PROJECT MANUAL

Interior and Exterior Repairs and Improvements Missouri State Highway Patrol Hangar

DESIGNED BY: Peckham & Wright Architects, Inc.
2120 Forum Blvd., Suite 101
Columbia, MO 65203

DATE ISSUED: December 27, 2019

PROJECT NO.: R2007-01

FOR: State of Missouri
Office of Administration
Division of Facilities Management, Design and Construction
**CERTIFICATION PAGE**

**Project Title:** Interior and Exterior Repairs and Improvements  
**Missouri State Highway Patrol Hangar**

**Project #**  
R2007-01

**PWA #**  
201919

The following drawings and specifications have been prepared by me or under my direct supervision:

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**Name and license:**

As the professional whose signature and personal seal appear herewith, I affirm that these documents listed above were prepared by me, or under my supervision, and disclaim (pursuant to section 327.431 RSMO) any responsibility for all other plans, specifications, estimates, reports, or other documents or instruments not sealed by me and which relate to or are intended to be used for any part or parts of the project. This statement applies to all documents listed above and any addenda issued to the above.

**Interior and Exterior Repairs and Improvements**  
**Missouri State Highway Patrol Hangar**  
**Project #** R2007-01  
**00 0107**  
**CERTIFICATION**
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Interior and Exterior Repairs and Improvements
Missouri State Highway Patrol Hangar

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The following drawings and specifications have been prepared by me or under my direct supervision:

**Structural Drawings:**
- S100 COVER/GENERAL STRUCTURAL DATA
- S200 FRAMING PLAN
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- 04 2200 CONCRETE UNIT MASONRY
- 05 1200 STRUCTURAL STEEL FRAMING
- 06 4000 COLD FORMED METAL FRAMING
- 06 1000 ROUGH CARPENTRY

**Name and License:**

**AS THE PROFESSIONAL WHOSE SIGNATURE AND PERSONAL SEAL APPEAR HEREWITH, I AFFIRM THAT THESE DOCUMENTS LISTED ABOVE WERE PREPARED BY ME, OR UNDER MY SUPERVISION, AND DISCLAIM (PURSUANT TO SECTION 327.411 RSMO) ANY RESPONSIBILITY FOR ALL OTHER PLANS, SPECIFICATIONS, ESTIMATES, REPORTS, OR OTHER DOCUMENTS OR INSTRUMENTS NOT SEALED BY ME AND WHICH RELATE TO OR ARE INTENDED TO BE USED FOR ANY PART OR PARTS OF THE PROJECT. THIS STATEMENT APPLIES TO ALL DOCUMENTS LISTED ABOVE AND ANY ADDENDA ISSUED TO THE ABOVE.**

12/27/19
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Project Title: Interior and Exterior Repairs and Improvements
Missouri State Highway Patrol Hangar

Project #: R2007-01

PWA #: 201919

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**Drawings:**

- MECHANICAL, ELECTRICAL & PLUMBING
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  - M-500 MECHANICAL DETAILS & SCHEDULES
  - EP-100 POWER PLAN
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- 23 05 93 TESTING, ADJUSTING, AND BALANCING FOR HVAC
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- 23 31 00 HVAC DUCTS AND CASINGS
- 23 33 00 AIR DUCT ACCESSORIES
- 23 34 13 AXIAL HVAC FANS
- 23 37 00 AIR OUTLETS AND INLETS
- 26 05 05 SELECTIVE DEMOLITION FOR ELECTRICAL
- 26 05 05.13 CONDUIT FOR ELECTRICAL SYSTEMS
- 26 05 29 HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS
- 26 05 26 GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS
- 26 05 19 LOW VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES
- 26 05 33.16 BOXES FOR ELECTRICAL SYSTEMS
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- 26 09 23 LIGHTING CONTROL DEVICES
- 26 27 26 WIRING DEVICES
- 26 51 00 INTERIOR LIGHTING

Name and license:

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Interior and Exterior Repairs and Improvements
Missouri State Highway Patrol Hangar

Project # R2007-01

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**The following documents may be found on MissouriBUYS at https://missouribuys.mo.gov/**

| 004000    | PROCUREMENT FORMS & SUPPLEMENTS                    |                 |
| 004113    | Bid Form                                           | *               |
| 004322    | Unit Prices Form                                   | *               |
| 004336    | Proposec Subcontractors Form                       | *               |
| 004337    | MBE/WBE/SDVE Compliance Evaluation Form            | *               |
| 004338    | MBE/WBE/SDVE Eligibility Determination             | *               |
| 004339    | Form for Joint Ventures                            | *               |
| 004340    | MBE/WBE/SDVE Good Faith Effort (GFE) Determination Forms | *               |
| 004341    | SDVE Business Form                                 | *               |
| 004541    | Affidavit of Work Authorization                    | *               |

| 005000    | CONTRACTING FORMS AND SUPPLEMENTS                  |                 |
| 005213    | Construction Contract                              | 3               |
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PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section provides a comprehensive list of the drawings that comprise the Bid Documents for this project.

PART 2 - PRODUCTS (NOT APPLICABLE)

PART 3 - EXECUTION

3.1 LIST OF DRAWINGS

A. The following list of drawings is a part of the Bid Documents:

GENERAL
G001 COVER SHEET
G002 SHEET INDEX, SYMBOLS LEGEND, AND LOCATION MAP
G003 CODE AND EGRESS PLANS

DEMOLITION
D101 DEMOLITION FLOOR PLANS
D102 DEMOLITION REFLECTED CEILING PLANS

STRUCTURAL
S-100 COVER SHEET
S-200 FRAMING PLAN
S-201 STAIR FRAMING PLAN AND DETAILS
S-202 ENLARGED PLAN AND DETAILS

ARCHITECTURAL
A-100 OVERALL BUILDING PLAN
A-101 RENOVATION PLANS
A-102 REFLECTED CEILING PLANS
A-201 INTERIOR ELEVATIONS
A-202 EXTERIOR ELEVATIONS
A-301 BUILDING SECTIONS
A-302 BUILDING SECTIONS
A-501 WALL AND SECTION DETAILS
A-601 FINISH, DOOR AND WINDOW SCHEDULE AND DETAILS

MECH, ELEC, & PLUMBING
M-100 MECHANICAL PLAN
M-500 MECHANICAL DETAILS & SCHEDULES
EP-100 POWER PLAN
EP-101 POWER PLAN
EL-100 LIGHTING PLAN
SECTION 001116 - INVITATION FOR BID

1.0 OWNER:
   A. The State of Missouri
      Office of Administration,
      Division of Facilities Management, Design and Construction
      Jefferson City, Missouri

2.0 PROJECT TITLE AND NUMBER:
   A. Interior and Exterior Repairs and Improvements, MSHP Aircraft Hangar
      Jefferson City, Missouri
      Project No.: R2007-01

3.0 BIDS WILL BE RECEIVED:
   A. Until: 1:30 PM, Thursday, February 13, 2020
   B. Only electronic bids on MissouriBUYS shall be accepted: https://missouribuys.mo.gov. Bidder must be registered to bid.

4.0 DESCRIPTION:
   A. Scope: The Project consists of the renovation of the existing spaces on the first floor and the offices located on the mezzanine level both located on the East side the existing hangar building and selected removal and replacement of exterior and interior aluminum wall panels and insulation. New lighting will be installed throughout the hangar. The Work consists of the demolition of selected elements of existing construction with new construction of walls, floors, flooring, wall and ceiling finishes, ceilings, stairs, doors, windows, HVAC, Electrical and Plumbing to support the designed spaces. The main level new construction will utilize near flood proof construction materials and assemblies.
   B. Estimate: $403,000 to $555,000
   C. MBE/WBE/SDVE Goals: MBE 10.00%, WBE 10.00%, & SDVE 3.00%. NOTE: Only MBE/WBE firms certified by a State of Missouri public entity as of the date of bid opening, or SDVE(s) meeting the requirements of Section 34.074, RSMo and 1 CSR 30-5.010, can be used to satisfy the MBE/WBE/SDVE participation goals for this project.
   D. **NOTE: Bidders are provided new Good Faith Effort (GFE) forms on MissouriBUYS.

5.0 PRE-BID MEETING:
   A. Place/Time: 1:00 p.m, Thursday, January 30, 2020; MSHP Hangar, Jefferson City Memorial Airport, 511 Airport Road, Jefferson City, MO 65101.
   B. Access to State of Missouri property requires presentation of a photo ID by all persons

6.0 HOW TO GET PLANS & SPECIFICATIONS:
   A. View Only Electronic bid sets are available at no cost or paper bid sets for a deposit of $30 from American Document Solutions (ADS). MAKE CHECKS PAYABLE TO: American Document Solutions. Mail to: American Document Solutions, 1400 Forum Blvd., Suite 7A, Columbia, Missouri 65203. Phone 573-446-7768, Fax 573-355-5433, https://www.adsplanroom.net. NOTE: Prime contractors will be allowed a maximum of two bid sets at the deposit rate shown above. Other requesters will be allowed only one bid set at this rate. Additional bid sets or parts thereof may be obtained by any bidder at the cost of printing and shipping by request to American Document Solutions at the address shown above. Bidder must secure at least one bid set to become a planholder.
   B. Refunds: Return plans and specifications in unmarked condition within 15 working days of bid opening to American Document Solutions, 1400 Forum Blvd., Suite 7A, Columbia, Missouri 65203. Phone 573-446-7768, Fax 573-355-5433. Deposits for plans not returned within 15 working days shall be forfeited.
   C. Information for upcoming bids, including downloadable plans, specifications, Invitation for Bid, bid tabulation, award, addenda, and access to the ADS planholders list, is available on the Division of Facilities Management, Design and Construction’s web site: https://oa.mo.gov/facilities/bid-opportunities/bid-listing-electronic-plans.

7.0 POINT OF CONTACT:
   A. Designer: PWArchitects, Inc., Erik Miller, AIA, phone # 573-449-2683, fax # 573-442-6213
   B. Project Manager: Terry Bruns, phone # 573-526-5184, fax # 573-751-7277

8.0 GENERAL INFORMATION:
   A. The State reserves the right to reject any and all bids and to waive all informalities in bids. No bid may be withdrawn for a period of 20 working days subsequent to the specified bid opening time. The contractor shall pay not less than the prevailing hourly rate of wages for work of a similar character in the locality in which the work is performed, as determined by the Missouri Department of Labor and Industrial Relations and as set out in the detailed plans and specifications.
   B. Bid results will be available at https://oa.mo.gov/facilities/bid-opportunities/bid-listing-electronic-plans after it is verified that at least one bid is awardable and affordable.

SECTION 001116 – INVITATION FOR BID
1/2/20
Very Important MissouriBUYS Instructions to Help Submit a Bid Correctly

A. The bidder shall submit his or her bid and all supporting documentation on MissouriBUYS eProcurement System. No hard copy bids shall be accepted. Go to https://missouribuys.mo.gov and register. The bidder must register before access is granted to the solicitation details and bidding is possible, however, the bidder can review a summary of the project by selecting “Bid Board” and then checking off “Open” under “Status” and “OA-FMDC-Contracts Chapter 8” under “Organization” in the boxes shown on the left margin.

B. Once registered, log in.
   2. Under “Filter by Agency” select “OA-FMDC-Contracts Chapter 8.”
   4. Above the dark blue bar, select “Other Active Opportunities.”
   5. To see the Solicitation Summary, single click the Opp. No. (Project Number) and the summary will open. Single quick click each blue bar to open detailed information.

C. Here are simplified instructions for uploading the bid to MissouriBUYS:
   1. Find the solicitation by completing Steps 1 through 4 above.
   2. Select the three dots under “Actions.” Select “Add New Response.”
   3. When the Quote box opens, give the response a title and select “OK.”
   4. The detailed solicitation will open. Select “Check All” for the Original Solicitation Documents, open each document, and select “Accept.” If this step is not completed, a bid cannot be uploaded. Scroll to the bottom of the page and select “Add Attachments.” If you do not see this command, not all documents have been opened and accepted.
   5. The Supplier Attachments box will open. Select “Add Attachment” again.
   6. The Upload Documents box will open. Read the instructions for uploading. Disregard the “Confidential” check box.
   7. Browse and attach up to 5 files at a time. Scroll to bottom of box and select “Upload.” The Supplier Attachments box will open. Repeat Steps 5 through 7 if more than 5 files are to be uploaded.
   8. When the Supplier Attachments box opens again and uploading is complete, select “Done.” A message should appear that the upload is successful. If it does not, go to the Bidder Response tab and select “Submit.”
   9. The detailed solicitation will open. At the bottom select “Close.”

D. Any time a bidder wants to modify the bid, he or she will have to submit a new one. FMDC will open the last response the bidder submits. The bidder may revise and submit the bid up to the close of the solicitation (bid date and time). Be sure to allow for uploading time so that the bid is successfully uploaded prior to the 1:30 PM deadline; we can only accept the bid if it is uploaded before the deadline.

E. If you want to verify that you are uploading documents correctly, we encourage you to submit a fake bid early. Label the fake bid as such to distinguish it from the real bid. The contracts person you contact will let you know if your “bid” was received successfully. Please contact Drew Henrickson: 573-751-8128, drew.henrickson@oa.mo.gov; Kelly Copeland: 573-522-2283, kelly.copeland@oa.mo.gov; or Paul Girouard: 573-751-4797, paul.girouard@oa.mo.gov.

F. If you are experiencing login issues, please contact Web Procure Support (Proactis) at 866-889-8533 anytime from 7:00 AM to 7:00 PM Central Time, Monday through Friday. If you try using a userid or password several times that is incorrect, the system will lock you out. Web Procure Support is the only option to unlock you! If you forget your userid or password, Web Procure Support will provide a temporary userid or password. Also, if it has been a while since your last successful login and you receive an “inactive” message, contact Web Procure (Proactis). If you are having a registration issue, you may contact Cathy Holliday at 573-751-3491. Her email: cathy.holliday@oa.mo.gov.
IMPORTANT INFORMATION REGARDING REQUIREMENT FOR OEO CERTIFICATION

SPECIFICATION CHANGES:

A. SECTION 002113 – INSTRUCTIONS TO BIDDERS: Article 14.0, Section B.1. (bottom of page 6 of 8): Delete: “an MBE or WBE must be certified by the State of Missouri, Office of Equal Opportunity and”.

To allow MBE, WBE, or MBE/WBE contractors, subcontractors, and suppliers to have ample time to register with the Office of Equal Opportunity, this requirement will not take effect until July 1, 2020. Until then, we will continue to accept certifications from the Office of Equal Opportunity and other Missouri certifying agencies.
1.0 - SPECIAL NOTICE TO BIDDERS

A. If awarded a contract, the Bidder’s employees, and the employees of all subcontractors, who perform the work on the project, will be required to undergo a fingerprint background check and obtain a State of Missouri identification badge prior to beginning work on site. The Bidder should review the information regarding this requirement in Section 013513 – Site Security and Health Requirements prior to submitting a bid.

B. The Bidder’s prices shall include all city, state, and federal sales, excise, and similar taxes that may lawfully be assessed in connection with the performance of work, and the purchased of materials to be incorporated in the work. THIS PROJECT IS NOT TAX EXEMPT.

2.0 - BID DOCUMENTS

A. The number of sets obtainable by any one (1) party may be limited in accordance with available supply.

B. For the convenience of contractors, sub-contractors and suppliers, copies of construction documents are on file at the office of the Director, Division of Facilities Management, Design and Construction and on the Division’s web site - https://oa.mo.gov/facilities/bid-opportunities/bid-listing-electronic-plans.

3.0 - BIDDERS' OBLIGATIONS

A. Bidders must carefully examine the entire site of the work and shall make all reasonable and necessary investigations to inform themselves thoroughly as to the facilities available as well as to all the difficulties involved in the completion of all work in accordance with the specifications and the plans. Bidders are also required to examine all maps, plans and data mentioned in the specifications. No plea of ignorance concerning observable existing conditions or difficulties that may be encountered in the execution of the work under this contract will be accepted as an excuse for any failure or omission on the part of the contractor to fulfill in every detail all of the requirements of the contract, nor accepted as a basis for any claims for extra compensation.

B. Under no circumstances will contractors give their plans and specifications to another contractor. Any bid received from a contractor whose name does not appear on the list of plan holders may be subject to rejection.

4.0 - INTERPRETATIONS

A. No bidder shall be entitled to rely on oral interpretations as to the meaning of the plans and specifications or the acceptability of alternate products, materials, form or type of construction. Every request for interpretation shall be made in writing and submitted with all supporting documents not less than five (5) working days before opening of bids. Every interpretation made to a bidder will be in the form of an addendum and will be sent as promptly as is practicable to all persons to whom plans and specifications have been issued. All such addenda shall become part of the contract documents.

B. Approval for an “acceptable substitution” issued in the form of an addendum as per Paragraph 4A above, and as per Article 3.1 of the General Conditions; ACCEPTABLE SUBSTITUTIONS shall constitute approval for use in the project of the product.

C. An “acceptable substitution” requested after the award of bid shall be approved if proven to the satisfaction of the Owner and the Designer as per Article 3.1, that the product is acceptable in design, strength, durability, usefulness, and convenience for the purpose intended. Approval of the substitution after award is at the sole discretion of the Owner.

D. A request for “Acceptable Substitutions” shall be made on the Section 006325 Substitution Request Form. The request shall be sent directly to the project Designer. A copy of said request should also be mailed to the Owner, Division of Facilities Management, Design and Construction, Post Office Box 809, Jefferson City, Missouri 65102.

5.0 - BIDS AND BIDDING PROCEDURE

A. Bidders shall submit all submission forms and accompanying documents listed in SECTION 004113 – BID FORM, Article 5.0, ATTACHMENTS TO BID by the stated time or their bid will be rejected for being non-responsive.
Depending on the specific project requirements, the following is a GENERIC list of all possible bid forms that may be due with bid submittals and times when they may be due. Please check for specific project requirements on the proposal form (Section 004113). Not all of the following bid forms may be required to be submitted.

**Bid Submittal – due before stated date and time of bid opening (see IFB):**

- 004113  Bid Form (all pages are always required)
- 004322  Unit Prices Form
- 004336  Proposed Subcontractors Form
- 004337  MBE/WBE/SDVE Compliance Evaluation Form
- 004338  MBE/WBE/SDVE Eligibility Determination for Joint Ventures
- 004339  MBE/WBE/SDVE GFE Determination
- 004340  SDVE Business Form
- 004541  Affidavit of Work Authorization

B. All bids shall be submitted without additional terms and conditions, modification or reservation on the bid forms with each space properly filled. Bids not on these forms will be rejected.

C. All bids shall be accompanied by a bid bond executed by the bidder and a duly authorized surety company, certified check, cashier's check or bank draft made payable to the Division of Facilities Management, Design and Construction, State of Missouri, in the amount indicated on the bid form, Section 004113. Failure of the contractor to submit the full amount required shall be sufficient cause to reject his bid. The bidder agrees that the proceeds of the check, draft or bond shall become the property of the State of Missouri, if for any reason the bidder withdraws his bid after closing, or if on notification of award refuses or is unable to execute tendered contract, provide an acceptable performance and payment bond, provide evidence of required insurance coverage and/or provide required copies of affirmative action plans within ten (10) working days after such tender.

D. The check or draft submitted by the successful bidder will be returned after the receipt of an acceptable performance and payment bond and execution of the formal contract. Checks or drafts of all other bidders will be returned within a reasonable time after it is determined that the bid represented by same will receive no further consideration by the State of Missouri. Bid bonds will only be returned upon request.

### 6.0 - SIGNING OF BIDS

A. A bid from an individual shall be signed as noted on the Bid Form.

B. A bid from a partnership or joint venture shall require only one signature of a partner, an officer of the joint venture authorized to bind the venture or an attorney-in-fact. If the bid is signed by an officer of a joint venture or an attorney-in-fact, a document evidencing the individual's authority to execute contracts should be included with the bid form.

C. A bid from a limited liability company (LLC) shall be signed by a manager or a managing member of the LLC.

D. A bid from a corporation shall have the correct corporate name thereon and the signature of an authorized officer of the corporation manually written. Title of office held by the person signing for the corporation shall appear, along with typed name of said individual. Corporate license number shall be provided and, if a corporation organized in a state other than Missouri, a Certificate of Authority to do business in the State of Missouri shall be attached. In addition, for corporate proposals, the President or Vice-President should sign as the bidder. If the signator is other than the corporate president or vice president, the bidder must provide satisfactory evidence that the signator has the legal authority to bind the corporation.

E. A bid should contain the full and correct legal name of the Bidder. If the Bidder is an entity registered with the Missouri Secretary of State, the Bidder’s name on the bid form should appear as shown in the Secretary of State’s records.

F. The Bidder should include its corporate license number on the Bid Form and, if the corporation is organized in a state other than Missouri, a Certificate of Authority to do business in the State of Missouri shall be attached to the bid form.
7.0 - RECEIVING BID SUBMITTALS

A. It is the bidder’s sole responsibility to assure receipt by Owner of bid submittals by the date and time specified in the Invitation for Bid. Bids received after the date and time specified shall not be considered by the Owner.

B. Bids must be submitted through the MissouriBUYS statewide eProcurement system (https://www.missouribuys.mo.gov/) in accordance with the instructions for that system. The Owner shall only accept bids submitted through MissouriBUYS. Bids received by the Owner through any other means, including hard copies, shall not be considered and will be discarded by the Owner unopened.

C. To respond to an Invitation for Bid, the Bidder must first register with MissouriBUYS by going through the MissouriBUYS Home Page (https://www.missouribuys.mo.gov/), clicking the “Register” button at the top of the page, and completing the Vendor Registration. Once registered, the Bidder accesses its account by clicking the “Login” button at the top of the MissouriBUYS Home Page. Enter your USERID and PASSWORD, which the Bidder will select. Under Solicitations, select “View Current Solicitations.” A new screen will open. Under “Filter by Agency” select “OA-FMDC-Contracts Chapter 8.” Under “Filter by Opp. No.” type in the State Project Number. Select “Submit.” Above the dark blue bar, select “Other Active Opportunities.” To see the Solicitation Summary, single click the Opp. No. (Project Number) and the summary will open. Single quick click each blue bar to open detailed information. The Bidder must read and accept the Original Solicitation Documents and complete all identified requirements. The Bidder should download and save all of the Original Solicitation Documents on its computer so that the Bidder can prepare its response to these documents. The Bidder should upload its completed response to the downloaded documents as an attachment to the electronic solicitation response.

D. Step-by-step instructions for how a registered vendor responds to a solicitation electronically are provided in Section 001116 – Invitation For Bid.

E. The Bidder shall submit its bid on the forms provided by the Owner on MissouriBUYS with each space fully and properly completed, including all amounts required for alternate bids, unit prices, cost accounting data, etc. The Owner may reject bids that are not on the Owner’s forms or that do not contain all requested information.

F. No Contractor shall stipulate in his bid any conditions not contained in the specifications or standard bid form contained in the contract documents. To do so may subject the Contractor’s bid to rejection.

G. The completed forms shall be without interlineations, alterations or erasures.

8.0 - MODIFICATION AND WITHDRAWAL OF BIDS

A. Bidder may withdraw his bid at any time prior to scheduled closing time for receipt of bids, but no bidder may withdraw his bid for a period of twenty (20) working days after the scheduled closing time for receipt of bids.

B. The Bidder shall modify his or her original bid by submitting a revised bid on MissouriBUYS.

9.0 - AWARD OF CONTRACT

A. The Owner reserves the right to reject any and/or all bids and further to waive all informalities in bidding when deemed in the best interest of the State of Missouri.

B. The Owner reserves the right to let other contracts in connection with the work, including but not by way of limitation, contracts for the furnishing and installation of furniture, equipment, machines, appliances and other apparatus.

C. In awarding the contract the Owner may take into consideration the bidder's skill, facilities, capacity, experience, responsibility, previous work record, financial standing and the necessity of prompt and efficient completion of work herein described. Inability of any bidder to meet the requirements mentioned above may be cause for rejection of his bid. However, no contract will be awarded to any individual,
partnership or corporation, who has had a contract with the State of Missouri declared in default within the preceding twelve months.

D. Award of alternates, if any, will be made in numerical order unless all bids received are such that the order of acceptance of alternates does not affect the determination of the low bidder.

E. No bid shall be considered binding upon the Owner until the written contract has been properly executed, a satisfactory bond has been furnished, evidence of required insurance coverage, submittal of executed Section 004541, Affidavit of Work Authorization form, documentation evidencing enrollment and participation in a federal work authorization program has been received and an affirmative action plan submitted. Failure to execute and return the contract and associated documents within the prescribed period of time shall be treated, at the option of the Owner, as a breach of bidder's obligation and the Owner shall be under no further obligation to bidder.

F. If the successful bidder is doing business in the State of Missouri under a fictitious name, he shall furnish to Owner, attached to the Bid Form, a properly certified copy of the certificate of Registration of Fictitious Name from the State of Missouri, and such certificate shall remain on file with the Owner.

G. Any successful bidder which is a corporation organized in a state other than Missouri shall furnish to the Owner, attached to the Bid Form, a properly certified copy of its current Certificate of Authority to do business in the State of Missouri, such certificate to remain on file with the Owner. No contract will be awarded by the Owner unless such certificate is furnished by the bidder.

H. Any successful bidder which is a corporation organized in the State of Missouri shall furnish at its own cost to the Owner, if requested, a Certificate of Good Standing issued by the Secretary of State, such certificate to remain on file with the Owner.

I. Transient employers subject to Sections 285.230 and 285.234, RSMo, (out-of-state employers who temporarily transact any business in the State of Missouri) may be required to file a bond with the Missouri Department of Revenue. No contract will be awarded by the Owner unless the successful bidder certifies that he has complied with all applicable provisions of Section 285.230-234.

J. Sections 285.525 and 285.530, RSMo, require business entities to enroll and participate in a federal work authorization program in order to be eligible to receive award of any state contract in excess of $5,000. Bidders should submit with their bid an Affidavit of Work Authorization (Section 004541) along with appropriate documentation evidencing such enrollment and participation. Section-004541, Affidavit of Work Authorization is located on the MissouriBUYS solicitation for this project. Bidders must also submit an E-Verify Memorandum before the Owner may award a contract to the Bidder. Information regarding a E-Verify is located at https://www.uscis.gov/e-verify/. The contractor shall be responsible for ensuring that all subcontractors and suppliers associated with this contract enroll in E-Verify.

10.0 - CONTRACT SECURITY

A. The successful bidder shall furnish a performance/payment bond as set forth in General Conditions Article 6.1 on a condition prior to the State executing the contract and issuing a notice to proceed.

11.0 - LIST OF SUBCONTRACTORS

A. If required by “Section 004113 – Bid Form,” each bidder must submit as part of their bid a list of subcontractors to be used in performing the work (Section 004336). The list must specify the name of the single designated subcontractor, for each category of work listed in “Section 004336 - Proposed Subcontractors Form.” If work within a category will be performed by more than one subcontractor, the bidder must provide the name of each subcontractor and specify the exact portion of the work to be done by each. Failure to list the Bidder’s firm, or a subcontractor for each category of work identified on the Bid Form or the listing of more than one subcontractor for any category without designating the portion of work to be performed by each shall be cause for rejection of the bid. If the bidder intends to perform any of the designated subcontract work with the use of his own employees, the bidder shall make that fact clear, by listing his own firm for the subject category. If any category of work is left vacant, the bid shall be rejected.

12.0 - WORKING DAYS

A. Contract duration time is stated in working days and will use the following definition in determining the actual calendar date for contract completion:

13.0 - AMERICAN AND MISSOURI - MADE PRODUCTS AND FIRMS

A. By signing the bid form and submitting a bid on this project, the Bidder certifies that it will use American and Missouri products as set forth in Article 1.7 of the General Conditions. Bidders are advised to review those requirements carefully prior to bidding.

B. A preference shall be given to Missouri firms, corporations or individuals, or firms, corporations or individuals that maintain Missouri offices or places of business, when the quality of performance promised is equal or better and the price quoted is the same or less.

C. Pursuant to Section 34.076, RSMo, a contractor or Bidder domiciled outside the boundaries of the State of Missouri shall be required, in order to be successful, to submit a bid the same percent less than the lowest bid submitted by a responsible contractor or Bidder domiciled in Missouri as would be required for such a Missouri domiciled contractor or Bidder to succeed over the bidding contractor or Bidder domiciled outside Missouri on a like contract or bid being let in the person's domiciliary state and, further, the contractor or Bidder domiciled outside the boundaries of Missouri shall be required to submit an audited financial statement as would be required of a Missouri domiciled contractor or Bidder on a like contract or bid being let in the domiciliary state of that contractor or Bidder.

14.0 - MBE/WBE/SDVE INSTRUCTIONS

A. Definitions:

1. “MBE” means a Minority Business Enterprise.

2. “MINORITY” has the same meaning as set forth in 1 C.S.R. 10-17.010.

3. “MINORITY BUSINESS ENTERPRISE” has the same meaning as set forth in section 37.020, RSMo.


5. “WOMEN'S BUSINESS ENTERPRISE” has the same meaning as set forth in section 37.020, RSMo.


7. “SERVICE-DISABLED VETERAN” has the same meaning as set forth in section 34.074, RSMo.

8. “SERVICE-DISABLED VETERAN ENTERPRISE” has the same meaning as “Service-Disabled Veteran Business” set forth in section 34.074, RSMo.

B. MBE/WBE/SDVE General Requirements:

1. For all bids greater than $100,000, the Bidder shall obtain MBE, WBE and SDVE participation in an amount equal to or greater than the percentage goals set forth in the Invitation for Bid and the Bid Form, unless the Bidder is granted a Good Faith Effort waiver by the Director of the Division, as set forth below. If the Bidder does not meet the MBE, WBE and SDVE goals, or make a good faith effort to do so, the Bidder shall be non-responsive, and its bid shall be rejected.

2. The Bidder should submit with its bid all of the information requested in the MBE/WBE/SDVE Compliance Evaluation Form for every MBE, WBE, or SDVE subcontractor or material supplier the Bidder intends to use for the contract work. The Bidder is required to submit all appropriate...
MBE/WBE/SDVE documentation before the stated time and date set forth in the Invitation for Bid. If the Bidder fails to provide such information by the specified date and time, the Owner shall reject the bid.

3. The Director reserves the right to request additional information from a Bidder to clarify the Bidder’s proposed MBE, WBE, and/or SDVE participation. The Bidder shall submit the clarifying information requested by the Owner within two (2) Working Days of receiving the request for clarification.

4. Pursuant to section 34.074, RSMo, a Bidder that is a SDVE doing business as Missouri firm, corporation, or individual, or that maintains a Missouri office or place of business, shall receive a three-point bonus preference in the contract award evaluation process. The bonus preference will be calculated and applied by reducing the bid amount of the eligible SDVE by three percent of the apparent low responsive bidder’s bid. Based on this calculation, if the eligible SDVE’s evaluation is less than the apparent low responsive bidder’s bid, the eligible SDVE’s bid becomes the apparent low responsive bid. This reduction is for evaluation purposes only, and will have no impact on the actual amount(s) of the bid or the amount(s) of any contract awarded. In order to be eligible for the SDVE preference, the Bidder must complete and submit with its bid the Missouri Service Disabled Veteran Business Form, and any information required by the form. The form is available on the MissouriBUYS solicitation for this project.

A. Computation of MBE/WBE/SDVE Goal Participation:
   1. A Bidder who is a MBE, WBE, or SDVE may count 100% of the contract towards the MBE, WBE or SDVE goal, less any amounts awarded to another MBE, WBE or SDVE. (NOTE: A MBE firm that bids as general contractor must obtain WBE and SDVE participation; a WBE firm that bids as a general contractor must obtain MBE and SDVE participation; and a SDVE firm that bids as general contractor must obtain MBE and WBE participation.) In order for the remaining contract amount to be counted towards the MBE, WBE or SDVE goal, the Bidder must complete the MBE/WBE/SDVE Compliance Evaluation Form (Section 004337) identifying itself as an MBE, WBE or SDVE.
   2. The total dollar value of the work granted to a certified MBE, WBE or SDVE by the Bidder shall be counted towards the applicable goal.
   3. Expenditures for materials and supplies obtained from a certified MBE, WBE, or SDVE supplier or manufacturer may be counted towards the MBE, WBE and SDVE goals, if the MBE, WBE, or SDVE assumes the actual and contractual responsibility for the provision of the materials and supplies.
   4. The total dollar value of the work granted to a second or subsequent tier subcontractor or a supplier may be counted towards a Bidder’s MBE, WBE and SDVE goals, if the MBE, WBE, or SDVE properly assumes the actual and contractual responsibility for the work.
   5. The total dollar value of work granted to a certified joint venture equal to the percentage of the ownership and control of the MBE, WBE, or SDVE partner in the joint venture may be counted towards the MBE/WBE/SDVE goals.
   6. Only expenditures to a MBE, WBE, or SDVE that performs a commercially useful function in the work may be counted towards the MBE, WBE and SDVE goals. A MBE, WBE, or SDVE performs a commercially useful function when it is responsible for executing a distinct element of the work and carrying out its responsibilities by actually performing, managing and supervising the work or providing supplies or manufactured materials.

B. Certification of MBE/WBE/SDVE Subcontractors:
   1. In order to be counted towards the goals, an MBE or WBE must be certified by the State of Missouri, Office of Equal Opportunity and an SDVE must be certified by the State of Missouri, Office of Administration, Division of Purchasing and Material Management or by the Department of Veterans Affairs.
2. The Bidder may determine the certification status of a proposed MBE or WBE subcontractor or supplier by referring to the Office of Equal Opportunity (OEO)’s online MBE/WBE directory (https://apps1.mo.gov/oeo/). The Bidder may determine the eligibility of a SDVE subcontractor or supplier by referring to the Division of Purchasing and Materials Management’s online SDVE directory (http://oa.mo.gov/purchasing/vendor-information/missouri-service-disabled-veteran-business-enterprise-sdve-information) or the Department of Veterans Affairs’ directory (https://www.vip.vetbiz.gov/).

3. Additional information, clarifications, etc., regarding the listings in the directories may be obtained by calling the Division at (573)751-3339 and asking to speak to the Contract Specialist of record as shown in the Supplementary Conditions (Section 007300).

C. Waiver of MBE/WBE/SDVE Participation:

1. If a Bidder has made a good faith effort to secure the required MBE, WBE and/or SDVE participation and has failed, the Bidder shall submit with its bid the information requested in MBE/WBE/SDVE Good Faith Effort (GFE) Determination form. The GFE forms are located on the MissouriBUYS solicitation for this project. The Director will determine if the Bidder made a good faith effort to meet the applicable goals. If the Director determines that the Bidder did not make a good faith effort, the bid shall be rejected as being nonresponsive to the bid requirements. Bidders who demonstrate that they have made a good faith effort to include MBE, WBE, and/or SDVE participation will be determined to be responsive to the applicable participation goals, regardless of the percent of actual participation obtained, if the bid is otherwise acceptable.

2. In determining whether a Bidder has made a good faith effort to obtain MBE, WBE and/or SDVE participation, the Director may evaluate the factors set forth in 1 CSR 30-5.010(6)(C) and the following:
   a. The amount of actual participation obtained;
   b. How and when the Bidder contacted potential MBE, WBE, and SDVE subcontractors and suppliers;
   c. The documentation provided by the Bidder to support its contacts, including whether the Bidder provided the names, addresses, phone numbers, and dates of contact for MBE/WBE/SDVE firms contacted for specific categories of work;
   d. If project information, including plans and specifications, were provided to MBE/WBE/SDVE subcontractors;
   e. Whether the Bidder made any attempts to follow-up with MBE, WBE or SDVE firms prior to bid;
   f. Amount of bids received from any of the subcontractors and/or suppliers that the Bidder contacted;
   g. The Bidder’s stated reasons for rejecting any bids;

3. If no bidder has obtained any participation in a particular category (MBE/WBE/SDVE) or made a good faith effort to do so, the Director may waive that goal rather than rebid.

D. Contractor MBE/WBE/SDVE Obligations

1. If awarded a contract, the Bidder will be contractually required to subcontract with or obtain materials from the MBE, WBE, and SDVE firms listed in its bid, in amounts equal to or greater than the dollar amount bid, unless the amount is modified in writing by the Owner.

2. If the Contractor fails to meet or maintain the participation requirements contained in the Contractor’s bid, the Contractor must satisfactorily explain to the Director why it cannot comply
with the requirement and why failing meeting the requirement was beyond the Contractor’s control. If the Director finds the Contractor's explanation unsatisfactory, the Director may take any appropriate action including, but not limited to:

a. Declaring the Contractor ineligible to participate in any contracts with the Division for up to twelve (12) months (suspension); and/or

b. Declaring the Contractor be non-responsive to the Invitation for Bid, or in breach of contract and rejecting the bid or terminating the contract.

3. If the Contractor replaces an MBE, WBE, or SDVE during the course of this contract, the Contractor shall replace it with another MBE, WBE, or SDVE or make a good faith effort to do so. All MBE, WBE and SDVE substitutions must be approved by the Director.

4. The Contractor shall provide the Owner with regular reports on its progress in meeting its MBE/WBE/SDVE obligations. At a minimum, the Contractor shall report the dollar-value of work completed by each MBE, WBE, or SDVE during the preceding month and the cumulative total of work completed by each MBE, WBE or SDVE to date with each monthly application for payment. The Contractor shall also make a final report, which shall include the total dollar-value of work completed by each MBE, WBE, and SDVE during the entire contract.
The MBE/WBE Directory for goods and services is maintained by the Office of Equal Opportunity (OEO). The current Directory can be accessed at the following web address:

https://apps1.mo.gov/MWBCertifiedFirms/

Please note that you may search by MBE, WBE, or both as well as by region, location of the business by city or state, as well as by commodity or service.

The SERVICE DISABLED VETERAN ENTERPRISE (SDVE) Directory (s) may be accessed at the following web addresses:

https://oa.mo.gov/sites/default/files/sdvelisting.pdf

https://www.vip.vetbiz.va.gov
THIS AGREEMENT, made (DATE) by and between:

Contractor Name and Address
hereinafter called the "Contractor,"

and the State of Missouri, hereinafter called the "Owner", represented by the Office of Administration, Division of Facilities Management, Design and Construction, on behalf of the Department of Public Safety-MO Hwy Patrol.

WITNESSETH, that the Contractor and the Owner, for the consideration stated herein agree as follows:

ARTICLE 1. STATEMENT OF WORK

The Contractor shall furnish all labor and materials and perform all work required for furnishing and installing all labor, materials, equipment and transportation and everything necessarily inferred from the general nature and tendency of the plans and specifications for the proper execution of the work for:

Project Name: Interior and Exterior Repairs and Improvements MSHP Aircraft Hangar
Jefferson City, Missouri

Project Number: R2007-01

in strict accordance with the Contract Documents as enumerated in Article 7, all of which are made a part hereof.

ARTICLE 2. TIME OF COMPLETION

The contract performance time is 86 working days from the transmittal date of this agreement. The contract completion date is MONTH, DAY, YEAR. This time includes ten (10) working days for the Contractor to receive, sign and return the contract form along with required bonding and insurance certificates. Failure of the Contractor to provide correct bonding and insurance within the ten (10) working days shall not be grounds for a time extension. Receipt of proper bonding and insurance is a condition precedent to the formation of the contract and if not timely received, may result in forfeiture of the Contractor's bid security. Work may not commence until the Owner issues a written Notice to Proceed and must commence within seven (7) working days thereafter.

ARTICLE 3. LIQUIDATED DAMAGES

Whenever time is mentioned in this contract, time shall be and is of the essence of this contract. The Owner would suffer a loss should the Contractor fail to have the work embraced in this contract fully completed on or before the time above specified. THEREFORE, the parties hereto realize in order to adjust satisfactorily the damages on account of such failure that it might be impossible to compute accurately or estimate the amount of such loss or damages which the Owner would sustain by reason of failure to complete fully said work within the time required by this contract. The Contractor hereby covenants and agrees to pay the Owner, as and for liquidated damages, the sum of $700.00 per day for each and every day, Sunday and legal holidays excepted, during which the work remains incomplete and unfinished. Any sum which may be due the Owner for such damages shall be deducted and retained by the Owner from any balance which may be due the Contractor when said work shall have been finished and accepted. But such provisions shall not release the Bond of the Contractor from liability according to its terms. In case of failure to complete, the Owner will be under no obligation to show or prove any actual or specific loss or damage.
ARTICLE 4. CONTRACT SUM

The Owner shall pay the Contractor for the prompt, faithful and efficient performance of the conditions and undertakings of this contract, subject to additions, and deductions as provided herein, in current funds the sum of:

Base Bid: $ 

DELETE THE ALTERNATE INFORMATION IF NOT USED

The Owner accepts the following Alternate Bids:

Alternate One: $ 

TOTAL CONTRACT AMOUNT: (SCONTRACT AMOUNT)

UNIT PRICES: The Owner accepts the following Unit Prices:

For changing specified quantities of work from those indicated by the contract drawings and specifications, upon written instructions of Owner, the following unit prices shall prevail. The unit prices include all labor, overhead and profit, materials, equipment, appliances, bailing, shoring, shoring removal, etc., to cover the finished work of the several kinds of work called for. Only a single unit price shall be given and it shall apply for either MORE or LESS work than that shown on the drawings and called for in the specifications or included in the Base Bid. In the event of more or less units than so indicated or included, change orders may be issued for the increased or decreased amount.

