VAC or 208 VAC.
 - b. Fully Rated Systems: Provide circuit breakers with interrupting capacity not less than the short circuit current rating indicated.
 - 3. Conductor Terminations:
 - a. Provide mechanical lugs unless otherwise indicated.
 - b. Lug Material: Aluminum, suitable for terminating aluminum or copper conductors.
 - 4. Thermal Magnetic Circuit Breakers: For each pole, furnish thermal inverse time tripping element for overload protection and magnetic instantaneous tripping element for short circuit protection.
 - a. Provide field-adjustable magnetic instantaneous trip setting for circuit breaker frame sizes 225 amperes and larger.
 - 5. Multi-Pole Circuit Breakers: Furnish with common trip for all poles.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Perform work in accordance with NECA 1 (general workmanship).
- B. Install products in accordance with manufacturer's instructions.
- C. Install panelboards in accordance with NECA 407 and NEMA PB 1.1.
- D. Arrange equipment to provide minimum clearances in accordance with manufacturer's instructions and NFPA 70.
- E. Provide required support and attachment in accordance with Section 26 0529.
- F. Install panelboards plumb.
- G. Provide grounding and bonding in accordance with Section 26 0526.

- H. Install all field-installed branch devices, components, and accessories.
- I. Provide filler plates to cover unused spaces in panelboards.

3.2 FIELD QUALITY CONTROL

- A. Inspect and test in accordance with NETA ATS, except Section 4.
- B. Correct deficiencies and replace damaged or defective panelboards or associated components.

3.3 ADJUSTING

- A. Adjust tightness of mechanical and electrical connections to manufacturer's recommended torque settings.
- B. Adjust alignment of panelboard fronts.
- C. Load Balancing: For each panelboard, rearrange circuits such that the difference between each measured steady state phase load does not exceed 20 percent and adjust circuit directories accordingly. Maintain proper phasing for multi-wire branch circuits.

END OF SECTION

SECTION 26 2726 WIRING DEVICES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Receptacles.
- B. Wall plates and covers.

1.2 SUBMITTALS

- A. Product Data: Provide manufacturer's catalog information showing dimensions, colors, and configurations.

PART 2 PRODUCTS

2.1 WIRING DEVICES - GENERAL REQUIREMENTS

- A. Provide wiring devices suitable for intended use with ratings adequate for load served.
- B. Wiring Device Finishes:
 - 1. Provide wiring device finishes as described below, unless otherwise indicated.

2.2 RECEPTACLES

- A. General Requirements: Self-grounding, complying with NEMA WD 1 and NEMA WD 6, and listed as complying with UL 498, and where applicable, FS W-C-596; types as indicated on the drawings.
 - 1. Wiring Provisions: Terminal screws for side wiring with separate ground terminal screw.
 - 2. NEMA configurations specified are according to NEMA WD 6.
- B. Convenience Receptacles:
 - 1. Standard Convenience Receptacles: Commercial specification grade, 20A, 125V, NEMA 5-20R; single or duplex as indicated on the drawings.

2.3 WALL PLATES AND COVERS

- A. Wall Plates: Comply with UL 514D.
 - 1. Configuration: One piece cover as required for quantity and types of corresponding wiring devices.
 - 2. Size: Standard.
 - 3. Screws: Metal with slotted heads finished to match wall plate finish.
- B. Stainless Steel Wall Plates: Brushed satin finish, Type 302 stainless steel.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that field measurements are as indicated.
- B. Verify that outlet boxes are installed in proper locations and at proper mounting heights and are properly sized to accommodate devices and conductors in accordance with NFPA 70.
- C. Verify that wall openings are neatly cut and will be completely covered by wall plates.
- D. Verify that final surface finishes are complete, including painting.
- E. Verify that branch circuit wiring installation is completed, tested, and ready for connection to wiring devices.
- F. Verify that conditions are satisfactory for installation prior to starting work.

3.2 INSTALLATION

- A. Perform work in accordance with NECA 1 (general workmanship) and, where applicable, NECA 130, including mounting heights specified in those standards unless otherwise indicated.

- B. Coordinate locations of outlet boxes provided under Section 26 0533.16 as required for installation of wiring devices provided under this section.
- C. Install wiring devices in accordance with manufacturer's instructions.
- D. Install permanent barrier between ganged wiring devices when voltage between adjacent devices exceeds 300 V.
- E. Where required, connect wiring devices using pigtails not less than 6 inches long. Do not connect more than one conductor to wiring device terminals.
- F. Connect wiring devices by wrapping conductor clockwise 3/4 turn around screw terminal and tightening to proper torque specified by the manufacturer. Where present, do not use push-in pressure terminals that do not rely on screw-actuated binding.
- G. Unless otherwise indicated, connect wiring device grounding terminal to branch circuit equipment grounding conductor and to outlet box with bonding jumper.
- H. Install wiring devices plumb and level with mounting yoke held rigidly in place.
- I. Install vertically mounted receptacles with grounding pole on top and horizontally mounted receptacles with grounding pole on left.
- J. Install wall plates to fit completely flush to wall with no gaps and rough opening completely covered without strain on wall plate. Repair or reinstall improperly installed outlet boxes or improperly sized rough openings. Do not use oversized wall plates in lieu of meeting this requirement.
- K. Install blank wall plates on junction boxes and on outlet boxes with no wiring devices installed or designated for future use.

END OF SECTION

SECTION 26 2816.16 ENCLOSED SWITCHES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Enclosed safety switches.

1.2 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
 - 1. Coordinate the work with other trades. Avoid placement of ductwork, piping, equipment, or other potential obstructions within the dedicated equipment spaces and within working clearances for electrical equipment required by NFPA 70.
 - 2. Coordinate arrangement of electrical equipment with the dimensions and clearance requirements of the actual equipment to be installed.
 - 3. Verify with manufacturer that conductor terminations are suitable for use with the conductors to be installed.
 - 4. Notify Engineer of any conflicts with or deviations from Contract Documents. Obtain direction before proceeding with work.

1.3 SUBMITTALS

- A. Product Data: Provide manufacturer's standard catalog pages and data sheets for enclosed switches and other installed components and accessories.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Schneider Electric: www.se.com/#sle.
- B. Substitutions: See Section 01 6000 - Product Requirements.
- C. Source Limitations: Provide enclosed switches and associated components produced by same manufacturer as other electrical distribution equipment used for project and obtained from single supplier.

2.2 ENCLOSED SAFETY SWITCHES

- A. Description: Quick-make, quick-break enclosed safety switches listed and labeled as complying with UL 98; heavy duty; ratings, configurations, and features as indicated on the drawings.
- B. Provide products listed, classified, and labeled as suitable for the purpose intended.
- C. Unless otherwise indicated, provide products suitable for continuous operation under the following service conditions:
 - 1. Altitude: Less than 6,600 feet.
 - 2. Ambient Temperature: Between -22 degrees F and 104 degrees F.
- D. Horsepower Rating: Suitable for connected load.
- E. Voltage Rating: Suitable for circuit voltage.
- F. Short Circuit Current Rating:
 - 1. Provide enclosed safety switches, when protected by the fuses or supply side overcurrent protective devices to be installed, with listed short circuit current rating not less than the available fault current at the installed location as indicated on the drawings.
- G. Provide with switch blade contact position that is visible when the cover is open.
- H. Conductor Terminations: Suitable for use with the conductors to be installed.
- I. Provide solidly bonded equipment ground bus in each enclosed safety switch, with a suitable lug for terminating each equipment grounding conductor.
- J. Enclosures: Comply with NEMA EN 10250, and list and label as complying with UL 50 and UL 50E.