INSERT UNIT PRICE DESCRIPTIONS AND QUANTITY INCLUDED IN THE BASE BID FROM SECTION 01026

OR

IF NO Unit Prices are used, type “NOT APPLICABLE”

ARTICLE 5. PREVAILING WAGE RATE

It is understood and agreed by and between the parties that not less than the prevailing hourly rate of wages shall be paid for work of a similar character in the locality in which the work is performed, and not less than the prevailing hourly rate of wages for legal holiday and overtime work in the locality in which the work is performed, both as determined by the Department of Labor and Industrial Relations or as determined by the court on appeal, to all workmen employed by or on behalf of the Contractor or any subcontractor, exclusive of maintenance work. Only such workmen as are directly employed by the Contractor or his subcontractors, in actual construction work on the site shall be deemed to be employed.

When the hauling of materials or equipment includes some phase of the construction other than the mere transportation to the site of the construction, workmen engaged in this dual capacity shall be deemed to be employed directly on the project and entitled to the prevailing wage.

ARTICLE 6. MINORITY/WOMEN/SERVICE DISABLED VETERAN BUSINESS ENTERPRISE PARTICIPATION

The Contractor has been granted a waiver of the 10% MBE and 10% WBE and 3% SDVE participation goals. The Contractor agrees to secure the MBE/WBE/SDVE participation amounts for this project as follows: (OR)

The Contractor has met the MBE/WBE/SDVE participation goals and agrees to secure the MBE/WBE/SDVE participation amounts for this project as follows:

MBE/WBE/SDVE Firm: Subcontract Amt: $ 
MBE/WBE/SDVE Firm: Subcontract Amt: $ 
MBE/WBE/SDVE Firm: Subcontract Amt: $ 

Total $ 

SECTION 005213 – CONSTRUCTION CONTRACT 
07/16 
2
MBE/WBE/SDVE assignments identified above shall not be changed without a Contract Change signed by the Owner.

The Director of the Division of Facilities Management, Design and Construction or his Designee shall be the final authority to resolve disputes and disagreements between the Contractor and the MBE/WBE/SDVE firms listed above when such disputes impact the subcontract amounts shown above.

ARTICLE 7. CONTRACT DOCUMENTS

Contract documents shall consist of the following component parts:

1. Division 0, with executed forms
2. Division 1
3. Executed Construction Contract Form
4. The Drawings
5. The Technical Specifications
6. Addenda
7. Contractor's Proposal as accepted by the Owner

By signature below, the parties hereby execute this contract document.

APPROVED:

________________________________________
Mark Hill, P.E., Director
Division of Facilities Management,
Design and Construction

________________________________________
Contractor’s Authorized Signature

DELETE IF PRIVATE OR PARTNERSHIP

I, Corporate Secretary, certify that I am Secretary of the corporation named above and that (CONTRACTOR NAME), who signed said contract on behalf of the corporation, was then (TITLE) of said corporation and that said contract was duly signed for and in behalf of the corporation by authority of its governing body, and is within the scope of its corporate powers.

________________________________________
Corporate Secretary
STATE OF MISSOURI
OFFICE OF ADMINISTRATION
DIVISION OF FACILITIES MANAGEMENT, DESIGN AND CONSTRUCTION

AFFIDAVIT FOR AFFIRMATIVE ACTION

NAME:

First being duly sworn on oath states: that

he/she is the □ sole proprietor □ partner □ officer or □ manager or managing member of

NAME:

NAME:

a □ sole proprietorship □ partnership
□ limited liability company (LLC)

or □ corporation, and as such, said proprietor, partner, or officer is duly authorized to make this affidavit on behalf of said sole proprietorship, partnership, or corporation; that under the contract known as

PROJECT TITLE

Less than 50 persons in the aggregate will be employed and therefore, the applicable Affirmative Action requirements as set forth in Article 1.4 of the General Conditions of the State of Missouri have been met.

PRINT NAME & SIGNATURE

DATE

NOTARY INFORMATION

STATE OF

COUNTY (OR CITY OF ST. LOUIS)

SUBSCRIBED AND SWORN BEFORE ME, THIS

DAY OF

YEAR

NOTARY PUBLIC SIGNATURE

MY COMMISSION EXPIRES

NOTARY PUBLIC NAME (TYPED OR PRINTED)

USE RUBBER STAMP IN CLEAR AREA BELOW

MO 300-1401 (05/18) FILE/Construction Contract

SECTION 005414 – AFFIDAVIT FOR AFFIRMATIVE ACTION 05/18 Page 1 of 1
SECTION 006113 - PERFORMANCE AND PAYMENT BOND FORM

KNOW ALL MEN BY THESE PRESENTS, THAT we ____________________________________________________
as principal, and ___________________________________________________________________________________
_____________________________________________________________ as Surety, are held and firmly bound unto the
STATE OF MISSOURI. in the sum of ___________________________________ Dollars ($                                          )
for payment whereof the Principal and Surety bind themselves, their heirs, executors, administrators and successors, jointly
and severally, firmly by these presents.

WHEREAS, the Principal has, by means of a written agreement dated the ______________________________________
day of_______________________________________, 20_________, enter into a contract with the State of Missouri for
_________________________________________________________________________________________________
_________________________________________________________________________________________________
_________________________________________________________________________________________________
(Insert Project Title and Number)

NOW, THEREFORE, if the Principal shall faithfully perform and fulfill all the undertakings, covenants, terms, conditions and
agreements of said contract during the original term of said contract and any extensions thereof that may be granted by the State of
Missouri, with or without notice to the Surety and during the life of any guaranty required under the contract; and shall also faithfully
perform and fulfill all undertakings, covenants, terms, conditions and agreements of any and all duly authorized modifications of said
contract that may hereafter be made with or without notice to the Surety; and shall also promptly make payment for materials
incorporated, consumed or used in connection with the work set forth in the contract referred to above, and all insurance premiums,
both compensation and all other kinds of insurance, on said work, and for all labor performed on such work, whether by subcontractor
or otherwise, at not less than the prevailing hourly rate of wages for work of a similar character (exclusive of maintenance work) in the
locality in which the work is performed and not less than the prevailing hourly rate of wages for legal holiday and overtime work
(exclusive of maintenance work) in the locality in which the work is performed both as determined by the Department of Labor and
Industrial Relations or determined by the Court of Appeal, as provided for in said contract and in any and all duly authorized
modifications of said contract that may be hereafter made, with or without notice to the Surety, then, this obligation shall be void and
of no effect, but it is expressly understood that if the Principal should make default in or should fail to strictly, faithfully and
efficiently do, perform and comply with any or more of the covenants, agreements, stipulations, conditions, requirements or
undertakings, as specified in or by the terms of said contract, and with the time therein named, then this obligation shall be valid and
binding upon each of the parties hereto and this bond shall remain in full force and effect; and the same may be sued on at the instance
of any material man, laborer, mechanic, subcontractor, individual, or otherwise to whom such payment is due, in the name of the State
of Missouri, to the use of any such person.
AND, IT IS FURTHER specifically provided that any modifications which may hereinafter be made in the terms of the contract or in
the work to be done under it or the giving by the Owner of any extension of the time for the performance of the contract or any other
forbearance on the part of either the Owner or the Principal to the other, shall not in any way release the Principal and the Surety, or
either or any of them, their heirs, executors, administrators and successors, from their liability hereunder, notice to the Surety of any
such extension, modifications or forbearance being hereby waived.

IN WITNESS WHEREOF, the above bounden parties have executed the within instrument this ________________ day of
______________________, 20 ___.

AS APPLICABLE:

AN INDIVIDUAL

Name: ______________________________________
Signature: ______________________________________

A PARTNERSHIP

Name of Partner: _____________________________________
Signature of Partner: _____________________________________

Name of Partner: _____________________________________
Signature of Partner: _____________________________________

CORPORATION

Firm Name: ______________________________________
Signature of President: ______________________________________

SURETY

Surety Name: ______________________________________
Attorney-in-Fact: ______________________________________
Address of Attorney-in-Fact: ______________________________________
Telephone Number of Attorney-in-Fact: ______________________________________
Signature Attorney-in-Fact: ______________________________________

NOTE: Surety shall attach Power of Attorney
**STATE OF MISSOURI**  
**OFFICE OF ADMINISTRATION**  
**DIVISION OF FACILITIES MANAGEMENT, DESIGN AND CONSTRUCTION**

### PRODUCT SUBSTITUTION REQUEST

**PROJECT NUMBER**

**PROJECT TITLE AND LOCATION**

#### CHECK APPROPRIATE BOX

- [ ] **SUBSTITUTION PRIOR TO BID OPENING**  
  (Minimum of (5) working days prior to receipt of Bids as per Article 4 – Instructions to Bidders)

- [ ] **SUBSTITUTION FOLLOWING AWARD**  
  (Maximum of (20) working days from Notice to Proceed as per Article 3 – General Conditions)

**FROM:**  
BIDDER/CONTRACTOR (PRINT COMPANY NAME)

**TO:**  
ARCHITECT/ENGINEER (PRINT COMPANY NAME)

Bidder/Contractor hereby requests acceptance of the following product or systems as a substitution in accordance with provisions of Division One of the Bidding Documents:

**SPECIFIED PRODUCT OR SYSTEM**

<table>
<thead>
<tr>
<th>SPECIFICATION SECTION NO.</th>
</tr>
</thead>
<tbody>
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<td></td>
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</tbody>
</table>

**SUPPORTING DATA**

- [ ] Product data for proposed substitution is attached (include description of product, standards, performance, and test data)
- [ ] Sample  
  Sample will be sent, if requested

**QUALITY COMPARISON**

<table>
<thead>
<tr>
<th>SPECIFIED PRODUCT</th>
<th>SUBSTITUTION REQUEST</th>
</tr>
</thead>
<tbody>
<tr>
<td>NAME, BRAND</td>
<td></td>
</tr>
<tr>
<td>CATALOG NO.</td>
<td></td>
</tr>
<tr>
<td>MANUFACTURER</td>
<td></td>
</tr>
<tr>
<td>VENDOR</td>
<td></td>
</tr>
</tbody>
</table>

**PREVIOUS INSTALLATIONS**

<table>
<thead>
<tr>
<th>PROJECT</th>
<th>ARCHITECT/ENGINEER</th>
</tr>
</thead>
<tbody>
<tr>
<td>LOCATION</td>
<td>DATE INSTALLED</td>
</tr>
</tbody>
</table>

**SIGNIFICANT VARIATIONS FROM SPECIFIED PRODUCT**

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REASON FOR SUBSTITUTION


DOES PROPOSED SUBSTITUTION AFFECT OTHER PARTS OF WORK?
☐ YES  ☐ NO

IF YES, EXPLAIN


SUBSTITUTION REQUIRES DIMENSIONAL REVISION OR REDESIGN OF STRUCTURE OR A/E WORK
☐ YES  ☐ NO

BIDDER’S/CONTRACTOR’S STATEMENT OF CONFORMANCE OF PROPOSED SUBSTITUTION TO CONTRACT REQUIREMENT:

We have investigated the proposed substitution. We believe that it is equal or superior in all respects to specified product, except as stated above; that it will provide the same Warranty as specified product; that we have included complete implications of the substitution; that we will pay redesign and other costs caused by the substitution which subsequently become apparent; and that we will pay costs to modify other parts of the Work as may be needed, to make all parts of the Work complete and functioning as a result of the substitution.

BIDDER/CONTRACTOR  DATE

REVIEW AND ACTION

☐ Resubmit Substitution Request with the following additional information:


☐ Substitution is accepted.

☐ Substitution is accepted with the following comments:


☐ Substitution is not accepted.

ARCHITECT/ENGINEER  DATE
KNOW ALL MEN BY THESE PRESENT THAT:        hereinafter called “Subcontractor” who heretofore entered into an agreement with       hereinafter called “Contractor”, for the performance of work and/or furnishing of material for the construction of the project entitled

(PROJECT TITLE, PROJECT LOCATION, AND PROJECT NUMBER)

at

(ADDRESS OF PROJECT)

for the State of Missouri (Owner) which said subcontract is by this reference incorporated herein, in consideration of such final payment by Contractor.

DOES HEREBY:

1. ACKNOWLEDGE that they have been PAID IN FULL all sums due for work and materials contracted or done by their Subcontractors, Material Vendors, Equipment and Fixture Suppliers, Agents and Employees, or otherwise in the performance of the Work called for by the aforesaid Contract and all modifications or extras or additions thereto, for the construction of said project or otherwise.

2. RELEASE and fully, finally, and forever discharge the Owner from any and all suits, actions, claims, and demands for payment for work performed or materials supplied by Subcontractor in accordance with the requirements of the above referenced Contract.

1. REPRESENT that all of their Employees, Subcontractors, Material Vendors, Equipment and Fixture Suppliers, and everyone else has been paid in full all sums due them, or any of them, in connection with performance of said Work, or anything done or omitted by them, or any of them in connection with the construction of said improvements, or otherwise.

DATED this day of , 20 .

NAME OF SUBCONTRACTOR

BY (TYPED OR PRINTED NAME)

SIGNATURE

TITLE

ORIGINAL: FILE/Closeout Documents
<table>
<thead>
<tr>
<th>CHECK</th>
<th>MBE WBE SDVE</th>
<th>ITEM OF WORK</th>
<th>TOTAL AMOUNT OF SUBCONTRACT</th>
<th>$ AMOUNT &amp; % COMPLETE (PAID-TO-DATE)</th>
<th>CONSULTANT/SUBCONSULTANT OR CONTRACTOR/SUBCONTRACTOR/SUPPLIER NAME, ADDRESS, CONTACT, AND PHONE NUMBER</th>
</tr>
</thead>
<tbody>
<tr>
<td>MBE</td>
<td>WBE</td>
<td>SDVE</td>
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</tr>
</tbody>
</table>

THE PERCENTAGE AND DOLLAR AMOUNT OF THIS PROJECT THAT ARE TO BE MBE/WBE/SDVE AS INDICATED IN THE ORIGINAL CONTRACT: % and $ .

ORIGINAL: Attach to ALL Progress and Final Payments
Before me, the undersigned Notary Public, in and for the County of ____________________________
State of ____________________________ personally came and appeared ____________________________
(NAME)
of the ____________________________
(POSITION) ____________________________ (NAME OF THE COMPANY)
(a corporation) (a partnership) (a proprietorship) and after being duly sworn did depose and say that all provisions
and requirements set out in Chapter 290, Sections 290.210 through and including 290.340, Missouri Revised
Statutes, pertaining to the payment of wages to workmen employed on public works project have been fully satisfied
and there has been no exception to the full and completed compliance with said provisions and requirements
and with Wage Determination No: ____________________________ issued by the
Department of Labor and Industrial Relations, State of Missouri on the ______ day of ______ 20 ___
in carrying out the contract and working in connection with ____________________________
(NAME OF PROJECT)
Located at ____________________________ in ____________________________ County
(NAME OF THE INSTITUTION)
Missouri, and completed on the ______ day of ______ 20 ___

SIGNATURE

NOTARY INFORMATION

NOTARY PUBLIC EMBOSSER OR BLACK INK RUBBER STAMP SEAL

STATE

COUNTY (OR CITY OF ST. LOUIS)

SUBSCRIBED AND SWORN BEFORE ME, THIS

DAY OF YEAR

USE RUBBER STAMP IN CLEAR AREA BELOW

NOTARY PUBLIC SIGNATURE

MY COMMISSION EXPIRES

NOTARY PUBLIC NAME (TYPED OR PRINTED)
GENERAL CONDITIONS

INDEX

ARTICLE:

   1.1. Definitions
   1.2. Drawings and Specifications
   1.3. Compliance with Laws, Permits, Regulations and Inspections
   1.4. Nondiscrimination in Employment
   1.5. Anti-Kickback
   1.6. Patents and Royalties
   1.7. Preference for American and Missouri Products and Services
   1.8. Communications
   1.9. Separate Contracts and Cooperation
   1.10. Assignment of Contract
   1.11. Indemnification
   1.12. Disputes and Disagreements

2. Owner/Designer Responsibilities

3. Contractor Responsibilities
   3.1. Acceptable Substitutions
   3.2. Submittals
   3.3. As-Built Drawings
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5. Construction and Completion
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   5.2. Project Construction
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6. Bond and Insurance
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   6.2. Insurance

7. Termination or Suspension of Contract
   7.1. For Site Conditions
   7.2. For Cause
   7.3. For Convenience
SECTION 007213 - GENERAL CONDITIONS

A. These General Conditions apply to each section of these specifications. The Contractor is subject to the provisions contained herein.

B. The General Conditions are intended to define the relationship of the Owner, the Designer and the Contractor thereby establishing certain rules and provisions governing the operation and performance of the work so that the work may be performed in a safe, orderly, expeditious and workmanlike manner.

ARTICLE 1 – GENERAL PROVISIONS

ARTICLE 1.1 - DEFINITIONS

A. As used in these contract documents, the following terms shall have the meanings and refer to the parties designated in these definitions.

1. "COMMISSIONER": The Commissioner of the Office of Administration.

2. “CONSTRUCTION DOCUMENTS”: The “Construction Documents” shall consist of the Project Manual, Drawings and Addenda.

3. "CONSTRUCTION REPRESENTATIVE:" Whenever the term “Construction Representative” is used, it shall mean the Owner’s Representative at the work site.

4. "CONTRACTOR": Party or parties who have entered into a contract with the Owner to furnish work under these specifications and drawings.

5. "DESIGNER": When the term "Designer" is used herein, it shall refer to the Architect, Engineer, or Consultant of Record specified and defined in Paragraph 2.0 of the Supplemental Conditions, or his duly authorized representative. The Designer may be either a consultant or state employee.

6. "DIRECTOR": Whenever the term "Director" is used, it shall mean the Director of the Division of Facilities Management, Design and Construction or his Designee, representing the Office of Administration, State of Missouri. The Director is the agent of the Owner.


8. “INCIDENTAL JOB BURDENS”: Shall mean those expenses relating to the cost of work, incurred either in the home office or on the job-site, which are necessary in the course of doing business but are incidental to the job. Such costs include office supplies and equipment, postage, courier services, telephone expenses including long distance, water and ice and other similar expenses.

9. "JOINT VENTURE": An association of two (2) or more businesses to carry out a single business enterprise for profit for which purpose they combine their property, capital, efforts, skills and knowledge.

10. "OWNER": Whenever the term “Owner” is used, it shall mean the State of Missouri.

11. “PROJECT”: Wherever the term “Project” is used, it shall mean the work required to be completed by the construction contract.


13. "SUBCONTRACTOR": Party or parties who contract under, or for the performance of part or this entire Contract between the Owner and Contractor. The subcontract may or may not be direct with the Contractor.

14. "WORK": Labor, material, supplies, plant and equipment required to perform and complete the service agreed to by the Contractor in a safe, expeditious, orderly and workmanlike manner so that the project shall be complete and finished in the best manner known to each respective trade.


ARTICLE 1.2 DRAWINGS AND SPECIFICATIONS

A. In case of discrepancy between drawings and specifications, specifications shall govern. Should discrepancies in architectural drawings, structural drawings and mechanical drawings occur, architectural drawings shall govern and, in case of
conflict between structural and mechanical drawings, structural drawings shall govern.

B. Specifications are separated into titled divisions for convenience of reference only and to facilitate letting of contracts and subcontracts. The Contractor is responsible for establishing the scope of work for subcontractors, which may cross titled divisions. Neither the Owner nor Designer will establish limits and jurisdiction of subcontracts.

C. Figured dimensions take precedence over scaled measurements and details over smaller scale general drawings. In the event of conflict between any of the documents contained within the contract, the documents shall take precedence and be controlling in the following sequence: addenda, supplementary general conditions, general conditions, division 1 specifications, technical division specifications, drawings, bid form and instructions to bidders.

D. Anything shown on drawings and not mentioned in these specifications or vice versa, as well as any incidental work which is obviously necessary to complete the project within the limits established by the drawings and specifications, although not shown on or described therein, shall be performed by the Contractor at no additional cost as a part of his contract.

E. Upon encountering conditions differing materially from those indicated in the contract documents, the Contractor shall promptly notify the Designer and Construction Representative in writing before such conditions are disturbed. The Designer shall promptly investigate said conditions and report to the Owner, with a recommended course of action. If conditions do materially differ and cause an increase or decrease in contract cost or time required for completion of any portion of the work, a contract change will be initiated as outlined in Article 4 of these General Conditions.

E. Only work included in the contract documents is authorized, and the Contractor shall do no work other than that described therein or in accordance with appropriately authorized and approved contract changes.

ARTICLE 1.3 - COMPLIANCE WITH LAWS, PERMITS, REGULATIONS AND INSPECTIONS

A. Since the Owner is the State of Missouri, municipal or political subdivisions, zoning ordinances, construction codes (other than licensing of trades), and other like ordinances are not applicable to construction on Owner’s property, and Contractor will not be required to submit drawings and specifications to any municipal or political subdivision, authority, obtain construction permits or any other licenses (other than licensing of trades) or permits from or submit to inspections by any municipality or political subdivision relating to the construction for this project. All permits or licenses required by municipality or political subdivision for operation on property not belonging to Owner shall be obtained by and paid for by Contractor. Each Contractor shall comply with all applicable laws, ordinances, rules and regulations that pertain to the work of this contract.

B. Contractors, subcontractors and their employees engaged in the businesses of electrical, mechanical, plumbing, carpentry, sprinkler system work, and other construction related trades shall be licensed to perform such work by the municipal or political subdivision where the project is located, if such licensure is required by local code. Local codes shall dictate the level (master, journeyman, and apprentice) and the number, type and ratio of licensed tradesmen required for this project within the jurisdiction of such municipal or political subdivision.

C. Equipment and controls manufacturers and their authorized service and installation technicians that do not maintain an office within the jurisdiction of the municipal or political subdivision but are a listed or specified contractor or subcontractor on this project are exempt from Paragraph 1.3 B above.

D. The Contractor shall post a copy of the wage determination issued for the project and included as a part of the contract documents, in a prominent and easily accessible location at the site of construction for the duration of the project.

E. Any contractor or subcontractor to such contractor at any tier signing a contract to work on this project shall provide a ten-hour Occupational Safety and Health Administration (OSHA) construction safety program for their on-site employees which includes a course in construction safety and health approved by OSHA or a similar program approved by the Department of Labor and Industrial Relations which is at least as stringent as an approved OSHA program. The contractor shall forfeit as a penalty to the public body on whose behalf the contract is made or awarded, two thousand five hundred dollars plus one hundred dollars for each employee employed by the contractor or subcontractor, for each calendar day, or portion thereof, such employee is employed without the required training.

ARTICLE 1.4 - NONDISCRIMINATION IN EMPLOYMENT

A. The Contractor and his subcontractors will not discriminate against individuals based on race, color, religion, national origin, sex, disability, or
age, but may use restrictions which relate to bona
fide occupational qualifications. Specifically, the
Contractor and his subcontractors shall not
discriminate:

1. Against recipients of service on the basis of
race, color, religion, national origin, sex,
disability or age.

2. Against any employee or applicant, for
employment on the basis of race, color,
religion, national origin, sex or otherwise
qualified disability status.

3. Against any applicant for employment or
employee on the basis of age, where such
applicant or employee is between ages 40 and
70 and where such Contractor employs at least
20 persons.

4. Against any applicant for employment or
employee on the basis of that person's status as
a disabled or Vietnam-era veteran.

The Contractor and his Subcontractors will take
affirmative action to insure applicants for
employment and employees are treated equally
without regard to race, color, religion, national
origin, sex, disability, or age. Such action shall
include, but not be limited to, the following:
employment, upgrading, demotion and transfer;
recruitment or recruitment advertising; and
selection for training, including apprenticeship.
The Contractor and his Subcontractors will give
written notice of their commitments under this
clause to any labor union with which they have
bargaining or other agreements.

B. The Contractor and his Subcontractors shall
develop, implement, maintain and submit in
writing to the Owner an affirmative action program
if at least fifty (50) persons in the aggregate are
employed under this contract. If less than fifty
(50) persons in the aggregate are to be employed
under this contract, the Contractor shall submit, in
lieu of the written affirmative action program, a
properly executed Affidavit for Affirmative Action
in the form included in the contract specifications.
For the purpose of this section, an "affirmative
action program" means positive action to influence
all employment practices (including, but not
limited to, recruiting, hiring, promoting and
training) in providing equal employment
opportunity regardless of race, color, sex, national
origin, religion, age (where the person affected is
between age 40 and 70), disabled and Vietnam-era
veteran status, and disability. Such "affirmative
action program" shall include:

1. A written policy statement committing the
total organization to affirmative action and
assigning management responsibilities and
procedures for evaluation and dissemination;

2. The identification of a person designated to
handle affirmative action;

3. The establishment of non-discriminatory
selection standards, objective measures to
analyze recruitment, an upward mobility
system, a wage and salary structure, and
standards applicable to lay-off, recall,
discharge, demotion and discipline;

4. The exclusion of discrimination from all
collective bargaining agreements; and

5. Performance of an internal audit of the
reporting system to monitor execution and to
provide for future planning.

In the enforcement of this non-discrimination
clause, the Owner may use any reasonable
procedures available, including, but not limited to:
requests, reports, site visits and inspection of
relevant documents of contractors and
subcontractors.

C. In the event of the Contractor's or his
subcontractor's noncompliance with any provisions
of this Article of the Contract, the Owner may
cancel this contract in whole or in part or require
the Contractor to terminate his contract with the
subcontractor.

ARTICLE 1.5 - ANTI-KICKBACK

A. No employee of the division, shall have or acquire
any pecuniary interest, whether direct or indirect,
in this contract or in any part hereof. No officer,
employee, designer, attorney, or administrator of or
for the Owner who is authorized in such capacity
and on behalf of the Owner to exercise any
legislative, executive, supervisory or other similar
functions in connection with the construction of the
project, shall have or acquire any pecuniary
interest, whether direct or indirect, in this contract,
any material supply contract, subcontract,
insurance contract, or any other contract pertaining
to the project.

ARTICLE 1.6 - PATENTS AND ROYALTIES

A. The Contractor shall hold and save the Owner and
its officers, agents, servants and employees
harmless from liabilities of any nature or kind,
including cost and expenses, for, or on account of,
any patented or unpatented invention, process,
article or appliance manufactured or used in the
performance of this contract, including its use by
the Owner; unless otherwise specifically stipulated
in the contract documents.

B. If the Contractor uses any design, device or
materials covered by letters, patent or copyright,
the Contractor shall provide for such use by suitable agreement with the Owner of such patented or copyrighted design, device or material. It is mutually agreed and understood, without exception, that the contract prices shall include all royalties or costs arising from the use of such design, device or materials, in any way involved in the work. The Contractor and/or his sureties shall indemnify and save harmless the Owner of the project from any and all claims for infringement by reason of the use of such patented or copyrighted design, device or materials or any trademark or copyright in connection with work agreed to be performed under this contract and shall indemnify the Owner for any cost, expense or damage it may be obliged to pay by reason of such infringement at any time during the prosecution of the work or after completion of the work.

ARTICLE 1.7 - PREFERENCE FOR AMERICAN AND MISSOURI PRODUCTS AND SERVICES

A. By virtue of statutory authority a preference will be given to Missouri labor and to products of mines, forests and quarries of the state of Missouri when they are found in marketable quantities in the state, and all such materials shall be of the best quality and suitable character that can be obtained at reasonable market prices, all as provided for in Section 8.280, Missouri Revised Statutes and Cumulative Supplements.

B. Furthermore, pursuant to Section 34.076 Missouri Revised Statutes and Cumulative Supplements, a preference shall be given to those persons doing business as Missouri firms, corporations, or individuals, or which maintain Missouri offices or places of business, when the quality of performance promised is equal or better and the price quoted is the same or less. In addition, in order for a non-domiciliary bidder to be successful, his bid must be that same percentage lower than a domiciliary Missouri bidder's bid, as would be required for a Missouri bidder to successfully bid in the non-domiciliary state.

C. In accordance with the Missouri Domestic Products Procurement Act Section 34.350 RSMo and Cumulative Supplements any manufactured goods or commodities used or supplied in the performance of this contract or any subcontract thereto shall be manufactured, assembled or produced in the United States, unless the specified products are not manufactured, assembled or produced in the United States in sufficient quantities to meet the agency's requirements or cannot be manufactured, assembled or produced in the United States within the necessary time in sufficient quantities to meet the contract requirements, or if obtaining the specified products manufactured, assembled or produced in the United States would increase the cost of this contract for purchase of the product by more than ten percent.

ARTICLE 1.8 - COMMUNICATIONS

A. All notices, requests, instructions, approvals and claims must be in writing and shall be delivered to the Designer and copied to the Construction Representative for the project except as required by Article 1.12 Disputes and Disagreements, or as otherwise specified by the Owner in writing as stated in Section 012600. Any such notice shall be deemed to have been given as of the time of actual receipt.

B. The Contractor shall attend on-site progress and coordination meetings, as scheduled by the Construction Representative, no less than once a month.

C. The Contractor shall ensure that major subcontractors and suppliers shall attend monthly progress meetings as necessary to coordinate the work, and as specifically requested by the Construction Representative.

ARTICLE 1.9 - SEPARATE CONTRACTS AND COOPERATION

A. The Owner reserves the right to let other contracts in connection with this work. The Contractor shall afford other contractors reasonable opportunity for the introduction and storage of their materials and the execution of their work and shall properly connect and coordinate his work with theirs.

B. The Contractor shall consult the drawings for all other contractors in connection with this work. Any work conflicting with the above shall be brought to the attention of the Owner's Representative before the work is performed. If the Contractor fails to do this, and constructs any work which interferes with the work of another contractor, the Contractor shall remove any part so conflicting and rebuild same, as directed by the Owner’s Representative at no additional cost to the Owner.

C. Each contractor shall be required to coordinate his work with other contractors so as to afford others reasonable opportunity for execution of their work. No contractor shall delay any other contractor by neglecting to perform contract work at the proper time. If any contractor causes delay to another, they shall be liable directly to that contractor for such delay in addition to any liquidated damages which might be due the Owner.

D. Should the Contractor or project associated subcontractors refuse to cooperate with the instructions and reasonable requests of other Contractors or other subcontractors in the overall
coordinating of the work, the Owner may take such appropriate action and issue directions, as required, to avoid unnecessary and unwarranted delays.

E. Each Contractor shall be responsible for damage done to Owner's or other Contractor's property by him/her or workers in his employ through their fault or negligence.

F. Should a Contractor sustain any damage through any act or omission of any other Contractor having a contract with the Owner, the Contractor so damaged shall have no claim or cause of action against the Owner for such damage, but shall have a claim or cause of action against the other Contractor to recover any and all damages sustained by reason of the acts or omissions of such Contractor. The phrase "acts or omissions" as used in this section shall be defined to include, but not be limited to, any unreasonable delay on the part of any such contractors.

ARTICLE 1.10 - ASSIGNMENT OF CONTRACT

A. No assignment by Contractor of any amount or any part of this contract or of the funds to be received thereunder will be recognized unless such assignment has had the written approval of the Director and the surety has been given due notice of such assignment and has furnished written consent thereunto. In addition to the usual recitals in assignment contracts, the following language must be set forth: "It is agreed that the funds to be paid to the assignee under this assignment are subject to performance by the Contractor of this contract and to claims or liens for services rendered or materials supplied for the performance of the work called for in said contract in favor of all persons, firms or corporations rendering such services or supplying such materials."

ARTICLE 1.11 - INDEMNIFICATION

A. Contractor agrees to indemnify and save harmless Owner and its respective commissioners, officers, officials, agents, consultants and employees and Designer, their agents, servants and employees, from and against any and all liability for damage arising from injuries to persons or damage to property occasioned by any acts or omissions of Contractor, any subcontractors, agents, servants or employees, including any and all expense, legal or otherwise, which may be incurred by Owner or Designer, its agents, servants or employees, in defense of any claim, action or suit.

B. The obligations of the Contractor under this paragraph shall not extend to the liability of the Designer, his agents or employees, arising out of (1) the preparation or approval of maps, drawings, opinions, reports, surveys, contract changes, design or specifications, or (2) giving of or the failure to give directions or instructions by the Designer, his agents or employees as required by this contract documents provided such giving or failure to give is the primary cause of the injury or damage.

ARTICLE 1.12 - DISPUTES AND DISAGREEMENTS

A. It is hereby expressly agreed and understood that in case any controversy or difference of opinion arises during construction, best efforts will be given to resolution at the field level. Should those efforts be unsuccessful, the Contractor has the right to appeal in writing, the decision of the Director's Designee to the Director at Room 730 Truman Building, P.O. Box 809, Jefferson City, Missouri 65102. The decision of the Director shall be final and binding on all parties.

ARTICLE 2 - OWNER/DESIGNER RESPONSIBILITIES

A. The Owner shall give all orders and directions contemplated under this contract relative to the execution of the work. During progress of work the Owner will be represented at the project site by the Construction Representative and/or Designer, whose responsibilities are to see that this contract is properly fulfilled.

B. The Owner shall at all times have access to the work whenever it is in preparation or progress. The Contractors shall provide proper facilities for such access and for inspection and supervision.

C. All materials and workmanship used in the work shall be subject to the inspection of the Designer and Construction Representative, and any work which is deemed defective shall be removed, rebuilt or made good immediately upon notice. The cost of such correction shall be borne by the Contractor. Contractor shall not be entitled to an extension of the contract completion date in order to remedy defective work. All rejected materials shall be immediately removed from the site of the work.

D. If the Contractor fails to proceed at once with the correction of rejected defective materials or workmanship, the Owner may, by separate contract or otherwise, have the defects remedied or rejected. Materials removed from the site and charge the cost of the same against any monies which may be due the Contractor, without prejudice to any other rights or remedies of the Owner.

E. Failure or neglect on the part of Owner to observe faulty work, or work done which is not in accordance with the drawings and specifications shall not relieve the Contractor from responsibility
for correcting such work without additional compensation.

F. The Owner shall have the right to direct the Contractor to uncover any completed work.

1. If the Contractor fails to adequately notify the Construction Representative and/or Designer of an inspection as required by the Contract Documents, the Contractor shall, upon written request, uncover the work. The Contractor shall bear all costs associated with uncovering and again covering the work exposed.

2. If the Contractor is directed to uncover work, which was not otherwise required by the Contract Documents to be inspected, and the work is found to be defective in any respect, no compensation shall be allowed for this work. If, however, such work is found to meet the requirements of this contract, the actual cost of labor and material necessarily involved in the examination and replacement plus 10% shall be allowed the Contractor.

G. The Designer shall give all orders and directions contemplated under this contract relative to the scope of the work and shall give the initial interpretation of the contract documents.

H. The Owner may file a written notice to the Contractor to dismiss immediately any subcontractors, project managers, superintendents, foremen, workers, watchmen or other employees whom the Owner may deem incompetent, careless or a hindrance to proper or timely execution of the work. The Contractor shall comply with such notice as promptly as practicable without detriment to the work or its progress.

I. If in the Owner’s judgment it becomes necessary at any time to accelerate work, when ordered by the Owner in writing, the Contractor shall redirect resources to such work items and execute such portions of the work as may be required to complete the work within the current approved contract schedule.

ARTICLE 3 -- CONTRACTOR RESPONSIBILITIES

ARTICLE 3.1 -- ACCEPTABLE SUBSTITUTIONS

A. The Contractor may request use of any article, device, product, material, fixture, form or type of construction which in the judgment of the Owner and Designer is equal in all respects to that named. Standard products of manufacturers other than those specified will be accepted when, prior to the ordering or use thereof, it is proven to the satisfaction of the Owner and Designer that they are equal in design, strength, durability, usefulness and convenience for the purpose intended.

B. Any changes required in the details and dimensions indicated on the drawings for the substitution of products other than those specified shall be properly made at the expense of the Contractor requesting the substitution or change.

C. The Contractor shall submit a request for such substitutions in writing to the Owner and Designer within twenty (20) working days after the date of the "Notice to Proceed." Thereafter no consideration will be given to alternate forms of accomplishing the work. This Article does not preclude the Owner from exercising the provisions of Article 4 hereof.

D. Any request for substitution by the Contractor shall be submitted in accordance with SECTION 002113 - INSTRUCTIONS TO BIDDERS.

E. When a material has been approved, no change in brand or make will be permitted unless:

1. Written verification is received from the manufacturer stating they cannot make delivery on the date previously agreed, or

2. Material delivered fails to comply with contract requirements.

ARTICLE 3.2 -- SUBMITTALS

A. The Contractor’s submittals must be submitted with such promptness as to allow for review and approval so as not to cause delay in the work. The Contractor shall coordinate preparation and processing of submittals with performance of construction activities.

Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.

Submit four (4) copies to the Designer and additional copies as required for the subcontractors and material suppliers. Also provide copies to meet the requirements for maintenance manuals.

B. All subcontractors' shop drawings and schedules shall be submitted by the Contractor and shall bear evidence that Contractor has received, reviewed, and approved them. Any shop drawings and schedules submitted without this evidence will be returned to the Contractor for resubmission.

C. The Contractor shall include with the shop drawing, a letter indicating any and all deviations from the drawings and/or specifications. Failure to notify the Designer of such deviations will be grounds for subsequent rejection of the related work or materials. If, in the opinion of the Designer, the deviations are not acceptable, the Contractor will be required to furnish the item as specified and indicated on the drawings.
D. The Designer shall check shop drawings and schedules with reasonable promptness and approve them only if they conform to the design concept of the project and comply with the information given in the contract documents. The approval shall not relieve the Contractor from the responsibility to comply with the drawings and specifications, unless the Contractor has called the Designer's attention to the deviation, in writing, at the time of submission and the Designer has knowingly approved thereof. An approval of any such modification will be given only under the following conditions:

1. It is in the best interest of the Owner
2. It does not increase the contract sum and/or completion time
3. It does not deviate from the design intent
4. It is without prejudice to any and all rights under the surety bond.

E. No extension of time will be granted because of the Contractor's failure to submit shop drawings and schedules in ample time to allow for review, possible resubmission, and approval. Fabrication of work shall not commence until the Contractor has received approval. The Contractor shall furnish prints of approved shop drawings and schedules to all subcontractors whose work is in any way related to the work under this contract. Only prints bearing this approval will be allowed on the site of construction.

F. The Contractor shall maintain a complete file on-site of approved shop drawings available for use by the Construction Representative.

ARTICLE 3.3 – AS-BUILT DRAWINGS

A. The Contractor shall update a complete set of the construction drawings, shop drawings and schedules of all work monthly by marking changes, and at the completion of their work (prior to submission of request for final payment) note all changes and turn the set over to the Construction Representative. The updates shall show all addenda, all field changes that were made to adapt to field conditions, changes resulting from contract changes or supplemental instructions, and all locations of structures, buried installations of piping, conduit, and utility services. All buried and concealed items both inside and outside shall be accurately located as to depth and referenced to permanent features such as interior or exterior wall faces and dimensions shall be given in a neat and legible manner in a contrasting colored pencil or ink. If approved by the Designer, an electronic file format may be provided.

ARTICLE 3.4 – GUARANTY AND WARRANTIES

A. General Guaranty

1. Neither the final certificate of payment nor any provision in the contract documents nor partial use or occupancy of the premises by the Owner shall constitute an acceptance of work not done in accordance with contract requirements.

2. The Contractor or surety shall remedy any defects in the work and pay for any damage to property resulting there from which shall appear within a period of one (1) year from the date of substantial completion unless a longer period is otherwise specified or a differing guaranty period has been established in the substantial completion certificate. The Owner will give notice of observed defects with reasonable promptness.