1. Environment Type per NEMA EN 10250: Unless otherwise indicated, as specified for the following installation locations:
 - a. Outdoor Locations: Type 3R.
- K. Provide safety interlock to prevent opening the cover with the switch in the ON position with capability of overriding interlock for testing purposes.
- L. Heavy Duty Switches:
 1. Comply with NEMA BS 31047.
 2. Conductor Terminations:
 - a. Lug Material: Aluminum, suitable for terminating aluminum or copper conductors.
 3. Provide externally operable handle with means for locking in the OFF position, capable of accepting three padlocks.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install products in accordance with manufacturer's instructions.
- B. Perform work in accordance with NECA 1 (general workmanship).
- C. Arrange equipment to provide minimum clearances in accordance with manufacturer's instructions and NFPA 70.
- D. Provide required support and attachment in accordance with Section 26 0529.
- E. Install enclosed switches plumb.
- F. Except where indicated to be mounted adjacent to the equipment they supply, mount enclosed switches such that the highest position of the operating handle does not exceed 79 inches above the floor or working platform.
- G. Provide grounding and bonding in accordance with Section 26 0526.

END OF SECTION

SECTION 26 5600 EXTERIOR LIGHTING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Exterior luminaires.

1.2 SUBMITTALS

- A. Product Data: Provide manufacturer's standard catalog pages and data sheets including detailed information on luminaire construction, dimensions, ratings, finishes, mounting requirements, listings, service conditions, photometric performance, weight, effective projected area (EPA), and installed accessories; include model number nomenclature clearly marked with all proposed features.

1.3 WARRANTY

- A. Provide 2-year manufacturer warranty for all LED luminaires, including drivers.

PART 2 PRODUCTS

2.1 LUMINAIRES

- A. Manufacturers:
 - 1. Acuity Brands, Inc: www.acuitybrands.com/#sle.
 - 2. Cooper Lighting, a division of Cooper Industries: www.cooperindustries.com/#sle.
 - 3. Hubbell Lighting, Inc: www.hubbellighting.com/#sle.
 - 4. Substitutions: See Section 01 6000 - Product Requirements.
- B. Provide products that comply with requirements of NFPA 70.
- C. Provide products that are listed and labeled as complying with UL 1598, where applicable.
- D. Provide products listed, classified, and labeled as suitable for the purpose intended.
- E. Unless otherwise indicated, provide complete luminaires including lamp(s) and all sockets, ballasts, reflectors, lenses, housings and other components required to position, energize and protect the lamp and distribute the light.
- F. Unless specifically indicated to be excluded, provide all required conduit, boxes, wiring, connectors, hardware, poles, foundations, supports, trims, accessories, etc. as necessary for a complete operating system.
- G. Provide products suitable to withstand normal handling, installation, and service without any damage, distortion, corrosion, fading, discoloring, etc.
- H. Recessed Luminaires:
 - 1. Ceiling Compatibility: Comply with NEMA LE 4.
 - 2. Luminaires Recessed in Insulated Ceilings: Listed and labeled as IC-rated, suitable for direct contact with insulation and combustible materials.
- I. LED Luminaires:
 - 1. Components: UL 8750 recognized or listed as applicable.
 - 2. Tested in accordance with IES LM-79 and IES LM-80.
 - 3. LED Estimated Useful Life: Minimum of 50,000 hours at 70 percent lumen maintenance, calculated based on IES LM-80 test data.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that field measurements are as indicated.
- B. Verify that outlet boxes are installed in proper locations and at proper mounting heights and are properly sized to accommodate conductors in accordance with NFPA 70.

- C. Verify that suitable support frames are installed where required.
- D. Verify that branch circuit wiring installation is completed, tested, and ready for connection to luminaires.
- E. Verify that conditions are satisfactory for installation prior to starting work.

3.2 PREPARATION

- A. Provide extension rings to bring outlet boxes flush with finished surface.
- B. Clean dirt, debris, plaster, and other foreign materials from outlet boxes.

3.3 INSTALLATION

- A. Coordinate locations of outlet boxes provided under Section 26 0533.16 as required for installation of luminaires provided under this section.
- B. Install products in accordance with manufacturer's instructions.
- C. Install luminaires in accordance with NECA/IESNA 501.
- D. Provide required support and attachment in accordance with Section 26 0529.
- E. Install luminaires plumb and square and aligned with building lines and with adjacent luminaires.
- F. Recessed Luminaires:
 - 1. Install trims tight to mounting surface with no visible light leakage.
 - 2. Non-IC Rated Luminaires: Maintain required separation from insulation and combustible materials according to listing.
 - 3. Luminaires Recessed in Fire-Rated Ceilings: Install using accessories and firestopping materials to meet regulatory requirements for fire rating.
- G. Install accessories furnished with each luminaire.
- H. Bond products and metal accessories to branch circuit equipment grounding conductor.
- I. Install lamps in each luminaire.

3.4 FIELD QUALITY CONTROL

- A. Inspect each product for damage and defects.
- B. Operate each luminaire after installation and connection to verify proper operation.
- C. Correct wiring deficiencies and repair or replace damaged or defective products. Repair or replace excessively noisy ballasts as determined by Engineer.

3.5 CLEANING

- A. Clean surfaces according to NECA/IESNA 501 and manufacturer's instructions to remove dirt, fingerprints, paint, or other foreign material and restore finishes to match original factory finish.

END OF SECTION

**SECTION 27 0010
COMMUNICATIONS GENERAL PROVISIONS**

PART 1 GENERAL

1.1 GENERAL

- A. Division 00 – Procurement, Contracting and Warranty Requirements and Division 01 - General Requirements are applicable to all work described in this section.

1.2 DESCRIPTION OF WORK

- A. This section covers all tasks under the telecommunications contract. This includes, but is not limited to, the following activities:
 - 1. Supplying and installing a complete voice and data wiring infrastructure.
 - 2. Supplying, installing, and terminating all UTP cable and fiber as applicable and according to drawings.
 - 3. Supplying and installing all wall plates, jacks, patch panels, and patch cords as necessary and as specified.
 - 4. Supplying and installing any cabinets, racks, and ladder racks as required and indicated.
 - 5. Providing any additional materials necessary to establish a functional system.
 - 6. Conducting permanent link testing (100% of links) and certification of all components.
 - 7. Supplying test results for all cabling to the owner in electronic format, organized by closet and workstation ID.
 - 8. Providing the owner with as-built documentation, including one electronic copy with a labeled map of the building that displays the structured cabling plant.
 - 9. Delivering training and testing documentation to the owner.
- B. The scope of work includes all materials, equipment, and labor required for fully operational telecommunications systems. All construction activities are to be performed by individuals skilled and regularly employed in the relevant craft. Work should be conducted in an orderly and professional manner consistent with industry standards.