3. In case of default on the part of the Contractor in fulfilling this part of this contract, the Owner may correct the work or repair the damage and the cost and expense incurred in such event shall be paid by or recoverable from the Contractor or surety.

4. The work will be free from defects not inherent in the quality required or permitted, and that the Work will conform to the requirements of the Contract Documents. Work not conforming to these requirements, including substitutions not properly approved and authorized, may be considered defective. The Contractor's guaranty excludes remedy for damage or defect caused by abuse, modifications not executed by the Contractor, improper or insufficient maintenance, improper operation, or normal wear and tear under normal usage. If required by the Owner, the Contractor shall furnish satisfactory evidence as to the kind and quality of materials and equipment.

B. Extended Warranty

Manufacturer's certificates of warranty shall be obtained for all major equipment. Warranty shall be obtained for at least one year. Where a longer period is offered at no additional cost or called for in the specific equipment specifications, the longer period shall govern.

ARTICLE 3.5 – OPERATION AND MAINTENANCE MANUALS

A. Immediately after equipment submittals are approved and no later than ten (10) working days prior to the substantial completion inspection, the Contractor shall provide to the Designer three (3)
copies of operating instructions and service manuals, containing the following:

1. Start-up and Shut-down Procedures: Provide a step-by-step write up of all major equipment. When manufacturer's printed start-up, trouble shooting and shut-down procedures are available; they may be incorporated into the operating manual for reference.

2. Operating Instructions: Written operating instructions shall be included for the efficient and safe operation of all equipment.

3. Equipment List: List of all major equipment as installed shall be prepared to include model number, capacities, flow rate, name place data, shop drawings and air and water balance reports.

4. Service Instructions: Provide the following information for all pieces of equipment.
   a. Recommended spare parts including catalog number and name of local supplier or factory representative.
   b. Belt sizes, types, and lengths.
   c. Wiring diagrams.

5. Manufacturer's Certificate of Warranty as described in Article 3.4.

6. Prior to the final payment, furnish to the Designer three (4) copies of parts catalogs for each piece of equipment furnished by him/her on the project with the components identified by number for replacement ordering.

B. Submission of operating instructions shall be done in the following manner.

1. Manuals shall be in quadruplicate, and all materials shall be bound into volumes of standard 8½" x 11" hard binders. Large drawings too bulky to be folded into 8½" x 11" shall be separately bound or folded and in envelopes, cross referenced and indexed with the manuals.

2. The manuals shall identify project name, project number, and include the name and address of the Contractor, subcontractors and manufacturers who were involved with the activity described in that particular manual.

3. Internally subdivide the binder contents with permanent page dividers, logically organized with tab titles clearly printed under reinforced laminated plastic tabs.

4. Contents: Prepare a Table of Contents for each volume, with each product or system description identified.

ARTICLE 3.6 – OTHER CONTRACTOR RESPONSIBILITIES

A. The Contractor shall keep on site, during progress of the work, a competent superintendent satisfactory to the Construction Representative. The superintendent shall represent the Contractor and all agreements made by the superintendent shall be binding. The superintendent shall carefully study and compare all drawings, specifications and other instructions and shall promptly notify the Construction Representative and Designer, in writing, any error, inconsistency or omission which may be discovered. The superintendent shall coordinate all work on the project. Any change of the superintendent shall be approved by the Construction Representative.

B. Contractor shall, at all times, enforce strict discipline and good order among his employees, and shall not employ on the work any unfit person or anyone not skilled in the work assigned to him/her.

C. The Contractor shall supply sufficient labor, material, plant and equipment and pay when due any laborer, subcontractor or supplier for supplies furnished and otherwise prosecute the work with diligence to prevent work stoppage and insure completion thereof within the time specified.

D. The Contractor and each of his subcontractors shall submit to the Construction Representative, through the Designer such schedules of quantities and costs, progress schedules, payrolls, reports, estimates, records and other data as the Owner may request concerning work performed or to be performed under this contract.

E. The Contractor, subcontractors, and material suppliers shall upon written request, give the Owner access to all time cards, material invoices, payrolls, estimates, profit and loss statements, and all other direct or indirect costs related to this work.

F. The Contractor shall be responsible for laying out all contract work such as layout of architectural, structural, mechanical and electrical work, which shall be coordinated with layouts of subcontractors for general construction work. The Contractor is also responsible for unloading, uncrating and handling of all materials and equipment to be erected or placed by him/her, whether furnished by Contractor or others. No extra charges or compensation will be allowed as a result of failure to verify dimensions before ordering materials or fabricating items.

G. The Contractor must notify the Construction Representative at least one working day before
H. Contractors shall prearrange time with the Construction Representative for the interruption of any facility operation. Unless otherwise specified in these documents, all connections, alterations or relocations as well as all other portions of the work will be performed during normal working hours.

I. The Contractor shall coordinate all work so there will not be prolonged interruptions of existing equipment operation. Any existing plumbing, heating, ventilating, air conditioning or electrical disconnections necessary for the project, which affect portions of this construction or building or any other building must be scheduled with the Construction Representative to minimize or avoid any disruption of facility operations. In no case, unless previously approved in writing by the Construction Representative, shall utilities be left disconnected at the end of a work day or over a weekend. Any interruption of utilities either intentionally or accidentally shall not relieve the Contractor responsible for the interruption from the responsibility to repair and restore the utility to normal service. Repairs and restoration shall be made before the workers responsible for the repair and restoration leave the job.

J. Contractors shall limit operations and storage of materials to the area within the project, except as necessary to connect to existing utilities, and shall not encroach on neighboring property. The Contractor shall be responsible for repair of their damage to property on or off the project site occurring during construction of project. All such repairs shall be made to the satisfaction of the property owner.

K. Unless otherwise permitted, all materials shall be new and both workmanship and materials shall be of the best quality.

L. Unless otherwise provided and stipulated within these specifications, the Contractor shall furnish, construct, and/or install and pay for materials, devices, mechanisms, equipment, all necessary personnel, utilities including, but not limited to water, heat, light and electric power, transportation services, applicable taxes of every nature, and all other facilities necessary for the proper execution and completion of the work.

M. Contractor shall carefully examine the plans and drawings and shall be responsible for the proper fitting of his material, equipment and apparatus into the building.

N. The Contractor or subcontractors shall not overload, or permit others to overload, any part of any structure during the performance of this contract.

O. All temporary shoring, bracing, etc., required for the removal of existing work and/or for the installation of new work shall be included in this contract. The Contractor shall make good, at no cost to the Owner, any damage caused by improper support or failure of shoring in any respect. Each Contractor shall be responsible for shoring required to protect his work or adjacent property and improvements of Owner and shall be responsible for shoring or for giving written notice to adjacent property owners. Shoring shall be removed only after completion of permanent supports.

P. The Contractor shall provide at the proper time such material as is required for support of the work. If openings are required, whether shown on drawings or not, the Contractor shall see that they are properly constructed.

Q. During the performance of work the Contractor shall be responsible for providing and maintaining warning signs, lights, signal devices, barricades, guard rails, fences and other devices appropriately located on site which will give proper and understandable warning to all persons of danger of entry onto land, structure or equipment.

R. The Contractor shall be responsible for protection, including weather protection, and proper maintenance of all equipment and materials.

S. The Contractor shall be responsible for care of the finished work and shall protect same from damage or defacement until substantial completion by the Owner. If the work is damaged by any cause, the Contractor shall immediately begin to make repairs in accordance with the drawings and specifications. Contractor shall be liable for all damage or loss unless attributable to the acts or omissions of the Owner or Designer. Any claim for reimbursement shall be submitted in accordance with Article 4. After substantial completion the Contractor will only be responsible for damage resulting from acts or omissions of the Contractor or subcontractors through final warranty.

T. In the event the Contractor encounters an unforeseen hazardous material, the Contractor shall immediately stop work in the area affected and report the condition to the Owner and Designer in writing. The Contractor shall not be required, pursuant to Article 4, to perform, any work relating to hazardous materials.

U. 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 4.

V. Before commencing work, Contractors shall confer with the Construction Representative and facility representative and review any facility rules and regulations which may affect the conduct of the work.

W. Project signs will only be erected on major projects and only as described in the specifications. If no sign is specified, none shall be erected.

ARTICLE 3.7 -- SUBCONTRACTS

A. Subcontractor assignments as identified in the bid form shall not be changed without written approval of the Owner. The Owner will not approve changes of a listed subcontractor unless the Contractor documents, to the satisfaction of the Owner that the subcontractor cannot or will not perform the work as specified.

B. The Contractor is fully responsible to the Owner for the acts and omissions of all subcontractors and of persons either directly or indirectly employed by them.

C. Every subcontractor shall be bound by the applicable terms and provisions of these contract documents, but no contractual relationship shall exist between any subcontractor and the Owner unless the right of the Contractor to proceed with the work is suspended or this contract is terminated as herein provided, and the Owner in writing elects to assume the subcontract.

D. The Contractor shall upon receipt of "Notice to Proceed" and prior to submission of the first payment request, notify the Designer and Construction Representative in writing of the names of any subcontractors to be used in addition to those identified in the bid form and all major material suppliers proposed for all parts of the work.

ARTICLE 4 -- CHANGES IN THE WORK

4.1 CHANGES IN THE WORK

A. The Construction Representative, without giving notice to the surety and without invalidating this contract, may order extra work or make changes by altering, adding to or deducting from the work, this contract sum being adjusted accordingly. All such work shall be executed under the conditions of the original contract. A claim for extension of time caused by any change must be adjusted at the time of ordering such change. No future request for time will be considered.

B. Each Contract Change shall include all costs required to perform the work including all labor, material, equipment, overheads and profit, delay, disruptions, or other miscellaneous expenses. No subsequent requests for additional compensation including claims for delay, disruption, or reduced efficiency as a result of each change will be considered. Values from the Schedule of Values will not be binding as a basis for additions to or deductions from the contract price.

C. The amount of any adjustment in this contract price for authorized changes shall be agreed upon before such changes become effective and shall be determined, through submission of a request for proposal, as follows:

1. By an acceptable fixed price proposal from the Contractor. Breakdowns shall include all takeoff sheets of each Contractor and subcontractor. Breakdown shall include a listing of each item of material with unit prices and number of hours of labor for each task. Labor costs per hour shall be included with labor burden identified, which shall be not less than the prevailing wage rate, etc. Overhead and profit shall be shown separately for each subcontractor and the Contractor.

2. By a cost-plus-fixed-fee (time and material) basis with maximum price, total cost not to exceed said maximum. Breakdown shall include a listing of each item of material with unit prices and number of hours of labor for each task. Labor costs per hour shall be included with labor burden identified, which shall be not less than the prevailing wage rate, etc. Overhead and profit shall be shown separately for each subcontractor and the Contractor.

3. By unit prices contained in Contractor's original bid form and incorporated in the construction contract.

D. Overhead and Profit on Contract Changes shall be applied as follows:

1. The overhead and profit charge by the Contractor and all subcontractors shall be considered to include, but is not limited to: incidental job burdens, small truck (under 1 ton) expense, mileage, small hand tools, warranty costs, company benefits and general office overhead. Project supervision including field supervision and job site office expense shall be considered a part of overhead and profit unless a compensable time extension is granted.

2. The percentages for overhead and profit charged on Contract Changes shall be negotiated, and may vary according to the nature, extent, and complexity of the work.
involved. However, the overhead and profit for the Contractor or subcontractor actually performing the work shall not exceed 14%. When one or more tiers of subcontractors are used, in no event shall any Contractor or subcontractor receive as overhead and profit more than 3% of the cost of the work performed by any of his subcontractors. In no case shall the total overhead and profit paid by the Owner on any Contract Changes exceed twenty percent (20%) of the cost of materials, labor and equipment (exclusive of Contractor or any Subcontractor overhead and profit) necessary to put the contract change work in place.

3. The Contractor will be allowed to add the cost of bonding and insurance to their cost of work. This bonding and insurance cost shall not exceed 2% and shall be allowed on the total cost of the added work, including overhead and profit.

4. On proposals covering both increases and decreases in the amount of this contract, the application of overhead and profit shall be on the net change in the cost of the work.

5. The percentage for overhead and profit to be credited to the Owner on Contract Changes that are solely decreases in the quantity of work or materials shall be negotiated, and may vary according to the nature, extent and complexity of the work involved, but in no case shall be less than ten percent (10%). If the percentage for overhead and profit charged for work added by Contract Changes for this contract has been negotiated to less than 10%, the negotiated rate shall then apply to credits as well.

E. No claim for an addition to this contract sum shall be valid unless authorized as aforesaid in writing by the Owner. In the event that none of the foregoing methods are agreed upon, the Owner may order the Contractor to perform work on a time and material basis. The cost of such work shall be determined by the Contractor's actual labor and material cost to perform the work plus overhead and profit as outlined herein. The Designer and Construction Representative shall approve the Contractor's daily time and material invoices for the work involved.

F. If the Contractor claims that any instructions involve extra cost under this contract, the Contractor shall give the Owner’s Representative written notice thereof within a reasonable time after the receipt of such instructions, and in any event before proceeding to execute the work. No such claim shall be valid unless so made and authorized by the Owner, in writing.

G. In an emergency affecting the safety of life or of the structure or of adjoining property, the Contractor, without special instruction or authorization from the Construction Representative, is hereby permitted to act at their discretion to prevent such threatened loss or injury. The Contractor shall submit a claim for compensation for such emergency work in writing to the Owner’s Representative.

ARTICLE 4.2 – CHANGES IN COMPLETION TIME

A. Extension of the number of work days stipulated in the Contract for completion of the work with compensation may be made when:

1. The contractor documents that proposed Changes in the work, as provided in Article 4.1, extends construction activities critical to contract completion date, OR

2. The Owner suspends all work for convenience of the Owner as provided in Article 7.3, OR

3. An Owner caused delay extends construction activities critical to contract completion (except as provided elsewhere in these General Conditions). The Contractor is to review the work activities yet to begin and evaluate the possibility of rescheduling the work to minimize the overall project delay.

B. Extension of the number of work days stipulated in the Contract for completion of the work without compensation may be made when:

1. Weather-related delays occur, subject to provisions for the inclusion of a specified number of "bad weather" days when provided for in Section 012100-Allowances, OR

2. Labor strikes or acts of God occur, OR

3. The work of the Contractor is delayed on account of conditions which were beyond the control of the Contractor, subcontractors or suppliers, and were not the result of their fault or negligence.

C. No time extension or compensation will be provided for delays caused by or within the control of the Contractor, subcontractors or suppliers and for concurrent delays caused by the Owner.

D. The Contractor shall notify the Owner promptly of any occurrence or conditions which in the Contractor's opinion results in a need for an extension of time. The notice shall be in writing and shall include all necessary supporting materials with details of any resultant costs and be submitted in time to permit full investigation and
evaluation of the Contractor's claim. The Owner shall promptly acknowledge the Contractor's notice and, after recommendation from the Owner's Representative and/or Designer, shall provide a decision to the Contractor. Failure on the part of the Contractor to provide such notice and to detail the costs shall constitute a waiver by the Contractor of any claim. Requests for extensions of time shall be for working days only.

ARTICLE 5 - CONSTRUCTION AND COMPLETION

ARTICLE 5.1 – CONSTRUCTION COMMENCEMENT

A. Upon receipt of the "Intent to Award" letter, the Contractor must submit the following properly executed instruments to the Owner:

1. Contract;
2. Performance/payment bond as described in Article 6.1;
3. Certificates of Insurance, or the actual policies themselves, showing that the Contractor has obtained the insurance coverage required by Article 6.2.

Above referenced items must be received by the Owner within ten (10) working days after the effective date of the contract. If not received, the Owner may treat the failure to timely submit them as a refusal by the Contractor to accept a contract for this work and may retain as liquidated damages the Contractor's bid bond, cashier's check or certified check as provided in the Instructions to Bidders. Upon receipt the Owner will issue a "Notice to Proceed" with the work to the Contractor.

B. Within the time frame noted in Section 013200 - Schedules, following receipt of the "Notice to Proceed", the Contractor shall submit to the Owner a progress schedule and schedule of values, showing activities through the end of the contract period. Should the Contractor not receive written notification from the Owner of the disapproval of the schedule of values within fifteen (15) working days, the Contractor may consider it approved for purpose of determining when the first monthly Application and Certification for Payment may be submitted.

C. The Contractor may commence work upon receipt of the Division of Facilities Management, Design and Construction's "Notice to Proceed" letter. Contractor shall prosecute the work with faithfulness and energy, and shall complete the entire work on or before the completion time stated in the contract documents or pay to the Owner the damages resulting from the failure to timely complete the work as set out within Article 5.4.

ARTICLE 5.2 -- PROJECT CONSTRUCTION

A. Each Contractor shall submit for the Owner's approval, in reproducible form, a progress schedule showing the rate of progress and the order of the work proposed to carry on various phases of the project. The schedule shall be in conformance with the requirements outlined in Section 013200 – Schedules.

B. Contractor shall employ and supply a sufficient force of workers, material, and equipment and shall pay when due, any worker, subcontractor or supplier and otherwise prosecute the work with such diligence so as to maintain the rate of progress indicated on the progress schedule, prevent work stoppage, and insure completion of the project within the time specified.

ARTICLE 5.3 -- PROJECT COMPLETION

A. Substantial Completion. A Project is substantially complete when construction is essentially complete and work items remaining to be completed can be done without interfering with the Owner's ability to use the Project for its intended purpose.

1. Once the Contractor has reached what they believe is Substantial Completion, the Contractor shall notify the Designer and the Construction Representative of the following:
   a. That work is essentially complete with the exception of certain listed work items. The list shall be referred to as the "Contractor's Punch."
   b. That all Operation and Maintenance Manuals have been assembled and submitted in accordance with Article 3.5A.
   c. That the Work is ready for inspection by the Designer and Construction Representative. The Owner shall be entitled to a minimum of ten working days notice before the inspection shall be performed.

2. If the work is acceptable, the Owner shall issue a Certificate of Substantial Completion, which shall set forth the responsibilities of the Owner and the Contractor for utilities, security, maintenance, damage to the work and risk of loss. The Certificate shall also identify those remaining items of work to be
performed by the Contractor. All such work items shall be complete within 30 working days of the date of the Certificate, unless the Certificate specifies a different time. If the Contractor shall be required to perform tests that must be delayed due to climatic conditions, it is understood that such tests and affected equipment will be identified on the Certificate and shall be accomplished by the Contractor at the earliest possible date. Performance of the tests may not be required before Substantial Completion can be issued. The date of the issuance of the Certificate of Substantial Completion shall determine whether or not the work was completed within the contract time and whether or not Liquidated Damages are due.

3. If the work is not acceptable, and the Owner does not issue a Certificate of Substantial Completion, the Owner shall be entitled to charge the Contractor with the Designer’s and Owner’s costs of re-inspection, including time and travel.

B. Partial Occupancy. Contractor agrees that the Owner shall be permitted to occupy and use any completed or partially completed portions of the Project, when such occupancy and use is in the Owner’s best interest. Owner shall notify Contractor of its desire and intention to take Partial Occupancy as soon as possible but at least ten (10) working days before the Owner intends to occupy. If the Contractor believes that the portion of the work the Owner intends to occupy is not ready for occupancy, the Contractor shall notify the Owner immediately. The Designer shall inspect the work in accordance with the procedures above. If the Contractor claims increased cost of the project or delay in completion as a result of the occupancy, he shall notify the Owner immediately but in all cases before occupancy occurs.

C. Final Completion. The Project is finally complete when the Certificate of Substantial Completion has been issued and all work items identified therein as incomplete have been completed, and when all administrative items required by the contract have been completed. Final Completion entitles the Contractor to payment of the outstanding balance of the contract amount including all change orders and retainage. Within five (5) working days of the date of the Certificate of Substantial Completion, the Contractor shall identify the cost to complete any outstanding items of work. The Designer shall review the Contractor’s estimate and either approve it or provide an independent estimate for all such items. If the Contractor fails to complete the remaining items within the time specified in the Certificate, the Owner may terminate the contract and go to the surety for project completion in accordance with Article 7.2 or release the contract balance to the Contractor less 150% of the approved estimate to complete the outstanding items. Upon completion of the outstanding items, when a final cost has been established, any monies remaining shall be paid to the Contractor. Failure to complete items of work does not relieve the Contractor from the obligation to complete the administrative requirements of the contract, such as the provisions of Article 5.3 FAILURE TO COMPLETE ALL ITEMS OF WORK UNDER THE CONTRACT SHALL BE CONSIDERED A DEFAULT AND BE GROUNDS FOR CONTRACT TERMINATION AND DEBARMENT.

D. Liquidated Damages. Contractor agrees that the Owner may deduct from the contract price and retain as liquidated damages, and not as penalty or forfeiture, the sum stipulated in this contract for each work day after the Contract Completion Day on which work is not Substantially Complete. Assessment of Liquidated Damages shall not relieve the Contractor or the surety of any responsibility or obligation under the Contract. In addition, the Owner may, without prejudice to any other rights, claims, or remedies the Owner may have including the right to Liquidated Damages, charge the Contractor for all additional expenses incurred by the Owner and/or Designer as the result of the extended contract period through Final Completion. Additional Expenses shall include but not be limited to the costs of additional inspections.

E. Early Completion. The Contractor has the right to finish the work before the contract completion date; however, the Owner assumes no liability for any hindrances to the Contractor unless Owner caused delays result in a time extension to the contract completion date. The Contractor shall not be entitled to any claims for lost efficiencies or for delay if a Certificate of Substantial Completion is given on or before the Contract Completion Date.

ARTICLE 5.4 -- PAYMENT TO CONTRACTOR

A. Payments on account of this contract will be made monthly in proportion to the work which has been completed. Request for payment must be submitted on the Owner’s forms. No other pay request will be processed. Supporting breakdowns must be in the same format as Owner’s forms and must provide the same level of detail. The Designer will, within 5 working days from receipt of the contractor’s request for payment either issue a Certificate for Payment to the Owner, for such amount as the Designer determines is properly due, or notify the Contractor in writing of reasons for withholding a Certificate. The Owner shall make
payment within 30 calendar days after the "Application and Certification for Payment" has been received and certified by the Designer. The following items are to be attached to the contractor’s pay request:

1. Updated construction schedule
2. Certified payrolls consisting of name, occupation and craft, number of hours worked and actual wages paid for each individual employee, of the Contractor and all subcontractors working on the project

B. The Owner shall retain 5 percent of the amount of each such payment application, except as allowed by Article 5.4, until final completion and acceptance of all work covered by this contract.

C. Each payment made to Contractor shall be on account of the total amount payable to Contractor and all material and work covered by paid partial payment shall thereupon become the sole property of Owner. This provision shall not be construed as relieving Contractor from sole responsibility for care and protection of materials and work upon which payments have been made or restoration of any damaged work or as a waiver of the right of Owner to require fulfillment of all terms of this contract.

D. Materials delivered to the work site and not incorporated in the work will be allowed in the Application and Certification for Payment on the basis of one hundred (100%) percent of value, subject to the 5% retainage providing that they are suitably stored on the site or in an approved warehouse in accordance with the following requirements:
1. Material has previously been approved through submittal and acceptance of shop drawings conforming to requirements of Article 3.2 of General Conditions.
2. Delivery is made in accordance with the time frame on the approved schedule.
3. Materials, equipment, etc., are properly stored and protected from damage and deterioration and remain so - if not, previously approved amounts will be deleted from subsequent pay applications.
4. The payment request is accompanied by a breakdown identifying the material equipment, etc. in sufficient detail to establish quantity and value.

E. The Contractor shall be allowed to include in the Application and Certification for Payment, one hundred (100%) of the value, subject to retainage, of major equipment and material stored off the site if all of the following conditions are met:
1. The request for consideration of payment for materials stored off site is made at least 15 working days prior to submittal of the Application for Payment including such material. Only materials inspected will be considered for inclusion on Application for Payment requests.
2. Materials stored in one location off site are valued in excess of $25,000.
3. That a Certificate of Insurance is provided indicating adequate protection from loss, theft, conversion or damage for materials stored off site. This Certificate shall show the State of Missouri as an additional insured for this loss.
4. The materials are stored in a facility approved and inspected, by the Construction Representative.
5. Contractor shall be responsible for, Owner costs to inspect out of state facilities, and any delays in the completion of the work caused by damage to the material or for any other failure of the Contractor to have access to this material for the execution of the work.

F. The Owner shall determine the amount, quality and acceptability of the work and materials which are to be paid for under this contract. In the event any questions shall arise between the parties, relative to this contract or specifications, determination or decision of the Owner or the Construction Representative and the Designer shall be a condition precedent to the right of the Contractor to receive any money or payment for work under this contract affected in any manner or to any extent by such question.

G. Payments Withheld: The Owner may withhold or nullify in whole or part any certificate to such extent as may be necessary to protect the Owner from loss on account of:
1. Defective work not remedied. When a notice of noncompliance is issued on an item or items, corrective action shall be undertaken immediately. Until corrective action is completed, no monies will be paid and no additional time will be allowed for the item or items. The cost of corrective action(s) shall be borne by the Contractor.
2. A reasonable doubt that this contract can be completed for the unpaid balance.
3. Failure of the Contractor to update as-built drawings monthly for review by the Construction Representative.
4. Failure of the Contractor to update the construction schedule.
When the Construction Representative is satisfied the Contractor has remedied above deficiencies, payment shall be released.

H. Final Payment: Upon receipt of written notice from the Contractor to the Designer and Project Representative that the work is ready for final inspection and acceptance, the Designer and Project Representative, with the Contractor, shall promptly make such inspection. If the work is acceptable and the contract fully performed, the Construction Representative shall complete a final acceptance report and the Contractor will be directed to submit a final Application and Certification for Payment. If the Owner approves the same, the entire balance shall be due and payable, with the exception of deductions as provided for under Article 5.4.

1. Where the specifications provide for the performance by the Contractor of (certain tests for the purpose of balancing and checking the air conditioning and heating equipment and the Contractor shall have furnished and installed all such equipment in accordance with the specifications, but said test cannot then be made because of climatic conditions, such test shall be considered as required under the provisions of the specifications, Section 013300 and this contract may be substantial. Full payment will not be made until the tests have been completed. If the tests are not completed when scheduled, the Owner may deduct 150% of the value of the tests from the final payment.

2. The final payment shall not become due until the Contractor delivers to the Construction Representative:
   a) A complete file of releases, on the standard form included in the contract documents as "Final Receipt of Payment and Release Form", from subcontractors and material suppliers evidencing payment in full for services, equipment and materials, as the case may require, if the Owner approves, or a consent from the Surety to final payment accepting liability for any unpaid amounts.
   b) An Affidavit of Compliance with Prevailing Wage Law, in the form as included in this contract specifications, properly executed by each subcontractor, and the Contractor
   c) Certified copies of all payrolls
   d) As-built drawings

3. If any claim remains unsatisfied after all payments are made, the Contractor shall refund to the Owner all monies that the latter may be compelled to pay in discharging such a claim including all costs and a reasonable attorney's fee.

4. Missouri statute requires prompt payment from the Owner to the Contractor within thirty calendar days and from the Contractor to his subcontractors within fifteen calendar days. Failure to make payments within the required time frame entitles the receiving party to charge interest at the rate of one and one half percent per month calculated from the expiration of the statutory time period until paid.

5. The value of all unused unit price allowances and/or 150% of the value of the outstanding work items, and/or liquidated damages may be deducted from the final pay request without executing a Contract Change. Any unit price items which exceed the number of units in the contract may be added by Contract Change.

ARTICLE 6 -- INSURANCE AND BONDS

ARTICLE 6.1 -- BOND
A. Contractor shall furnish a performance/payment bond in an amount equal to 100% of the contract price to guarantee faithful performance of the contract and 100% of the contract price to guarantee the payment of all persons performing labor on the project and furnishing materials in connection therewith under this contract as set forth in the standard form of performance and payment bond included in the contract documents. The surety on such bond shall be issued by a surety company authorized by the Missouri Department of Insurance to do business in the state of Missouri.

B. All Performance/Payment Bonds furnished in response to this provision shall be provided by a bonding company with a rating of B+ or higher as established by A.M. Best Company, Inc. in their most recent publication.

ARTICLE 6.2 – INSURANCE
A. The successful Contractor shall procure and maintain for the duration of the contract issued a policy or policies of insurance for the protection of both the Contractor and the Owner and their respective officers, officials, agents, consultants and employees. The Owner requires certification of insurance coverage from the Contractor prior to commencing work.

B. Minimum Scope and Extent of Coverage
1. General Liability

Commercial General Liability, ISO coverage form number or equivalent CG 00 01 ("occurrence" basis), or I-SO coverage form number CG 00 02, or ISO equivalent.

If ISO equivalent or manuscript general liability coverage forms are used, minimum coverage will be as follows:
Premises/Operations; Independent Contractors; Products/Completed Operations; personal Injury; Broad Form Property Damage including Completed Operations; Broad Form Contractual Liability Coverage to include Contractor's obligations under Article 1.11 Indemnification and any other Special Hazards required by the work of the contract.

2. Automobile Liability

Business Automobile Liability Insurance, ISO Coverage form number or equivalent CA 00 01 covering automobile liability, code 1 "ANY AUTO".

3. Workers' Compensation and Employer's Liability

Statutory Workers' Compensation Insurance for Missouri and standard Employer's Liability Insurance, or the authorization to self-insure for such liability from the Missouri Division of Workers' Compensation.

4. Builder's Risk or Installation Floater Insurance

Insurance upon the work and all materials, equipment, supplies, temporary structures and similar items which may be incident to the performance of the work and located at or adjacent to the site, against loss or damage from fire and such other casualties as are included in extended coverage in broad "All Risk" form, including coverage for Flood and Earthquake, in an amount not less than the replacement cost of the work or this contract price, whichever is greater, with loss payable to Contractor and Owner as their respective interests may appear.

Contractor shall maintain sufficient insurance to cover the full value of the work and materials as the work progresses, and shall furnish Owner copies of all endorsements. If Builder's Risk Reporting- Form of Endorsement is used, Contractor shall make all reports as required therein so as to keep in force an amount of insurance which will equal the replacement cost of the work, materials, equipment, supplies, temporary structures, and other property covered thereby; and if, as a result of Contractor's failure to make any such report, the amount of insurance so recoverable shall be less than such replacement cost, Contractor's interest in the proceeds of such insurance, if any, shall be subordinated to Owner's interest to the end that Owner may receive full reimbursement for its loss.

C. Minimum Limits of Insurance

1. General Liability

Contractor

$2,000,000 combined single limit per occurrence for bodily injury, personal injury, and property damage

$2,000,000 annual aggregate

2. Automobile Liability

$2,000,000 combined single limit per occurrence for bodily injury and property damage

3. Workers' Compensation and Employers Liability

Workers' Compensation limits as required by applicable State Statutes (generally unlimited) and minimum of $1,000,000 limit per accident for Employer's Liability.

General Liability and Automobile Liability insurance may be arranged under individual policies for the full limits required or by a combination of underlying policies with the balance provided by a form-following Excess or Umbrella Liability policy.

D. Deductibles and Self-Insured Retentions

All deductibles, co-payment clauses, and self-insured retentions must be declared to and approved by the Owner. The Owner reserves the right to request the reduction or elimination of unacceptable deductibles or self-insured retentions, as they would apply to the Owner, and their respective officers, officials, agents, consultants and employees. Alternatively, the Owner may request Contractor to procure a bond guaranteeing payment of losses and related investigations, claims administration, and defense expenses.

E. Other Insurance Provisions and Requirements

The respective insurance policies and coverage, as specified below, must contain, or be endorsed to contain the following conditions or provisions:

1. General Liability

The Owner, and its respective commissioners, officers, officials, agents, consultants and employees shall be endorsed as additional insured’s by ISO form CG 20 26 Additional
Insured - Designated Person or Organization. As additional insured’s, they shall be covered as to work performed by or on behalf of the Contractor or as to liability which arises out of Contractor's activities or resulting from the performance of services or the delivery of goods called for by the Contract.

Contractor's insurance coverage shall be primary with respect to all additional insured’s. Insurance of self-insurance programs maintained by the designated additional -insured’s shall be excess of the Contractor's insurance and shall not contribute with it.

Additionally, the Contractor and Contractor's general liability insurer shall agree to waive all rights of subrogation against the Owner and any of their respective officers, officials, agents, consultants or employees for claims, losses, or expenses which arise out of Contractor's activities or result from the performance of services or the delivery of goods called for by the Contract.

Contractor's failure to comply with the terms and conditions of these insurance policies shall not affect or abridge coverage for the Owner or for any of its officers, officials, agents, consultants or employees.

3. Workers' Compensation/Employer's Liability

Contractor's workers' compensation insurance shall be endorsed with NCCI form WC 00 03 01 A - Alternative Employer Endorsement. The Alternative Employer Endorsement shall designate the Owner as "alternate employers."

4. All Coverages

Each insurance policy required by this section of the Contract shall contain a stipulation, endorsed if necessary, that the Owner will receive a minimum of a thirty (30) calendar day advance notice of any policy cancellation. Ten (10) calendar days advance notice is required for policy cancellation due to non-payment of premium.

F. Insurer Qualifications and Acceptability

Insurance required hereunder shall be issued by an A.M. Best, “B+” rated, Class IX insurance company approved to conduct insurance business in the state of Missouri.

G. Verification of Insurance Coverage

Prior to Owner issuing a Notice to Proceed, the Contractor shall furnish the Owner with Certificate(s) of Insurance and with any applicable original endorsements evidencing the required insurance coverage. The insurance certificates and endorsements are to be signed by a person authorized by that insurer to bind coverage on its behalf. All certificates and endorsements received by the Owner are subject to review and approval by the Owner. The Owner reserves the right to require certified copies of all required policies at any time. If the scope of this contract will exceed one (1) year - or, if any of Contractor’s applicable insurance coverage expires prior to completion of the work or services required under this contract - the Contractor will provide a renewal or replacement certificate before continuing work or services hereunder. If the Contractor fails to provide documentation of required insurance coverage, the Owner may issue a stop work order and no additional contract completion time and/or compensation shall be granted as a result thereof.
ARTICLE 7 – SUSPENSION OR TERMINATION OF CONTRACT

ARTICLE 7.1 - FOR SITE CONDITIONS
A. When conditions at the site of the proposed work are considered by the Owner to be unsatisfactory for prosecution of the work, the Contractor may be ordered in writing to suspend the work or any part thereof until reasonable conditions exist. When such suspension is not due to fault or negligence of the Contractor, time allowed for completion of such suspended work will be extended by a period of time equal to that lost due to delay occasioned by ordered suspension. This will be a no cost time extension.

ARTICLE 7.2 - FOR CAUSE
A. Termination or Suspension for Cause:

1. If the Contractor shall file for bankruptcy, or should make a general assignment for the benefit of the creditors, or if a receiver should be appointed on account of insolvency, or if the contractor should persistently or repeatedly refuse or fail to supply enough properly skilled workers or proper materials, or if the contractor should fail to make prompt payment to subcontractors or for material or labor, or persistently disregard laws, ordinances or the instructions of the Owner, or otherwise be guilty of a substantial violation of any provision of this contract, then the Owner may serve notice on the Contractor and the surety setting forth the violations and demanding compliance with this contract. Unless within ten (10) consecutive calendar days after serving such notice, such violations shall cease and satisfactory arrangements for correction be made, the Owner may suspend the Contractor's right to proceed with the work or terminate this contract.

2. In the event the Owner suspends Contractor's right to proceed with the work or terminates the contract, the Owner may demand that the Contractor's surety take over and complete the work on this contract, after the surety submits a written proposal to the Owner and receives written approval and upon the surety's failure or refusal to do so within ten (10) consecutive calendar days after demand therefore, the Owner may take over the work and prosecute the same to completion by bid or negotiated contract, or the Owner may elect to take possession of and utilize in completing the work such materials, supplies, appliances and plant as may be on the site of the work, and all subcontractors, if the Owner elects, shall be bound to perform their contracts.

B. The Contractor and its surety shall be and remain liable to the Owner for any excess cost or damages occasioned to the Owner as a result of the actions above set forth.

C. The Contractor in the event of such suspension or termination shall not be entitled to receive any further payments under this contract until the work is wholly finished. Then if the unpaid balance under this contract shall exceed all expenses of the Owner as certified by the Director, such excess shall be paid to the Contractor; but, if such expenses shall exceed the unpaid balance as certified by the Director, the Contractor and their surety shall be liable for and shall pay the difference and any damages to the Owner.

D. In exercising Owner's right to secure completion of the work under any of the provisions hereof, the Director shall have the right to exercise Owner's sole discretion as to the manner, methods and reasonableness of costs of completing the work.

E. The rights of the Owner to suspend or terminate as herein provided shall be cumulative and not exclusive and shall be in addition to any other remedy provided by law.

F. The Contractor in the event of such suspension or termination may be declared ineligible for Owner contracts for a minimal period of twelve (12) months. Further, no contract will be awarded to any Contractor who lists in their bid form any subcontractor whose prior performance has contributed, as determined by the Owner, to a breach of a contract. In order to be considered for state-awarded contracts after this period, the Contractor/subcontractor will be required to forward acceptance reports to the Owner regarding successful completion of non-state projects during the intervening twelve (12) months from the date of default. No contracts will be awarded to a subcontractor/Contractor until the ability to perform responsibly in the private sector has been proven to the Owner.

ARTICLE 7.3 -- FOR CONVENIENCE
A. The Owner may terminate or suspend the Contract or any portion of the Work without cause at any time, and at the Owner's convenience. Notification of a termination or suspension shall be in writing and shall be given to the Contractor and their surety. If the Contract is suspended, the notice will contain the anticipated duration of the suspension or the conditions under which work will be permitted to resume. If appropriate, the Contractor will be requested to demobilize and re-mobilize and will be reimbursed time and costs associated with the suspension.

B. Upon receipt of notification, the Contractor shall:
1. Cease operations when directed.

2. Take actions to protect the work and any stored materials.

3. Place no further subcontracts or orders for material, supplies, services or facilities except as may be necessary to complete the portion of the Contract that has not been terminated. No claim for payment of materials or supplies ordered after the termination date shall be considered.

4. Terminate all existing subcontracts, rentals, material, and equipment orders.

5. Settle all outstanding liabilities arising from termination with subcontractors and suppliers.

6. Transfer title and deliver to the Owner, work in progress, completed work, supplies and other material produced or acquire for the work terminated, and completed or partially completed plans, drawings information and other property that, if the Contract had been completed, would be required to be furnished to the Owner.

C. For termination without cause and at the Owner's convenience, in addition to payment for work completed prior to date of termination, the Contractor may be entitled to payment of other documented costs directly associated with the early termination of the contract. Payment for anticipated profit and unapplied overhead will not be allowed.
SECTION 007300 - SUPPLEMENTARY CONDITIONS

1.0 GENERAL:
   A. These Supplementary General Conditions clarify, add, delete, or otherwise modify standard terms and conditions of DIVISION 0, BIDDING AND CONTRACTING REQUIREMENTS.

2.0 CONTACTS:

   Designer: Erik Miller, AIA
   Peckham & Wright Architects
   2120 Forum Blvd., Ste. 101
   Columbia, MO   65203
   Telephone: 573-449-2683; Fax: 573-442-6213
   Email: emiller@pwarchitects.com

   Construction Representative: Joe Sanning
   Division of Facilities Management, Design and Construction
   301 West High Street, Room 730, PO Box 809, Jefferson City, MO 65102
   Telephone: 573.526.5184; Fax: 573.751.7277
   Email: joe.sanning@oa.mo.gov

   Project Manager: Terry Bruns
   Division of Facilities Management, Design and Construction
   301 West High Street, Room 730
   Jefferson City, Missouri 65102
   Telephone: 573-526-5184; Fax: 573-751-7277
   Email: terry.bruns@oa.mo.gov

   Contract Specialist: Drew Henrickson
   Division of Facilities Management, Design and Construction
   301 West High Street, Room 730
   Jefferson City, Missouri 65102
   Telephone: 573-751-8128; Fax: 573-751-7277
   Email: drew.henrickson@oa.mo.gov

3.0 NOTICE: ALL BID MATERIALS ARE DUE AT THE TIME OF BID SUBMITTAL. THERE IS NO SECOND SUBMITTAL FOR THIS PROJECT.

4.0 FURNISHING CONSTRUCTION DOCUMENTS:
   A. The Owner will furnish the Contractor with approximately 5 complete sets of drawings and specifications at no charge.
   B. The Owner will furnish the Contractor with approximately 5 sets of explanatory or change drawings at no charge.
   C. The Contractor may make copies of the documents as needed with no additional cost to the Owner.