1.3 CODES AND STANDARDS

- A. All work shall be done in accordance with the applicable portion of the following codes and standards:
 - 1. National Electrical Code
 - 2. Local Electrical Code
 - 3. National Fire Protection Association
 - 4. Applicable Building Codes
 - 5. Occupational Safety and Health Act
 - 6. Iowa Administrative Codes
 - 7. ANSI TIA-526-7 Measurement of Optical Power Loss of Installed Single-Mode Fiber Cable Plant
 - 8. ANSI TIA-568-D.1 Commercial Building Telecommunications Cabling Standard Part 1: General Requirements
 - 9. ANSI TIA-568-C.2 Balanced Twisted-Pair Telecommunications Cabling and Components Standards
 - 10. ANSI TIA-568-C.3 Optical Fiber Cabling Components Standard
 - 11. ANSI TIA-568-C.4 Broadband Coaxial Cabling and Components Standard
 - 12. ANSI TIA-569-D Telecommunications Pathways and Spaces
 - 13. ANSI TIA-606-B Administration Standard for Commercial Telecommunications Infrastructure
 - 14. ANSI TIA-607-B Commercial Building Grounding (Earthing) and Bonding Requirements for Telecommunications

15. ANSI TIA-758-B Customer-owned Outside Plant Telecommunications Infrastructure Standard

16. National Fire Protection Agency (NFPA - 70), National Electrical Code (NEC)

- B. Contractors shall follow all relevant codes and standards for their work. No extra payment will be given for correcting work that does not comply. If codes or standards conflict, the one requiring higher workmanship applies, with final decisions made by the Design Professional.

1.4 REQUIREMENTS & FEES OF REGULATORY AGENCIES

- A. Contractor must follow local utility company rules, verify service requirements with each provider, and obtain all necessary permits, licenses, fees, and inspections.

1.5 DRAWINGS

- A. The drawings are partly diagrammatic, showing work scope and general equipment locations. The contractor must lay out the work, determine exact quantities and locations, and verify all measurements in the field—do not rely solely on drawing scales. Some essential items may not appear on the drawings due to scale; however, all code-required or necessary components for proper installation and operation must still be supplied and installed.

1.6 ACTIVE SERVICES

- A. Contractor must verify the exact location of existing services before starting work. If active services need relocation, contractor shall request instructions from the relevant authorities. Abandoned services must be terminated according to authority requirements.

1.7 SITE INSPECTION

- A. Contractor must inspect the site and verify utility or system wiring connections before bidding to understand site conditions. No extra payment will be granted for work changes due to failure to inspect the site.

1.8 COORDINATION AND COOPERATION

- A. The Contractor must coordinate their schedule and work with the General Contractor to avoid delays. They are responsible for reviewing drawings and specifications of other trades and ensuring installations fit with others' work, cooperating as needed to confirm space and clearance. The Design Professional will resolve any space conflicts between contractors.
- B. Drawings and specifications complement each other; any discrepancies should be reported to the Design Professional before bidding. Lack of inquiry implies acceptance of construction documents. Clarifications after contract award shall be directed to the Design Professional.
- C. All equipment and materials must be protected until project completion, repair damage as required. While the Painting Contractor protects equipment during painting, the Contractor must still ensure adequate protection. If working in finished areas, the Contractor must prevent and repair any damage.
- D. If conflicts arise between specified items or systems, the one requiring the highest workmanship and cost prevails, subject to the Design Professional's final decision.

1.9 MATERIALS AND EQUIPMENT

- A. All materials and equipment must be standard products from reputable manufacturers unless otherwise approved in writing by the Design Professional. Multiple units of the same item should come from the same manufacturer unless specified. Install all materials and equipment according to the manufacturer's instructions. Any necessary components for proper equipment function, even if not specifically listed, must be included.

1.10 SUBMITTALS

- A. The Contractor shall provide the Design Professional with complete, organized sets of submittals. All submittals must be thoroughly reviewed and signed by the Contractor prior to submission. Unless otherwise directed, submittals are to be delivered electronically in PDF format. Additional submission requirements can be found in Division 01 specifications.
- B. Each set of submittals must be grouped according to the relevant specification section. Submittals should encompass all related items for a system wherever feasible, and items must

be clearly identified using the symbols or “plan marks” referenced in the drawings. Submittals that are incomplete, fragmented will not be accepted.

- C. A cover sheet is required for each submittal, including the Approved Contractor’s name, address, phone number, and a designated contact person for inquiries. Sufficient white space must be reserved on the cover page for the design professional’s review stamp, as well as any upstream contractor stamps. The entity submitting the package must correspond with the party fulfilling the APPROVED CONTRACTOR requirements, detailed later in this section. Any submittals lacking proper contractor identification on the cover page will not be processed to ensure compliance with the Approved Contractor protocol.
- D. The Design Professional’s review of submittals is solely to aid contractors in accurately interpreting project plans and specifications. Submittals do not supersede contract requirements. The contract documents remain fully enforceable, regardless of whether equipment differing from the original drawings and specifications is submitted and marked as reviewed.
- E. All required information must be submitted for each item in accordance with the applicable specification sections of the project. Submittals must be sorted and distinctly identified.

1.11 OPERATION AND MAINTENANCE MANUALS

- A. Operation and maintenance manuals shall be submitted in electronic format to the Design Professional upon completion of the job. Refer to Division 01 specifications for additional information.

1.12 TESTS AND DEMONSTRATIONS

- A. All systems shall be tested by Contractor and placed in proper working order prior to demonstrating systems to Owner.

1.13 SUBSTITUTIONS

- A. Bidding Contractors must submit written requests to the Design Professional at least 10 days before the bid date to seek approval for unspecified equipment. Requests should detail the equipment, provide supporting data to show equivalent capacity, features, and performance, and include a cost comparison with specified equipment. If approved, the Design Professional will issue an addendum; they are not required to demonstrate whether the substitute equals the specified item.

1.14 ACCEPTABLE MANUFACTURERS

- A. Equipment specifications usually reference a specific manufacturer’s details, with alternate approved manufacturers listed for bidding comparable products. Manufacturers must submit drawings and catalog numbers to the Design Professional at least 8 days before bids are due; failure to do so risks product rejection, with replacement costs falling on the contractor or manufacturer. If the contractor selects an alternative manufacturer, they are responsible for ensuring all requirements are met and for any resulting changes or extra work. Model or catalog numbers given may not cover every requirement—review plans and specs for additional criteria, and ensure all such requirements are satisfied.

1.15 QUALITY ASSURANCE

- A. Contractor shall be a company specializing in telecommunication cable and/or accessories with a minimum of five years documented experience in installation of cable and/or accessories similar to those specified below.

1.16 WARRANTY

- A. Refer to Divisions 00 and 01 for warranty information. If not specified, all warranties begin at Substantial Completion and last one year. For phased construction with separate Substantial Completion dates, provide distinct warranties for each area or system.
- B. All Division 27 systems and sub-systems are guaranteed against material and installation defects for the full warranty period; any issues must be corrected at no cost to the Owner. This does not limit any manufacturer’s warranties.

- C. See Division 28 for items requiring extended warranties. The warranty start date is always Substantial Completion, regardless of equipment startup or delivery dates. Early use of systems for construction purposes does not affect the warranty duration.

1.17 COMPLETION

- A. Systems shall be delivered fully operational, non-hazardous, and ready for standard use by the Owner at the time of completion. Upon finishing all work, the Contractor is to clean all materials and equipment installed under this contract, ensuring they are left in a condition comparable to new. The Contractor is also responsible for removing all debris, excess materials, and equipment from the site once the contract work is concluded.

PART 2 PRODUCT - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 27 0529 HANGERS AND SUPPORTS FOR COMMUNICATIONS SYSTEMS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Support and attachment requirements and components for equipment, conduit, cable, boxes, and other communications work.

1.2 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
 - 1. Coordinate compatibility of support and attachment components with mounting surfaces at installed locations.
 - 2. Coordinate arrangement of supports with ductwork, piping, equipment and other potential conflicts.
 - 3. Notify Engineer of conflicts with or deviations from Contract Documents. Obtain direction before proceeding with work.

PART 2 PRODUCTS

2.1 SUPPORT AND ATTACHMENT COMPONENTS

- A. General Requirements:
 - 1. Comply with the following. Where requirements differ, comply with most stringent.
 - a. TIA-569.
 - b. NFPA 70.
 - c. Requirements of authorities having jurisdiction.
 - 2. Provide required hangers, supports, anchors, fasteners, fittings, accessories, and hardware as necessary for complete installation of communications work.
 - 3. Provide products listed, classified, and labeled as suitable for purpose intended, where applicable.
 - 4. Do not use products for applications other than as permitted by NFPA 70 and product listing.
 - 5. Steel Components: Use corrosion-resistant materials suitable for environment where installed.
 - a. Indoor Dry Locations: Use zinc-plated steel or approved equivalent unless otherwise indicated.
 - b. Outdoor and Damp or Wet Indoor Locations: Use galvanized steel, stainless steel, or approved equivalent unless otherwise indicated.
- B. Conduit Supports: Straps and clamps suitable for conduit to be supported.
 - 1. Conduit Straps: One-hole or two-hole type; steel or malleable iron.
 - 2. Conduit Clamps: Bolted type unless otherwise indicated.
- C. Noncontinuous Cable Supports: Suitable for cables to be supported, including but not limited to J-hooks, bridle rings, drive rings, and flexible harnesses/slings.
 - 1. Applications:
 - a. Do not exceed 5 feet between cable supports.
 - b. Maximum Number of Cables per Cable Support:
 - 2. Cable Supports Installed in Spaces Used for Environmental Air: Plenum rated; listed and labeled as complying with UL 2043, suitable for use in air-handling spaces.
 - 3. J-Hooks: Noncontinuous cabling support with removable top retainer clip.
 - a. Material: Use galvanized steel, factory-painted steel, or stainless steel.
 - b. Provide support surfaces with smooth, beveled edges and radius not less than minimum allowable bend radius of cables supported.

- c. Provide multitiered J-hooks where required to support multiple cabling systems.
- D. Outlet Box Supports: Hangers and brackets suitable for boxes to be supported.
- E. Metal Channel/Strut Framing Systems:
 - 1. Description: Factory-fabricated, continuous-slot, metal channel/strut and associated fittings, accessories, and hardware required for field assembly of supports.
 - 2. Comply with MFMA-4.
- F. Hanger Rods: Threaded, zinc-plated steel unless otherwise indicated.
 - 1. Minimum Size, Unless Otherwise Indicated or Required:
 - a. Single Conduit up to 1-inch (27 mm) Trade Size: 1/4-inch diameter.
- G. Anchors and Fasteners:
 - 1. Unless otherwise indicated and where not otherwise restricted, use anchor and fastener types indicated for specified applications.
 - 2. Solid or Grout-Filled Masonry: Use expansion anchors or screw anchors.
 - 3. Hollow Masonry: Use toggle bolts.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install products in accordance with manufacturer's instructions.
- B. Install hangers and supports in accordance with NECA 1, BICSI ITSIMM, and BICSI N1.
- C. Provide independent support from building structure. Do not provide support from piping, ductwork, or other systems.
- D. Unless specifically indicated or approved by Engineer, do not provide support from suspended ceiling support system or ceiling grid.
- E. Unless specifically indicated or approved by Engineer, do not provide support from roof deck.
- F. Do not penetrate or otherwise notch or cut structural members without approval of Structural Engineer.
- G. Secure fasteners in accordance with manufacturer's recommended torque settings.
- H. Remove temporary supports.

END OF SECTION

SECTION 27 0533.13 CONDUIT FOR COMMUNICATIONS SYSTEMS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Galvanized steel rigid metal conduit (RMC).
- B. Liquidtight flexible metal conduit (LFMC).
- C. Inside-plant flexible nonmetallic communications raceway/innerduct.

1.2 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
 - 1. Coordinate minimum sizes of conduits with actual type and quantity of cables to be installed.
 - 2. Coordinate arrangement of conduits with structural members, ductwork, piping, equipment and other potential conflicts.
 - 3. Verify exact conduit termination locations required for boxes, enclosures, and equipment.
 - 4. Coordinate work to provide roof penetrations that preserve integrity of roofing system and do not void roof warranty.
- B. Sequencing:
 - 1. Do not begin installation of communications cables until installation of conduit between termination points is complete.

PART 2 PRODUCTS

2.1 CONDUIT APPLICATIONS

- A. Do not use conduit and associated fittings for applications other than as permitted by NFPA 70, TIA-569, BICSI ITSIMM, BICSI TDMM, manufacturers' instructions, and product listing.
- B. Unless otherwise indicated and where not otherwise restricted, use conduit types indicated for specified applications. Where more than one listed application applies, comply with most restrictive requirements. Where conduit type for particular application is not specified, use galvanized steel rigid metal conduit.
- C. Concealed Above Accessible Ceilings: Use inside-plant flexible nonmetallic communications raceway/innerduct.
- D. Exposed, Exterior, Not Subject to Severe Physical Damage: Use galvanized steel rigid metal conduit (RMC).
- E. Flexible Connections to Vibrating Equipment:
 - 1. Damp, Wet, or Corrosive Locations: Use liquidtight flexible metal conduit.
- F. Fished in Existing Walls, Where Necessary: Use inside-plant flexible nonmetallic communications raceway/innerduct.

2.2 CONDUIT - GENERAL REQUIREMENTS

- A. Comply with NFPA 70 and TIA-569.
- B. Provide conduit, fittings, supports, and accessories required for complete communications pathway.
- C. Provide products listed, classified, and labeled as suitable for purpose intended.
- D. Minimum Conduit Size, Unless Otherwise Indicated:
 - 1. Communications Outlet Box: 3/4-inch trade size.
 - 2. Continuous Conduit Homerun Serving Two Communications Outlet Boxes: 1-inch trade size.
- E. Where conduit size is not indicated, size to comply with NFPA 70, TIA-569, and BICSI TDMM, but not less than applicable minimum size requirements specified. Where specified standards differ, comply with most stringent.