5.0 ILLEGAL IMMIGRATION REFORM AND IMMIGRANT RESPONSIBILITY ACT
   The Contractor understands and agrees that by signing a contract for this project, they certify the following:
   A. The Contractor shall only utilize personnel authorized to work in the United States in accordance with applicable federal and state laws. This includes but is not limited to the Illegal Immigration Reform and Immigrant Responsibility Act (IIRIRA) and INA Section 274A.
   B. If the Contractor is found to be in violation of this requirement or the applicable laws of the state, federal and local laws and regulations, and if the State of Missouri has reasonable cause to believe that the Contractor has knowingly employed individuals who are not eligible to work in the United States, the state shall have the right to cancel the contract immediately without penalty or recourse and suspend or debar the contractor from doing business with the state.
   C. The Contractor agrees to fully cooperate with any audit or investigation from federal, state or local law enforcement agencies.

6.0 SAFETY REQUIREMENTS
   Contractor and subcontractors at any tier shall comply with RSMo 292.675 and Article 1.3, E, of Section 007213, General Conditions.
Missouri
Division of Labor Standards
WAGE AND HOUR SECTION

MICHAEL L. PARSON, Governor

Annual Wage Order No. 26

Section 014
CALLAWAY COUNTY

In accordance with Section 290.262 RSMo 2000, within thirty (30) days after a certified copy of this Annual Wage Order has been filed with the Secretary of State as indicated below, any person who may be affected by this Annual Wage Order may object by filing an objection in triplicate with the Labor and Industrial Relations Commission, P.O. Box 599, Jefferson City, MO 65102-0599. Such objections must set forth in writing the specific grounds of objection. Each objection shall certify that a copy has been furnished to the Division of Labor Standards, P.O. Box 449, Jefferson City, MO 65102-0449 pursuant to 8 CSR 20-5.010(1). A certified copy of the Annual Wage Order has been filed with the Secretary of State of Missouri.

Original Signed by
Taylor Burks, Director
Division of Labor Standards

Filed With Secretary of State: ________________________________ March 8, 2019

Last Date Objections May Be Filed: April 8, 2019

Prepared by Missouri Department of Labor and Industrial Relations
<table>
<thead>
<tr>
<th>OCCUPATIONAL TITLE</th>
<th>** Date of Increase</th>
<th>Basic Hourly Rates</th>
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*The Division of Labor Standards received less than 1,000 reportable hours as required by RSMo 290.257.4(b). Public works contracting minimum wage is established for this occupational title using data provided by Missouri Economic Research and Information Center, in accordance with RSMo 290.257.2.

**Annual Incremental Increase

ANNUAL WAGE ORDER NO. 26
### OCCUPATIONAL TITLE

<table>
<thead>
<tr>
<th>Occupational Title</th>
<th>** Date of Increase</th>
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<tbody>
<tr>
<td>Carpenter</td>
<td></td>
<td>$24.58*</td>
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</table>

Use Heavy Construction Rates on Highway and Heavy construction in accordance with the classifications of construction work established in 8 CSR 30-3.040(3).

Use Building Construction Rates on Building construction in accordance with the classifications of construction work established in 8 CSR 30-3.040(2).

If a worker is performing work on a heavy construction project within an occupational title that is not listed on the Heavy Construction Rate Sheet use the rate for that occupational title as shown on the Building Construction Rate Sheet.

*The Division of Labor Standards received less than 1,000 reportable hours as required by RSMo 290.257.4(b). Public works contracting minimum wage is established for this occupational title using data provided by Missouri Economic Research and Information Center, in accordance with RSMo 290.257.2.*
OVERTIME
and
HOLIDAYS

OVERTIME

For all work performed on a Sunday or a holiday, not less than twice (2x) the prevailing hourly rate of wages for work of a similar character in the locality in which the work is performed or the public works contracting minimum wage, whichever is applicable, shall be paid to all workers employed by or on behalf of any public body engaged in the construction of public works, exclusive of maintenance work.

For all overtime work performed, not less than one and one-half (1½) the prevailing hourly rate of wages for work of a similar character in the locality in which the work is performed or the public works contracting minimum wage, whichever is applicable, shall be paid to all workers employed by or on behalf of any public body engaged in the construction of public works, exclusive of maintenance work or contractual obligation. For purposes of this subdivision, "overtime work" shall include work that exceeds ten hours in one day and work in excess of forty hours in one calendar week; and

A thirty-minute lunch period on each calendar day shall be allowed for each worker on a public works project, provided that such time shall not be considered as time worked.

HOLIDAYS

January first;
The last Monday in May;
July fourth;
The first Monday in September;
November eleventh;
The fourth Thursday in November; and
December twenty-fifth;

If any holiday falls on a Sunday, the following Monday shall be considered a holiday.
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 WORK COVERED BY CONTRACT DOCUMENTS

A. The Project consists of the renovation of the existing spaces on the first floor and the offices located on the mezzanine level both located on the East side the existing hangar building and selected removal and replacement of exterior and interior aluminum wall panels and insulation. New lighting will be installed throughout the hangar.

1. Project Location: Missouri State Highway Patrol Hangar, 511 Airport Road, Jefferson City MO, 65101.

2. Owner: State of Missouri, Office of Administration, Division of Facilities Management, Design and Construction, Harry S Truman State Office Building, Post Office Box 809, 301 West High Street, Jefferson City, Missouri 65102.

B. Contract Documents dated December 27, 2019 were prepared for the Project by PW Architects, Inc. 2120 Forum Boulevard, Suite 101, Columbia, MO, 65203.

C. The Work consists of the demolition of selected elements of existing construction with new construction of walls, floors, flooring, wall and ceiling finishes, ceilings, stairs, doors, windows, HVAC, Electrical and Plumbing to support the designed spaces.

1. The Work includes:
   a. Demolition of existing construction in selected areas.
   b. Replacement of the lower portion of steel siding completely around the exterior of the building with aluminum siding.
   c. New spray foam insulation for the exterior walls to a height of approximately 12 feet above slab.
   d. Replacement of selected portions of the mezzanine level flooring.
   e. New interior wood and steel stud partition walls with painted gypsum board, painted cement board or steel panel siding.
   f. New suspended acoustic ceiling systems in selected areas.
   g. New flooring in selected areas.
   h. New steel stairs.
   i. New doors and windows in selected locations.
   j. Repairs to existing metal building insulation systems.
   k. HVAC system modifications and new ductwork.
   l. Electrical wiring and controls.
   m. New lighting and controls.

D. The Work will be constructed under a single prime contract.

E. Secure and pay for, as necessary for proper execution of work all permits, licenses, and government fees.

1. Submit copies of all permits, licenses, and other similar permissions obtained, and receipts for fees paid, to the owner directly.
2. All applicable building permits from the City of Jefferson are required for this project. The
permit is approved for issuance pending notification to the City of Jefferson of the prime
contractor and receipt of payment of the permit fees from the prime contractor.

1.3 DESIGNER’S ESTIMATE OF CONSTRUCTION COST RANGE

A. The project designer has prepared this cost estimate range. The State of Missouri makes no guarantee
regarding the accuracy of the estimate range nor does the State of Missouri intend to imply that the
estimate range in any way reflects the actual cost required to perform the work represented by the
specifications and drawings. The contractor should not rely on this estimate range in any way while
preparing a bid for this project or otherwise.

Estimate Range: $403,000 to $555,000.

1.4 WORK UNDER OTHER CONTRACTS

A. Separate Contract: The Owner will award a separate contract for performance of certain construction
operations at the site. The separate contract includes the following:
1. Contract: A separate contract will be awarded to provide and install access control
equipment.
2. Mark Huhn will be the contact for the State of Missouri; Cell # 573.694.6440

B. Cooperate fully with separate contractors so that work under those contracts may be carried out
smoothly, without interfering with or delaying work under this Contract.

1.5 WORK SEQUENCE

A. The Work will be conducted in a single phase.

1.6 CONTRACTOR USE OF PREMISES

A. General: During the construction period the Contractor shall have full use of the premises for
construction operations, including use of the site. The Contractor’s use of the premises limited only
by the Owner’s right to perform work or to retain other contractors on portions of the Project.

B. Use of the Site: Limit use of the premises to work in areas indicated. Confine operations to areas within
contract limits indicated. Do not disturb portions of the site beyond the areas in which the Work is
indicated.
1. Owner Occupancy: Allow for Partial Owner occupancy and use by the public.
2. Driveways and Entrances: Keep driveways and entrances serving the premises clear and
available to the Owner, the Owner’s employees, and emergency vehicles at all times. Do not
use these areas for parking or storage of materials. Schedule deliveries to minimize space
and time requirements for storage of materials and equipment on-site.

C. Use of the Existing Building: Maintain the existing building in a weathertight condition throughout the
construction period. Repair damage cause by construction operations. Take all precautions necessary
to protect the building and its occupants during the construction period.

1.7 OCCUPANCY REQUIREMENTS

A. Partial Owner Occupancy: The Owner reserves the right to occupy and to place and install equipment
in completed areas of the building prior to Substantial Completion, provided such occupancy does
not interfere with completion of the Work. Such placing of equipment and partial occupancy shall
not constitute acceptance of the total Work.
1. The Designer will prepare a Certificate of Partial Occupancy for each specific portion of the Work to be occupied prior to substantial completion.

2. Prior to partial Owner occupancy, mechanical and electrical systems shall be fully operational. Required inspections and tests shall have been successfully completed. Upon occupancy, the Owner will operate and maintain mechanical and electrical systems serving occupied portions for the building.

3. Upon occupancy, the Owner will assume responsibility for maintenance and custodial service for occupied portions for the building.

1.8 OWNER-FURNISHED PRODUCTS

A. The Owner will furnish and install, thru a separate contract, Access Control Equipment, except for the wiring. Cooperate with the Owner’s contractor regarding access and scheduling.

1. The Owner will arrange for and deliver necessary shop drawings, product data, and samples to the Contractor.

2. The Owner will arrange and pay for delivery of Owner-furnished items according to the contractor’s Construction Schedule.

3. If Owner-furnished items are damaged, defective, or missing, the Owner will arrange for replacement.

4. The Owner will arrange for manufacturer’s field services and for the delivery of manufacturer’s warranties to the appropriate Contractor.

5. The Contractor is responsible for protecting Owner-furnished items from damage, including damage from exposure to the elements. The Contractor shall repair or replace items damaged as a result of his operations.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 011000
SECTION 012100 – ALLOWANCES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes administrative and procedural requirements governing allowances.

1. Certain items are specified in the Contract Documents by allowances. Allowances have been established in lieu of additional requirements and to defer selection of actual materials and equipment to a later date when additional information is available for evaluation. If necessary, additional requirements will be issued by Contract Change.

B. Types of allowances include the following:

1. Lump-sum allowances.

C. Related Sections include the following:

1. Division 1 Section "Contract Modification Procedures" for procedures for submitting and handling Contract Changes for allowances.

2. Division 1 Section "Unit Prices" for procedures for using unit prices.

1.3 SELECTION AND PURCHASE

A. At the earliest practical date after award of the Contract, Designer of the date when final selection and purchase of each product or system described by an allowance must be completed to avoid delaying the Work.

B. At Designer's request, obtain proposals for each allowance for use in making final selections. Include recommendations that are relevant to performing the Work.

C. Purchase products and systems selected by Designer from the designated supplier.

1.4 SUBMITTALS

A. Submit proposals for purchase of products or systems included in allowances, in the form specified for Contract Changes.

B. Submit invoices or delivery slips to show actual quantities of materials delivered to the site for use in fulfillment of each allowance.

C. Coordinate and process submittals for allowance items in same manner as for other portions of the Work.
1.5 COORDINATION
   A. Coordinate allowance items with other portions of the Work. Furnish templates as required to coordinate installation.

1.6 LUMP-SUM ALLOWANCES
   A. Unless otherwise indicated, Contractor's costs for receiving and handling at Project site, labor, installation, overhead and profit, and similar costs related to products and materials epoxy floor cleaning under allowance shall be included as part of the Contract Sum and not part of the allowance.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

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

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

3.3 SCHEDULE OF ALLOWANCES
   A. Epoxy Floor Cleaning and Patching Allowance: Include a cash Allowance of Five Thousand ($5,000.00) Dollars in the Base bid for cleaning and patching of the existing epoxy coated concrete floors in the Hangar Area.

END OF SECTION 012100
PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

B. Quantities of Units to be included in the Base Bid are indicated in Section 004322 – Unit Prices Form.

1.2 SUMMARY

A. This Section includes administrative and procedural requirements for Unit Prices.

B. Related Sections include the following:
   1. Division 1 Section "Allowances" for procedures for using Unit Prices to adjust quantity allowances.
   2. Division 1 Section "Contract Modification Procedures" for procedures for submitting and handling Contract Changes.

1.3 DEFINITIONS

A. Unit Price is an amount proposed by bidders, stated on the Bid Form Attachment 004322 a price per unit of measurement for materials or services added to or deducted from the Contract Sum by appropriate modification, if estimated quantities of Work required by the Contract Documents are increased or decreased.

1.4 PROCEDURES

A. Unit Prices include all necessary material plus cost for delivery, installation, insurance, overhead, and profit.

B. Measurement and Payment: Refer to individual Specification Sections for work that requires establishment of Unit Prices. Methods of measurement and payment for Unit Prices are specified in those Sections.

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

D. List of Unit Prices: A list of Unit Prices is included in Part 3. Specification Sections referenced in the schedule contain requirements for materials described under each Unit Price.
PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 LIST OF UNIT PRICES

A. Unit Price No. 1 – Foamed-In-Place Insulation:
   1. Description: Foamed-In-Place Insulation and Protective Intumescent Coating according to Division 7 Section "07 2119 Foamed-In-Place Insulation"
   2. Unit of Measurement: 1 square foot of application area.
   3. Base Bid Quantity: 4200 square feet of application area.

END OF SECTION 012200
SECTION 012300 - ALTERNATES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes administrative and procedural requirements governing Alternates.

1.3 DEFINITIONS

A. Definition: An alternate is an amount proposed by bidders and stated on the Bid Form for certain work defined in the Bidding Requirements that may be added to the Base Bid amount if the Owner decides to accept a corresponding change in either the amount of construction to be completed, or in the products, materials, equipment, systems, or installation methods described in the Contract Documents.

1. The cost for each alternate is the net addition to the Contract Sum to incorporate the Alternate into the Work. No other adjustments are made to the Contract Sum.

B. No additional time will be allowed for alternate work unless the number of work days is so stated on the bid form.

1.4 PROCEDURES

A. Coordination: Modify or adjust affected adjacent Work as necessary to completely and fully integrate the Alternate Work into the Project.

1. Include as part of each alternate, miscellaneous devices, accessory objects, and similar items incidental to or required for a complete installation whether or not mentioned as part of the Alternate.

B. Notification: The award of the Contract will indicate whether alternates have been accepted or rejected.

C. Execute accepted alternates under the same conditions as other Work of this Contract.

D. Schedule: A “Schedule of Alternates” is included at the end of this Section. Specification Sections referenced in the Schedule contain requirements for materials necessary to achieve the Work described under each alternate.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.1 SCHEDULE OF ALTERNATES

A. Alternate No. 1: Remove existing Vinyl Windows on Mezzanine Level and replace with Aluminum Windows as specified in Section 08 5113.
A. Alternate No. 2: Remove existing epoxy floor coating throughout the hangar area/s and replace with new epoxy floor coating. See Section 09 6700 Fluid-Applied Flooring. See Section 09 0561 Common Work Results for Flooring Preparation for testing, and remedial coatings for the concrete slab. See D-101 note 26 and A-100 note 15 for scope limits. The Alternate 2 bid value should include the reduction of the $5,000 allowance in the base bid for epoxy floor cleaning and patching. (E.g. Cost for Alternate 2 scope of work - $5,000 allowance in base bid = Alternate 2 bid value.)
PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section specifies administrative and procedural requirements for handling and processing Contract Modifications.

B. Related Sections include the following:
   1. Division 1, Section 012100 "Allowances" for procedural requirements for handling and processing Allowances.
   2. Division 1, Section 012200 "Unit Prices" for administrative requirements for using Unit Prices.
   3. Division 0, Section 007213, Article 3.1 "Acceptable Substitutions" for administrative procedures for handling Requests for Substitutions made after Contract award.
   4. Division 0, Section 007213, Article 4.0 "Changes in the Work" for Contract Change requirements.

1.3 REQUESTS FOR INFORMATION

A. In the event that the Contractor or Subcontractor, at any tier, determines that some portion of the Drawings, Specifications, or other Contract Documents requires clarification or interpretation, the Contractor shall submit a “Request for Information” (RFI) in writing to the Designer. A RFI may only be submitted by the Contractor and shall only be submitted on the RFI forms provided by the Owner. The Contractor shall clearly and concisely set forth the issue for which clarification or interpretation is sought and why a response is needed. In the RFI, the Contractor shall set forth an interpretation or understanding of the requirement along with reasons why such an understanding was reached.

B. Responses to RFI shall be issued within ten (10) working days of receipt of the Request from the Contractor unless the Designer determines that a longer time is necessary to provide an adequate response. If a longer time is determined necessary by the Designer, the Designer will, within five (5) working days of receipt of the request, notify the Contractor of the anticipated response time. If the Contractor submits a RFI on a time sensitive activity on the current project schedule, the Contractor shall not be entitled to any time extension due to the time it takes the Designer to respond to the request provided that the Designer responds within the ten (10) working days set forth above.

C. Responses from the Designer will not change any requirement of the Contract Documents. In the event the Contractor believes that a response to a RFI will cause a change to the requirements of the Contract Document, the Contractor shall give written notice to the Designer requesting a Contract Change for the work. Failure to give such written notice within ten (10) working days, shall waive the Contractor’s right to seek additional time or cost under Article 4, “Changes in the Work” of the General Conditions.
1.4 MINOR CHANGES IN THE WORK

A. Designer will issue supplemental instructions authorizing Minor Changes in the Work, not involving adjustment to the Contract Amount or the Contract Time, on “Designer’s Supplemental Instructions” (DSI).

1.5 PROPOSAL REQUESTS

A. The Designer or Owner Representative will issue a detailed description of proposed Changes in the Work that may require adjustment to the Contract Amount or the Contract Time. The proposed Change Description will be issued using the “Request for Proposal” (RFP) form. If necessary, the description will include supplemental or revised Drawings and Specifications.

1. Proposal Requests issued by the Designer or Owner Representative are for information only. Do not consider them instructions either to stop work in progress or to execute the proposed change.

2. Within ten (10) working days after receipt of Proposal Request, submit a proposal for the cost adjustments to the Contract Amount and the Contract Time necessary to execute the Change. The Contractor shall submit his proposal on the appropriate Contract Change Detailed Breakdown form. Subcontractors may use the appropriate Contract Change Detailed Breakdown form or submit their proposal on their letterhead provided the same level of detail is included. All proposals shall include:

   a. A detailed breakdown of costs per Article 4.1 of the General Conditions.

   b. If requesting additional time per Article 4.2 of the General Conditions, include an updated Contractor's Construction Schedule that indicates the effect of the Change including, but not limited to, changes in activity duration, start and finish times, and activity relationship.

1.6 CONTRACT CHANGE PROCEDURES

A. On Owner's approval of a Proposal Request, the Designer or Owner Representative will issue a Contract Change for signatures of Owner and Contractor on the “Contract Change” form.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 REFERENCED FORMS

A. The following forms can be found on our website at https://oa.mo.gov/facilities/vendor-links/architectengineering-forms or https://oa.mo.gov/facilities/vendor-links/contractor-forms:

   1. Request for Information
   2. Designer’s Supplemental Instructions
   3. Request for Proposal
   4. Contract Change
   5. Contract Change Detailed Breakdown – SAMPLES
6. Contract Change Detailed Breakdown – General Contractor (GC)
7. Contract Change Detailed Breakdown – Subcontractor (SUB)

END OF SECTION 012600
PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes administrative provisions for coordinating construction operations on Projects including, but not limited to, the following:
   1. Coordination Drawings.
   2. Administrative and supervisory personnel.
   3. Project meetings.

B. Each Contractor shall participate in coordination requirements. Certain areas of responsibility will be assigned to a specific Contractor.

C. Related Sections include the following:
   1. Division 1, Section 013200 "Schedules" for preparing and submitting Contractor's Construction Schedule.
   3. Article 5.4.H of Section 007213 "General Conditions" for coordinating Closeout of the Contract.

1.3 COORDINATION

A. Coordination: Coordinate construction operations included in different Sections of the Specifications to ensure efficient and orderly installation of each part of the Work. Coordinate construction operations included in different Sections, which depend on each other for proper installation, connection, and operation.

B. Coordination: Each Contractor shall coordinate its construction operations with those of other contractors and entities to ensure efficient and orderly installation of each part of the Work. Each Contractor shall coordinate its operations with operations included in different Sections that depend on each other for proper installation, connection, and operation.

   1. Schedule construction operations in sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
   2. Coordinate installation of different components with other Contractors to ensure maximum accessibility for required maintenance, service, and repair.
   3. Make adequate provisions to accommodate items scheduled for later installation.
   4. Where availability of space is limited, coordinate installation of different components to ensure maximum performance and accessibility for required
maintenance, service, and repair of all components including mechanical and electrical.

C. Prepare memoranda for distribution to each party involved outlining special procedures required for coordination. Include such items as required notices, reports, and list of attendees at meetings.
   1. Prepare similar memoranda for Owner and separate Contractors if coordination of their Work is required.

D. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities and activities of other Contractors to avoid conflicts and to ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:
   1. Preparation of Contractor's Construction Schedule.
   2. Preparation of the Schedule of Values.
   3. Installation and removal of temporary facilities and controls.
   4. Delivery and processing of submittals.
   5. Progress meetings.
   6. Preinstallation conferences.
   7. Startup and adjustment of systems.
   8. Project Closeout activities.

E. Conservation: Coordinate construction activities to ensure that operations are carried out with consideration given to conservation of energy, water, and materials.
   1. Salvage materials and equipment involved in performance of, but not actually incorporated into, the Work. Refer to other Sections for disposition of salvaged materials that are designated as Owner's property.

1.4 SUBMITTALS

A. Coordination Drawings: Prepare Coordination Drawings if limited space availability necessitates maximum utilization of space for efficient installation of different components or if coordination is required for installation of products and materials fabricated by separate entities.

B. Key Personnel Names: Within fifteen (15) work days of starting construction operations, submit a list of key personnel assignments including superintendent and other personnel in attendance at Project site. Identify individuals and their duties and responsibilities; list addresses and telephone numbers including home and office telephone numbers. Provide names, addresses, and telephone numbers of individuals assigned as standbys in the absence of individuals assigned to Project.
   1. Post copies of list in Project meeting room, in temporary field office, and by each temporary telephone. Keep list current at all times.

1.5 PROJECT MEETINGS

A. The Owner’s Construction Representative will schedule a Pre-Construction Meeting prior to beginning of construction. The date, time, and exact place of this meeting will be determined after Contract Award and notification of all interested parties. The
Contractor shall arrange to have the Job Superintendent and all prime Subcontractors present at the meeting. During the Pre-Construction Meeting, the construction procedures and information necessary for submitting payment requests will be discussed and materials distributed along with any other pertinent information.

1. Minutes: Designer will record and distribute meeting minutes.

B. Progress Meetings: The Owner’s Construction Representative will conduct Monthly Progress Meetings as stated in Articles 1.8.B and 1.8.C of Section 007213 “General Conditions”.

1. Minutes: Designer will record and distribute to Contractor the meeting minutes.

C. Preinstallation Conferences: Contractor shall conduct a preinstallation conference at Project site before each construction activity that requires coordination with other construction.

1. Attendees: Installer and representatives of Manufacturers and Fabricators involved in or affected by the installation and its coordination or integration with other materials and installations that have preceded or will follow, shall attend the meeting. Advise Designer and Construction Representative of scheduled meeting dates.

2. Agenda: Review progress of other construction activities and preparations for the particular activity under consideration including requirements for the following:
   a. Contract Documents
   b. Options
   c. Related RFIs
   d. Related Contract Changes
   e. Purchases
   f. Deliveries
   g. Submittals
   h. Review of mockups
   i. Possible conflicts
   j. Compatibility problems
   k. Time schedules
   l. Weather limitations
   m. Manufacturer's written recommendations
   n. Warranty requirements
   o. Compatibility of materials
   p. Acceptability of substrates
   q. Temporary facilities and controls
   r. Space and access limitations
   s. Regulations of authorities having jurisdiction
   t. Testing and inspecting requirements
u. Installation procedures
v. Coordination with other Work
w. Required performance results
x. Protection of adjacent Work
y. Protection of construction and personnel

3. Contractor shall record significant conference discussions, agreements, and disagreements including required corrective measures and actions.

4. Reporting: Distribute minutes of the meeting to each party present and to parties who should have been present.

5. Do not proceed with installation if the conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of the Work and reconvene the conference at earliest feasible date.

6. Revise paragraph below if Project requires holding progress meetings at different intervals. Insert special intervals such as "every third Tuesday" to suit special circumstances.

7. Project name
8. Name and address of Contractor
9. Name and address of Designer
10. RFI number including RFIs that were dropped and not submitted
11. RFI description
12. Date the RFI was submitted
13. Date Designer's response was received
14. Identification of related DSI or Proposal Request, as appropriate

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 013100
SECTION 013200.10 – SCHEDULES – CRITICAL PATH METHOD (CPM)

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 CONSTRUCTION PROGRESS SCHEDULE – CRITICAL PATH METHOD (CPM)

A. This Section includes administrative and procedural requirements for the Critical Path Method (CPM) of scheduling and reporting progress of the Work.

1. Refer to the General Conditions and the Agreement for definitions and specified dates of Contract Time.

2. Due to the scheduling sensitivity of this Project and the need for the Owner to closely monitor all levels of activity, the following personnel and reporting requirements are mandatory.

B. CPM Definitions

1. Critical Path Method (CPM): A method of planning and scheduling a construction project where activities are arranged based on activity relationships and network calculations determine when activities can be performed and the critical path of the Project.

2. Critical Path: The longest continuous chain of activities through the network schedule that establishes the minimum overall project duration.

3. Network Diagram: A graphic diagram of a network schedule, showing the activities and activity relationships.

4. Activity: A discrete part of a project that can be identified for planning, scheduling, monitoring, and controlling the construction project. Activities included in a construction schedule consume time and resources.
   a. Critical activities are activities on the critical path.
   b. Predecessor activity is an activity that must be completed before a given activity can be started.

5. Event: An event is the starting or ending point of an activity.

6. Milestone: A key or critical point in time for reference or measurement.

7. Float or Slack Time: The measure of leeway in activity performance. Accumulative float time is not for the exclusive use or benefit of the Owner or Contractor, but is a project resource available to both parties as needed to meet contract milestones and the completion date.
   a. Free float is the amount of time an activity can be delayed without adversely affecting the early start of the following activity.
   b. Total float is the measure of leeway in starting or completing an activity without adversely affecting the planned project completion date.

8. Inclement Weather: Adverse weather conditions affecting the critical path.
C. CPM Quality Assurance

1. The Owner’s Consultant shall assist in planning, evaluating, and reporting by CPM Scheduling.

2. The Contractor is responsible for developing its own schedule logic and activities with appropriate duration, restraints and relationships. All information must be acceptable and compatible with the Owner’s needs. All target, completion, and milestone dates generated must be acceptable to the Owner and meet the requirements of the Contract Documents including the Statement of Work in the Agreement.

3. The Owner reserves the right to reject any schedule or report that fails to reflect timely completion of the Project, or any intermediate milestone, or otherwise indicates unrealistic performance. Failure of the Contractor to deliver satisfactory schedules or reports to the Owner may result in temporary suspension of progress payments at the Owner’s sole discretion.

1.3 PROJECT INSPECTION

A. The Owner will designate the time for a regular monthly update inspection at which time representatives of the Owner, Designer, and Contractor will inspect the Project and agree on progress of all activities. The information so obtained may be the basis for the Contractor’s monthly schedule update.

1.4 REPORTS

A. Daily Construction Reports: Prepare a daily construction report recording the following information concerning events at Project site:

1. List of subcontractors at Project site
2. List of separate contractors at Project site
3. Approximate count of personnel at Project site
4. Equipment at Project site
5. Material deliveries
6. High and low temperatures and general weather conditions
7. Accidents
8. Meetings and significant decisions
9. Unusual events (refer to special reports)
10. Stoppages, delays, shortages, and losses
11. Meter readings and similar recordings
12. Emergency procedures
13. Orders and requests of authorities having jurisdiction
14. Change Orders received and implemented
15. Services connected and disconnected
16. Equipment or system tests and startups
17. Partial Completions and Occupancies
18. Substantial Completions authorized
PART 2 - PRODUCTS

2.1 HARDWARE – Reserved

2.2 CPM SCHEDULING SOFTWARE
   A. The Contractor will use Microsoft Project or other approved scheduling software.

2.3 CPM SCHEDULING PERSONNEL
   A. The Contractor is to designate a person who will have all scheduling responsibilities for this Work. That individual must have had previous scheduling responsibilities on similar construction projects. The Contractor shall submit the resume of the designated person for approval by Owner prior to the Notice to Proceed.
   B. The Owner will designate the time and location for regular Monthly Progress Meetings. The Contractor is required to attend these Meetings. Current schedule, job progress, delays, projections, problem issues, alternatives, and applications for payment will be among the priority items addressed in detail at these meetings.

PART 3 - EXECUTION

3.1 CONSTRUCTION PROGRESS SCHEDULE – CRITICAL PATH METHOD (CPM)
   A. Preliminary Schedule:
      1. The Contractor's Preliminary CPM Schedule including Schedule of Values shall be submitted before the first pay application is approved. The preliminary network diagram shall outline activities for the first (60) days of construction. Include a skeleton diagram for the remainder of the Work with the preliminary diagram. This schedule will be the basis for pay applications for the first (60) days.
         a. Include each significant construction activity. Coordinate each activity in the network with other activities. Schedule each construction activity in proper sequence.
         b. Include an activity showing the contract weather allowance time – if any.
         c. Indicate completion of the Work on the date established for Substantial Completion.
         d. A tabular activity list.
         e. In addition to submitting paper copies of schedule reports, updates, and plots, the Contractor shall submit all diskettes containing all required schedule information.
      2. Cash Requirement Prediction: With submittal of the preliminary network diagram, include a preliminary cash requirement prediction based on indicated activities.
      3. Distribution: Distribute the preliminary network diagram to parties involved in construction activities that are scheduled early, including the Designer and the Owner.
   B. Schedule Submittals:
1. In preparing the CPM Schedule, the Contractor shall include procurement, submittal, approval, fabrication, and delivery activities for review and approval by the Owner.

2. Submittal and Distribution: Submit (3) copies of the initial issue of the tabulations and network for acceptance. When authorized, distribute copies to the Designer, Owner's CPM Consultant, and the Owner, separate Contractors, subcontractors, and suppliers or fabricators, and others identified by the Contractor with a need-to-know schedule responsibility.
   a. Post copies in the Project meeting rooms and temporary field offices.
   b. When revisions are made, distribute updated schedules to the same parties and post in the same locations. Delete parties from distribution when they have completed their assigned portion of the Work and are no longer involved in the performance of construction activities.
   c. Submit copies of each computer-produced report to the Designer.

3. Schedule Updating: Revise the Schedule within five (5) working days after each meeting or other activity, where revisions have been recognized or made. Issue the updated Schedule concurrently with the report of each project meeting.
   a. Weekly: On a weekly basis, the current detailed construction schedule (Three Week Look Ahead Schedule) shall be provided by the Contractor, at the request of the Owner. This information shall include a brief written report describing activities begun or finished, during the preceding week and a projection of all activities to be started or finished in the next three weeks.
   b. Monthly: Each month, the Contractor shall provide current, detailed construction schedule information consisting of certified tabular data and summaries, which show all changes to the schedule which have occurred since the previous submission of schedule information and indicates progress of each activity and shown completion dates. The submittal shall include major changes in scope, logic changes, activities modified since previous update, identification of any slippage, revised projections due to changes, out-of-sequence progress, and other identifiable changes.

4. In the event a revised detailed schedule is not acceptable to the Owner, the Schedule shall be revised within five (5) working days by the Contractor until it is found acceptable by the Owner.

5. The Contractor shall submit an updated schedule to CPM Consultant a minimum of five (5) working days prior to the scheduled Monthly Progress Meeting.

6. In the event that the Contractor fails to provide the required Schedules, reports, or updates noted above, in a timely manner, the Owner shall have the right to withhold all progress payments until such time as acceptable scheduling documentation is received.

7. Following each update, the Contractor shall distribute copies of the updated schedule to subcontractors, designer, and Owner.

C. Schedule Requirements:

1. Within (30) days after approval of the proposed preliminary network diagram, the Contractor shall submit draft of proposed complete network diagram for review. Upon request, include written certification that major subcontractors have reviewed and accepted the proposed schedule.
2. Within (15) days after joint review of proposed complete network diagram, submit final complete network diagram. The Owner anticipates a final base line schedule acceptable to the CPM Consultant within (90) days from Contractor's Notice to Proceed.

3. All relevant data is to be acquired and processed and reports prepared and submitted by the person designated to be responsible for the Project Schedule.

4. The scheduled logic for the Work shall be developed by the Contractor and approved by the Owner, along with established duration for each activity. Activity numbers shall be based on a reasonable, rational system for identification purposes. As a minimum, along with the activity numbers, include the building/area and type of work by trade and subcontractor company activity codes.

5. Participate in joint review and evaluation of network diagrams and analysis with Owner, Owner's CPM Consultant, and Designer at each submittal above.
   a. Following joint review of the final completion network diagram, distribute copies of the schedule to subcontractors, suppliers, designer, and Owner.

6. The detailed construction schedule submitted by the Contractor shall reflect complete sequence of construction by activity including:
   a. Procurement and delivery dates for long lead items
   b. Contractual milestone dates
   c. Dates for beginning and completion of each element of construction
   d. Disruptions and shutdowns due to other operations, facilities, functions, or testing agencies' activities
   e. Planned periods of inactivity on the project
   f. Anticipated periods of overtime or shift work
   g. Dates for installation and testing of all equipment
   h. Cleanup
   i. Contract startup and closeout

7. Identify work for separate buildings or areas and other logically grouped activities.

8. The schedule is to show projected percentage of completion for each item of work as of the last day of each month. Each item of work shall be cost loaded.

9. Provide special schedules to define critical portions of the entire schedule as requested by Owner.

10. Incorporate the procurement submittal schedule.
   a. Discrete activities shall be separated by trade or other category as requested by the Owner and separate activities shall be assigned activity numbers for use and monitoring.
   b. Separate activities shall be reflected in a level of detail such that no activity shall be of greater duration than (15) days. Specific exceptions must be requested in writing.

11. Provide recovery plan to complete the project within the contract completion time as requested by Owner.
12. The schedule activities shall be cost loaded per the schedule of values and will be used as the basis for the Contractor's monthly pay applications including:
   a. Milestone and zero duration activities shall not be dollar loaded.
   b. The dollar value for each activity will be the cost including labor, materials, equipment, and pro rata contribution to overhead and profit. The Contractor shall make the sum of all activity costs equal to the total Contract sum.
   c. The Contractor shall provide a “General Conditions” activity which shall include all Contractor jobsite costs. This activity cost shall be distributed evenly for the entire duration of the Contract. The Contractor shall furnish a detailed listing to the Owner of the items and their associated costs included in this activity.
   d. Separate activities should be shown for mobilization and demobilization. These should be equal cost amounts.
   e. “Front-end” dollar loading of construction activities will not be allowed.

13. Contract Changes that extend the Contract Completion Date shall be shown as a new activity. This schedule impact shall be submitted with the Contract Change proposal showing float used and/or impact on the critical path.

14. If a Contract Change results in a compensable time extension, the daily General Condition rate defined above will be used. It will be added to the Contract Change and will be excluded from overhead and profit markup as allowed by the General Conditions.
   a. Any additional General Condition monies associated with the approved additional time will be added on a daily basis to the end of the project. The additional time granted per the contract change shall also be added to the end of the latest approved contract completion date. These additional General Condition monies shall be held by the Owner and not paid to the Contractor until the project’s original contract time has been exceeded.
   b. If the Owner grants the Contractor Substantial Completion prior to the most current Contract Completion date, then for any and all contract days remaining beyond the date of Substantial Completion, the Contractor and Owner shall share on a 50% - 50% basis, all previously approved extended daily General Conditions costs.
   c. If the change warrants a reduction in contract time, for any reason, then the Owner shall deduct as part of the change 50% of the applicable pro rata share of the General Conditions monies as shown in the Schedule of Values.

D. Reporting:
   1. Contractor reports shall include monthly updates, and as requested by Owner, revised network logic diagrams, and activity lists. The monthly updates may be accompanied by certificates that all data submitted is complete and current (See sample at end of this Section).
   2. Contractor network diagrams shall legibly show the order and interdependence of activities, and the sequence in which the work is to be accomplished as planned by the Contractor. Networks shall be drawn on 24" by 36" or 11" by 17" sized
sheets, as directed by Owner, with title, match data, and date of latest version on each sheet.

3. Tabular Activity Lists shall be provided and shall show one activity per line along with appropriate data for the purpose intended including various combinations of the following:
   a. Activity ID number
   b. Activity description
   c. Preceding and succeeding activities and descriptions
   d. Original duration (in working days)
   e. Remaining duration (in working days)
   f. Percent complete
   g. Earliest start date (by calendar date)
   h. Earliest finish date (by calendar date)
   i. Latest start date (by calendar date)
   j. Latest finish date (by calendar date)

4. Narrative: A written narrative shall be required by Owner under the following circumstances:
   a. Added, deleted, or changed activities including logic and budget changes
   b. To explain out-of-sequence progress
   c. To detail procurement/delivery problems
   d. To describe recovery plans, if the Contractor fails to maintain its schedule
   e. To explain any schedule item which requires clarification as directed by the Owner

3.2 SCHEDULE OF SUBMITTALS

A. Tabulation of Submittals: With submittal of the preliminary network diagram, include a tabulation by date of submittals required during the first (90) days of construction. List those required to maintain orderly progress of the Work and those required early because of long lead-time for manufacture or fabrication.

B. Upon acceptance of the CPM Construction Progress Schedule, prepare, and submit a complete schedule of submittals. Coordinate the submittal schedule with Section 013300 SUBMITTALS, the approved Construction Progress Schedule, list of subcontracts, Schedule of Values and the list of products.

C. Prepare the schedule in chronological order. Provide the following information:
   1. Scheduled date for the first submittal
   2. Related Section number
   3. Submittal category
   4. Name of the subcontractor
   5. Description of the part of the Work covered
6. Scheduled date for resubmittal
7. Scheduled date for the Designer's final release or approval

D. Distribution: Following the Designer's response to the initial submittal schedule, print, and distribute copies to the Designer, Owner, Subcontractors, and other parties required to comply with submittal dates indicated.
   1. Post copies in the Project meeting room and temporary field office.
   2. When revisions are made, distribute to the same parties and post in the same locations. Delete parties from distribution when they have completed their assigned part of the Work and are no longer involved in construction activities.

E. Schedule Updating: Revise the schedule after each meeting or other activity where revisions have been recognized or made. Issue the updated schedule concurrently with the report of each meeting.

3.3 SCHEDULE OF INSPECTIONS AND TESTS

A. Upon acceptance of the CPM Construction Progress Schedule, prepare and submit within (15) working days a complete schedule of inspections, tests, and similar services required by the Contract Documents.

B. Form: The schedule shall be in tabular form and shall include, but not be limited to, the following:
   1. Specification Section number
   2. Description of the test
   3. Identification of applicable standards
   4. Identification of test methods
   5. Number of tests required
   6. Time schedule or time span for tests
   7. Entity responsible for performing tests
   8. Requirements for taking samples
   9. Unique characteristics of each service

C. Distribution: Distribute the schedule to the Owner, Designer, and each party involved in performance of portions of the Work where inspections and tests are required.