2.3 GALVANIZED STEEL RIGID METAL CONDUIT (RMC)

- A. Description: NFPA 70, Type RMC galvanized steel rigid metal conduit complying with ANSI C80.1 and listed and labeled as complying with UL 6.
- B. Fittings:
 - 1. Nonhazardous Locations: Use fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B or UL 6.
 - 2. Material: Use steel.
 - 3. Connectors and Couplings: Use threaded fittings only. Threadless fittings, including set screw and compression/gland types, are not permitted.
 - 4. Conduit Bodies: Use only conduit bodies specifically designed for communications cabling. Standard conduit bodies designed for electrical raceways are not permitted.
 - a. Comply with TIA-568.0 minimum bend radius requirements for fiber optic cables.

2.4 LIQUIDTIGHT FLEXIBLE METAL CONDUIT (LFMC)

- A. Description: NFPA 70, Type LFMC polyvinyl chloride (PVC) jacketed steel flexible metal conduit listed and labeled as complying with UL 360.
- B. Fittings:
 - 1. Description: Fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B.
 - 2. Material: Use steel or malleable iron.
 - 3. Conduit Bodies: Use only conduit bodies specifically designed for communications cabling. Standard conduit bodies designed for electrical raceways are not permitted.
 - a. Comply with TIA-568.0 minimum bend radius requirements for fiber optic cables.

2.5 INSIDE-PLANT FLEXIBLE NONMETALLIC COMMUNICATIONS RACEWAY/INNERDUCT

- A. Description: Flexible, corrugated, nonmetallic communications raceway and associated fittings listed and labeled as complying with UL 2024; also suitable for installation as innerduct.
- B. Use only with approved cables in accordance with listing.

2.6 ACCESSORIES

- A. Inside-Plant Fabric Innerduct:
 - 1. Listed as complying with UL 2024; plenum rated.
- B. Conduit Joint Compound: Corrosion-resistant, electrically conductive compound listed as complying with UL 2419; suitable for use with conduit to be installed.
- C. Pull Strings: Use nylon or polyester tape with average breaking strength of not less than 1,250 lbf.
- D. Foam Conduit Sealant:
 - 1. Removable, two-part, closed-cell foam, specifically designed for sealing conduit openings against water, moisture, gases, and dust.
 - 2. Suitable for use with conductors/cables and associated insulation/jackets to be installed.
 - 3. Rated to hold minimum of 10 ft water head pressure.
- E. Sealing Systems for Roof Penetrations: Premanufactured components and accessories as required to preserve integrity of roofing system and maintain roof warranty; suitable for conduits and roofing system to be installed; designed to accommodate existing penetrations where applicable.
- F. Flashing Panels for Exterior Wall Penetrations: Premanufactured components and accessories as required to preserve integrity of building envelope; suitable for conduits and facade materials to be installed.
- G. Firestop Sleeves: Listed; provide as required to preserve fire resistance rating of building elements.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install products in accordance with manufacturer's instructions.
- B. Install conduit in accordance with NECA 1, BICSI ITSIMM, and BICSI N1.
- C. Galvanized Steel Rigid Metal Conduit (RMC): Install in accordance with NECA 101.
- D. Liquidtight Flexible Nonmetallic Conduit (LFNC): Install in accordance with NECA 111.
- E. Conduit Routing:
 - 1. When conduit destination is indicated without specific routing, determine exact routing required.
 - 2. Conceal conduits unless specifically indicated to be exposed.
 - 3. Conduits in the following areas may be exposed, unless otherwise indicated:
 - a. Electrical rooms.
 - b. Communications rooms.
 - 4. Unless otherwise approved, do not route exposed conduits:
 - a. Across building exterior surfaces.
 - 5. Arrange conduit to provide no more than equivalent of two 90-degree bend(s) between pull points.
 - 6. Arrange conduit to provide no more than 100 feet between pull points.
 - 7. Route conduits above water and drain piping where possible.
 - 8. Maintain recommended separation from sources of EMI greater than 5 kVA in accordance with BICSI ITSIMM and BICSI TDMM.
 - 9. Maintain minimum clearance of 12 inches between conduits and hot surfaces. This includes, but is not limited to:
 - a. Heaters.
 - b. Hot water piping.
 - c. Flues.
- F. Conduit Support:
 - 1. Secure and support conduits in accordance with NFPA 70 using suitable supports and methods approved by authorities having jurisdiction.
 - 2. Provide independent support from building structure. Do not provide support from piping, ductwork, or other systems.
 - 3. Installation Above Suspended Ceilings: Do not provide support from ceiling support system. Do not provide support from ceiling grid or allow conduits to lay on ceiling tiles.
 - 4. Use conduit strap to support single surface-mounted conduit.
 - a. Use clamp back spacer with conduit strap for damp and wet locations to provide space between conduit and mounting surface.
 - 5. Use nonpenetrating rooftop supports to support conduits routed across rooftops, where approved.
- G. Connections and Terminations:
 - 1. Use approved zinc-rich paint or conduit joint compound on field-cut threads of galvanized steel conduits prior to making connections.
 - 2. Where two threaded conduits must be joined and neither can be rotated, use three-piece couplings or split couplings. Do not use running threads.
 - 3. Use suitable adapters where required to transition from one type of conduit to another.
 - 4. Provide drip loops for liquidtight flexible conduit connections to prevent drainage of liquid into connectors.
 - 5. Terminate threaded conduits in boxes and enclosures using threaded hubs or double lock nuts for dry locations and raintight hubs for wet locations.
 - 6. Provide insulating bushings, insulated throats, or listed metal fittings with smooth, rounded edges at conduit terminations to protect cables.
 - 7. Secure joints and connections to provide mechanical strength and electrical continuity.

H. Penetrations:

1. Do not penetrate or otherwise notch or cut structural members, including footings and grade beams, without approval of Structural Engineer.
2. Make penetrations perpendicular to surfaces unless otherwise indicated.
3. Provide sleeves and/or slots for penetrations as indicated or as required to facilitate installation.
4. Conceal bends for conduit risers emerging above ground.
5. Where conduits penetrate waterproof membrane, seal as required to maintain integrity of membrane.
6. Make penetrations for roof-mounted equipment within associated equipment openings and curbs where possible to minimize roofing system penetrations. Where penetrations are necessary, seal as indicated or as required to preserve integrity of roofing system and maintain roof warranty.
7. Install firestopping to preserve fire resistance rating of partitions and other elements; see Section 07 8400.

I. Conduit Movement Provisions: Where conduits are subject to movement, provide expansion and expansion/deflection fittings to prevent damage to enclosed cables or connected equipment. This includes, but is not limited to:

1. Where conduits cross structural joints intended for expansion, contraction, or deflection.
2. Where conduits are subject to earth movement by settlement or frost.

J. Conduit Sealing:

1. Use foam conduit sealant to prevent entry of moisture and gases. This includes, but is not limited to:
 - a. Where conduits enter building from outside.
 - b. Where service conduits enter building from underground distribution system.
 - c. Where conduits enter building from underground.
 - d. Where conduits may transport moisture to contact live parts.
2. Where conduits cross barriers between areas of potential substantial temperature differential, use foam conduit sealant at accessible point near penetration to prevent condensation. This includes, but is not limited to:
 - a. Where conduits pass from outdoors into conditioned interior spaces.
 - b. Where conduits pass from unconditioned interior spaces into conditioned interior spaces.

K. Provide pull string in each empty conduit and innerduct/cell, and in each conduit where cables are to be installed by others. Leave minimum slack of 12 inches at each end.

L. Provide grounding and bonding.

END OF SECTION

SECTION 27 1000 STRUCTURED CABLING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Communications system design requirements.
- B. Copper cable and terminations.
- C. Communications outlets.

1.2 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
 - 1. Coordinate the work with other trades to avoid placement of other utilities or obstructions within the spaces dedicated for communications equipment.
 - 2. Coordinate arrangement of communications equipment with the dimensions and clearance requirements of the actual equipment to be installed.

1.3 SUBMITTALS

- A. Product Data: Provide manufacturer's standard catalog pages and data sheets for each product.
- B. Field Test Reports.

PART 2 PRODUCTS

2.1 SYSTEM DESIGN

- A. Provide a complete permanent system of cabling and pathways for voice and data communications, including cables, conduits and wireways, pull wires, support structures, enclosures and cabinets, and outlets.
 - 1. Provide fixed cables and pathways that comply with NFPA 70 and TIA-607 and are UL listed or third party independent testing laboratory certified.
 - 2. Provide connection devices that are rated for operation under conditions of 32 to 140 degrees F at relative humidity of 0 to 95 percent, noncondensing.
 - 3. In this project, the term plenum is defined as return air spaces above ceilings, inside ducts, under raised floors, and other air-handling spaces.
- B. Cabling to Outlets: Specified horizontal cabling, wired in star topology to distribution frame located at center hub of star; also referred to as "links".

2.2 COPPER CABLE AND TERMINATIONS

- A. Copper Horizontal Cable:
 - 1. Description: 100 ohm, balanced twisted pair cable complying with TIA-568.2 and listed and labeled as complying with UL 444.
 - 2. Cable Type - Voice and Data: TIA-568.2 Category 6 UTP (unshielded twisted pair); 23 AWG.
 - 3. Cable Capacity: 4-pair.
 - 4. Cable Applications: Use listed NFPA 70 Type CMP plenum cable unless otherwise indicated.
 - 5. Cable Jacket Color - Voice and Data Cable: Blue.
- B. Copper Cable Terminations: Insulation displacement connection (IDC) type using appropriate tool; use screw connections only where specifically indicated.
- C. Jacks and Connectors: Modular RJ-45, non-keyed, terminated with 110-style insulation displacement connectors (IDC); high impact thermoplastic housing; suitable for and complying with same standard as specified horizontal cable; UL 1863 listed.
 - 1. Performance: 500 mating cycles.

2. Voice and Data Jacks: 8-position modular jack, color-coded for both T568A and T568B wiring configurations.

2.3 COMMUNICATIONS OUTLETS

- A. Outlet Boxes: Comply with Section 26 0533.16.
 1. Provide depth as required to accommodate cable manufacturer's recommended minimum conductor bend radius.
- B. Wall Plates:
 1. Comply with system design standards and UL 514C.
 2. Accepts modular jacks/inserts.
 3. Capacity:
 - a. Data or Combination Voice/Data Outlets: 2 ports.

PART 3 EXECUTION

3.1 INSTALLATION - GENERAL

3.2 INSTALLATION OF PATHWAYS

- A. Install pathways with the following minimum clearances:
 1. 48 inches from motors, generators, frequency converters, transformers, x-ray equipment, and uninterruptible power systems.
 2. 12 inches from power conduits and cables and panelboards.
 3. 5 inches from fluorescent and high frequency lighting fixtures.
 4. 6 inches from flues, hot water pipes, and steam pipes.
- B. Outlet Boxes:
 1. Coordinate locations of outlet boxes provided under Section 26 0533.16 as required for installation of telecommunications outlets provided under this section.
 - a. Mounting Heights: Unless otherwise indicated, as follows:
 - 1) Telephone and Data Outlets: 18 inches above finished floor.
 - b. Locate outlet boxes so that wall plate does not cross masonry joints.

3.3 INSTALLATION OF EQUIPMENT AND CABLING

- A. Cabling:
 1. Do not bend cable at radius less than manufacturer's recommended bend radius; for unshielded twisted pair use bend radius of not less than 4 times cable diameter.
 2. Do not over-cinch or crush cables.
 3. Do not exceed manufacturer's recommended cable pull tension.
 4. When installing in conduit, use only lubricants approved by cable manufacturer and do not chafe or damage outer jacket.
- B. Service Loops (Slack or Excess Length): Provide the following minimum extra length of cable, looped neatly:
 1. At Distribution Frames: 120 inches.
 2. At Outlets - Copper: 12 inches.
- C. Copper Cabling:
 1. Category 5e and Above: Maintain cable geometry; do not untwist more than 1/2 inch from point of termination.
 2. For 4-pair cables in conduit, do not exceed 25 pounds pull tension.
 3. Use T568B wiring configuration.
- D. Identification:
 1. Use wire and cable markers to identify cables at each end.
 2. Use manufacturer-furnished label inserts, identification labels, or engraved wallplate to identify each jack at communications outlets with unique identifier.

3.4 FIELD QUALITY CONTROL

- A. Comply with inspection and testing requirements of specified installation standards.
- B. Visual Inspection:
 - 1. Inspect cable jackets for certification markings.
 - 2. Inspect cable terminations for color coded labels of proper type.
 - 3. Inspect outlet plates and patch panels for complete labels.
- C. Testing - Copper Cabling and Associated Equipment:
 - 1. Category 5e and Above Backbone: Perform near end cross talk (NEXT) and attenuation tests.
- D. Final Testing: After all work is complete, including installation of telecommunications outlets, and telephone dial tone service is active, test each voice jack for dial tone.

END OF SECTION

SECTION 28 0010
ELECTRONIC SAFETY AND SECURITY GENERAL PROVISIONS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Division 00 - Procurement and Contracting Requirements and Division 01 - General Requirements are applicable to the work described in this section.

1.2 DESCRIPTION OF WORK

- A. This section encompasses all activities under this division, including but not limited to the following:
 - 1. Furnishing, installing, and terminating all system equipment and cabling in accordance with the applicable drawings.
 - 2. Submitting As-Built drawings in compliance with Division 00 and/or Division 01 specifications.
 - 3. Delivering owner training and providing requisite testing documentation.
- B. All construction tasks shall be executed by individuals who are skilled and routinely engaged in the relevant craft. All work must be performed neatly and in a professional manner that reflects the highest standards of the trade.