END OF SECTION 013200.10
SECTION 013300 – SUBMITTALS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes administrative and procedural requirements for submittals required for performance of the Work including the following:
   1. Shop Drawings
   2. Product Data
   3. Samples
   4. Quality Assurance Submittals
   5. Construction Photographs
   6. Operating and Maintenance Manuals
   7. Warranties

B. Administrative Submittals: Refer to General and Supplementary Conditions other applicable Division 1 Sections and other Contract Documents for requirements for administrative submittals. Such submittals include, but are not limited to, the following:
   1. Construction Progress Schedule including Schedule of Values
   2. Performance and Payment Bonds
   3. Insurance Certificates
   4. Applications for Payment
   5. Certified Payroll Reports
   6. Partial and Final Receipt of Payment and Release Forms
   7. Affidavit – Compliance with Prevailing Wage Law
   8. Record Drawings
   9. Notifications, Permits, etc.

C. The Contractor is obliged and responsible to check all shop drawings and schedules to assure compliance with contract plans and specifications. The Contractor is responsible for the content of the shop drawings and coordination with other contract work. Shop drawings and schedules shall indicate, in detail, all parts of an Item or Work including erection and setting instructions and integration with the Work of other trades.

D. The Contractor shall at all times make a copy, of all approved submittals, available on site to the Construction Representative.
1.3 **SUBMITTAL PROCEDURES**

A. The Contractor shall comply with the General and Supplementary Conditions and other applicable sections of the Contract Documents. The Contractor shall submit, with such promptness as to cause no delay in his work or in that of any other contractors, all required submittals indicated in Part 3.1 of this section and elsewhere in the Contract Documents. Coordinate preparation and processing of submittals with performance of construction activities. Transmit each submittal sufficiently in advance of performance of related construction activities to avoid delay.

1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
2. Coordinate transmittal of different types of submittals for related elements of the Work so processing will not be delayed by the need to review submittals concurrently for coordination.
   a. The Designer reserves the right to withhold action on a submittal requiring coordination with other submittals until all related submittals are received.

B. Each drawing and/or series of drawings submitted must be accompanied by a letter of transmittal giving a list of the titles and numbers of the drawings. Each series shall be numbered consecutively for ready reference and each drawing shall be marked with the following information:

1. Date of Submission
2. Name of Project
3. Location
4. Section Number of Specification
5. State Project Number
6. Name of Submitting Contractor
7. Name of Subcontractor
8. Indicate if Item is submitted as specified or as a substitution

1.4 **SHOP DRAWINGS**

A. Comply with the General Conditions, Article 3.2.

B. The Contractor shall submit newly prepared information drawn accurately to scale. Highlight, encircle, or otherwise indicate deviations from the Contract Documents. Do not reproduce Contract Documents or copy standard information as the basis of Shop Drawings. Standard information prepared without specific reference to the Project is not a Shop Drawing.

C. Shop Drawings include fabrication and installation drawings, setting diagrams, schedules, patterns, templates, and similar drawings including the following information:

1. Dimensions
2. Identification of products and materials included by sheet and detail number
3. Compliance with specified standards
4. Notation of coordination requirements
5. Notation of dimensions established by field measurement
6. Sheet Size: Except for templates, patterns and similar full-size Drawings, submit Shop Drawings on sheets at least 8½”x11” but no larger than 36”x48”.

1.5 PRODUCT DATA

A. The Contractor shall comply with the General Conditions, Article 3.2.

B. The Contractor shall collect Product Data into a single submittal for each element of construction or system. Product Data includes printed information, such as manufacturer’s installation instructions, catalog cuts, standard color charts, roughing-in diagrams and templates, standard wiring diagrams, and performance curves.

1. Mark each copy to show applicable choices and options. Where printed Product Data includes information on several products that are not required, mark copies to indicate the applicable information including the following information:
   a. Manufacturer’s printed recommendations
   b. Compliance with Trade Association standards
   c. Compliance with recognized Testing Agency standards
   d. Application of Testing Agency labels and seals
   e. Notation of dimensions verified by field measurement
   f. Notation of coordination requirements

2. Do not submit Product Data until compliance with requirements of the Contract Documents has been confirmed.

1.6 SAMPLES

A. The Contractor shall comply with the General Conditions, Article 3.2.

B. The Contractor shall submit full-size, fully fabricated samples, cured and finished as specified, and physically identical with the material or product proposed. Samples include partial sections of manufactured or fabricated components, cuts or containers of materials, color range sets, and swatches showing color, texture, and pattern.

1. The Contractor shall mount or display samples in the manner to facilitate review of qualities indicated. Prepare samples to match the Designer’s sample including the following:
   a. Specification Section number and reference
   b. Generic description of the Sample
   c. Sample source
   d. Product name or name of the Manufacturer
   e. Compliance with recognized standards
   f. Availability and delivery time

2. The Contractor shall submit samples for review of size, kind, color, pattern, and texture. Submit samples for a final check of these characteristics with other elements and a comparison of these characteristics between the final submittal and the actual component as delivered and installed.
a. Where variation in color, pattern, texture, or other characteristic is inherent in the material or product represented, submit at least three (3) multiple units that show approximate limits of the variations.

b. Refer to other Specification Sections for requirements for samples that illustrate workmanship, fabrication techniques, details of assembly, connections, operation, and similar construction characteristics.

c. Refer to other Sections for samples to be returned to the Contractor for incorporation in the Work. Such samples must be undamaged at time of use. On the transmittal, indicate special requests regarding disposition of sample submittals.

d. Samples not incorporated into the Work, or otherwise designated as the Owner’s property, are the property of the Contractor and shall be removed from the site prior to Substantial Completion.

3. Field samples are full-size examples erected onsite to illustrate finishes, coatings, or finish materials and to establish the Project standard.

a. The Contractor shall comply with submittal requirements to the fullest extent possible. The Contractor shall process transmittal forms to provide a record of activity.

1.7 QUALITY ASSURANCE DOCUMENTS

A. The Contractor shall comply with the General Conditions, Article 3.2

B. The Contractor shall submit quality control submittals including design data, certifications, manufacturer’s instructions, manufacturer’s field reports, and other quality-control submittals as required under other Sections of the Specifications.

C. Certifications: Where other Sections of the Specifications require certification that a product, material, or installation complies with specified requirements, submit a notarized certification from the Manufacturer certifying compliance with specified requirements.

1. Signature: Certification shall be signed by an officer of the Manufacturer or other individual authorized to contractually bind the Company.

D. Inspection and Test Reports: The Contractor shall submit the required inspection and test reports from independent testing agencies as specified in this Section and in other Sections of the Contract Documents.

E. Construction Photographs: The Contractor shall submit record construction photographs as specified in this Section and in other Sections of the Contract Documents.

1. The Contractor shall submit digital photographs. The Construction Administrator shall determine the quantity and naming convention at the preconstruction meeting.

2. The Contractor shall identify each photograph with project name, location, number, date, time, and orientation.

3. The Contractor shall submit progress photographs monthly unless specified otherwise. Photographs shall be taken one (1) week prior to submitting.

4. The Contractor shall take four (4) site photographs from differing directions and a minimum of five (5) interior photographs indicating the relative progress of the Work.
1.8 OPERATING AND MAINTENANCE MANUALS AND WARRANTIES

A. The Contractor shall submit all required manufacturer’s operating instructions, maintenance/service manuals, and warranties in accordance with the General Conditions, Article 3.5, and Supplementary Conditions along with this and other Sections of the Contract Documents.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.1 REQUIRED SUBMITTALS

A. Contractor shall submit the following information for materials and equipment to be provided under this contract.

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<tr>
<th>SECTION</th>
<th>DESCRIPTION</th>
<th>TYPE OF SUBMITTAL</th>
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END OF SECTION 013300
PART 1 - GENERAL

1.1 RELATED DOCUMENTS
   A. Drawings and general provisions of the Contract including General and Supplementary Conditions, Bid Form, and other Division 1 Specification Sections apply to this Section.

1.2 SUBMITTALS
   A. List of required submittals:
      1. Materials Safety Data Sheets for all hazardous materials to be brought onsite.
      2. Schedule of proposed shutdowns, if applicable.
      3. Submit names, date of birth, and social security numbers for all personnel for security clearance checks.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.1 ACCESS TO THE SITE
   A. The Contractor shall arrange with the Construction Representative and appropriate Facility Representatives for the controlled entry of construction personnel, materials, and equipment into the work areas.

   B. The Contractor shall establish regular working hours with the Construction Representative and the Facility. Working hour changes or overtime are to be reported and approved (48) hours ahead of time. Emergency overtime is to be reported as soon as it is evident that overtime is needed.

   C. The Contractor shall provide the name and phone number of the individual(s) who is in charge onsite and who can be contacted in case of an emergency. This individual(s) must be able to furnish names and addresses of all construction personnel upon request.

   D. All construction personnel shall visibly display issued identification cards.

3.2 FIRE PROTECTION, SAFETY, AND HEALTH CONTROLS
   A. The Contractor shall be responsible and take all necessary precautions to guard against and eliminate possible fire hazards. Onsite burning is prohibited.

   B. Store all flammable or hazardous materials in proper container located outside the buildings or offsite, if possible.

   C. Provide and maintain in good order, during construction, all fire extinguishers as required by the National Fire Protection Association. In areas of flammable liquids, asphalt, or electrical hazards, extinguishers of the 15-pound carbon dioxide type or 20-pound dry chemical type shall be provided.

   D. Fire exits, alarm systems, and sprinkler systems shall remain fully operational at all times unless written approval is received from the Construction Representative and the appropriate Facility Representative at least (24) hours in advance. The Contractor shall submit a written time schedule for any proposed shutdowns.
E. Conduct operations and removal of debris to ensure minimum interference with roads, streets, walks, and other adjacent facilities. Do not obstruct streets, walks, or use facilities without permission from the Facility.

F. Construction personnel shall not exceed the Facility speed limit of 15mph unless posted otherwise.

G. Take all necessary reasonable measures to reduce air and water pollution by any material or equipment use during construction. Keep volatile wastes in covered containers. Do not dispose of volatile wastes or oils in storm or sanitary drains.

H. Keep project neat, orderly, and in a safe condition at all times. Immediately remove all hazardous waste. Do not allow rubbish to accumulate. Provide onsite containers for collection of rubbish and dispose of it at frequent intervals during progress of work.

I. For all hazardous materials brought onsite, Material Safety Data Sheets shall be on site and readily available upon request at least a day before delivery.

J. Intoxicating beverages or narcotics shall not be brought upon the premises nor shall Contractor’s personnel be under the influence of these substances while on the premises.

3.3 REQUIRED CRIMINAL BACKGROUND AND WANTS & WARRANTS CHECK

A. Prior to the commencement of any onsite work, the General Contractor shall submit a list containing the full name as displayed on their Drivers License, date of birth, and social security number of each contractor and subcontractor employee. The contractor shall submit this information to the Missouri State Highway Patrol for the purpose of obtaining security clearances.

B. The General Contractor shall designate a single point of contact for submittal of all contractor and subcontractor employee information. All information shall be submitted to: securityaudit@mshp.dps.mo.gov

C. No contractor personnel will be allowed on Highway Patrol property without first obtaining the appropriate security clearance. The Missouri State Highway Patrol reserves the right to deny admission to any individual they feel may be detrimental to the security of the agency. **The contractor will not incur any costs related to employee background checks for Missouri State Highway Patrol projects.**

D. The Missouri State Highway Patrol will issue contractor identification cards to all approved personnel. **All issued cards shall be returned to the agency upon completion of the project.**

3.4 DISRUPTION OF UTILITIES

A. The Contractor shall give minimum (72) hours written notice to the Construction Representative and Facility Representative before disconnecting electric, gas, water, fire protection, or sewer service to any building.

B. The contractor shall give minimum (72) hours written notice to the Construction Representative and Facility Representative before closing any access drives and shall make temporary access available if possible. Do not obstruct streets, walks, or parking.

END OF SECTION 013513.25
PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes requirements for construction facilities and temporary controls including temporary utilities, support facilities, security, and protection.

B. Temporary utilities include, but are not limited to, the following:
   1. Water service and distribution
   2. Temporary electric power and light
   3. Temporary heat
   4. Ventilation
   5. Telephone service
   6. Sanitary facilities, including drinking water
   7. Storm and sanitary sewer

C. Support facilities include, but are not limited to, the following:
   1. Field offices and storage sheds
   2. Temporary roads and paving
   3. Dewatering facilities and drains
   4. Temporary enclosures
   5. Hoists and temporary elevator use
   6. Temporary project identification signs and bulletin boards
   7. Waste disposal services
   8. Rodent and pest control
   9. Construction aids and miscellaneous services and facilities

D. Security and protection facilities include, but are not limited to, the following:
   1. Temporary fire protection
   2. Barricades, warning signs, and lights
   3. Sidewalk bridge or enclosure fence for the site
   4. Environmental protection
1.3 SUBMITTALS

A. Temporary Utilities: Submit reports of tests, inspections, meter readings, and similar procedures performed on temporary utilities.

B. Implementation and Termination Schedule: Within (15) days of the date established for commencement of the Work, submit a schedule indicating implementation and termination of each temporary utility.

1.4 QUALITY ASSURANCE

A. Regulations: Comply with industry standards and applicable laws and regulations including, but not limited to, the following:

1. Building code requirements
2. Health and safety regulations
3. Utility company regulations
4. Police, fire department, and rescue squad rules
5. Environmental protection regulations


1. Electrical Service: Comply with NEMA, NECA, and UL standards and regulations for temporary electric service. Install service in compliance with NFPA 70 “National Electric Code”.

C. Inspections: Arrange for authorities having jurisdiction to inspect and test each temporary utility before use. Obtain required certifications and permits.

1.5 PROJECT CONDITIONS

A. Temporary Utilities: Prepare a schedule indicating dates for implementation and termination of each temporary utility. At the earliest feasible time, when acceptable to the Owner, change over from use of temporary service to use of permanent service.

B. Conditions of Use: Keep temporary services and facilities clean and neat in appearance. Operate in a safe and efficient manner. Relocate temporary services and facilities as the Work progresses. Do not overload facilities or permit them to interfere with progress. Take necessary fire-prevention measures. Do not allow hazardous, dangerous, or unsanitary conditions, or public nuisances to develop or persist onsite.
PART 2 - PRODUCTS

2.1 MATERIALS

A. General: Provide new materials. If acceptable to the Designer, the Contractor may use undamaged, previously used materials in serviceable condition. Provide materials suitable for use intended.

B. Lumber and Plywood: Comply with requirements in Division 6 Section “Rough Carpentry”.
   1. For job-built temporary office, shops, and sheds within the construction area, provide UL-labeled, fire-treated lumber and plywood for framing, sheathing, and siding.
   2. For signs and directory boards, provide exterior-type, Grade B-B high-density concrete form overlay plywood of sized and thicknesses indicated.
   3. For fences and vision barriers, provide minimum 3/9” (9.5mm) thick exterior plywood.
   4. For safety barriers, sidewalk bridges, and similar uses, provide minimum 5/8” (16mm) thick exterior plywood.

C. Gypsum Wallboard: Provide gypsum wallboard on interior walls of temporary offices.

D. Roofing Materials: Provide UL Class A standard-weight asphalt shingles or UL Class C mineral-surfaced roll roofing on roofs of job-built temporary office, shops, and shed.

E. Paint: Comply with requirements of Division 9 Section “Painting”.
   1. For job-built temporary offices, shops, sheds, fences, and other exposed lumber and plywood, provide exterior-grade acrylic-latex emulsion over exterior primer.
   2. For sign panels and applying graphics, provide exterior-grade alkyd gloss enamel over exterior primer.
   3. For interior walls of temporary offices, provide two (2) quarts interior latex-flat wall paint.

F. Tarpaulins: Provide waterproof, fire-resistant, UL-labeled tarpaulins with flame-spread rating of (15) or less. For temporary enclosures, provide translucent, nylon-reinforced laminated polyethylene or polyvinyl chloride, fire-retardant tarpaulins.

G. Water: Provide potable water approved by local health authorities.

H. Open-Mesh Fencing: Provide 0.120” (3mm) thick, galvanized 2” (50mm) chainlink fabric fencing 6’ (2m) high with galvanized barbed-wire top strand and galvanized steel pipe posts, 1½” (38mm) ID for line posts and 2½” (64mm) ID for corner posts.
2.2 EQUIPMENT

A. General: Provide new equipment. If acceptable to the Designer, the Contractor may use undamaged, previously used equipment in serviceable condition. Provide equipment suitable for use intended.

B. Water Hoses: Provide ¾” (19mm), heavy-duty, abrasion-resistant, flexible rubber hoses 100’ (30m) long, with pressure rating greater than the maximum pressure of the water distribution system. Provide adjustable shutoff nozzles at hose discharge.

C. Electrical Outlets: Provide properly configured, NEMA-polarized outlets to prevent insertion of 110 to 120V plugs into higher voltage outlets. Provide receptacle outlets equipped with ground-fault circuit interrupters, reset button, and pilot light for connection of power tools and equipment.

D. Electrical Power Cords: Provide grounded extension cords. Use hard-service cords where exposed to abrasion and traffic. Provide waterproof connectors to connect separate lengths of electric cords if single lengths will not reach areas where construction activities are in progress. Do not exceed safe length-voltage rating.

E. Lamps and Light Fixtures: Provide general service incandescent lamps of wattage required for adequate illumination. Provide guard cages or tempered-glass enclosures where exposed to breakage. Provide exterior fixture where exposed to moisture.

F. Heating Units: Provide temporary heating units that have been tested and labeled by UL, FM, or another recognized trade association related to the type of fuel being consumed.

G. Temporary Offices: if required by GC: Provide prefabricated or mobile units or similar job-built construction with lockable entrances, operable windows, and serviceable finishes. Provide heated and air-conditioned units on foundations adequate for normal loading. If necessary, the cost for any utility connections are by the GC.

H. Temporary Toilet Units: Provide self-contained, single-occupant toilet units of the chemical, aerated re-circulation, or combustion type. Provide units properly vented and fully enclosed with a glass-fiber-reinforced polyester shell or similar nonabsorbent material.

I. Fire Extinguishers: Provide hand-carried, portable, UL-rated, Class A fire extinguishers for temporary offices and similar spaces. In other locations, provide hand-carried, portable, UL-rated, Class ABC, dry-chemical extinguishers, or a combination of extinguishers of NFPA-recommended classes for the exposures.

1. Comply with NFPA 10 and NFPA 241 for classification, extinguishing agent, and size required by location and class of fire exposure.
PART 3 - EXECUTION

3.1 INSTALLATION

A. Use qualified personnel for installation of temporary facilities. Locate facilities where they will serve the Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required.

B. Provide each Facility ready for use when needed to avoid delay. Maintain and modify as required. Do not remove until facilities are no longer needed or are replaced by authorized use of completed permanent facilities.

3.2 TEMPORARY UTILITY INSTALLATION

A. General: Engage the appropriate local utility company to install temporary service or connect to existing service. Where company provides only part of the service, provide the remainder with matching, compatible materials and equipment. Comply with company recommendations.

1. Arrange with company and existing users for a time when service can be interrupted, if necessary, to make connections for temporary services.

2. Provide adequate capacity at each stage of construction. Prior to temporary utility availability, provide trucked-in services.

3. Obtain easements to bring temporary utilities to the site where the Owner’s easements cannot be used for that purpose.

4. Use Charges: Cost or use charges for temporary facilities are not chargeable to the Owner or Designer. Neither the Owner nor Designer will accept cost or use charges as a basis of claims for Contract Change.

B. Temporary Water Service: The Owner will provide water for construction purposes from the existing building system. All required temporary extensions shall be provided and removed by the Contractor. Connection points and methods of connection shall be designated and approved by the Construction Representative.

C. Temporary Electric Power Service: The Owner will provide electric power for construction lighting and power tools. Contractors using such services shall pay all costs of temporary services, circuits, outlet, extensions, etc.

D. Temporary Lighting: When overhead floor or roof deck has been installed, provide temporary lighting with local switching.

1. Install and operate temporary lighting that will fulfill security and protection requirements without operating the entire system. Provide temporary lighting that will provide adequate illumination for construction operations and traffic conditions.

E. Temporary Heating: Provide temporary heat required by construction activities for curing or drying of completed installations or for protection of installed construction from adverse effects of low temperatures or high humidity. Select safe equipment that will not have a harmful effect on completed installations or elements being installed.
Coordinate ventilation requirements to produce the ambient condition required and minimize consumption of energy.

1. Heating Facilities: Provide vented, self-contained, Electric, LP gas or fuel-oil heaters with individual space thermostatic control. Verify the use of electric units with the power available on site. Costs for additional power or modifications to existing power for temporary units, if necessary, will be by the Contractor.

2. Use of gasoline-burning space heaters, open flame, or salamander heating units is prohibited.

F. Temporary Telephones: Provide temporary telephone service throughout the construction period for all personnel engaged in construction activities.

1. Telephone Lines: Provide telephone lines for the following:
   a. Where an office has more than two (2) occupants, install a telephone for each additional occupant or pair of occupants.
   b. Provide a dedicated telephone for a fax machine in the field office.
   c. Provide a separate line for the Owner's use.

2. At each telephone, post a list of important telephone numbers.

G. Temporary Toilets: Install self-contained toilet units. Use of pit-type privies will not be permitted. Comply with regulations and health codes for the type, number, location, operation, and maintenance of fixtures and facilities. Install where facilities will best serve the Project’s needs.

1. Shield toilets to ensure privacy.
2. Provide separate facilities for male and female personnel.
3. Provide toilet tissue materials for each facility.

H. Wash Facilities: Provide temporary wash facilities supplied with potable water at convenient locations for personnel involved in handling materials that require wash-up for a health and sanitary condition. Dispose of drainage properly. Supply cleaning compounds appropriate for each condition.

1. Provide paper towels or similar disposable materials for each facility.
2. Provide covered waste containers for used material.
3. Provide safety showers, eyewash fountains, and similar facilities for convenience, safety, and sanitation of personnel where required by all regulations.

I. Drinking-Water Facilities: Provide containerized, tap-dispenser, bottled-water drinking-water units, including paper supply.

3.3 SUPPORT FACILITIES INSTALLATION

A. General: Locate field offices, storage sheds, and other temporary construction and support facilities for easy access.
1. Maintain support facilities until near Substantial Completion. Remove prior to Substantial Completion. Personnel remaining after Substantial Completion will be permitted to use permanent facilities, under conditions acceptable to the Owner.

B. Storage Facilities: Limited areas for storage of building materials are available onsite. Available storage areas are shown on the drawings. The Contractor shall provide his own security. Specific locations for storage and craning operations will be discussed at the Pre-Bid Meeting and the Pre-Construction Meeting.

C. Storage Facilities: The Owner will provide storage onsite as designated by the Facility Representative or the Construction Representative. Areas for use by the Contractor for storage will be identified at the Pre-Bid Meeting.

D. Construction Parking: Parking at the site will be provided in the areas designated at the Pre-Construction Meeting.

E. Construction Parking: Contractors must be prepared to discuss their storage and parking needs at the Pre-Bid Meeting. Parking for construction personnel cannot be provided onsite. All parking will be offsite. Under no circumstances will any vehicle be parked in a fire lane. Parking on lawns shall be prohibited.

F. Dewatering Facilities and Drains: For temporary drainage and dewatering facilities and operations not directly associated with construction activities included under individual Sections, comply with dewatering requirements of applicable Division 2 Sections. Where feasible, utilize the same facilities. Maintain the site, excavations, and construction free of water.

G. Temporary Enclosures: Provide temporary enclosures for protection of construction, in progress and completed, from exposure, foul weather, other construction operations, and similar activities.
   1. Where heat is needed and the permanent building enclosure is not complete, provide temporary enclosures where there is no other provision for containment of heat. Coordinate enclosure with ventilating and materials drying or curing requirements to avoid dangerous conditions and effects.
   2. Install tarpaulins securely with incombustible wood framing and other materials. Close openings of 25SqFt (2.3SqM) or less with plywood or similar materials.
   3. Close openings through floor or roof decks and horizontal surfaces with load-bearing, wood-framed construction.
   4. Where temporary wood or plywood enclosure exceeds 100SqFt (9.2SqM) in area, use UL-labeled, fire-retardant-treated material for framing and main sheathing.

H. Temporary Lifts and Hoists: Provide facilities for hoisting materials and employees. Truck cranes and similar devices used for hoisting materials are considered “tools and equipment” and not temporary facilities.

I. Project Identification and Temporary Signs: Prepare project identification and other signs of size indicated. Install signs where indicated to inform the public and persons
seeking entrance to the Project. Support on posts or framing of preservative-treated wood or steel. Do not permit installation of unauthorized signs.

1. **Project Identification Signs:** Engage an experienced sign painter to apply graphics. Comply with details indicated.

2. **Temporary Signs:** Prepare signs to provide directional information to construction personnel and visitors.

**J. Collection and Disposal of Waste:** Collect waste from construction areas and elsewhere daily. Comply with requirements of NFPA 241 for removal of combustible waste material and debris. Enforce requirements strictly. Do not hold materials more than seven (7) days during normal weather or three (3) days when the temperature is expected to rise above 80°F (27°C). Handle hazardous, dangerous, or unsanitary waste materials separately from other waste by containerizing properly. Dispose of material lawfully.

**K. Stairs:** Until permanent stairs are available, provide temporary stairs where ladders are not adequate. Cover finished, permanent stairs with a protective covering of plywood or similar material so finishes will be undamaged at the time of acceptance.

### 3.4 SECURITY AND PROTECTION FACILITIES INSTALLATION

**A.** Except for use of permanent fire protection as soon as available, do not change over from use of temporary security and protection facilities to permanent facilities until Substantial Completion, or longer, as requested by the Designer.

**B.** Temporary Fire Protection: Until fire-protection needs are supplied by permanent facilities, install and maintain temporary fire-protection facilities of the types needed to protect against reasonable predictable and controllable fire losses. Comply with NFPA 10 “Standard for Portable Fire Extinguishers” and NFPA 241 “Standard for Safeguarding Construction, Alterations, and Demolition Operations”.

1. Locate fire extinguishers where convenient and effective for their intended purpose, but not less than one (1) extinguisher on each floor at or near each usable stairwell.

2. Store combustible materials in containers in fire-safe locations.

3. Maintain unobstructed access to fire extinguishers, fire hydrants, temporary fire-protection facilities, stairways, and other access routes for fighting fires. Prohibit smoking in hazardous fire-exposure areas.

4. Provide supervision of welding operations, combustion-type temporary heating units, and similar sources of fire ignition.

**C.** Permanent Fire Protection: At the earliest feasible date in each area of the Project complete installation of the permanent fire-protection facility including connected services and place into operation and use. Instruct key personnel on use of facilities.

**D.** Barricades, Warning Signs, and Lights: Comply with standards and code requirements for erection of structurally adequate barricades. Paint with appropriate colors, graphics, and warning signs to inform personnel and the public of the hazard being protected against. Where appropriate and needed, provide lighting including flashing red or amber lights.
E. Storage: Where materials and equipment must be stored and are of value or attractive for theft, provide a secure lockup. Enforce discipline in connection with the installation and release of material to minimize the opportunity for theft and vandalism.

F. Environmental Protection: Provide protection, operate temporary facilities, and conduct construction in ways and by methods that comply with environmental regulations and minimize the possibility that air, waterways, and subsoil might be contaminated or polluted or that other undesirable effects might result. Avoid use of tools and equipment that produce harmful noise. Restrict use of noisemaking tools and equipment to hours that will minimize complaints from persons or firms near the site.

3.5 OPERATION, TERMINATION AND REMOVAL

A. Supervision: Enforce strict discipline in use of temporary facilities. Limit availability of temporary facilities to essential and intended uses to minimize waste and abuse.

B. Maintenance: Maintain facilities in good operating condition until removal. Protect from damage by freezing temperatures and similar elements.
   1. Maintain operation of temporary enclosures, heating, cooling, humidity control, ventilation, and similar facilities on a 24-hour basis where required to achieve indicated results and to avoid possibility of damage.
   2. Protection: Prevent water-filled piping from freezing. Maintain markers for underground lines. Protect from damage during excavation operations.

C. Termination and Removal: Unless the Designer requests that it be maintained longer, remove each temporary facility when the need has ended, when replaced by authorized use of a permanent facility, or no later than Substantial Completion. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with the temporary facility. Repair damaged Work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.
   1. Materials and facilities that constitute temporary facilities are the Contractor’s property. The Owner reserves the right to take possession of project identification signs.
   2. Remove temporary paving not intended for or acceptable for integration into permanent paving. Where the area is intended for landscape development, remove soil and aggregate fill that do not comply with requirements for fill or subsoil in the area. Remove materials contaminated with road oil, asphalt and other petrochemical compounds, and other substances that might impair growth of plant materials or lawns. Repair or replace street paving, curbs, and sidewalks at the temporary entrances as required by the governing authority.
   3. At Substantial Completion, clean and renovate permanent facilities used during the construction period including, but not limited to, the following:
      a. Replace air filters and clean inside of ductwork and housing.
      b. Replace significantly worn parts and parts subject to unusual operating conditions.
      c. Replace lamps burned out or noticeably dimmed by hours of use.
END OF SECTION 015000
SECTION 017400 – CLEANING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes administrative and procedural requirements for cleaning during the Project.

B. Environmental Requirements: Conduct cleaning and waste-disposal operations in compliance with local laws and ordinances. Comply fully with federal and local environmental and anti-pollution regulations.
   1. Do not dispose of volatile wastes such as mineral spirits, oil, or paint thinner in storm or sanitary drains.
   2. Burning or burying of debris, rubbish, or other waste material on the premises is not permitted.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Cleaning Agents: Use cleaning materials and agents recommended by the manufacturer or fabricator for the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.

PART 3 - EXECUTION

3.1 PROGRESS CLEANING

A. General
   1. Retain all stored items in an orderly arrangement allowing maximum access, not impending drainage or traffic, and providing the required protection of materials.
   2. Do not allow the accumulation of scrap, debris, waste material, and other items not required for construction of this Work.
   3. At least weekly, and more often if necessary, completely remove all scrap, debris, and waste material from the jobsite.
   4. Provide adequate storage for all items awaiting removal from the jobsite, observing all requirements for fire protection and protection of the ecology.

B. Site
   1. Daily, inspect the site and pick up all scrap, debris, and waste material. Remove all such items to the place designated for their storage.
   2. Weekly, inspect all arrangements of materials stored onsite. Re-stack, tidy, or otherwise service all material arrangements.
3. Maintain the site in a neat and orderly condition at all times.

C. Structures

1. Daily, inspect the structures and pick up all scrap, debris, and waste material. Remove all such items to the place designated for their storage.

2. Weekly, sweep all interior spaces clean. “Clean” for the purposes of this paragraph, shall be interpreted as meaning free from dust and other material capable of being removed by use of reasonable effort and handheld broom.

3. In preparation for installation of succeeding materials, clean the structures or pertinent portions thereof to the degree of cleanliness recommended by the manufacturer of the succeeding material, using all equipment and materials required to achieve the required cleanliness.

4. Following the installation of finish floor materials, clean the finish floor daily while work is being performed in the space in which finish materials have been installed. “Clean” for the purposes of this subparagraph, shall be interpreted as meaning free from all foreign material which, in the opinion of the Construction Representative, may be injurious to the finish of the finish floor material.

3.2 FINAL CLEANING

A. General: Provide final cleaning operations when indicated. Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit of Work to the condition expected from a commercial building cleaning and maintenance program. Comply with manufacturer’s instructions.

B. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for the entire Project or a portion of the Project.

1. Clean the Project Site, yard and grounds, in areas disturbed by construction activities including landscape development areas, of rubbish, waste material, litter, and foreign substances.

2. Sweep paved areas broom clean. Rake grounds that are neither planted nor paved to a smooth, even-textured surface.

3. Remove petrochemical spills, stains, and other foreign deposits.

4. Remove tools, construction equipment, machinery, and surplus material from the site.

5. Remove snow and ice to provide safe access to the building.

6. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.

7. Remove debris and surface dust from limited access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.


9. Vacuum clean carpet and similar soft surfaces removing debris and excess nap. Shampoo, if required.

10. Clean transparent material, including mirrors and glass in doors and windows. Remove glazing compounds and other substances that are noticeable vision-
observing materials. Replace chipped or broken glass and other damaged transparent materials. Polish mirrors and glass, taking care not to scratch surfaces.

11. Remove labels that are not permanent labels.

12. Touch up and otherwise repair and restore marred, exposed finishes and surfaces. Replace finishes and surfaces that cannot be satisfactorily repaired or restored or that already show evidence of repair or restoration.

a. Do not paint over “UL” and similar labels, including mechanical and electrical nameplates.

13. Wipe surfaces of mechanical and electrical equipment, elevator equipment, and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.

14. Clean plumbing fixtures to a sanitary condition free of stains, including stains resulting from water exposure.

15. Replace disposable air filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grills.

16. Clean ducts, blowers, and coils if units were operated without filters during construction.

17. Clean food-service equipment to a sanitary condition, ready and acceptable for its intended use.

18. Clean light fixtures, lamps, globes, and reflectors to function with full efficiency. Replace burned-out bulbs and defective and noisy starters in fluorescent and mercury vapor fixtures.

19. Leave the Project clean and ready for occupancy.

C. Removal of Protection: Remove temporary protection and facilities installed during construction to protect previously completed installations during the remainder of the construction period.

D. Compliances: Comply with governing regulations and safety standards for cleaning operations. Remove waste materials from the site and dispose of lawfully.

1. Where extra materials of value remain after Final Acceptance by the Owner, they become the Owner’s property.

END OF SECTION 017400
PART 1 GENERAL

1.01 RELATED DOCUMENTS
   A. Drawings and general provisions of the Contract including General and Supplementary Conditions and Division 1 Specification Sections apply to this Section.

1.02 SECTION INCLUDES
   A. Selective demolition of building elements for alteration purposes.

1.03 REFERENCE STANDARDS

1.04 SUBMITTALS
   A. See Section 013300 - Submittals, 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.
      2. Identify demolition firm and submit qualifications.
      3. Include a summary of safety procedures.
   C. Project Record Documents: Accurately record actual locations of capped and active utilities and subsurface construction.

PART 2 PRODUCTS – NOT USED

PART 3 EXECUTION

3.01 SCOPE
   A. Remove portions of the existing building as indicated on the drawings and as required to properly perform the work.
   B. Remove concrete slabs on grade as indicated on drawings and as necessary to complete underground utility work.
   C. Remove other items indicated, for salvage, relocation, and recycling.

3.02 GENERAL PROCEDURES AND PROJECT CONDITIONS
   A. Comply with applicable codes and regulations for demolition operations and safety of adjacent portions of the structure and the spaces to remain in use.
      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. Use physical barriers to prevent access to areas that could be hazardous to workers or the public.
      5. Conduct operations to minimize effects on and interference with adjacent structures and occupants.
      6. Do not close or obstruct roadways or sidewalks without permit.
      7. 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.
8. 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. Do not begin removal until built elements to be salvaged or relocated have been removed.

D. Protect existing structures and other elements that are not to be removed.
   1. Provide bracing and shoring.
   2. Prevent movement or settlement of adjacent structures.
   3. Stop work immediately if adjacent structures appear to be in danger.

E. Minimize production of dust due to demolition operations; do not use water if that will result in ice, flooding, sedimentation of public waterways or storm sewers, or other pollution.

F. If hazardous materials are discovered during removal operations, stop work and notify Architect and Owner; hazardous materials include regulated asbestos containing materials, lead, PCB’s, and mercury.

3.03 EXISTING UTILITIES

A. Coordinate work with utility companies; notify before starting work and comply with their requirements; obtain required permits.

B. Protect existing utilities to remain from damage.

C. Do not disrupt public utilities without permit from authority having jurisdiction.

D. Do not close, shut off, or disrupt existing life safety systems that are in use without at least 7 days prior written notification to Owner.

E. Do not close, shut off, or disrupt existing utility branches or take-offs that are in use without at least 3 days prior written notification to Owner.

F. Locate and mark utilities to remain; mark using highly visible tags or flags, with identification of utility type; protect from damage due to subsequent construction, using substantial barricades if necessary.

G. Remove exposed piping, valves, meters, equipment, supports, and foundations of disconnected and abandoned utilities.

H. Prepare building demolition areas by disconnecting and capping utilities outside the demolition zone; identify and mark utilities to be subsequently reconnected, in same manner as other utilities to remain.

3.04 SELECTIVE DEMOLITION FOR ALTERATIONS

A. Drawings showing existing construction and utilities are based on casual field observation and existing record documents only.
   1. Verify that construction and utility arrangements are as 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. Separate areas in which demolition is being conducted from other areas that are still occupied.
   1. Provide, erect, and maintain temporary dustproof partitions of construction As Specified in Section 01500.

C. Maintain weatherproof exterior building enclosure except for interruptions required for replacement or modifications; take care to prevent water and humidity damage.

D. Remove existing work as indicated and as required to accomplish new work.
   1. Remove rotted wood, corroded metals, and deteriorated masonry and concrete; replace with new construction specified.
   2. Remove items indicated on drawings.

E. Services (Including but not limited to HVAC, Plumbing, Fire Protection, Electrical, and Telecommunications): Remove existing systems and equipment as indicated.
1. Maintain existing active systems that are to remain in operation; maintain access to equipment and operational components.
2. Where existing active systems serve occupied facilities but are to be replaced with new services, maintain existing systems in service until new systems are complete and ready for service.
3. 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.

F. Protect existing work to remain.
   1. Prevent movement of structure; provide shoring and bracing if necessary.
   2. Perform cutting to accomplish removals neatly and as specified for cutting new work.
   3. Repair adjacent construction and finishes damaged during removal work.
   4. Patch as specified for patching new work.

3.05 DEBRIS AND WASTE REMOVAL
   A. Remove debris, junk, and trash from site.
   B. Remove from site all materials not to be reused on site; do not burn or bury.
   C. Leave site in clean condition, ready for subsequent work.
   D. Clean up spillage and wind-blown debris from public and private lands.

END OF SECTION
PART 1 - GENERAL

1.1 SUMMARY
A. Section includes cast-in-place concrete, including formwork, reinforcement, concrete materials, mixture design, placement procedures, and finishes.
B. Related Sections:
   1. Division 31 Section "Earth Moving" for drainage fill under slabs-on-grade.
   2. Drawings and general provisions of the Contract including General and Supplementary Conditions and Division 1 Specification Sections apply to this Section.

1.2 ACTION SUBMITTALS
A. Product Data: For each type of product indicated.
B. Design Mixtures: For each concrete mixture.
C. Steel Reinforcement Shop Drawings: Placing drawings that detail fabrication, bending, and placement.

1.3 INFORMATIONAL SUBMITTALS
A. Material certificates.
B. Material test reports.

1.4 QUALITY ASSURANCE
A. Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C 94/C 94M requirements for production facilities and equipment.
   1. Manufacturer certified according to NRMCA's "Certification of Ready Mixed Concrete Production Facilities."
B. Testing Agency Qualifications: An independent agency, acceptable to authorities having jurisdiction, qualified according to ASTM C 1077 and ASTM E 329 for testing indicated.
C. ACI Publications: Comply with the following unless modified by requirements in the Contract Documents:
   1. ACI 301, "Specifications for Structural Concrete," Sections 1 through 5.
   2. ACI 117, "Specifications for Tolerances for Concrete Construction and Materials."
D. Concrete Testing Service: Owner engage a qualified independent testing agency to perform material evaluation tests and to design concrete mixtures.

PART 2 - PRODUCTS

2.1 FORM-FACING MATERIALS
A. Smooth-Formed Finished Concrete: Form-facing panels that will provide continuous, true, and smooth concrete surfaces. Furnish in largest practicable sizes to minimize number of joints.
B. Rough-Formed Finished Concrete: Plywood, lumber, metal, or another approved material. Provide lumber dressed on at least two edges and one side for tight fit.

2.2 STEEL REINFORCEMENT
A. Reinforcing Bars: ASTM A 615/A 615M, Grade 60 (Grade 420), deformed.
B. Plain-Steel Welded Wire Reinforcement: ASTM A 185/A 185M, plain, fabricated from as-drawn steel wire into flat sheets.
D. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded wire reinforcement in place. Manufacture bar supports from steel wire, plastic, or precast concrete according to CRSI's "Manual of Standard Practice.

2.3 CONCRETE MATERIALS
A. Cementitious Material: Use the following cementitious materials, of the same type, brand, and source, throughout Project:
   1. Portland Cement: ASTM C 150 Type I/II, gray. Supplement with the following:
      a. Fly Ash: ASTM C 618, Class F or C.
      b. Ground Granulated Blast-Furnace Slag: ASTM C 989, Grade 100 or 120.
B. Normal-Weight Aggregates: ASTM C 33, graded.
   1. Maximum Coarse-Aggregate Size: 1-1/2 inches (38 mm) nominal.
   2. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.