1.3 CODES AND STANDARDS

- A. All work shall be done in accordance with the applicable portion of the following codes and standards:
 - 1. National Electrical Code
 - 2. Local Electrical Code
 - 3. National Fire Protection Association
 - 4. Applicable Building Codes
 - 5. Occupational Safety and Health Act
 - 6. Iowa Administrative Codes
 - 7. ANSI TIA-526-7 Measurement of Optical Power Loss of Installed Single-Mode Fiber Cable Plant
 - 8. ANSI TIA-568-C.0 Generic Telecommunications Cabling For Customer Premises
 - 9. ANSI TIA-568-C.1 Commercial Building Telecommunications Cabling Standard Part 1: General Requirements
 - 10. ANSI TIA-568-C.2 Balanced Twisted-Pair Telecommunications Cabling and Components Standards
 - 11. ANSI TIA-568-C.3 Optical Fiber Cabling Components Standard
 - 12. ANSI TIA-568-C.4 Broadband Coaxial Cabling and Components Standard
 - 13. ANSI TIA-569-D Telecommunications Pathways and Spaces
 - 14. TIA-606-B Administration Standard for Commercial Telecommunications Infrastructure
- B. All Contractors shall familiarize themselves with all codes and standards applicable to their work. No extra compensation will be allowed for corrections or changes in the work required due to failure to comply with the applicable codes and standards. Where two or more codes or standards are in conflict, that requiring the highest order of workmanship shall take precedence, but such questions shall be referred to Design Professional for final decision.

1.4 REQUIREMENTS & FEES OF REGULATORY AGENCIES

- A. The contractor must follow all rules of local utility companies, confirm their requirements for services, and obtain and pay for all necessary permits, licenses, fees, and inspections.

1.5 DRAWINGS

- A. The drawings provided are partially diagrammatic and serve to illustrate the overall scope of work and indicate, in general terms, the location of equipment. The contractor is responsible for laying out the work and determining the precise quantities and locations for equipment. Field measurements are required to verify locations and dimensions; reliance on drawing scale alone is not adequate for layout purposes. Due to the scale of the drawings, some essential items necessary for a complete installation may not be depicted. However, items required by code or necessary for proper installation and operation must be supplied and installed as needed.

1.6 ACTIVE SERVICES

- A. The Contractor must verify the locations of all existing services before starting work. If active services need relocation, the Contractor should consult the relevant authorities for instructions. Abandoned services must be terminated as required by the authorities.
- B. Extra payment will not be allowed for changes in the work required because of Contractor's failure to make this inspection.

1.7 SITE INSPECTION

- A. Contractor must inspect the site before bidding to understand conditions and verify utility or system wiring connections. No extra payment will be provided for work changes caused by failure to inspect.

1.8 COORDINATION AND COOPERATION

- A. The Contractor must coordinate their work with the General Contractor's schedule to ensure efficient progress and avoid delays. They are responsible for reviewing all relevant drawings and specifications, and for coordinating installations with other contractors, consulting as necessary to determine space needs and ensure adequate clearances. The Design Professional will resolve any conflicts or prioritize space when systems interfere.
- B. Discrepancies between drawings and specifications or among divisions must be reported to the Design Professional; if no clarification is sought before bidding, the Contractor is assumed to accept the provided documents. Post-contract clarifications will be decided by the Design Professional.
- C. All equipment and materials must be protected from damage throughout the project. While the Painting Contractor is responsible for protection during painting, the primary Contractor must verify this protection is adequate.
- D. If work occurs in finished areas, the Contractor must prevent and repair any resulting damage. In case of conflicting requirements, the specification demanding the highest quality and cost prevails, subject to the Design Professional's final decision.

1.9 MATERIALS AND EQUIPMENT

- A. All materials and equipment must be standard products from reputable manufacturers, unless the Design Professional provides written approval otherwise. When multiple units of an item are needed, they should come from the same manufacturer unless specified. Install all materials and equipment per the manufacturer's recommendations. Any additional parts or devices required for equipment performance or to meet guarantees must be provided, even if not specifically mentioned.

1.10 SUBMITTALS

- A. The contractor is to provide the Design Professional with complete sets of shop drawings and related submittal data. Shop drawings should be reviewed and signed by the contractor before being submitted. Additional requirements can be found in Division 01 specifications.
- B. Shop drawings are to be organized into bound sets that group related items for a full system where feasible, and identified using symbols or "plan marks" as shown on drawings. Submittals that are incomplete, piecemeal, or unbound may not be accepted.
- C. Refer to individual specification sections for specific submittal requirements.

1.11 OPERATION AND MAINTENANCE MANUALS

- A. Submit electronic operation and maintenance manuals to the Design Professional upon project completion; see Division 01 for details. Include a master index at the front, and provide for each equipment section: warranties and guarantees, installation, operation, and maintenance instructions, spare parts list, service organization contact info, and relevant shop drawings with required review stamps.

1.12 TESTS AND DEMONSTRATIONS

- A. All systems shall be tested by the Contractor and placed in proper working order prior to demonstrating systems to Owner.

1.13 SUBSTITUTIONS

- A. To seek approval for the use of unspecified equipment, bidding contractors (excluding equipment suppliers, manufacturers, etc.) must submit written requests to the Design Professional no less than 10 days prior to the bid due date. Each request should provide a clear description of the equipment for which approval is sought, along with all necessary data to demonstrate that its capacities, features, and performance are equivalent to those specified. Additionally, a cost comparison between the specified equipment and the proposed alternative must be included. Should the equipment be deemed acceptable, the Design Professional will issue approval through an addendum. Under no circumstances will the Design Professional be required to establish whether a proposed substitute item is or is not of equal quality to the specified item.
- B. When substitutions receive approval, the Contractor assumes full responsibility for physical dimensions and any resulting changes. This responsibility includes all additional work required by other trades as a consequence of the substitution.

1.14 ACCEPTABLE MANUFACTURERS

- A. Equipment specifications typically reference a specific manufacturer's details such as type, style, and catalog number, with approved equivalent manufacturers listed in the manual or plans. Manufacturers wishing to bid alternatives must submit product drawings and information to the Design Professional at least 8 days before the bid deadline; failure to do so may result in rejection at the shop drawing stage, and any replacement costs will fall on the Contractor or manufacturer.
- B. If the Contractor uses an approved alternate manufacturer, they are responsible for ensuring compliance with relevant requirements, including dimensions and operating features, and for any additional work needed by other trades. Model or catalog numbers cited may not cover all requirements; consult the plans and specifications for full details, and meet any extra requirements implied by those numbers.

1.15 QUALITY ASSURANCE

- A. The Contractor shall be a company specializing in telecommunication cable and/or accessories with a minimum of five years documented experience in installation of cable and/or accessories similar to those specified below.

1.16 WARRANTY

- A.

1.17 COMPLETION

- A. Systems must be fully operational, safe, and ready for use upon completion. The Contractor shall clean and leave all equipment and materials in new condition and remove all debris, excess materials, and equipment from the site at job completion.

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PART 2 PRODUCT - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 28 1000 ACCESS CONTROL

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Access control point peripherals, including readers and keypads.

1.2 SUBMITTALS

- A. Product Data: Provide manufacturer's standard catalog pages and data sheets for each system component. Include ratings, configurations, standard wiring diagrams, dimensions, finishes, service condition requirements, and installed features.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Readers and Keypads:
 - 1. HID Signo 40: www.hidglobal.com

2.2 ACCESS CONTROL POINT PERIPHERALS

- A. Provide devices compatible with control units and software.
- B. Provide devices suitable for operation under the service conditions at the installed location.
- C. Readers and Keypads:
 - 1. General Requirements:
 - a. Provide readers compatible with credentials to be used.
 - b. Color: Black.
 - 2. Combination Reader:
 - a. Credentials Supported: Communicates with Bluetooth Low Energy (BLE) mobile credentials, 13.56 MHz smart cards, 125 kHz proximity cards, and near-field communication (NFC) credentials.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install access control system in accordance with NECA 1 (general workmanship).
- B. Install products in accordance with manufacturer's instructions.
- C. Readers shall be installed at same location as existing readers being removed. Contractor shall re-use existing wiring.

3.2 FIELD QUALITY CONTROL

- A. Prepare and start system in accordance with manufacturer's instructions.
- B. Program system parameters according to requirements of Owner.
- C. Test for proper interface with other systems.
- D. Correct defective work, adjust for proper operation, and retest until entire system complies with Contract Documents.

END OF SECTION

SECTION 32 9219 SEEDING AND RESTORATION

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Top dressing with compost.
- B. Hydroseeding, mulching and fertilizer.
- C. Maintenance.

1.2 RELATED WORK

- A. Contractor(s) are responsible for reviewing drawings and specifications for all disciplines/bid packages to determine full scope of project and identify work outside their scope that overlaps area of work.
- B. Contractor(s) to be responsible for coordinating submittal information and review comments from separate contracts for related work in other disciplines/bid packages. No extension of Contract Time will be authorized because of out of sequence submittals resulting in lack of coordination.

1.3 DEFINITIONS

- A. Weeds: Include Dandelion, Jimsonweed, Quackgrass, Horsetail, Morning Glory, Rush Grass, Mustard, Lambsquarter, Chickweed, Cress, Crabgrass, Canadian Thistle, Nutgrass, Poison Oak, Blackberry, Tansy Ragwort, Bermuda Grass, Johnson Grass, Poison Ivy, Nut Sedge, Nimble Will, Bindweed, Bent Grass, Wild Garlic, Perennial Sorrel, and Brome Grass.

1.4 SUBMITTALS

- A. Certification: Submit certification of grass species and location of seed source(s).
- B. Maintenance Data: Include maintenance instructions, cutting method and maximum grass height; types, application frequency, and recommended coverage of fertilizer.

1.5 REGULATORY REQUIREMENTS

- A. Comply with regulatory agencies for fertilizer and herbicide composition.
- B. Provide certificate of compliance from authority having jurisdiction indicating approval of seed mixture.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver grass seed mixtures in sealed containers. Seed in damaged packaging is not acceptable. Deliver seed mixtures in containers showing percentage of seed mix, year of production, net weight, date of packaging, and location of packaging.
- B. Deliver fertilizer in waterproof bags showing weight, chemical analysis, and name of manufacturer.

PART 2 PRODUCTS

2.1 SEED MIXTURE

- A. Seed Mix Type A: SUDAS Type 1 (Permanent Lawn Mixture)

2.2 SOIL MATERIALS

- A. Topsoil: Excavated from site or,
- B. Topsoil: Fertile, agricultural soil, typical for locality, capable of sustaining vigorous plant growth, taken from drained site; free of subsoil, clay or impurities, plants, weeds and roots; pH value of minimum 5.4 and maximum 7.0.

2.3 ACCESSORIES

- A. Mulching Material: Hemlock species wood cellulose fiber, dust form, free of growth or germination inhibiting ingredients.

- B. Fertilizer: As recommended by seed supplier, with fifty percent of the elements derived from organic sources; of proportion necessary to eliminate any deficiencies of topsoil, as indicated by analysis.
- C. Water: Clean, fresh and free of substances or matter that could inhibit vigorous growth of grass.

2.4 TESTS

- A. Provide analysis of topsoil with interpretation and recommendations. Analyze to ascertain percentage of nitrogen, phosphorus, potash, soluble salt content, organic matter content, and pH value.
- B. Testing is not required if recent tests are available for imported topsoil. Submit these test results to the testing laboratory for approval. Indicate, by test results, information necessary to determine suitability.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that prepared soil base is ready to receive the work of this Section.

3.2 PREPARATION

- A. Remove any existing vegetation within planting area.
- B. Existing soils exposed to construction activity shall be cleaned of any rubble or debris and de-compacted to a depth of 12" minimum.
- C. Spread topsoil where existing topsoils have been removed during construction activities.
- D. Till soils to a depth of 4", rake and remove any additional debris or rubble, smooth soil surface
- E. Lightly roll soil

3.3 HYDROSEEDING

- A. Apply seeding slurry with a hydraulic seeder at the rate recommended by seed supplier.
- B. Do not hydroseed area in excess of that which can be mulched on same day.
- C. Immediately following seeding, apply mulch to a thickness of 1/8 inches. Maintain clear of shrubs and trees.
- D. Apply water with a fine spray immediately after each area has been mulched. Saturate to 1. 4 inches of soil.
- E. Following germination, immediately re-seed areas without germinated seeds that are larger than 4 by 4 inches.

3.4 PROTECTION

- A. Cover seeded slopes where grade is 4 inches per foot or greater with erosion fabric. Roll fabric onto slopes without stretching or pulling.

3.5 MAINTENANCE AND WARRANTY

- A. Provide maintenance at no extra cost to Owner; Owner will pay for water.
- B. See Section 01 7000 - Execution and Closeout Requirements, for additional requirements relating to maintenance service.
- C. Provide maintenance of seeded areas for 90 days from Date of Substantial Completion.
- D. Maintain seeded areas immediately after placement until grass is well established and exhibits a vigorous growing condition.
- E. Mow lawn turf created with Seed Mix A at regular intervals to maintain at a maximum height of 2-1/2 inches. Do not cut more than 1/3 of grass blade at any one mowing.
- F. Neatly trim edges and hand clip where necessary.
- G. Immediately remove clippings after mowing and trimming.
- H. Water to prevent grass and soil from drying out.
- I. Roll surface to remove minor depressions or irregularities.
- J. Control growth of weeds. Apply herbicides in accordance with manufacturer's instructions. Remedy damage resulting from improper use of herbicides.

- K. Immediately reseed areas that show bare spots.
- L. Protect seeded areas with warning signs during maintenance period.
- M. At completion of the required maintenance period, the Landscape Installation Contractor shall request a Final Acceptance and Maintenance Turn-over meeting with the Landscape Architect and Owner.
- N. Once Final Acceptance has been determined by Landscape Architect and Owner, maintenance shall become the responsibility of the Owner.
- O. It is the responsibility of the Contractor to ensure that care and maintenance as instructed is carried out by Owner during warranty period.
- P. Provide warranty of seeded areas for six (6) months from date of Final Acceptance.

END OF SECTION