2.4 ADMIXTURES
A. Chemical Admixtures: Provide admixtures certified by manufacturer to be compatible with other admixtures and that will not contribute water-soluble chloride ions exceeding those permitted in hardened concrete. Do not use calcium chloride or admixtures containing calcium chloride.
   1. Water-Reducing Admixture: ASTM C 494/C 494M, Type A.
   2. Retarding Admixture: ASTM C 494/C 494M, Type B.
   3. Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type D.
   4. High-Range, Water-Reducing Admixture: ASTM C 494/C 494M, Type F.
   5. High-Range, Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type G.
   6. Plasticizing and Retarding Admixture: ASTM C 1017/C 1017M, Type II.

2.5 VAPOR RETARDERS
A. Sheet Vapor Retarder: ASTM E 1745, Class A. Include manufacturer's recommended adhesive or pressure-sensitive tape.

2.6 CURING MATERIALS
A. Evaporation Retarder: Waterborne, monomolecular film forming, manufactured for application to fresh concrete.
B. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. (305 g/sq. m) when dry.
C. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.
D. Water: Potable.
E. Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B, dissipating.
F. Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B, nondissipating, certified by curing compound manufacturer to not interfere with bonding of floor covering.
G. Clear, Solvent-Borne, Membrane-Forming Curing and Sealing Compound: ASTM C 1315, Type 1, Class A.
1. VOC Content: Curing and sealing compounds shall have a VOC content of 200 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

H. Clear, Waterborne, Membrane-Forming Curing and Sealing Compound: ASTM C 1315, Type 1, Class A.

1. VOC Content: Curing and sealing compounds shall have a VOC content of 200 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

2.7 RELATED MATERIALS


B. Concure Systems Crack Fill Binder

1. Acceptable Products:
   a. Concure Systems 1618 E. Briarwood Terrace, Phoenix, AZ 85048
      1) Contact: Emil Pikula Cell – (480) 820-7171, Fax (480) 820-7787, E-mail: epikula@cox.net

2.8 CONCRETE MIXTURES

A. Prepare design mixtures for each type and strength of concrete, proportioned on the basis of laboratory trial mixture or field test data, or both, according to ACI 301.

B. Cementitious Materials: Use fly ash, pozzolan, ground granulated blast-furnace slag, and silica fume as needed to reduce the total amount of portland cement, which would otherwise be used, by not less than 20 percent.

C. Admixtures: Use admixtures according to manufacturer’s written instructions.

1. Use water-reducing admixture in concrete, as required, for placement and workability.

D. Proportion normal-weight concrete mixture as follows:

1. Minimum Compressive Strength:
   a. Foundations: 3,000 psi
   b. Cast-in-place walls: 3,500 psi
   c. Floor Slab: 4,000 psi
   d. Exterior slabs, walls, and curbs: 4,000 psi

2. Maximum Water-Cementitious Materials Ratio: 0.50 – footings; 0.45 – all other mixes

3. Slump Limit: 4 inches (125 mm) or 8 inches (200 mm for concrete with verified slump of 2 to 4 inches (50 to 100 mm) before adding high-range water-reducing admixture or plasticizing admixture, plus or minus 1 inch (25 mm).

4. Air Content: Do not allow air content of trowel-finished floors to exceed 3 percent.

5. Admixtures: Add acceptable admixtures as recommended in ACI 211.1 and at rates recommended by manufacturer.
   a. Add water vapor reducing admixture per manufacturers specified dosage rate to ready mix truck at the batch plant, or jobsite before discharge, mix rapidly for 7 minutes. (Follow Manufacturer’s Instructions).

2.9 FABRICATING REINFORCEMENT

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

2.10 CONCRETE MIXING

A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete according to ASTM C 94/C 94M and ASTM C 1116/C 1116M, and furnish batch ticket information.

1. When air temperature is between 85 and 90 deg F (30 and 32 deg C), reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F (32 deg C), reduce mixing and delivery time to 60 minutes.
PART 3 - EXECUTION

3.1 FORMWORK
A. Design, erect, shore, brace, and maintain formwork, according to ACI 301, to support vertical, lateral, static, and dynamic loads, and construction loads that might be applied, until structure can support such loads.
B. Construct formwork so concrete members and structures are of size, shape, alignment, elevation, and position indicated, within tolerance limits of ACI 117.
C. Chamfer exterior corners and edges of permanently exposed concrete.

3.2 EMBEDDED ITEMS
A. Place and secure anchorage devices and other embedded items required for adjoining work that is attached to or supported by cast-in-place concrete. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.

3.3 VAPOR RETARDERS
A. Sheet Vapor Retarders: Place, protect, and repair sheet vapor retarder according to ASTM E 1643 and manufacturer's written instructions.
   1. Lap joints 6 inches (150 mm) and seal with manufacturer's recommended tape.

3.4 STEEL REINFORCEMENT
A. General: Comply with CRSI's "Manual of Standard Practice" for placing reinforcement.
   1. Do not cut or puncture vapor retarder. Repair damage and reseal vapor retarder before placing concrete.

3.5 JOINTS
A. General: Construct joints true to line with faces perpendicular to surface plane of concrete.
B. Construction Joints: Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by Architect.
C. Contraction Joints in Slabs-on-Grade: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least one-fourth of concrete thickness as follows:
   1. Sawed Joints: Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch (3.2-mm-) wide joints into concrete when cutting action will not tear, abrade, or otherwise damage surface and before concrete develops random contraction cracks.
D. Isolation Joints in Slabs-on-Grade: After removing formwork, install joint-filler strips at slab junctions with vertical surfaces, such as column pedestals, foundation walls, grade beams, and other locations, as indicated.
E. Waterstops: Install in construction joints and at other joints indicated according to manufacturer's written instructions.

3.6 CONCRETE PLACEMENT
A. Before placing concrete, verify that installation of formwork, reinforcement, and embedded items is complete and that required inspections have been performed.
B. Deposit concrete continuously in one layer or in horizontal layers of such thickness that no new concrete will be placed on concrete that has hardened enough to cause seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as indicated. Deposit concrete to avoid segregation.
   1. Consolidate placed concrete with mechanical vibrating equipment according to ACI 301.
C. Cold-Weather Placement: Comply with ACI 306.1.
D. Hot-Weather Placement: Comply with ACI 301.
3.7 FINISHING FORMED SURFACES
A. Rough-Formed Finish: As-cast concrete texture imparted by form-facing material with tie holes and defects repaired and patched. Remove fins and other projections that exceed specified limits on formed-surface irregularities.
   1. Apply to concrete surfaces not exposed to public view.
B. Smooth-Formed Finish: As-cast concrete texture imparted by form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams. Repair and patch tie holes and defects. Remove fins and other projections that exceed specified limits on formed-surface irregularities.
   1. Apply to concrete surfaces exposed to public view.
C. Related Unformed Surfaces: At tops of walls, horizontal offsets, and similar unformed surfaces adjacent to formed surfaces, strike off smooth and finish with a texture matching adjacent formed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces unless otherwise indicated.

3.8 FINISHING FLOORS AND SLABS
A. General: Comply with ACI 302.1R recommendations for screeding, restraightening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.
B. Trowel Finish: After applying float finish, apply first troweling and consolidate concrete by hand or power-driven trowel. Continue troweling passes and restraighten until surface is free of trowel marks and uniform in texture and appearance. Grind smooth any surface defects that would telegraph through applied coatings or floor coverings.
   1. Apply a trowel finish to surfaces exposed to view or to be covered with resilient flooring, carpet, ceramic or quarry tile set over a cleavage membrane, paint, or another thin-film-finish coating system.
   2. Finish and measure surface so gap at any point between concrete surface and an unleveled, freestanding, 10-ft.- (3.05-m-) long straightedge resting on two high spots and placed anywhere on the surface does not exceed 1/8 inch (3.2 mm) at the gymnasium floor and 1/4" (6.4mm) at all other locations.

3.9 CONCRETE PROTECTING AND CURING
A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 306.1 for cold-weather protection and ACI 301 for hot-weather protection during curing.
B. Evaporation Retarder: Apply evaporation retarder to unformed concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. x h (1 kg/sq. m x h) before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete, but before float finishing.
C. Cure concrete according to ACI 308.1, by one or a combination of the following methods:
   1. Moisture Curing: Keep surfaces continuously moist for not less than seven days.
   2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches (300 mm), and sealed by waterproof tape or adhesive. Cure for not less than seven days. Immediately repair any holes or tears during curing period using cover material and waterproof tape.
   3. Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recruit areas subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating and repair damage during curing period.
a. Removal: After curing period has elapsed, remove curing compound without damaging concrete surfaces by method recommended by curing compound manufacturer unless manufacturer certifies curing compound will not interfere with bonding of floor covering used on Project.

4. Curing and Sealing Compound: Apply uniformly to floors and slabs indicated in a continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Repeat process 24 hours later and apply a second coat. Maintain continuity of coating and repair damage during curing period.

3.10 CONCRETE SURFACE REPAIRS
A. Defective Concrete: Repair and patch defective areas when approved by Architect. Remove and replace concrete that cannot be repaired and patched to Architect's approval.

3.11 FIELD QUALITY CONTROL
A. Testing and Inspecting: Contractor will engage a qualified testing and inspecting agency to perform field tests and inspections and prepare test reports.

END OF SECTION 03 3000
PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Products and procedures for bonded abrasive polishing concrete floors using multi-step wet/dry mechanical process, and accessories indicated, specified, or required to complete polishing.

1.02 DEFINITIONS

A. Terminology: As defined by the Concrete Polishing Association of America (CPAA).
   1. Polished Concrete: The act of changing a concrete floor surface, with or without aggregate exposure, to achieve a specified level of gloss.
   2. Bonded Abrasive Polished Concrete: The multi-step operation of mechanically grinding, honing, polishing of a concrete floor surface with bonded abrasives to cut a concrete floor surface and to refine each cut to the maximum potential to achieve a specified level of finished gloss as defined by the CPAA.

1.03 SUBMITTALS

A. Product Data: Manufacturer’s technical literature for each product indicated, specified, or required. Include manufacturer’s technical data, application instructions, and recommendations.
B. Installer Qualifications: Data for company, principal personnel, experience, and training specified in PART 1 “Quality Assurance” Article.
C. Field Quality Control - Dynamic Coefficient of Friction Test Reports: Reports of testing specified in PART 3 “Field Quality Control” Article.
D. Field Quality Control - Static Coefficient of friction test reports: report of testing specified in Part 3 “Field Quality Control” article.
E. Maintenance Data: For inclusion in maintenance manual required by Division One.
   1. Include instructions for maintenance of installed work, including methods and frequency recommended for maintaining optimum condition under anticipated use.
   2. Include precautions against cleaning products and methods which may be detrimental to finishes and performance.

1.04 QUALITY ASSURANCE

A. Polisher Qualifications:
   1. Experience: Company experienced in performing specified work similar in design, products, and extent to scope of this Project; with a record of successful in-service performance; and with sufficient production capability, facilities, and personnel to produce specified work.
   2. Supervision: Maintain competent supervisor who is at Project during times specified work is in progress, and is currently certified as Craftsman - Level I or higher by CPAA.
   3. Manufacturer Qualification: Approved by manufacturer to apply liquid applied products.
B. Walkway Auditor: Certified by CPAA or NFSI to test bonded abrasive polished concrete floors for dynamic and static coefficient of friction according to ANSI B101.1 and B101.3.
C. Coefficient of Friction: Achieve following coefficient of friction by field quality control testing in accordance to the following standards:
   1. ANSI B101.1 Static Coefficient of Friction - Achieve a minimum of .42 for level floor surfaces.
   2. ANSI B101.3 Dynamic Coefficient of Friction - Achieve a minimum of .35 for level floor surfaces.
D. Field Mock-up: Before performing work of this Section, provide following field mock-up to verify selections made under submittals and to demonstrate aesthetic effects of polishing. Approval
does not constitute approval of deviations from Contract Documents, unless Architect specifically approves deviations in writing.

1. Form, reinforce, and cast concrete slab for 10 foot square field mock-up.
2. Concrete shall be same mix design as scheduled for Project.
3. Placement and finishing work shall be performed by same personnel as will place and finish concrete for Project.
4. Mock-up shall be representative of work to be expected.
5. Perform grinding, honing, and polishing work as scheduled for Project using same personnel as will perform work for Project.
6. Approval is for following aesthetic qualities:
   a. Compliance with approved submittals.
   b. Compliance with specified aggregate exposure.
   c. Compliance with specified finished gloss level.
7. Obtain Architect’s approval before starting work on Project.
8. Protect and maintain approved field mock-ups during construction in an undisturbed condition as a standard for judging completed work.

1.05 ADMINISTRATIVE REQUIREMENTS

A. Pre-Installation of Concrete Conference: Prior to placing concrete for areas scheduled for polishing, conduct conference at Project to comply with requirements of applicable Division One.

1. Required Attendees:
   a. Owners Representative.
   b. Architect.
   c. Contractor, including supervisor.
   d. Concrete producer.
   e. Concrete finisher, including supervisor.
   f. Concrete polisher, including supervisor.
   g. Technical representative of liquid applied product manufacturers.
2. Minimum Agenda: Demonstrate understanding of work required by reviewing and discussing procedures for, but not limited to, following:
   a. Tour field mock-up and representative areas of required work, discuss and evaluate for compliance with Contract Documents, including substrate conditions, surface preparations, sequence of procedures, and other preparatory work performed by other installers.
   b. Review Contract Document requirements.
   c. Review approved submittals and field mock-up.
   d. Review procedures, including, but not limited to:
   e. Applicable Division 03 Section on cast-in-place concrete
      1) Specific mix design.
      2) Specified curing methods/procedures.
      3) Projected 3, 10, and 28 day compression strength test related to specified aggregates exposure for finished floor and project phasing.
      4) Protection of concrete substrate during construction and prior to polishing process
      5) Project phasing and scheduling for each step of grinding, honing and polishing operations including, but not limited to:
         (a) Quality of qualified personnel committed to project.
         (b) Quality and size of grinders committed to project.
         (c) Proper disposal of concrete slurry and/or concrete dust.
      6) Details of each step of grinding, honing, and polishing operations.
   f. Application of liquid applied products.
   g. Protecting polished concrete floors after polishing work is complete.
   h. Reports: Record discussions, including decisions and agreements reached, and furnish copy of record to each party attending.
3. Reports: Record discussions, including decisions and agreements reached, and furnish copy of record to each party attending.

1.06 DELIVERY, STORAGE, AND HANDLING
   A. Deliver materials in manufacturer's sealed packaging, including application instructions.

1.07 FIELD CONDITIONS
   A. Damage and Stain Prevention: Take precautions to prevent damage and staining of concrete surfaces to be polished.
      1. Prohibit use of markers, spray paint, and soapstone.
      2. Prohibit improper application of liquid membrane film forming curing compounds.
      3. Prohibit vehicle parking over concrete surfaces.
      4. Prohibit pipe-cutting operations over concrete surfaces.
      5. Prohibit storage of any items over concrete surfaces for not less than 28 days after concrete placement.
      6. Prohibit ferrous metals storage over concrete surfaces.
      7. Protect from petroleum, oil, hydraulic fluid, or other liquid dripping from equipment working over concrete surfaces.
      8. Protect from acids and acidic detergents contacting concrete surfaces.
      9. Protect from painting activities over concrete surfaces.
   B. Environmental Limitations: Comply with manufacturer's written instructions for substrate temperature, ambient temperature, moisture, ventilation, and other conditions affecting liquid applied product application.

PART 2 - PRODUCTS

2.01 LIQUID APPLIED PRODUCTS
   A. Liquid Densifier: An Aqueous solution of Silicon Dioxide dissolved in one of the following Hydroxides that penetrates into the concrete surface and reacts with the Calcium Hydroxide to provide a permanent chemical reaction that hardens and densifies the wear surface of the cementitious portion of the concrete.
      1. Sodium Silicate
      2. Potassium Silicate
      3. Lithium Silicate
      4. Alkalis solution of Colloidal Silicates or Silica

2.02 ACCESSORIES
   A. Repair Material: Designed to repair cracks and surface imperfections. Material must have sufficient bonding capabilities to adhere after the polishing to the concrete surface and provide abrasion resistance equal to or greater than the surrounding concrete substrate.
   B. Grout Material: Thin mortar used for filling spaces. Acceptable products:
      1. Epoxy, urethane, poluyrea, or polyaspartic resins.
      2. Latex or acrylic binders mixed with cement dust from previous grinding steps.
      3. Silicate binders mixed with cement dust from previous grinding steps.
   C. Protective Cover: Non-woven, puncture and tear resistant, polypropylene fibers laminated with a multi-ply, textured membrane, not less than 18 mils in thickness.

2.03 POLISHING EQUIPMENT
   A. Field Grinding and Polishing Equipment:
      1. A multiple head, counter rotating, walk behind or ride on machine, of various size and weights, with diamond tooling affixed to the head for the purpose of grinding concrete. Excludes janitorial maintenance equipment.
      2. If dry grinding, honing, or polishing, use dust extraction equipment with flow rate suitable for dust generated, with squeegee attachments.
      3. If wet grinding, honing, or polishing, use slurry extraction equipment suitable for slurry removal and containment prior to proper disposal.
B. Edge Grinding and Polishing Equipment: Hand-held or walk-behind machines which produces same results, without noticeable differences, as field grinding and polishing equipment.

C. Burnishing Equipment: High speed walk-behind or ride-on machines capable of generating 1000 to 2000 revolutions per minute and with sufficient head pressure of not less than 20 pounds to raise floor temperature by 20 degrees F.

D. Diamond Tooling: Abrasive tools that contain industrial grade diamonds within a bonded matrix (such as metallic, resinous or ceramic,) that are attached to rotating heads to refine the concrete substrate.
   1. Bonded Abrasive: Abrasive medium held within a bonding that erodes away to expose new abrasive medium as it is used.
   2. Metal Bond Tooling: Diamond tooling containing industrial grade diamonds with a metallic bonded matrix that is attached to rotating heads to refine the concrete substrate, provide levels of soft, medium, and hard metallic matrices that are matched with contrasting concrete substrates (i.e. hard matrix/soft concrete, medium matrix/medium concrete, soft matrix/hard concrete) for grinding and early honing stages of the polishing process.
   3. Resin Bond Tooling: Diamond tooling containing industrial grade diamonds within a resinous bonded matrix (poly-phenolic, ester-phenolic, thermoplastic-phenolic) attached to rotating heads to refine the concrete substrate. Use resin bond tooling for the later honing and polishing stages of the polishing process.
   4. Hybrid Tooling: Diamond tooling containing metal bond and resin bond with the characteristics of both types of tooling. Use this type for either transitional tooling from metal bond tools to resin bond tools or as a first cut tool on smooth concrete surfaces.
   5. Transitional Tooling: Diamond tooling used to refine the scratch pattern of metal bond tooling prior to the application of resin bond tooling to extend the life of resin bond tooling and to create a better foundation for the polishing process.
   6. Abrasive Pad: An abrasive pad, that has the capability of refining the concrete surface on a microscopic level that may or may not contain industrial grade diamonds.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Acceptance of Surfaces and Conditions:
   1. Examine substrates to be polished for compliance with requirements and other conditions affecting performance.
      a. Concrete Finished Floor Flatness according to applicable Division 03 Section on cast-in-place concrete.
      b. Concrete curing methods according to applicable Division 03 Section on cast-in-place concrete.
      c. Concrete Compression strength per according to applicable Division 03 Section on cast-in-place concrete.

B. Proceed only when unsatisfactory conditions have been corrected in a manner complying with Contract Documents.

C. Starting work within a particular area will be construed as acceptance of surface conditions.

3.02 PREPARATION

A. Cleaning New Concrete Surfaces:
   1. Prepare and clean concrete surfaces.
   2. Provide sound concrete surfaces free of laitance, glaze, efflorescence, curing compounds, form-release agents, dust, dirt, grease, oil, paint splatter, and other contaminants incompatible with liquid applied products and polishing.

3.03 POLISHING CONCRETE FLOORS

A. Perform all polishing procedures to ensure a consistent appearance from wall to wall.

B. Initial Grinding:
   1. Use grinding equipment with metal or semi-metal bonded tooling.
2. Begin grinding in one direction using sufficient size equipment and diamond tooling to meet specified aggregate exposure class.

3. Make sequential passes with each pass perpendicular to previous pass using finer grit tool with each pass, up to 100 grit metal bonded tooling.

4. Achieve maximum refinement with each pass before proceeding to finer grit tools.

5. Clean floor thoroughly after each pass using dust extraction equipment properly fitted with squeegee attachment or walk behind auto scrubber suitable to remove all visible loose debris and dust.

6. Continue grinding until aggregate exposure matches approved field mock-ups.

C. Treating Surface Imperfections:
   1. Mix patching compound or grout material with dust created by grinding operations, manufacturer’s tint, or sand to match color of adjacent concrete surfaces.
   2. Fill surface imperfections including, but not limited to, holes, surface damage, small and micro cracks, air holes, pop-outs, and voids with grout to eliminate micro pitting in finished work.
   3. Work compound and treatment until color differences between concrete surface and filled surface imperfections are not reasonably noticeable when viewed from 10 feet away under lighting conditions that will be present after construction.

D. Liquid Densifier Application: Apply undiluted to point of rejection, remove excess liquid, and allow curing according to manufacturers instructions.

E. Grout Grinding:
   1. Use grinding equipment and appropriate grit and bond diamond tooling.
   2. Apply grout, forced into the pore structure of the concrete substrate, to fill surface imperfections.
   3. Clean floor thoroughly after each pass using dust extraction equipment properly fitted with squeegee attachment or walk behind auto scrubber suitable to remove all visible loose debris and dust.

F. Honing:
   1. Use grinding equipment with hybrid or resin bonded tooling.
   2. Hone concrete in one direction starting with a 100 grit tooling and make as many sequential passes as required to remove scratches, each pass perpendicular to previous pass, up to 400 grit tooling reaching maximum refinement with each pass before proceeding to finer grit tooling.
   3. Clean floor thoroughly after each pass using dust extraction equipment properly fitted with squeegee attachment or walk behind auto scrubber suitable to remove all visible loose debris and dust.

G. Polishing:
   1. Use polishing equipment with resin-bonded tooling.
   2. Begin polishing in one direction starting with 800 grit tooling.
   3. Make sequential passes with each pass perpendicular to previous pass using finer grit tooling with each pass until the specified level of gloss has been achieved.
   4. Achieve maximum refinement with each pass before proceeding to finer grit pads.
   5. Clean floor thoroughly after each pass using dust extraction equipment properly fitted with squeegee attachment or walk behind auto scrubber suitable to remove all visible loose debris and dust.
   6. Stain Protection: Uniformly apply and remove excessive liquid according to manufacturer’s instructions. Final film thickness should be less than .05 mils after cure.
   7. Final Polish: Using burnishing equipment and finest grit abrasive pads, burnish to uniform reflective sheen matching approved field mock-up.

H. Final Polished Concrete Floor Finish:
   1. Aggregate Exposure Class C - Medium Aggregate Finish: Remove not more than 1/8 inch of concrete surface by grinding and polishing resulting in majority of exposure displaying medium aggregate with no, or small amount of, large aggregate at random locations.
I. Finished Gloss Level 2 - Medium Gloss Appearance:
   1. Procedure: Not less than 4 step process with full refinement of each diamond tool with one application of densifier.
   2. Gloss Measurement: Determine the specular gloss by incorporating the following:
      a. Reflective Clarity Reading: Not less than 55 according to ASTM D5767 prior to the application of sealers.
      b. Reflective Sheen Reading: Not less than 25 according to ASTM D523 prior to the application of sealers.

3.04 CLOSEOUT ACTIVITIES
   A. Maintenance Training: Train Owner’s designated personnel in proper procedures for maintaining polished concrete floor.

3.05 PROTECTION
   A. Covering: After completion of polishing, protect polished floors from subsequent construction activities with protective covering.

END OF SECTION
SECTION 04 2200  
CONCRETE UNIT MASONRY

PART 1 - GENERAL

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

B. RELATED DOCUMENTS
   1. A. Drawings and general provisions of the Contract including General and Supplementary Conditions and Division 1 Specification Sections apply to this Section.

1.2 PRECONSTRUCTION TESTING
A. Preconstruction Testing Service: Owner will engage a qualified independent testing agency to perform preconstruction testing indicated below. Retesting of materials that fail to comply with specified requirements shall be done at Contractor's expense.
   1. Concrete Masonry Unit Test: For each type of unit required, according to ASTM C 140 for compressive strength.
   3. Mortar Test (Property Specification): For each mix required, according to ASTM C 780 for compressive strength.
   4. Grout Test (Compressive Strength): For each mix required, according to ASTM C 1019.

1.3 ACTION SUBMITTALS
A. Product Data: For each type of product indicated.
B. Shop Drawings: For reinforcing steel. Detail bending and placement of unit masonry reinforcing bars. Comply with ACI 315, “Details and Detailing of Concrete Reinforcement.” Show elevations of reinforced walls with embedded items and proposed expansion joint locations. Provide bracing/shoring diagrams signed and sealed by a professional engineer as required to meet OSHA requirements

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

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

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

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B. Hot-Weather Requirements: Comply with hot-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602.

PART 2 - PRODUCTS

2.1 MASONRY UNITS, GENERAL
A. Defective Units: Referenced masonry unit standards may allow a certain percentage of units to contain chips, cracks, or other defects exceeding limits stated in the standard. Do not use units where such defects will be exposed in the completed Work.
B. Fire-Resistance Ratings: Where indicated, provide units that comply with requirements for fire-resistance ratings indicated as determined by testing according to ASTM E 119, by equivalent masonry thickness, or by other means, as acceptable to authorities having jurisdiction.

2.2 CONCRETE MASONRY UNITS
A. Shapes: Provide shapes indicated and for lintels, corners, jambs, sashes, movement joints, headers, bonding, and other special conditions.
   1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
      a. ACM Chemistries, Inc.; RainBloc.
      b. BASF Aktiengesellschaft; Rheopel Plus.
B. CMUs: ASTM C 90.
   1. Unit Compressive Strength: Provide units with minimum average net-area compressive strength as shown on the drawings.
   2. Density Classification: Normal weight unless otherwise indicated.

2.3 MASONRY LINTELS
A. General: Provide one of the following:
B. Masonry Lintels: Prefabricated or built-in-place masonry lintels made from bond beam CMUs with reinforcing bars placed as indicated and filled with coarse grout or steel W-shape beams as indicated on the drawings.

2.4 MORTAR AND GROUT MATERIALS
A. Portland Cement: ASTM C 150, Type I or II, except Type III may be used for cold-weather construction. Provide natural color or white cement as required to produce mortar color indicated.
B. Hydrated Lime: ASTM C 207, Type S.
C. Portland Cement-Lime Mix: Packaged blend of portland cement and hydrated lime containing no other ingredients.
D. Masonry Cement: ASTM C 91.
   1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
      b. Cemex S.A.B. de C.V.; Citadel Type S or Dixie Type S or Victor Plastic Cement.
      c. Essroc, Italcementi Group; Brixment or Velvet.
      d. Holcim (US) Inc.; Mortamix Masonry Cement Rainbow, Mortamix Custom Buff Masonry Cement, or White Mortamix Masonry Cement.
      e. Lafarge North America Inc.; Magnolia Masonry Cement or Lafarge Masonry Cement or Trinity White Masonry Cement.
      f. Lehigh Cement Company; Lehigh Masonry Cement or Lehigh White Masonry Cement.

E. Mortar Cement: ASTM C 1329.
   1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
      a. Lafarge North America Inc.; Lafarge Mortar Cement or Magnolia Superbond Mortar Cement.

F. Aggregate for Mortar: ASTM C 144.
   1. For joints less than 1/4 inch (6 mm) thick, use aggregate graded with 100 percent passing the No. 16 (1.18-mm) sieve.
   2. White-Mortar Aggregates: Natural white sand or crushed white stone.
   3. Colored-Mortar Aggregates: Natural sand or crushed stone of color necessary to produce required mortar color.


H. Cold-Weather Admixture: Nonchloride, noncorrosive, accelerating admixture complying with ASTM C 494/C 494M, Type C, and recommended by manufacturer for use in masonry mortar of composition indicated.
   1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
      a. Euclid Chemical Company (The); Accelguard 80.
      c. Sonneborn Products, BASF Aktiengesellschaft; Trimix-NCA.

I. Water-Repellent Admixture: Liquid water-repellent mortar admixture intended for use with CMUs, containing integral water repellent by same manufacturer.
   1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
      a. ACM Chemistries, Inc.; RainBloc for Mortar.
      b. BASF Aktiengesellschaft; Rheopel Mortar Admixture.

J. Water: Potable.

2.5 REINFORCEMENT

A. Uncoated Steel Reinforcing Bars: ASTM A 615/A 615M or ASTM A 996/A 996M, Grade 60 (Grade 420).

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

2.6 TIES AND ANCHORS

A. Materials: Provide ties and anchors specified in this article that are made from materials that comply with the following unless otherwise indicated.
3. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.

**B. Adjustable Anchors for Connecting to Structural Steel Framing:** Provide anchors that allow vertical or horizontal adjustment but resist tension and compression forces perpendicular to plane of wall.

1. Anchor Section for Welding to Steel Frame: Crimped 1/4-inch (6.35-mm-) diameter, hot-dip galvanized steel wire.
2. Tie Section: Triangular-shaped wire tie, sized to extend within 1 inch (25 mm) of masonry face, made from 0.25-inch (6.35-mm-) diameter, hot-dip galvanized steel wire.

**C. Adjustable Anchors for Connecting to Concrete:** Provide anchors that allow vertical or horizontal adjustment but resist tension and compression forces perpendicular to plane of wall.

1. Connector Section: Dovetail tabs for inserting into dovetail slots in concrete and attached to tie section; formed from 0.105-inch (2.66-mm-) thick, steel sheet, galvanized after fabrication.
2. Tie Section: Triangular-shaped wire tie, sized to extend within 1 inch (25 mm) of masonry face, made from 0.25-inch (6.35-mm-) diameter, hot-dip galvanized steel wire.
3. Corrugated Metal Ties: Metal strips not less than 7/8 inch (22 mm) wide with corrugations having a wavelength of 0.3 to 0.5 inch (7.6 to 12.7 mm) and an amplitude of 0.06 to 0.10 inch (1.5 to 2.5 mm) made from 0.105-inch (2.66-mm-) thick, steel sheet, galvanized after fabrication with dovetail tabs for inserting into dovetail slots in concrete and sized to extend to within 1 inch (25 mm) of masonry face.

**D. Partition Top anchors:** 0.105-inch (2.66-mm-) thick metal plate with 3/8-inch (9.5-mm-) diameter metal rod 6 inches (152 mm) long welded to plate and with closed-end plastic tube fitted over rod that allows rod to move in and out of tube. Fabricate from steel, hot-dip galvanized after fabrication.

**E. Rigid Anchors:** Fabricate from steel bars 1-1/2 inches (38 mm) wide by 1/4 inch (6.35 mm) thick by 24 inches (610 mm) long, with ends turned up 2 inches (51 mm) or with cross pins unless otherwise indicated.

1. Corrosion Protection: Hot-dip galvanized to comply with ASTM A 153/A 153M.

**F. Anchor Bolts:** Headed steel bolts complying with ASTM A 307, Grade A (ASTM F 568M, Property Class 4.6); with ASTM A 563 (ASTM A 563M) hex nuts and, where indicated, flat washers; hot-dip galvanized to comply with ASTM A 153/A 153M, Class C; of dimensions indicated.

### 2.7 EMBEDDED FLASHING MATERIALS

**A. Metal Flashing:** Provide metal flashing complying with Division 07 Section “Sheet Metal Flashing and Trim” and as follows:

1. Metal Drip Edge: Fabricate from stainless steel. Extend at least 3 inches (76 mm) into wall and 1/2 inch (13 mm) out from wall, with outer edge bent down 30 degrees and hemmed.
2. Metal Sealant Stop: Fabricate from stainless steel. Extend at least 3 inches (76 mm) into wall and out to exterior face of wall. At exterior face of wall, bend metal back on itself for 3/4 inch (19 mm) and down into joint 1/4 inch (6 mm) to form a stop for retaining sealant backer rod.

**B. Flexible Flashing:** Use one of the following unless otherwise indicated:

1. Copper-Laminated Flashing[7-oz./sq. ft. (2-kg/sq. m) copper sheet bonded between 2 layers of glass-fiber cloth. Use only where flashing is fully concealed in masonry.]
a. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

1) Advanced Building Products Inc.
2) Dayton Superior Corporation, Dur-O-Wal Division; Copper Fabric Thru-Wall Flashing.
3) Hohmann & Barnard, Inc.; H & B C-Fab Flashing.
4) Phoenix Building Products; Type FCC-Fabric Covered Copper.
5) Sandell Manufacturing Co., Inc.; Copper Fabric Flashing.
6) York Manufacturing, Inc.; Multi-Flash 500.

2. Rubberized-Asphalt Flashing: Composite flashing product consisting of a pliable, adhesive rubberized-asphalt compound, bonded to a high-density, cross-laminated polyethylene film to produce an overall thickness of not less than 0.040 inch (1.02 mm).

a. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

1) Advanced Building Products Inc.; Peel-N-Seal.
2) Carlisle Coatings & Waterproofing; CCW-705-TWF Thru-Wall Flashing.
3) Dayton Superior Corporation, Dur-O-Wal Division; Dur-O-Barrier Thru-Wall Flashing.
4) Fiberweb, Clark Hammerbeam Corp.; Aquaflash 500.
6) Heckmann Building Products Inc.; No. 82 Rubberized-Asphalt Thru-Wall Flashing.
7) Hohmann & Barnard, Inc.; Textroflash.
8) W. R. Meadows, Inc.; Air-Shield Thru-Wall Flashing.
9) Polyguard Products, Inc.; [Polyguard 300] [Polyguard 400].
10) Sandell Manufacturing Co., Inc.; Sando-Seal.


a. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

1) DuPont; Thru-Wall Flashing.
2) Hohmann & Barnard, Inc.; Flex-Flash.
3) Hyload, Inc.; Hyload Cloaked Flashing System.
4) <Insert manufacturer's name; product name or designation>.

4. EPDM Flashing: Sheet flashing product made from ethylene-propylene-diene terpolymer, complying with ASTM D 4637, 0.040 inch (1.0 mm) thick.

a. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

1) Carlisle Coatings & Waterproofing; Pre-Kleened EPDM Thru-Wall Flashing.
2) Firestone Specialty Products; FlashGuard.
3) Heckmann Building Products Inc.; No. 81 EPDM Thru-Wall Flashing.
4) Hohmann & Barnard, Inc.; Epra-Max EPDM Thru-Wall Flashing.
5) Sandell Manufacturing Co., Inc.; EPDM Flashing.

C. Single-Wythe CMU Flashing System: System of CMU cell flashing pans and interlocking CMU web covers made from high-density polyethylene incorporating chemical stabilizers that prevent UV degradation. Cell flashing pans have integral weep spouts that are designed to be built into mortar bed joints and weep collected moisture to the exterior of CMU walls and that extend into the cell to prevent clogging with mortar.

D. Solder and Sealants for Sheet Metal Flashings: As specified in Division 07 Section "Sheet Metal Flashing and Trim."

E. Adhesives, Primers, and Seam Tapes for Flashings: Flashing manufacturer's standard products or products recommended by flashing manufacturer for bonding flashing sheets to each other and to substrates.

2.8 MISCELLANEOUS MASONRY ACCESSORIES

A. Compressible Filler: Premolded filler strips complying with ASTM D 1056, Grade 2A1; compressible up to 35 percent; formulated from neoprene, urethane, or PVC.

B. Preformed Control-Joint Gaskets: Made from styrene-butadiene-rubber compound, complying with ASTM D 2000, Designation M2A-805 or PVC, complying with ASTM D 2287, Type PVC-65406 and designed to fit standard sash block and to maintain lateral stability in masonry wall; size and configuration as indicated.

C. Bond-Breaker Strips: Asphalt-saturated, organic roofing felt complying with ASTM D 226, Type I (No. 15 asphalt felt).

2.9 MORTAR AND GROUT MIXES

A. General: Do not use admixtures, including pigments, air-entraining agents, accelerators, retarders, water-repellent agents, antifreeze compounds, or other admixtures unless otherwise indicated.
   1. Do not use calcium chloride in mortar or grout.
   2. Use mortar cement mortar unless otherwise indicated.
   3. For exterior masonry, use mortar cement mortar.
   4. For reinforced masonry, use mortar cement mortar.
   5. Add cold-weather admixture (if used) at same rate for all mortar that will be exposed to view, regardless of weather conditions, to ensure that mortar color is consistent.

B. Preblended, Dry Mortar Mix: Furnish dry mortar ingredients in form of a preblended mix. Measure quantities by weight to ensure accurate proportions, and thoroughly blend ingredients before delivering to Project site.

C. Mortar for Unit Masonry: Comply with ASTM C 270, Proportion Specification. Provide the following types of mortar for applications stated unless another type is indicated.
   1. For masonry below grade or in contact with earth, use Type S.
   2. For reinforced masonry, use Type S.
   3. For mortar parging coats, use Type S.
   4. For exterior, above-grade, load-bearing and non-load-bearing walls and parapet walls; for interior load-bearing walls; for interior non-load-bearing partitions; and for other applications where another type is not indicated, use Type N.
   5. For interior non-load-bearing partitions, Type O may be used instead of Type N.

D. Grout for Unit Masonry: Comply with ASTM C 476.
   1. Use grout of type indicated or, if not otherwise indicated, of type (fine or coarse) that will comply with Table 1.15.1 in ACI 530.1/ASCE 6/TMS 602 for dimensions of grout spaces and pour height.
2. Proportion grout in accordance with ASTM C 476, paragraph 4.2.2 for specified 28-day compressive strength indicated on drawings.

3. Provide grout with a slump of 8 to 11 inches (203 to 279 mm) as measured according to ASTM C 143/C 143M.

PART 3 - EXECUTION

3.1 TOLERANCES

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

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

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

3.2 LAYING MASONRY WALLS

A. Lay out walls in advance for accurate spacing of surface bond patterns with uniform joint thicknesses and for accurate location of openings, movement-type joints, returns, and offsets. Avoid using less-than-half-size units, particularly at corners, jambs, and, where possible, at other locations.

B. Use full-size units without cutting if possible. If cutting is required to provide a continuous pattern or to fit adjoining construction, cut units with motor-driven saws; provide clean, sharp, unchipped edges. Allow units to dry before laying unless wetting of units is specified. Install cut units with cut surfaces and, where possible, cut edges concealed.

C. Bond Pattern for Exposed Masonry: Unless otherwise indicated, lay exposed masonry in running bond; do not use units with less than nominal 4-inch (100-mm) horizontal face dimensions at corners or jambs.

D. Built-in Work: As construction progresses, build in items specified in this and other Sections. Fill in solidly with masonry around built-in items.
E. Fill space between steel frames and masonry solidly with mortar unless otherwise indicated.
F. Where built-in items are to be embedded in cores of hollow masonry units, place a layer of metal lath, wire mesh, or plastic mesh in the joint below and rod mortar or grout into core.
G. Fill cores in hollow CMUs with grout 24 inches (600 mm) under bearing plates, beams, lintels, posts, and similar items unless otherwise indicated.

3.3 MORTAR BEDDING AND JOINTING

A. Lay hollow CMUs as follows:
1. With face shells fully bedded in mortar and with head joints of depth equal to bed joints.
2. With webs fully bedded in mortar in all courses of piers, columns, and pilasters.
3. With webs fully bedded in mortar in grouted masonry, including starting course on footings.
4. With entire units, including areas under cells, fully bedded in mortar at starting course on footings where cells are not grouted.

B. Lay solid masonry units with completely filled bed and head joints; butter ends with sufficient mortar to fill head joints and shove into place. Do not deeply furrow bed joints or slush head joints.

C. Tool exposed joints slightly concave when thumbprint hard, using a jointer larger than joint thickness unless otherwise indicated.

D. Cut joints flush for masonry walls to receive plaster or other direct-applied finishes (other than paint) unless otherwise indicated.

3.4 MASONRY JOINT REINFORCEMENT

A. General: Install entire length of longitudinal side rods in mortar with a minimum cover of 5/8 inch (16 mm) on exterior side of walls, 1/2 inch (13 mm) elsewhere. Lap reinforcement a minimum of 6 inches (150 mm).
1. Space reinforcement not more than 16 inches (406 mm) o.c.
2. Space reinforcement not more than 8 inches (203 mm) o.c. in foundation walls and parapet walls.
3. Provide reinforcement not more than 8 inches (203 mm) above and below wall openings and extending 12 inches (305 mm) beyond openings in addition to continuous reinforcement.

B. Interrupt joint reinforcement at control and expansion joints unless otherwise indicated.

C. Provide continuity at wall intersections by using prefabricated T-shaped units.

D. Provide continuity at corners by using prefabricated L-shaped units.

3.5 ANCHORING MASONRY TO STRUCTURAL STEEL AND CONCRETE

A. Anchor masonry to structural steel and concrete where masonry abuts or faces structural steel or concrete to comply with the following:
1. Provide an open space not less than 1 inch (25 mm) wide between masonry and structural steel or concrete unless otherwise indicated. Keep open space free of mortar and other rigid materials.
2. Anchor masonry with anchors embedded in masonry joints and attached to structure.
3. Space anchors as indicated, but not more than 24 inches (610 mm) o.c. vertically and 36 inches (915 mm) o.c. horizontally.

3.6 FLASHING

A. General: Install embedded flashing in masonry at lintels, ledges, other obstructions to downward flow of water in wall, and where indicated.

B. Install flashing as follows unless otherwise indicated:
1. Prepare masonry surfaces so they are smooth and free from projections that could puncture flashing. Where flashing is within mortar joint, place through-wall flashing on sloping bed of mortar and cover with mortar. Before covering with mortar, seal penetrations in flashing with adhesive, sealant, or tape as recommended by flashing manufacturer.

2. At lintels, extend flashing a minimum of 6 inches (150 mm) into masonry at each end. At heads and sills, extend flashing 6 inches (150 mm) at ends and turn up not less than 2 inches (50 mm) to form end dams.

3. Install metal drip edges beneath flexible flashing at exterior face of wall. Stop flexible flashing 1/2 inch (13 mm) back from outside face of wall and adhere flexible flashing to top of metal drip edge.

4. Install metal flashing termination beneath flexible flashing at exterior face of wall. Stop flexible flashing 1/2 inch (13 mm) back from outside face of wall and adhere flexible flashing to top of metal flashing termination.

C. Install single-wythe CMU flashing system in bed joints of CMU walls where indicated to comply with manufacturer’s written instructions. Install CMU cell pans with upturned edges located below face shells and webs of CMUs above and with weep spouts aligned with face of wall. Install CMU web covers so that they cover upturned edges of CMU cell pans at CMU webs and extend from face shell to face shell.

3.7 REINFORCED UNIT MASONRY INSTALLATION

A. Temporary Formwork and Shores: Construct formwork and shores as needed to support reinforced masonry elements during construction.

1. Construct formwork to provide shape, line, and dimensions of completed masonry as indicated. Make forms sufficiently tight to prevent leakage of mortar and grout. Brace, tie, and support forms to maintain position and shape during construction and curing of reinforced masonry.

2. Do not remove forms and shores until reinforced masonry members have hardened sufficiently to carry their own weight and other loads that may be placed on them during construction.

B. Placing Reinforcement: Comply with requirements in ACI 530.1/ASCE 6/TMS 602.

C. Grouting: Do not place grout until entire height of masonry to be grouted has attained enough strength to resist grout pressure.

1. Comply with requirements in ACI 530.1/ASCE 6/TMS 602 for cleanouts and for grout placement, including minimum grout space and maximum pour height.

2. Limit height of vertical grout pours to not more than 60 inches (1520 mm) [12.67 ft. (3.86 m)].

3.8 FIELD QUALITY CONTROL

A. Testing and Inspecting: Contractor will engage special inspectors to perform tests and inspections and prepare reports. Allow inspectors access to scaffolding and work areas, as needed to perform tests and inspections. Retesting of materials that fail to meet specified requirements shall be done at Contractor's expense.

B. Inspections: Level 1 special inspections according to the "International Building Code."

1. Begin masonry construction only after inspectors have verified proportions of site-prepared mortar.

2. Place grout only after inspectors have verified compliance of grout spaces and of grades, sizes, and locations of reinforcement.

3. Place grout only after inspectors have verified proportions of site-prepared grout.

C. Testing Prior to Construction: One set of tests.
D. Testing Frequency: One set of tests for each 5000 sq. ft. (464 sq. m) of wall area or portion thereof.

E. Concrete Masonry Unit Test: For each type of unit provided, according to ASTM C 140 for compressive strength.

F. Mortar Aggregate Ratio Test (Proportion Specification): For each mix provided, according to ASTM C 780.

G. Mortar Test (Property Specification): For each mix provided, according to ASTM C 780. Test mortar for compressive strength.

H. Grout Test (Compressive Strength): For each mix provided, according to ASTM C 1019.

3.9 REPAIRING, POINTING, AND CLEANING

A. In-Progress Cleaning: Clean unit masonry as work progresses by dry brushing to remove mortar fins and smears before tooling joints.

B. Final Cleaning: After mortar is thoroughly set and cured, clean exposed masonry as follows:
   1. Test cleaning methods on sample wall panel; leave one-half of panel uncleaned for comparison purposes.
   2. Clean concrete masonry by cleaning method indicated in NCMA TEK 8-2A applicable to type of stain on exposed surfaces.

3.10 MASONRY WASTE DISPOSAL

A. Waste Disposal as Fill Material: Dispose of clean masonry waste, including excess or soil-contaminated sand, waste mortar, and broken masonry units, by crushing and mixing with fill material as fill is placed.
   1. Do not dispose of masonry waste as fill within 18 inches (450 mm) of finished grade.

B. Excess Masonry Waste: Remove excess clean masonry waste that cannot be used as fill, as described above, and other masonry waste, and legally dispose of off Owner’s property.

END OF SECTION 04 2200
SECTION 05 1200
STRUCTURAL STEEL FRAMING

PART 1 - GENERAL

1.1 SUMMARY
A. Section includes structural steel and grout.
B. Related Sections:
   1. Division 05 Section "Architecturally Exposed Structural Steel Framing" for additional requirements for architecturally exposed structural steel.
   2. Drawings and general provisions of the Contract including General and Supplementary Conditions and Division 1 Specification Sections apply to this Section.

1.2 DEFINITIONS
A. Structural Steel: Elements of structural-steel frame, as classified by AISC 303, "Code of Standard Practice for Steel Buildings and Bridges."
B. Moment Connections: Type FR, fully restrained.

1.3 ACTION SUBMITTALS
A. Product Data: For each type of product indicated.
B. Shop Drawings: Show fabrication of structural-steel components.

1.4 INFORMATIONAL SUBMITTALS
A. Qualification Data: For qualified Installer, fabricator, and testing agency.
B. Welding certificates.
C. Mill test reports for structural steel, including chemical and physical properties.
D. Source quality-control reports.

1.5 QUALITY ASSURANCE
A. Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."
B. Comply with applicable provisions of the following specifications and documents:
   1. AISC 303.
   2. AISC 360.
   3. RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."

PART 2 - PRODUCTS

2.1 STRUCTURAL-STEEL MATERIALS
A. W-Shapes: ASTM A 572/A 572M, Grade 50 (345).
B. Channels, Angles, M, S-Shapes: ASTM A 36/A 36M.
C. Plate and Bar: ASTM A 36/A 36M.
D. Cold-Formed Hollow Structural Sections: ASTM A 500, Grade B, structural tubing.
E. Steel Pipe: ASTM A 53/A 53M, Type E or S, Grade B.
F. Welding Electrodes: Comply with AWS requirements.

2.2 BOLTS, CONNECTORS, AND ANCHORS
A. High-Strength Bolts, Nuts, and Washers: ASTM A 325 (ASTM A 325M), Type 1, heavy-hex steel structural bolts; ASTM A 563, Grade C, (ASTM A 563M, Class 8S) heavy-hex carbon-steel nuts; and ASTM F 436 (ASTM F 436M), Type 1, hardened carbon-steel washers; all with plain finish.
1. Direct-Tension Indicators: ASTM F 959, Type 325 (ASTM F 959M, Type 8.8), compressible-washer type with plain finish.

B. Tension-Control, High-Strength Bolt-Nut-Washer Assemblies: ASTM F 1852, Type 1, heavy-hex head assemblies consisting of steel structural bolts with splined ends, heavy-hex carbon-steel nuts, and hardened carbon-steel washers.
   1. Finish: Plain.

C. Shear Connectors: ASTM A 108, Grades 1015 through 1020, headed-stud type, cold-finished carbon steel; AWS D1.1/D1.1M, Type B.

D. Unheaded Anchor Rods: ASTM F 1554, Grade 36.
   2. Finish: Plain.

E. Headed Anchor Rods: ASTM F 1554, Grade 36, straight.
   1. Finish: Plain.

F. Threaded Rods: ASTM A 36/A 36M.
   1. Finish: Plain.

2.3 PRIMER
A. Primer: Fabricator's standard lead- and chromate-free, nonasphaltic, rust-inhibiting primer complying with MPI#79 and compatible with topcoat.

2.4 GROUT
A. Metallic, Shrinkage-Resistant Grout: ASTM C 1107, factory-packaged, metallic aggregate grout, mixed with water to consistency suitable for application and a 30-minute working time.

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

B. Shear Connectors: Prepare steel surfaces as recommended by manufacturer of shear connectors. Use automatic end welding of headed-stud shear connectors according to AWS D1.1/D1.1M and manufacturer's written instructions.

2.6 SHOP CONNECTIONS
A. High-Strength Bolts: Shop install high-strength bolts according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts" for type of bolt and type of joint specified.
   1. Joint Type: Snug tightened.

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

2.7 SHOP PRIMING
A. Shop prime steel surfaces except the following:
   1. Surfaces embedded in concrete or mortar. Extend priming of partially embedded members to a depth of 2 inches (50 mm).
   2. Surfaces to be field welded.
   3. Surfaces to be high-strength bolted with slip-critical connections.
   4. Surfaces to receive sprayed fire-resistant materials (applied fireproofing).
   5. Galvanized surfaces.

B. Surface Preparation: Clean surfaces to be painted. Remove loose rust and mill scale and spatter, slag, or flux deposits. Prepare surfaces according to the following specifications and standards:
   1. SSPC-SP 2, "Hand Tool Cleaning."
2. SSPC-SP 3, "Power Tool Cleaning."

C. Priming: Immediately after surface preparation, apply primer according to manufacturer's written instructions and at rate recommended by SSPC to provide a minimum dry film thickness of 1.5 mils (0.038 mm). Use priming methods that result in full coverage of joints, corners, edges, and exposed surfaces.

2.8 SOURCE QUALITY CONTROL

A. Testing Agency: Contractor shall engage an independent testing and inspecting agency to perform shop tests and inspections and prepare test reports.

1. Provide testing agency with access to places where structural-steel work is being fabricated or produced to perform tests and inspections.

B. Correct deficiencies in Work that test reports and inspections indicate does not comply with the Contract Documents.

C. Bolted Connections: Shop-bolted connections will be tested and inspected according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."

D. Welded Connections: In addition to visual inspection, shop-welded connections will be tested and inspected according to AWS D1.1/D1.1M and the following inspection procedures, at testing agency's option:

1. Liquid Penetrant Inspection: ASTM E 165.
2. Magnetic Particle Inspection: ASTM E 709; performed on root pass and on finished weld. Cracks or zones of incomplete fusion or penetration will not be accepted.
4. Radiographic Inspection: ASTM E 94.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify, with steel Erector present, elevations of concrete- and masonry-bearing surfaces and locations of anchor rods, bearing plates, and other embedments for compliance with requirements.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 ERECTION

A. Set structural steel accurately in locations and to elevations indicated and according to AISC 303 and AISC 360.


1. Set plates for structural members on wedges, shims, or setting nuts as required.
2. Weld plate washers to top of baseplate.
3. Snug-tighten Pretension anchor rods after supported members have been positioned and plumbed. Do not remove wedges or shims but, if protruding, cut off flush with edge of plate before packing with grout.
4. Promptly pack grout solidly between bearing surfaces and plates so no voids remain. Neatly finish exposed surfaces; protect grout and allow to cure. Comply with manufacturer's written installation instructions for shrinkage-resistant grouts.

C. Maintain erection tolerances of structural steel within AISC's "Code of Standard Practice for Steel Buildings and Bridges."

3.3 FIELD CONNECTIONS

A. High-Strength Bolts: Install high-strength bolts according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts" for type of bolt and type of joint specified.
1. Joint Type: Snug tightened.

B. Weld Connections: Comply with AWS D1.1/D1.1M and AWS D1.8/D1.8M for tolerances, appearances, welding procedure specifications, weld quality, and methods used in correcting welding work.

1. Comply with AISC 303 and AISC 360 for bearing, alignment, adequacy of temporary connections, and removal of paint on surfaces adjacent to field welds.

3.4 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified independent testing and inspecting agency to inspect field welds and high-strength bolted connections.

B. Bolted Connections: Bolted connections will be tested and inspected according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."

C. Welded Connections: Field welds will be visually inspected according to AWS D1.1/D1.1M.

D. Correct deficiencies in Work that test reports and inspections indicate does not comply with the Contract Documents.

END OF SECTION 05 1200
PART 1 - GENERAL

1.1 SUMMARY
A. This Section includes the following:
   1. Exterior load-bearing wall framing.
   2. Interior load-bearing wall framing.

1.2 RELATED DOCUMENTS
A. Drawings and general provisions of the Contract including General and Supplementary Conditions and Division 1 Specification Sections apply to this Section.

1.3 ACTION SUBMITTALS
A. Product Data: For each type of product and accessory indicated.

1.4 INFORMATIONAL SUBMITTALS
A. Qualification data.
B. Welding certificates.
C. Product test reports.
D. Research/evaluation reports.

1.5 QUALITY ASSURANCE
A. Product Tests: Mill certificates or data from a qualified independent testing agency indicating steel sheet complies with requirements.
C. Fire-Test-Response Characteristics: Where indicated, provide cold-formed metal framing identical to that of assemblies tested for fire resistance per ASTM E 119 by a testing and inspecting agency acceptable to authorities having jurisdiction.
D. AISI Specifications and Standards: Comply with AISI's "North American Specification for the Design of Cold-Formed Steel Structural Members" and its "Standard for Cold-Formed Steel Framing - General Provisions."
   1. Comply with AISI's "Standard for Cold-Formed Steel Framing - Truss Design."
   2. Comply with AISI's "Standard for Cold-Formed Steel Framing - Header Design."
E. Comply with AISI's "Standard for Cold-Formed Steel Framing - Prescriptive Method for One and Two Family Dwellings."

PART 2 - PRODUCTS

2.1 LOAD-BEARING WALL FRAMING
A. Steel Studs: Manufacturer's standard C-shaped steel studs, of web depths indicated, punched, with stiffened flanges, and as follows:
   1. Minimum Base-Metal Thickness: As indicated on drawings.
B. Steel Track: Manufacturer's standard U-shaped steel track, of web depths indicated, unpunched, with straight flanges, and same minimum base-metal thickness as steel studs.
C. Steel Box or Back-to-Back Headers: Manufacturer's standard C-shapes used to form header beams, of web depths indicated, punched, with stiffened flanges, and as follows:
   1. Minimum Base-Metal Thickness: 0.0428 inch (1.09 mm).
   2. Flange Width: 1-5/8 inches (41 mm).
2.2 EXTERIOR NON-LOAD-BEARING WALL FRAMING

A. Steel Studs: Manufacturer's standard C-shaped steel studs, of web depths indicated, punched, with stiffened flanges, and as follows:
   1. Minimum Base-Metal Thickness: 0.0428 inch (1.09 mm).
   2. Flange Width: 1-5/8 inches (41 mm).
B. Steel Track: Manufacturer's standard U-shaped steel track, of web depths indicated, unpunched, with unstiffened flanges, and same minimum base-metal thickness as steel studs.
C. Vertical Deflection Clips: Manufacturer's standard bypass clips, capable of accommodating upward and downward vertical displacement of primary structure through positive mechanical attachment to stud web.
D. Single Deflection Track: Manufacturer's single, deep-leg, U-shaped steel track; unpunched, with unstiffened flanges, of web depth to contain studs while allowing free vertical movement, with flanges designed to support horizontal and lateral loads.
E. Double Deflection Tracks: Manufacturer's double, deep-leg, U-shaped steel tracks, consisting of nested inner and outer tracks; unpunched, with unstiffened flanges.

2.3 FRAMING ACCESSORIES

A. Fabricate steel-framing accessories from steel sheet, ASTM A 1003/A 1003M, Structural Grade, Type H, metallic coated, of same grade and coating weight used for framing members, unless otherwise indicated.
B. Steel Shapes and Clips: ASTM A 36/A 36M, zinc coated by hot-dip process according to ASTM A 123/A 123M.
C. Anchor Bolts: ASTM F 1554, Grade 36, threaded carbon-steel hex-headed bolts and carbon-steel nuts; and flat, hardened-steel washers; zinc coated by hot-dip process according to ASTM A 153/A 153M, Class C.
D. Expansion Anchors: Fabricated from corrosion-resistant materials, with capability to sustain, without failure, a load equal to 5 times design load, as determined by testing per ASTM E 488 conducted by a qualified independent testing agency.
E. Power-Actuated Anchors: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with capability to sustain, without failure, a load equal to 10 times design load, as determined by testing per ASTM E 1190 conducted by a qualified independent testing agency.
F. Mechanical Fasteners: ASTM C 1513, corrosion-resistant-coated, self-drilling, self-tapping steel drill screws.
   1. Head Type: Low-profile head beneath sheathing, manufacturer's standard elsewhere.
   2. Coating: Rust-inhibitive coating per ASTM F 1941, such as Climaseal by ITW Buildex.

2.4 MISCELLANEOUS MATERIALS

A. Galvanizing Repair Paint: ASTM A 780.
B. Cement Grout: Portland cement, ASTM C 150, Type I; and clean, natural sand, ASTM C 404. Mix at ratio of 1 part cement to 2-1/2 parts sand, by volume, with minimum water required for placement and hydration.
C. Shims: Load bearing, high-density multimonomer plastic, nonleaching.
D. Sealer Gaskets: Closed-cell neoprene foam, 1/4 inch (6.4 mm) thick, selected from manufacturer's standard widths to match width of bottom track or rim track members.

PART 3 - EXECUTION

3.1 PREPARATION

A. Install load bearing shims or grout between the underside of wall bottom track or rim track and the top of foundation wall or slab at stud or joist locations to ensure a uniform bearing surface on supporting concrete or masonry construction.
B. Install sealer gaskets to isolate the underside of wall bottom track or rim track and the top of foundation wall or slab at stud or joist locations.

3.2 INSTALLATION, GENERAL

A. Install cold-formed metal framing according to AISI’s “Standard for Cold-Formed Steel Framing - General Provisions” and to manufacturer’s written instructions unless more stringent requirements are indicated.

B. Install cold-formed metal framing and accessories plumb, square, and true to line, and with connections securely fastened.

C. Install framing members in one-piece lengths.

D. Install temporary bracing and supports to secure framing and support loads comparable in intensity to those for which structure was designed. Maintain braces and supports in place, undisturbed, until entire integrated supporting structure has been completed and permanent connections to framing are secured.

E. Do not bridge building expansion and control joints with cold-formed metal framing. Independently frame both sides of joints.

F. Install insulation, specified in Division 07 Section “Thermal Insulation,” in built-up exterior framing members, such as headers, sills, boxed joists, and multiple studs at openings, that are inaccessible on completion of framing work.

G. Fasten hole reinforcing plate over web penetrations that exceed size of manufacturer’s standard punched openings.

H. Erection Tolerances: Install cold-formed metal framing level, plumb, and true to line to a maximum allowable tolerance variation of 1/8 inch in 10 feet (1:960) and as follows:
   1. Space individual framing members no more than plus or minus 1/8 inch (3 mm) from plan location. Cumulative error shall not exceed minimum fastening requirements of sheathing or other finishing materials.

3.3 LOAD-BEARING WALL INSTALLATION

A. Install continuous top and bottom tracks sized to match studs. Align tracks accurately and securely anchor at corners and ends, and at spacings as follows:
   1. Anchor Spacing: As shown on Drawings.

B. Squarely seat studs against top and bottom tracks with gap not exceeding of 1/8 inch (3 mm) between the end of wall framing member and the web of track. Fasten both flanges of studs to top and bottom tracks. Space studs as follows:
   1. Stud Spacing: As indicated.

C. Set studs plumb, except as needed for diagonal bracing or required for nonplumb walls or warped surfaces and similar configurations.

D. Align studs vertically where floor framing interrupts wall-framing continuity. Where studs cannot be aligned, continuously reinforce track to transfer loads.

E. Align floor and roof framing over studs. Where framing cannot be aligned, continuously reinforce track to transfer loads.

F. Anchor studs abutting structural columns or walls, including masonry walls, to supporting structure as indicated.

G. Install headers over wall openings wider than stud spacing. Locate headers above openings as indicated. Fabricate headers of compound shapes indicated or required to transfer load to supporting studs, complete with clip-angle connectors, web stiffeners, or gusset plates.
   1. Frame wall openings with not less than a double stud at each jamb of frame as indicated on Shop Drawings. Fasten jamb members together to uniformly distribute loads.
2. Install runner tracks and jack studs above and below wall openings. Anchor tracks to jamb studs with clip angles or by welding, and space jack studs same as full-height wall studs.

H. Install supplementary framing, blocking, and bracing in stud framing indicated to support fixtures, equipment, services, casework, heavy trim, furnishings, and similar work requiring attachment to framing.
   1. If type of supplementary support is not indicated, comply with stud manufacturer's written recommendations and industry standards in each case, considering weight or load resulting from item supported.

I. Install horizontal bridging in stud system, spaced as indicated. Fasten at each stud intersection.
   1. Bridging: Cold-rolled steel channel, welded or mechanically fastened to webs of punched studs with a minimum of 2 screws into each flange of the clip angle for framing members up to 6 inches (150 mm) deep.
   2. Bridging: Combination of flat, taut, steel sheet straps of width and thickness indicated and stud-track solid blocking of width and thickness to match studs. Fasten flat straps to stud flanges and secure solid blocking to stud webs or flanges.
   3. Bridging: Proprietary bridging bars installed according to manufacturer's written instructions.

J. Install steel sheet diagonal bracing straps to both stud flanges, terminate at and fasten to reinforced top and bottom tracks. Fasten clip-angle connectors to multiple studs at ends of bracing and anchor to structure.

K. Install miscellaneous framing and connections, including supplementary framing, web stiffeners, clip angles, continuous angles, anchors, and fasteners, to provide a complete and stable wall-framing system.

3.4 EXTERIOR NON-LOAD-BEARING WALL INSTALLATION

A. Install continuous tracks sized to match studs. Align tracks accurately and securely anchor to supporting structure as indicated.

B. Fasten both flanges of studs to top and bottom track, unless otherwise indicated. Space studs as follows:
   1. Stud Spacing: As indicated.

C. Set studs plumb, except as needed for diagonal bracing or required for nonplumb walls or warped surfaces and similar requirements.

D. Isolate non-load-bearing steel framing from building structure to prevent transfer of vertical loads while providing lateral support.
   1. Install single deflection tracks and anchor to building structure.
   2. Install double deflection tracks and anchor outer track to building structure.
   3. Connect vertical deflection clips to bypassing studs and anchor to primary building structure.

E. Install horizontal bridging in wall studs, spaced in rows indicated on Drawings. Fasten at each stud intersection.
   1. Top Bridging for Single Deflection Track: Install row of horizontal bridging within 12 inches (305 mm) of single deflection track. Install a combination of flat, taut, steel sheet straps of width and thickness indicated and stud or stud-track solid blocking of width and thickness matching studs. Fasten flat straps to stud flanges and secure solid blocking to stud webs or flanges.
      a. Install solid blocking at centers indicated.
   2. Bridging: Cold-rolled steel channel, welded or mechanically fastened to webs of punched studs.
3. Bridging: Combination of flat, taut, steel sheet straps of width and thickness indicated and stud-track solid blocking of width and thickness to match studs. Fasten flat straps to stud flanges and secure solid blocking to stud webs or flanges.

4. Bridging: Proprietary bridging bars installed according to manufacturer's written instructions.

F. Install miscellaneous framing and connections, including stud kickers, web stiffeners, clip angles, continuous angles, anchors, fasteners, and stud girts, to provide a complete and stable curtain-wall-framing system.

3.5 FIELD QUALITY CONTROL

A. Testing: Contractor will engage a qualified independent testing and inspecting agency to perform field tests and inspections and prepare test reports.

B. Field and shop welds will be subject to testing and inspecting.

C. Testing agency will report test results promptly and in writing to Contractor and Architect.

D. Remove and replace work where test results indicate that it does not comply with specified requirements.

E. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

3.6 REPAIRS AND PROTECTION

A. Galvanizing Repairs: Prepare and repair damaged galvanized coatings on fabricated and installed cold-formed metal framing with galvanized repair paint according to ASTM A 780 and manufacturer's written instructions.

B. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer, that ensure that cold-formed metal framing is without damage or deterioration at time of Substantial Completion.

END OF SECTION 05 4000
PART 1 GENERAL

1.01 RELATED DOCUMENTS
A. Drawings and general provisions of the Contract including General and Supplementary Conditions and Division 1 Specification Sections apply to this Section.

1.02 SECTION INCLUDES
A. Shop fabricated steel items.

1.03 REFERENCE STANDARDS
G. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination; 2012.
J. SSPC-Paint 15 - Steel Joist Shop Primer/Metal Building Primer; 1999 (Ed. 2004).

1.04 SUBMITTALS
A. See Section 013300 - Submittals, for submittal procedures.
B. Shop Drawings: Indicate profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners, and accessories. Include erection drawings, elevations, and details where applicable.
   1. Indicate welded connections using standard AWS A2.4 welding symbols. Indicate net weld lengths.
C. Welders' Certificates: Submit certification for welders employed on the project, verifying AWS qualification within the previous 12 months.

1.05 QUALITY ASSURANCE
A. Fabricator Qualifications: A qualified steel fabricator that is accredited by IAS AC172.

PART 2 PRODUCTS

2.01 MATERIALS - STEEL
A. Steel Sections: ASTM A36/A36M.
B. Steel Tubing: ASTM A501/A501M hot-formed structural tubing.
C. Plates: ASTM A283/A283M.
F. Welding Materials: AWS D1.1/D1.1M; type required for materials being welded.
G. Shop and Touch-Up Primer: SSPC-Paint 15, complying with VOC limitations of authorities having jurisdiction.
H. Touch-Up Primer for Galvanized Surfaces: SSPC-Paint 20, Type I - Inorganic, complying with VOC limitations of authorities having jurisdiction.

2.02 FABRICATION
A. Fit and shop assemble items in largest practical sections, for delivery to site.
B. Fabricate items with joints tightly fitted and secured.
C. Continuously seal joined members by intermittent welds and plastic filler.
D. 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.
E. Exposed Mechanical Fastenings: Flush countersunk screws or bolts; unobtrusively located; consistent with design of component, except where specifically noted otherwise.
F. Supply components required for anchorage of fabrications. Fabricate anchors and related components of same material and finish as fabrication, except where specifically noted otherwise.

2.03 FABRICATED ITEMS
A. Ledge Angles, Shelf Angles, Channels, and Plates Not Attached to Structural Framing: For support of metal decking; galvanized finish.
B. Lintels: As detailed; galvanized finish.

2.04 FINISHES - STEEL
A. Galvanizing of Structural Steel Members: Galvanize after fabrication to ASTM A123/A123M requirements. Provide minimum 1.7 oz/sq ft galvanized coating.
B. Galvanizing of Non-structural Items: Galvanize after fabrication to ASTM A123/A123M requirements.

PART 3 EXECUTION
3.01 EXAMINATION
A. Verify that field conditions are acceptable and are ready to receive work.

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

3.03 INSTALLATION
A. Install items plumb and level, accurately fitted, free from distortion or defects.
B. Provide for erection loads, and for sufficient temporary bracing to maintain true alignment until completion of erection and installation of permanent attachments.
C. Perform field welding in accordance with AWS D1.1/D1.1M.
D. Obtain approval prior to site cutting or making adjustments not scheduled.
E. After erection, prime welds, abrasions, and surfaces not shop primed, except surfaces to be in contact with concrete.

3.04 TOLERANCES
A. Maximum Variation From Plumb: 1/4 inch per story, non-cumulative.
B. Maximum Offset From True Alignment: 1/4 inch.

END OF SECTION
PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Framing with dimension lumber.
   2. Framing with engineered wood products.
   3. Shear wall panels.
   4. Rooftop equipment bases and support curbs.
   5. Wood blocking, cants, and nailers.
   6. Wood furring and grounds.
   7. Wood sleepers.
   8. Plywood backing panels.

1.2 RELATED DOCUMENT

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

1.3 ACTION SUBMITTALS

A. Product Data: For each type of process and factory-fabricated product.
   1. Include data for wood-preservative treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements.
   2. Include data for fire-retardant treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements.

1.4 INFORMATIONAL SUBMITTALS

A. Material Certificates: For dimension lumber specified to comply with minimum allowable unit stresses. Indicate species and grade selected for each use and design values approved by the ALSC Board of Review.

B. Evaluation Reports: For the following, from ICC-ES:
   1. Wood-preservative-treated wood.
   2. Fire-retardant-treated wood.
   3. Engineered wood products.
   4. Shear panels.
   5. Power-driven fasteners.
   7. Expansion anchors.
   8. Metal framing anchors.

PART 2 - PRODUCTS

2.1 WOOD PRODUCTS, GENERAL

A. Certified Wood: Materials shall be produced from wood obtained from forests certified by an FSC-accredited certification body to comply with FSC STD-01-001, "FSC Principles and Criteria for Forest Stewardship for the following:
   1. Dimension lumber framing.
   2. Laminated-veneer lumber.
5. Rim boards.

B. Lumber: DOC PS 20 and applicable rules of grading agencies indicated. If no grading agency is indicated, provide lumber that complies with the applicable rules of any rules-writing agency certified by the ALSC Board of Review. Provide lumber graded by an agency certified by the ALSC Board of Review to inspect and grade lumber under the rules indicated.
   1. Factory mark each piece of lumber with grade stamp of grading agency.
   2. For exposed lumber indicated to receive a stained or natural finish, mark grade stamp on end or back of each piece.
   3. Provide dressed lumber, S4S, unless otherwise indicated.

C. Maximum Moisture Content of Lumber: 19 percent unless otherwise indicated.

D. Engineered Wood Products: Provide engineered wood products acceptable to authorities having jurisdiction and for which current model code research or evaluation reports exist that show compliance with building code in effect for Project.
   1. Allowable Design Stresses: Provide engineered wood products with allowable design stresses, as published by manufacturer, that meet or exceed those indicated. Manufacturer's published values shall be determined from empirical data or by rational engineering analysis and demonstrated by comprehensive testing performed by a qualified independent testing agency.

2.2 WOOD-PRESERVATIVE-TREATED LUMBER

A. Preservative Treatment by Pressure Process: AWPA U1; Use Category UC2 for interior construction not in contact with the ground, Use Category UC3b for exterior construction not in contact with the ground, and Use Category UC4a for items in contact with the ground.
   1. Preservative Chemicals: Acceptable to authorities having jurisdiction and containing no arsenic or chromium. Do not use inorganic boron (SBX) for sill plates.

B. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent. Do not use material that is warped or that does not comply with requirements for untreated material.

C. Mark lumber with treatment quality mark of an inspection agency approved by the ALSC Board of Review.

D. Application: Treat items indicated on Drawings, and the following:
   1. Wood cants, nailers, curbs, equipment support bases, blocking, stripping, and similar members in connection with roofing, flashing, vapor barriers, and waterproofing.
   2. Wood sills, sleepers, blocking, furring, stripping, and similar concealed members in contact with masonry or concrete.
   3. Wood framing and furring attached directly to the interior of below-grade exterior masonry or concrete walls.
   4. Wood framing members that are less than 18 inches (460 mm) above the ground in crawspaces or unexcavated areas.
   5. Wood floor plates that are installed over concrete slabs-on-grade.

2.3 FIRE-RETARDANT-TREATED MATERIALS

A. General: Where fire-retardant-treated materials are indicated, use materials complying with requirements in this article, that are acceptable to authorities having jurisdiction, and with fire-test-response characteristics specified as determined by testing identical products per test method indicated by a qualified testing agency.

B. Fire-Retardant-Treated Lumber and Plywood by Pressure Process: Products with a flame spread index of 25 or less when tested according to ASTM E 84, and with no evidence of
significant progressive combustion when the test is extended an additional 20 minutes, and with
the flame front not extending more than 10.5 feet (3.2 m) beyond the centerline of the burners at
any time during the test.

1. Exterior Type: Treated materials shall comply with requirements specified above for fire-
retardant-treated lumber and plywood by pressure process after being subjected to
accelerated weathering according to ASTM D 2898. Use for exterior locations and where
indicated.

2. Interior Type A: Treated materials shall have a moisture content of 28 percent or less
when tested according to ASTM D 3201 at 92 percent relative humidity. Use where
exterior type is not indicated.

C. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent. Kiln-dry plywood
after treatment to a maximum moisture content of 15 percent.

D. Identify fire-retardant-treated wood with appropriate classification marking of qualified testing
agency.

E. Application: Treat items indicated on Drawings, and the following:
   1. Framing for raised platforms.
   2. Framing for stages.
   3. Concealed blocking.
   4. Framing for non-load-bearing partitions.
   5. Framing for non-load-bearing exterior walls.
   6. Roof construction.
   7. Plywood backing panels.

2.4 DIMENSION LUMBER FRAMING

A. Non-Load-Bearing Interior Partitions: Standard, Stud, or No. 3 grade.
   1. Application: Interior partitions not indicated as load-bearing.
   2. Species:
      a. Mixed southern pine; SPIB.
      b. Northern species; NLGA.
      c. Eastern softwoods; NeLMA.
      d. Western woods; WCLIB or WWPA.

B. Framing Other Than Non-Load-Bearing Interior Partitions: As shown on the drawings.
   1. Application: Framing other than interior partitions not indicated as load-bearing.
   2. Species:
      a. Hem-fir (north); NLGA.
      b. Southern pine; SPIB.
      c. Douglas fir-larch; WCLIB or WWPA.
      d. Mixed southern pine; SPIB.
      e. Spruce-pine-fir; NLGA.
      f. Douglas fir-south; WWPA.
      g. Hem-fir; WCLIB or WWPA.
      h. Douglas fir-larch (north); NLGA.
      i. Spruce-pine-fir (south); NeLMA, WCLIB, or WWPA.
C. Exposed Framing: Provide material hand-selected for uniformity of appearance and freedom from characteristics, on exposed surfaces and edges, that would impair finish appearance, including decay, honeycomb, knot-holes, shake, splits, torn grain, and wane.
   1. Application: Exposed exterior and interior framing indicated to receive a stained or natural finish.
   2. Species and Grade: As indicated above for load-bearing construction of same type.

2.5 ENGINEERED WOOD PRODUCTS

A. Engineered Wood Products, General: Products shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

B. Laminated-Veneer Lumber: Structural composite lumber made from wood veneers with grain primarily parallel to member lengths, evaluated and monitored according to ASTM D 5456 and manufactured with an exterior-type adhesive complying with ASTM D 2559.
   1. Extreme Fiber Stress in Bending, Edgewise: As shown on drawings.
   2. Modulus of Elasticity, Edgewise: As shown on drawings.

C. Wood I-Joists: Prefabricated units, I-shaped in cross section, made with solid or structural composite lumber flanges and wood-based structural panel webs, let into and bonded to flanges. Provide units complying with material requirements of and with structural capacities established and monitored according to ASTM D 5055.
   1. Web Material: Either oriented strand board or plywood, complying with DOC PS 1 or DOC PS 2, Exposure.
   2. Structural Properties: Provide units with depths and design values not less than those indicated.
   3. Provide units complying with APA PRI-400, factory marked with APA trademark indicating nominal joist depth, joist class, span ratings, mill identification, and compliance with APA standard.

D. Rim Boards: Product designed to be used as a load-bearing member and to brace wood I-joists at bearing ends, complying with research/evaluation report for I-joists.
   1. Material: Product made from any combination solid lumber, wood strands, and veneers.
   2. Thickness: 1-1/4 inches (32 mm).
   3. Provide performance-rated product complying with APA PRR-401, rim board grade, factory marked with APA trademark indicating thickness, grade, and compliance with APA standard.

2.6 SHEAR WALL PANELS

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

B. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:
   1. Shear Transfer Systems.
   2. Simpson Strong-Tie Co., Inc.
   3. Weyerhaeuser Company.

Wood-Framed Shear Wall Panels: Prefabricated assembly consisting of wood perimeter framing, tie downs, and Exposure I, Structural I plywood or OSB sheathing.
4. Products shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."
C. Steel-Framed Shear Wall Panels: Prefabricated assembly consisting of cold-formed galvanized steel panel, steel top and bottom plates, and wood studs.

D. Allowable Design Loads: Provide products with allowable design loads, as published by manufacturer, that meet or exceed those indicated. Manufacturer’s published values shall be determined from empirical data or by rational engineering analysis and demonstrated by comprehensive testing performed by a qualified independent testing agency.

2.7 MISCELLANEOUS LUMBER

A. General: Provide miscellaneous lumber indicated and lumber for support or attachment of other construction, including the following:
   1. Blocking.
   2. Nailers.
   3. Rooftop equipment bases and support curbs.
   5. Furring.

B. For items of dimension lumber size, provide Standard, Stud, or No. 3 grade lumber of any species.

C. For concealed boards, provide lumber with 19 percent maximum moisture content and any of the following species and grades:
   1. Mixed southern pine; No. 2 grade; SPIB.
   2. Eastern softwoods; No. 2 Common grade; NeLMA.
   3. Northern species; No. 2 Common grade; NLGA.
   4. Western woods; Construction or No. 2 Common; WCLIB or WWPA.

2.8 PLYWOOD BACKING PANELS

A. Equipment Backing Panels: DOC PS 1, Exterior, AC in thickness indicated or, if not indicated, not less than 1/2-inch (13-mm) nominal thickness.
   1. Plywood shall comply with the testing and product requirements of the California Department of Health Services’ “Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers.”

2.9 FASTENERS

A. General: Provide fasteners of size and type indicated that comply with requirements specified in this article for material and manufacture.
   1. Where rough carpentry is exposed to weather, in ground contact, pressure-preservative treated, or in area of high relative humidity, provide fasteners with hot-dip zinc coating complying with ASTM A 153/A 153M or Type 304 stainless steel.


C. Bolts: Steel bolts complying with ASTM A 307, Grade A (ASTM F 568M, Property Class 4.6); with ASTM A 563 (ASTM A 563M) hex nuts and, where indicated, flat washers.

2.10 METAL FRAMING ANCHORS

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

B. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:
   1. Cleveland Steel Specialty Co.
   2. KC Metals Products, Inc.
3. Phoenix Metal Products, Inc.
4. Simpson Strong-Tie Co., Inc.
5. USP Structural Connectors.

C. Allowable Design Loads: Provide products with allowable design loads, as published by manufacturer, that meet or exceed those indicated. Manufacturer’s published values shall be determined from empirical data or by rational engineering analysis and demonstrated by comprehensive testing performed by a qualified independent testing agency.

   1. Use for interior locations unless otherwise indicated.

E. Hot-Dip, Heavy-Galvanized Steel Sheet: ASTM A 653/A 653M; structural steel (SS), high-strength low-alloy steel Type A (HSLAS Type A), or high-strength low-alloy steel Type B (HSLAS Type B); G185 (Z550) coating designation; and not less than 0.036 inch (0.9 mm) thick.
   1. Use for wood-preservative-treated lumber and where indicated.

2.11 MISCELLANEOUS MATERIALS
A. Sill-Sealer Gaskets: Glass-fiber-resilient insulation, fabricated in strip form, for use as a sill sealer; 1-inch (25-mm) nominal thickness, compressible to 1/32 inch (0.8 mm); selected from manufacturer’s standard widths to suit width of sill members indicated.
B. Sill-Sealer Gaskets: Closed-cell neoprene foam, 1/4 inch (6.4 mm) thick, selected from manufacturer’s standard widths to suit width of sill members indicated.
C. Flexible Flashing: Composite, self-adhesive, flashing product consisting of a pliable, butyl rubber or rubberized-asphalt compound, bonded to a high-density polyethylene film, aluminum foil, or spunbonded polyolefin to produce an overall thickness of not less than 0.025 inch (0.6 mm).

PART 3 - EXECUTION
3.1 INSTALLATION, GENERAL
A. Set rough carpentry to required levels and lines, with members plumb, true to line, cut, and fitted. Fit rough carpentry to other construction; scribe and cope as needed for accurate fit. Locate furring, nailers, blocking, grounds, and similar supports to comply with requirements for attaching other construction.
B. Framing Standard: Comply with AF&PA’s WCD 1, “Details for Conventional Wood Frame Construction,” unless otherwise indicated.
C. Framing with Engineered Wood Products: Install engineered wood products to comply with manufacturer’s written instructions.
D. Install fire-retardant treated plywood backing panels with classification marking of testing agency exposed to view.
E. Shear Wall Panels: Install shear wall panels to comply with manufacturer's written instructions.
F. Metal Framing Anchors: Install metal framing anchors to comply with manufacturer's written instructions. Install fasteners through each fastener hole.
G. Do not splice structural members between supports unless otherwise indicated.
H. Comply with AWPA M4 for applying field treatment to cut surfaces of preservative-treated lumber.
I. Where wood-preservative-treated lumber is installed adjacent to metal decking, install continuous flexible flashing separator between wood and metal decking.
J. Securely attach rough carpentry work to substrate by anchoring and fastening as indicated, complying with the following:
   1. NES NER-272 for power-driven fasteners.
3. Table R602.3(1), "Fastener Schedule for Structural Members," and Table R602.3(2), "Alternate Attachments," in ICC's International Residential Code for One- and Two-Family Dwellings.

3.2 PROTECTION
   A. Protect wood that has been treated with inorganic boron (SBX) from weather. If, despite protection, inorganic boron-treated wood becomes wet, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.
   B. Protect rough carpentry from weather. If, despite protection, rough carpentry becomes sufficiently wet that moisture content exceeds that specified, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.

END OF SECTION 06 1000
SECTION 06 2000
FINISH CARPENTRY

PART 1 GENERAL

1.01 RELATED DOCUMENTS
A. Drawings and general provisions of the Contract including General and Supplementary Conditions and Division 1 Specification Sections apply to this Section.

1.02 SECTION INCLUDES
A. Finish carpentry items.
B. Wood casings and moldings.
C. Hardware and attachment accessories.

1.03 REFERENCE STANDARDS
A. AWI/AWMAC/WI (AWS) - Architectural Woodwork Standards; 2014, with Errata (2016).

1.04 SUBMITTALS
A. See Section 013300 - Submittals for submittal procedures.
B. Samples: Submit two samples of wood trim 12 inch long.

1.05 DELIVERY, STORAGE, AND HANDLING
A. Store finish carpentry items under cover, elevated above grade, and in a dry, well-ventilated area not exposed to heat or sunlight.
B. Protect from moisture damage.

PART 2 PRODUCTS

2.01 FINISH CARPENTRY ITEMS
A. Quality Standard: Custom Grade, in accordance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS), unless noted otherwise.
B. Interior Woodwork Items:
   1. Casings, and Miscellaneous Trim: Red Oak Colonial Casing-Size to match existing casing; prepare for stain finish.

2.02 LUMBER MATERIALS
A. Hardwood Lumber: Oak species, plain sawn, maximum moisture content of 6 percent; with vertical grain, of quality suitable for transparent finish.

2.03 FASTENINGS
A. Adhesive for Purposes Other Than Laminate Installation: Suitable for the purpose; not containing formaldehyde or other volatile organic compounds.
B. Fasteners: Of size and type to suit application.

2.04 ACCESSORIES
A. Wood Filler: water base, tinted to match surface finish color.

2.05 SITE FINISHING MATERIALS
A. Finishing: Field finished as specified in Section 09 9300.

2.06 FABRICATION
A. Shop assemble work for delivery to site, permitting passage through building openings.
B. When necessary to cut and fit on site, provide materials with ample allowance for cutting. Provide trim for scribing and site cutting.
PART 3 EXECUTION

3.01 EXAMINATION
   A. Verify adequacy of backing and support framing.
   B. Verify mechanical, electrical, and building items affecting work of this section are placed and ready to receive this work.

3.02 INSTALLATION
   A. Install custom fabrications in accordance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS) requirements for grade indicated.
   B. Set and secure materials and components in place, plumb and level.
   C. Carefully scribe work abutting other components, with maximum gaps of 1/32 inch. Do not use additional overlay trim to conceal larger gaps.

3.03 PREPARATION FOR SITE FINISHING
   A. Set exposed fasteners. Apply wood filler in exposed fastener indentations. Sand work smooth.
   B. Site Finishing: See Section 09 9300.
   C. Before installation, prime paint surfaces of items or assemblies to be in contact with cementitious materials.

3.04 TOLERANCES
   A. Maximum Variation from True Position: 1/16 inch.
   B. Maximum Offset from True Alignment with Abutting Materials: 1/32 inch.

END OF SECTION
PART 1 GENERAL

1.01 SECTION INCLUDES
A. Batt insulation with Vapor Retader facing in exterior roof construction.

1.02 REFERENCE STANDARDS

1.03 SUBMITTALS
A. See Section 013300 - Submittals, for submittal procedures
B. Product Data: Provide data on product characteristics, performance criteria, and product limitations.
C. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
D. Manufacturer's Installation Instructions: Include information on special environmental conditions required for installation and installation techniques.

1.04 FIELD CONDITIONS
A. Do not install insulation adhesives when temperature or weather conditions are detrimental to successful installation.

PART 2 PRODUCTS

2.01 BATT INSULATION MATERIALS
A. Glass Fiber Batt Insulation: Flexible preformed batt or blanket, complying with ASTM C665; Compatible with existing steel building construction.
   1. Combustibility: Non-combustible, when tested in accordance with ASTM E136, except for facing, if any.
   3. Facing: PolyPropylene with Fiber reinforcing, one side.
   4. Manufacturers:
      a. Simple Saver-Retrofit System: https://thermaldesign.com
      b. Metal Building Insulation: https://insulationceilings.html
      c. Therm All: Optiliner System: http://therm-all.com
      d. Substitutions: Equal Products approved by the Architect.

2.02 ACCESSORIES
A. Tape: Reinforced polyethylene film with acrylic pressure sensitive adhesive.
   1. Application: Sealing of interior circular penetrations, such as pipes or cables.
   2. Width: Are required for application.
B. Insulation Fasteners: Appropriate for purpose intended. Do not attach insulation mechanically to the roof panels.
C. Adhesive: Type recommended by insulation manufacturer for application.
D. Straps: 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 irregularities or materials or substances that may impede adhesive bond.

3.02 BATT INSTALLATION
A. Install insulation and vapor retarder in accordance with manufacturer's instructions.
B. Install in exterior roof 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. Install with factory applied vapor retarder membrane facing warm side of building spaces. Lap ends and side flanges of membrane between framing members.
F. Retain insulation batts in place with straps secured to framing members.
G. Tape seal butt ends, lapped flanges, and tears or cuts in membrane.
H. Tape seal tears or cuts in vapor retarder.

3.03 PROTECTION
A. Do not permit installed insulation to be damaged prior to its concealment.

END OF SECTION
SECTION 07 2119
FOAMED-IN-PLACE INSULATION

PART 1 GENERAL

1.01 RELATED DOCUMENTS
A. Drawings and general provisions of the Contract including General and Supplementary Conditions and Division 1 Specification Sections apply to this Section.
B. Coordinate with Section 012200 Unit Prices. Work Under this section is governed under Unit Pricing Criteria.
   1. MEASUREMENT OF QUANTITIES
      a. Take all measurements and compute quantities. Measurements and quantities will be verified by Owner.
      b. Assist by providing necessary equipment, workers, and survey personnel as required.
      c. Measurement by Area: Measured by square dimension using mean length and width or radius.

1.02 SECTION INCLUDES
A. Foamed-in-place insulation.
   1. In exterior or interior framed walls where indicated on drawings.
   2. In wall crevices.
B. Protective intumescent coating.

1.03 REFERENCE STANDARDS

1.04 ADMINISTRATIVE REQUIREMENTS
A. Preinstallation Meeting: Convene one week prior to commencing work of this section.

1.05 SUBMITTALS
A. See Section 013300 - Submittals, for submittal procedures.
B. Product Data: Provide product description, insulation properties, overcoat properties, and preparation requirements.
C. Manufacturer’s Installation Instructions: Indicate special procedures, and perimeter conditions requiring special attention.

1.06 QUALITY ASSURANCE
A. Applicator Qualifications: Company specializing in performing work of the type specified, with minimum three years documented experience.

1.07 FIELD CONDITIONS
A. Do not apply foam when temperature is below that specified by the manufacturer for ambient air and substrate.
B. Do not apply foam when temperature is within 5 degrees F of dew point.
PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Foamed-In-Place Insulation:
   4. Substitutions: Equal Products approved by the Architect.

2.02 MATERIALS

A. Foamed-In-Place Insulation: Medium-density, rigid or semi-rigid, closed cell polyurethane foam; foamed on-site, using blowing agent of water or non-ozone-depleting gas.
   1. Regulatory Requirements: Comply with applicable code for flame and smoke, concealment, and overcoat limitations.
   2. Thermal Resistance: R-value of 6.5, minimum, per 1 inch thickness at 75 degrees F mean temperature when tested in accordance with ASTM C518.
   3. Water Absorption: Less than 2 percent by volume, maximum, when tested in accordance with ASTM D2842.
   4. Air Permeance: 0.04 cfm/sq ft, maximum, when tested at intended thickness in accordance with ASTM E2178 or ASTM E283 at 1.57 psf.
   5. Closed Cell Content: At least 90 percent.
   6. Surface Burning Characteristics: Flame spread/Smoke developed index of 25/450, maximum, when tested in accordance with ASTM E84.

2.03 ACCESSORIES

A. Primer: As required by insulation manufacturer.
B. Protective Coating: Intumescent coating of type recommended by insulation manufacturer and as required to comply with applicable codes as a 15 minute ignition barrier.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify work within construction spaces or crevices is complete prior to insulation application.
B. Verify that surfaces are clean, dry, and free of matter that may inhibit insulation or overcoat adhesion.

3.02 PREPARATION

A. Mask and protect adjacent surfaces from over spray or dusting.
B. Apply primer in accordance with manufacturer’s instructions.

3.03 APPLICATION

A. Apply insulation in accordance with manufacturer’s instructions.
B. Apply insulation by spray method, to a uniform monolithic density without voids.
C. Apply to achieve a thermal resistance R-value of 21 minimum.
D. Apply overcoat monolithically, without voids to fully cover foam insulation, to achieve fire rating required.
E. Patch damaged areas.
F. Where applied to voids and gaps assure space for expansion to avoid pressure on adjacent materials that may bind operable parts.
G. Trim excess away for applied trim or remove as required for continuous sealant bead.

3.04 PROTECTION

A. Do not permit subsequent construction work to disturb applied insulation.

END OF SECTION
PART 1 GENERAL

1.01 RELATED DOCUMENTS
   A. Drawings and general provisions of the Contract including General and Supplementary
      Conditions and Division 1 Specification Sections apply to this Section.

1.02 SECTION INCLUDES
   A. Manufactured metal panels for exterior wall panels and interior liner panels, with related
      flashings and accessory components.

1.03 REFERENCE STANDARDS
   A. AAMA 609 & 610 - Cleaning and Maintenance Guide for Architecturally Finished Aluminum
      (Combined Document); 2015.
   C. ASTM B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate
      (Metric); 2014.

1.04 SUBMITTALS
   A. See Section 013300 - Submittals, for submittal procedures.
   B. Samples: Submit two samples of wall panel, 12 inch by 12 inch in size illustrating finish color,
      sheen, and texture.
   C. Manufacturer's Qualification Statement.
   D. Installer’s Qualification Statement.

1.05 QUALITY ASSURANCE
   A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in
      this section with minimum three years of documented experience.
   B. Installer Qualifications: Company specializing in installing products of the type specified in
      this section with minimum three years of documented experience.

1.06 DELIVERY, STORAGE, AND HANDLING
   A. Protect panels from accelerated weathering by removing or venting sheet plastic shipping wrap.
   B. Store prefinished material off the ground and protected from weather; prevent twisting, bending,
      or abrasion; provide ventilation; slope metal sheets to ensure proper drainage.
   C. Prevent contact with materials that may cause discoloration or staining of products.

1.07 WARRANTY
   A. Correct defective work within a five year period after Date of Substantial Completion for
      degradation of panel finish, including color fading caused by exposure to weather.
   B. Correct defective work within a five year period after Date of Substantial Completion, including
      defects in water tightness and integrity of seals for metal wall panels.

PART 2 PRODUCTS

2.01 MANUFACTURERS
   A. Metal Wall Panels - Exposed Fasteners:
4. Substitutions: Equal Products approved by the Architect.

2.02 MANUFACTURED METAL PANELS

A. Wall Panel System: Factory fabricated prefinished metal panel system, site assembled.
   1. Provide exterior wall panels and interior liner panels.
   2. Design and size components to support assembly dead loads, and to withstand live loads caused by positive and negative wind pressure acting normal to plane of wall.
   3. Maximum Allowable Deflection of Panel: \( L/180 \) for length \( L \) of span.
   4. Movement: Accommodate movement within system without damage to components or deterioration of seals, movement between system and perimeter components when subject to seasonal temperature cycling; dynamic loading and release of loads; and deflection of structural support framing.
   5. Drainage: Provide positive drainage to exterior for moisture entering or condensation occurring within panel system.
   6. Fabrication: Formed true to shape, accurate in size, square, and free from distortion or defects; pieces of longest practical lengths.
   7. Corners: Factory-fabricated in one continuous piece with minimum 2 inch returns.

B. Exterior Wall Panels:
   1. Profile: Vertical.
   2. Side Seams: Double-interlocked, tight-fitting, sealed with continuous bead of sealant.
   5. Color: As selected by Architect from manufacturer's standard line.

C. Interior Liner Panels:
   1. Profile: Vertical; style as indicated.
   2. Side Seams: Interlocking, sealed with continuous bead of sealant.
   5. Color: As selected by Architect from manufacturer's standard line.

D. Internal and External Corners: Same material, thickness, and finish as exterior sheets; profile to suit system; shop cut and factory mitered to required angles.

E. Expansion Joints: Same material, thickness and finish as exterior sheets; ____ gage, ____ inch thick; manufacturer's standard brake formed type, of profile to suit system.

F. Trim: Same material, thickness and finish as exterior sheets; brake formed to required profiles.

G. Anchors: Stainless steel.

2.03 MATERIALS

A. Precoated Aluminum Sheet: ASTM B209 (ASTM B209M), 3105 alloy, O temper, smooth surface texture; continuous-coll-coated on exposed surfaces with specified finish coating and on panel back with specified panel back coating.

2.04 FINISHES

A. Exposed Surface Finish: Panel manufacturer's standard polyvinylidene fluoride (PVDF) coating, top coat over epoxy primer.

2.05 ACCESSORIES

A. Gaskets: Manufacturer's standard type suitable for use with system, permanently resilient; ultraviolet and ozone resistant.

B. Concealed Sealants: Non-curing butyl sealant or tape sealant.

C. Exposed Sealant: Elastomeric; silicone, polyurethane, or silyl-terminated polyether/polyurethane.

D. Fasteners: Manufacturer's standard type to suit application; with soft neoprene washers, stainless steel. Exposed fasteners same finish as panel system.

E. Field Touch-up Paint: As recommended by panel manufacturer.

F. Bituminous Paint: Asphalt base.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that building framing members are ready to receive panels.

3.02 INSTALLATION

A. Install panels on walls in accordance with manufacturer's instructions over existing subgirt framing.

B. Protect surfaces in contact with cementitious materials and dissimilar metals with bituminous paint. Allow to dry prior to installation.

C. Fasten panels to structural supports; aligned, level, and plumb.

D. Locate joints over supports.

E. Lap panel ends minimum 2 inches.

F. Use exposed fasteners unless otherwise approved by Architect.

G. Seal and place gaskets to prevent weather penetration. Maintain neat appearance.

3.03 TOLERANCES

A. Maximum Offset From True Alignment Between Adjacent Members Butting or In Line: 1/16 inch.

B. Maximum Variation from Plane or Location Indicated on Drawings: 1/4 inch.

3.04 CLEANING

A. Remove site cuttings from finish surfaces.

B. Remove protective material from wall panel surfaces.

C. Clean and wash prefinished surfaces with mild soap and water; rinse with clean water.

D. Upon completion of installation, thoroughly clean prefinished aluminum surfaces in accordance with AAMA 609 & 610.

END OF SECTION
SECTION 07 4646
FIBER-CEMENT SIDING

PART 1 GENERAL

1.01 SECTION INCLUDES
A. Fiber-cement siding for interior installation.

1.02 RELATED REQUIREMENTS
A. Section 09 9123 – Interior Painting.

1.03 REFERENCE STANDARDS

1.04 SUBMITTALS
A. See Section 013300 - Submittals, for submittal procedures.
B. Product Data: Submit manufacturer’s data sheets on each product to be used, including:
   1. Manufacturer's requirements for related materials to be installed by others.
   2. Preparation instructions and recommendations.
   3. Storage and handling requirements and recommendations.
   4. Installation methods, including nail patterns.
C. Warranty: Submit copy of manufacturer’s warranty, made out in Owner’s name, showing that it has been registered with manufacturer.

2.05 WARRANTY
A. Correct defective work within a five year period after Date of Substantial Completion.

PART 2 PRODUCTS

2.01 FIBER-CEMENT SIDING
A. Panel Siding: Vertically oriented panels made of cement and cellulose fiber formed under high pressure with integral surface texture, complying to ASTM C1186, Type A, Grade II; with machined edges, for nail attachment.
   1. Texture: Simulated cedar grain, vertically grooved.
   2. Length (Height): 96 inches, nominal.
   5. Finish: Factory applied primer.
   6. Finish Painting: Refer to Section 09 9123.
   7. Warranty: 30 year limited; transferable.
   8. Manufacturers:
      a. Allura, a division of Plycem USA, Inc: www.allurausa.com/#sle.
      d. Substitutions: Equal Products approved by the Architect.

2.02 ACCESSORIES
A. Trim: Same material and texture as siding.
B. Fasteners: Galvanized or corrosion resistant; length as required to penetrate minimum 1-1/4 inch.
C. Sealant: Elastomeric, polyurethane or silyl-terminated polyether/polyurethane as recommended by manufacturer, and capable of being painted.
D. Finish Painting: Refer to Section 09 9123.
PART 3 EXECUTION

3.01 EXAMINATION

A. Examine substrate, clean and repair as required to eliminate conditions that would be detrimental to proper installation.

B. Do not begin until unacceptable conditions have been corrected.

C. If substrate preparation is responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.02 INSTALLATION

A. Install in accordance with manufacturer’s instructions and recommendations.
   1. Read warranty and comply with terms necessary to maintain warranty coverage.
   2. Use trim details indicated on drawings.
   3. Touch up field cut edges before installing.
   4. Pre-drill nail holes if necessary to prevent breakage.

B. Over Steel Studs: Use hot-dipped galvanized self-tapping screws, with the points of at least three screws penetrating each stud the panel crosses and at panel ends.

C. Joints in Vertical Siding: Install sealant in vertical and horizontal joints between successive courses of vertical siding.

D. Do not install siding less than 6 inches from surface of ground nor closer than 1 inch to roofs, patios, porches, and other surfaces where water may collect.

E. After installation, seal joints except lap joints of lap siding; seal around penetrations, and paint exposed cut edges.

F. Finish Painting: Refer to Section 09 9123.

3.03 PROTECTION

A. Protect installed products until Date of Substantial Completion.

B. Touch-up, repair or replace damaged products before Date of Substantial Completion.

END OF SECTION
SECTION 07 9005
JOINT SEALERS

PART 1 GENERAL

1.01 RELATED DOCUMENTS
   A. Drawings and general provisions of the Contract including General and Supplementary
      Conditions and Division 1 Specification Sections apply to this Section.

1.02 SECTION INCLUDES
   A. Sealants, joint backing, and bond breakers.

1.03 ADMINISTRATIVE REQUIREMENTS
   A. Coordinate the work with other sections referencing this section.

1.04 SUBMITTALS
   A. See Section 013300 Submittals, for submittal procedures.
   B. Product Data: Provide data indicating sealant chemical characteristics, performance criteria,
      substrate preparation, limitations, and color availability.
   C. Samples: Submit two sets of samples, 1/4 inch dia. x 2 inch in size illustrating Manufacturer's
      full range of sealant colors.
   D. Manufacturer's Installation Instructions: Indicate special procedures.

1.05 QUALITY ASSURANCE
   A. Maintain one copy of each referenced document covering installation requirements on site.
   B. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in
      this section with minimum ten years documented experience.
   C. Applicator Qualifications: Company specializing in performing the work of this section with
      minimum five years documented experience.

1.06 MOCK-UP
   A. Provide mock-up of sealant joints.
   B. Construct mock-up with specified sealant types and with other components noted.
   C. Locate where directed.
   D. Mock-up may not remain as part of the Work.

1.07 FIELD CONDITIONS
   A. Maintain temperature and humidity recommended by the sealant manufacturer during and after
      installation.

1.08 WARRANTY
   A. Correct defective work within a two year period after Date of Substantial Completion.
   B. Warranty: Include coverage for installed sealants and accessories which fail to achieve airtight
      seal and watertight seal, exhibit loss of adhesion or cohesion, or do not cure.

PART 2 PRODUCTS

2.01 SEALANTS
   A. Type E-1 - General Purpose Exterior Sealant: Polyurethane; ASTM C920, Grade NS, Class
      25, Uses M, G, and A; single or multi- component.
      1. Color: To be selected by Architect from manufacturer's standard range.
      2. Applications: Use for:
         a. Joints between concrete and other materials.
         b. Joints between metal frames and other materials.
         c. Other exterior joints for which no other sealant is indicated.
B. Type E-2 - Exterior Metal Lap Joint Sealant: Butyl or polyisobutylene, nondrying, nonskinning, noncuring.
   1. Applications: Use for:
      a. Concealed sealant bead in sheet metal work.

C. Type I-1 - General Purpose Interior Sealant: Acrylic emulsion latex; ASTM C834, Type OP, Grade NF single component, paintable.
   1. Color: To be selected by Architect from manufacturer's standard range.
   2. Applications: Use for:
      a. Interior wall and ceiling control joints.
      b. Joints between door and window frames and wall surfaces.
      c. Other interior joints for which no other type of sealant is indicated.

D. Type I-2 - Bathroom Sealant: Silicone; ASTM C920, Uses I, M and A; single component, mildew resistant.
   1. Applications: Use for:
      a. Joints between plumbing fixtures and floor and wall surfaces.
      b. Joints between kitchen and bathroom countertops and wall surfaces.

E. Type I-3 - Acoustical Sealant: Butyl or acrylic sealant; ASTM C920, Grade NS, Class 12-1/2, Uses M and A; single component, solvent release curing, non-skinning.
   1. Applications: Use for concealed locations only:
      a. Sealant bead between top stud runner and structure and between bottom stud track and floor.
      b. Sealant between top of gypsum wall board and structure and bottom of gypsum wall board and structure.
      c. Where noted on drawings.

F. Type E-3 - Concrete Paving Joint Sealant: Polyurethane, self-leveling; ASTM C920, Class 25, Uses T, I, M and A; single or multi-component.
   1. Color: To be selected by Architect from manufacturer's full range.
   2. Applications: Use for:
      a. Joints in concrete slabs.

G. Type G-1 - Silicone Sealant: ASTM C920, Grade NS, Class 25, Uses NT, A, G, M, O; single component, solvent curing, non-sagging, non-staining, fungus resistant, non-bleeding.
   1. Color: To be selected by Architect from manufacturer's standard range.
   3. Service Temperature Range: -65 to 180 degrees F.
   5. Applications: Use for:
      a. All glazing operations.

2.02 ACCESSORIES
A. Primer: Non-staining type, recommended by sealant manufacturer to suit application.
B. Joint Cleaner: Non-corrosive and non-staining type, recommended by sealant manufacturer; compatible with joint forming materials.
C. Joint Backing: Round foam rod compatible with sealant; closed cell polyethylene; oversized 30 to 50 percent larger than joint width recommended by Sealant Manufacturer.
D. Bond Breaker: Pressure sensitive tape recommended by sealant manufacturer to suit application.

PART 3 EXECUTION
3.01 EXAMINATION
A. Verify that substrate surfaces and joint openings are ready to receive work.
B. Verify that joint backing and release tapes are compatible with sealant.
3.02 PREPARATION
A. Remove loose materials and foreign matter that could impair adhesion of sealant.
B. Clean and prime joints in accordance with manufacturer’s instructions.
C. Perform preparation in accordance with manufacturer's instructions and ASTM C1193.
D. Protect elements surrounding the work of this section from damage or disfigurement.

3.03 INSTALLATION
A. Perform work in accordance with sealant manufacturer's requirements for preparation of surfaces and material installation instructions.
B. Perform installation in accordance with ASTM C1193.
C. Mask joints if necessary to keep adjacent surfaces not scheduled to receive sealant clean.
D. Perform acoustical sealant application work in accordance with ASTM C919.
E. Measure joint dimensions and size joint backers to achieve width-to-depth ratio, neck dimension, and surface bond area as recommended by manufacturer.
F. Install bond breaker where joint backing is not used.
G. Install sealant free of air pockets, foreign embedded matter, ridges, and sags.
H. Apply sealant within recommended application temperature ranges. Consult manufacturer when sealant cannot be applied within these temperature ranges.
I. Tool joints flush.

3.04 CLEANING
A. Clean adjacent surfaces of excess sealant and smears as a result of this work, before the sealant cures.
B. Repair joints that have shrunk, sagged, run, and that have thin spots or other defects.
C. Leave adjacent surfaces in as good or better condition as they were before sealant operations.

3.05 PROTECTION
A. Protect sealants until cured.

3.06 SCHEDULE
A. See Drawings for designated sealant joints.
B. Exterior Joints for Which No Other Sealant Type is Indicated: Type E-1.
C. Control and Expansion Joints in Concrete: Type E-3.
D. Lap Joints in Exterior Sheet Metal Work: Type E-2.
E. Joints Between Exterior Metal Frames and Adjacent Work: Type E-1.
F. Under Door Thresholds: Type E-1.
G. Interior Joints for Which No Other Sealant is Indicated: Type I-1.
H. Control and Expansion Joints in Interior Concrete Slabs and Floors: Type E-3.
I. Joints Between Plumbing Fixtures and Walls and Floors, and Between Countertops and Walls: Type I-2.
J. Interior Walls, Between Metal Stud Track/Runner and Adjacent Construction and Between Outlet Boxes and Gypsum Board: Type I-3.
K. Joints in interior Window Glazing: Type G-1.

END OF SECTION
PART 1 GENERAL

1.01 RELATED DOCUMENTS
   A. Drawings and general provisions of the Contract including General and Supplementary
      Conditions and Division 1 Specification Sections apply to this Section.

1.02 SECTION INCLUDES
   A. Wood doors, stile and rail design; non-fire rated.
   B. Panels of wood.

1.03 REFERENCE STANDARDS
   A. AWI/AWMAC/WI (AWS) - Architectural Woodwork Standards; 2014, with Errata (2016).

1.04 SUBMITTALS
   A. See Section 013300 - Submittals, for submittal procedures.
   B. Product Data: Indicate stile and rail core materials and construction; veneer species, type and
      characteristics.
   C. Shop Drawings: Illustrate door opening criteria, elevations, sizes, types, swings, undercuts
      required, special beveling, special blocking for hardware, factory machining criteria.

PART 2 PRODUCTS

2.01 MANUFACTURERS
   A. Stile and Rail 6-panel Wood Doors:
      1. Jeld-Wen; 0066 All Panel; www.jeld-wen.com
      2. Midwest Manufacturing; Mastercraft 6-panel: www.midwestmanufacturing.com
      3. Nick's Building Supply, Inc.; 6-Panel Oak; www.nicksbuilding.com
      4. Substitutions: Equal Products approved by the Architect.

2.02 DOORS
   A. Interior Pre-Hung Doors and Frames: 1-3/8 inches thick unless otherwise indicated; veneer
      and lumber stile and rail construction; mortise and tenon joints. Transparent finish.
   B. Wood veneer facing or solid wood with factory transparent finish.
   C. Design Style/Pattern: Manufacturer's standard 6 Panel Door and frame.

2.03 DOOR AND PANEL FACINGS
   A. Veneer Facing for Transparent Finish: Red Oak, veneer grade in accordance with quality
      standard indicated, plain sliced (flat cut), with book match between leaves of veneer, running
      match of spliced veneer leaves assembled on door or panel face.
   B. Adhesive: Type I - Waterproof.

2.04 FACTORY FINISHING
   A. Finish work in accordance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS), Section 5 -
      Finishing for grade specified and as follows:
      1. Transparent:
         a. Stain: As selected by Architect.
         b. Sheen: Satin.
      B. Factory finish doors in accordance with approved sample.
2.05 ACCESSORIES
   A. Door Hardware: As specified in Section 08 7100.

PART 3 EXECUTION
3.01 EXAMINATION
   A. Verify existing conditions before starting work.
   B. Verify that opening sizes and tolerances are acceptable.
   C. Do not install doors in frame openings that are not plumb or are out of tolerance for size or alignment.

3.02 INSTALLATION
   A. Install doors in accordance with manufacturer's instructions and specified quality standards.
   B. Factory-Finished Doors: Do not field cut or trim; if fit or clearance is not correct, replace door.
   C. Machine cut for hardware.
   D. Coordinate installation of doors with installation of frames and hardware.

3.03 TOLERANCES
   A. Comply with specified quality standard for fit, clearance, and joinery tolerances.
   B. Maximum Width Distortion (Cup): 1/8 inch measured with straight edge or taut string, edge to edge, over an imaginary 36 by 84 inch surface area.

3.04 ADJUSTING
   A. Adjust doors for smooth and balanced door movement.

3.05 SCHEDULE
   A. Refer to Door and Frame Schedule on drawings.

END OF SECTION
SECTION 08 1613
FIBERGLASS DOORS

PART 1  GENERAL
1.01  SECTION INCLUDES
A. Fiberglass doors.
B. Fiberglass door frames.
C. Glazing.

1.02  RELATED REQUIREMENTS
A. Section 08 7100 - Door Hardware.

1.03  REFERENCE STANDARDS

1.04  ADMINISTRATIVE REQUIREMENTS
A. Coordination: Obtain hardware templates from hardware manufacturer prior to starting fabrication.

1.05  SUBMITTALS
A. See Section 013300 - Submittals, for submittal procedures.
B. Product Data: Provide manufacturer's standard details, installation instructions, hardware and anchor recommendations.
C. Shop Drawings: Indicate layout and profiles; include assembly methods.
   1. Indicate product components, including hardware reinforcement locations and preparations, accessories, finish colors, patterns, and textures.
   2. Indicate wall conditions, door and frame elevations, sections, materials, gages, finishes, location of door hardware by dimension, and details of openings; use same reference numbers indicated on drawings to identify details and openings.
D. Selection Samples: Submit two complete sets of color chips, illustrating manufacturer's available finishes, colors, and textures.
E. Manufacturer's Qualification Statement.
F. Installer's Qualification Statement.
G. Maintenance Data: Include instructions for repair of minor scratches and damage.
H. Warranty: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer; include detailed terms of warranty.

1.06  QUALITY ASSURANCE
A. Manufacturer Qualifications: Company specializing in manufacturing products of the type specified in this section, with not less than three years of documented experience.
B. Installer Qualifications: Company specializing in performing work of the type specified and with at least three years of documented experience.

1.07  DELIVERY, STORAGE, AND HANDLING
A. Deliver materials in manufacturer’s original, unopened, undamaged containers with identification labels intact.
B. Store materials in original packaging, under cover, protected from exposure to harmful weather conditions and from direct contact with water.
   1. Store at temperature and humidity conditions recommended by manufacturer.
   2. Do not use non-vented plastic or canvas shelters.
   3. Immediately remove wet wrappers.
C. Store in position recommended by manufacturer, elevated minimum 4 inch above grade, with minimum 1/4 inch space between doors.

1.08 FIELD CONDITIONS
A. Do not install doors until structure is enclosed.
B. Maintain temperature and humidity at manufacturer’s recommended levels during and after installation of doors.

1.09 WARRANTY
A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.
B. Provide five (5) year manufacturer warranty covering materials and workmanship, including degradation or failure due to chemical contact.

PART 2 PRODUCTS
2.01 MANUFACTURERS
A. Fiberglass Composite Doors:
   1. Special-Lite, Inc; Model SL-17: www.special-lite.com/#sle.
   2. Tiger Door, LLC; F-200 Series: www.tigerdoor.com/#sle.
   4. Substitutions: Equal Products approved by the Architect.

2.02 DOOR AND FRAME ASSEMBLIES
A. Door and Frame Assemblies: Factory-fabricated, prepared and machined for hardware.
   1. Surface Burning Characteristics: Flame spread index (FSI) of 0 to 25, Class A, and smoke developed index (SDI) of 450 or less, when tested in accordance with ASTM E84.
   2. Flammability: Self-extinguishing when tested in accordance with ASTM D635.
   3. Sizes: As indicated on drawings.
   5. Clearance Between Bottom of Door and Finished Floor: 3/4 inch, maximum; not less than 1/4 inch clearance to threshold.

2.03 COMPONENTS
A. Doors: Fiberglass construction with reinforced core.
   2. Core Material: Polypropylene (PP) honeycomb.
   3. Construction:
      a. Fiberglass faces laminated to core with an applied gel coating, or molded in one piece including gel coating on each side.
   4. Face Sheet Texture: Smooth.
   5. Door Panel: As indicated on drawings.
   7. Waterproof Integrity: Provide factory fabricated edges, cut-outs, and hardware preparations of fiberglass reinforced plastic (FRP); provide cut-outs with joints sealed independently of glazing, louver inserts, or trim.
   8. Hardware Preparations: Factory reinforce, machine, and prepare for door hardware including field installed items; provide solid blocking for each item; field cutting, drilling or tapping is not permitted; obtain manufacturer’s hardware templates for preparation as necessary.
   9. Bottom Rail: Provide height necessary to allow up to 1-1/4 inch field cut off bottom of door without impairing door strength or durability.
B. Door Frames: Provide type in compliance with performance requirements specified for doors.
   1. Type: Factory assembled with chemically welded joints.
   2. Profiles: 7-3/4 inch deep, 2 inch wide at jambs, and 2 inch wide at headers.
   4. Non-Fire-Rated:
      a. Fiberglass pultrusions with factory finish.
   5. Corner Joints: Mitered with concealed corner blocks or angles of same material as frame; fiberglass and aluminum joined with screws; steel and stainless steel spot welded; sealed watertight with silicone sealant; field assemble knock-down type frames as required.
   6. Frame Anchors: Stainless steel, Type 304; provide three anchors in each jamb for heights up to 84 inches with one additional anchor for each additional 24 inches in height.
   7. Reinforcing: Provide manufacturer's standard reinforcing at hinge, strike, and closer locations.

2.04 PERFORMANCE REQUIREMENTS
A. Provide door assemblies that have been designed and fabricated in compliance with specified performance requirements.
B. Water Leakage: No uncontrolled leakage on interior face when tested in accordance with ASTM E331 at differential pressure of 7.5 psf.

2.05 FINISHES
A. Gel Coating: Ultraviolet (UV) stabilized polyester finish.
   1. Thickness: Minimum 15 mils wet thickness, plus/minus 3 mils.
   2. Color: As selected by Architect from manufacturer's standard line of colors.

2.06 ACCESSORIES
A. Stops for Glazing: Fiberglass, unless otherwise indicated or required by fire rating; provided by door manufacturer to fit factory made openings, with color and texture to match door; fasteners shall maintain waterproof integrity.
   2. Opening Sizes and Shapes: As indicated on drawings.
B. Glazing:
   1. Fully tempered float glass, 1/4 inch thick, clear.
C. Door Window Frames: Door window frames with glazing securely fastened within door opening.
   1. Size: As indicated on drawings.
D. Door Hardware: As specified in Section 08 7100.

PART 3 EXECUTION

3.01 EXAMINATION
A. Do not begin installation until substrates have been properly prepared.

3.02 PREPARATION
A. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
B. Clean and prepare substrate in accordance with manufacturer's directions.
C. Protect adjacent work and finish surfaces from damage during installation.

3.03 INSTALLATION
A. Install in accordance with manufacturer's instructions; do not penetrate frames with anchors.
B. Set units plumb, level, and true-to-line, without warping or racking doors, and with specified clearances; anchor in place.
C. Set thresholds in continuous bed of sealant.
D. In masonry walls, install frames prior to laying masonry; anchor frames into masonry mortar joints; fill jambs with grout as walls are laid up.
E. Separate aluminum and other metal surfaces from sources of corrosion of electrolytic action at points of contact with other materials.

3.04 ADJUSTING
A. Lubricate, test, and adjust doors to operate easily, free from warp, twist or distortion, and to fit watertight for entire perimeter.
B. Adjust hardware for smooth and quiet operation.
C. Adjust doors to fit snugly and close without sticking or binding.

3.05 CLEANING
A. Clean installed products in accordance with manufacturer’s instructions prior to owner’s acceptance.

3.06 PROTECTION
A. Protect installed products from damage until Date of Substantial Completion.

END OF SECTION
SECTION 08 5113
ALUMINUM WINDOWS

PART 1 GENERAL

1.01 RELATED DOCUMENTS
A. Drawings and general provisions of the Contract including General and Supplementary Conditions and Division 1 Specification Sections apply to this Section.
B. See Section 01030 Alternates. Aluminum Windows are an Alternate Bid item.

1.02 SECTION INCLUDES
A. Extruded aluminum windows with fixed sash and operating sash. Fixed sash for lower level windows, operating sash for upper level windows.
B. Operating hardware.
C. Insect screens.

1.03 RELATED REQUIREMENTS
A. Section 012300 - Alternates
B. Section 08 8000 - Glazing.

1.04 REFERENCE STANDARDS
B. AAMA CW-10 - Care and Handling of Architectural Aluminum From Shop to Site; 2015.

1.05 SUBMITTALS
A. See Section 013300 - Submittals, for submittal procedures.
B. Product Data: Provide component dimensions, information on glass and glazing, internal drainage details, and descriptions of hardware and accessories.
C. Shop Drawings: Indicate opening dimensions, elevations of different types, framed opening tolerances, method for achieving air and vapor barrier seal to adjacent construction, anchorage locations, and installation requirements.
D. Submit two samples of operating hardware.
E. Test Reports: Prior to submitting shop drawings or starting fabrication, submit test report(s) by independent testing agency showing compliance with performance requirements in excess of those prescribed by specified grade.
F. Manufacturer's Installation Instructions: Include complete preparation, installation, and cleaning requirements.
G. Warranty: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

1.06 QUALITY ASSURANCE
A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with minimum three years of documented experience.
B. Installer Qualifications: Company specializing in performing work of type specified and with at least three years of documented experience.
1.07 DELIVERY, STORAGE, AND HANDLING
A. Comply with requirements of AAMA CW-10.
B. Protect finished surfaces with wrapping paper or strippable coating during installation. Do not use adhesive papers or sprayed coatings that bond to substrate when exposed to sunlight or weather.

1.08 FIELD CONDITIONS
A. Do not install sealants when ambient temperature is less than 40 degrees F.
B. Maintain this minimum temperature during and 24 hours after installation of sealants.

1.09 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 five 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 Windows Manufacturers:
   3. EFCO; https://www.efcocorp.com
   4. Substitutions: Equal Products approved by the Architect.

2.02 ALUMINUM WINDOWS
A. Aluminum Windows: Extruded aluminum frame and sash, factory fabricated, factory finished, with operating hardware, related flashings, and anchorage and attachment devices.
   1. Frame Depth: 3.25 inch.
   2. Operable Units: Double weatherstripped.
   3. Fabrication: Joints and corners flush, hairline, and weatherproof, accurately fitted and secured; prepared to receive anchors; fasteners and attachments concealed from view; reinforced as required for operating hardware and imposed loads.
   4. Perimeter Clearance: Minimize space between framing members and adjacent construction while allowing expected movement.
   5. Movement: Accommodate movement between window and perimeter framing and deflection of lintel, without damage to components or deterioration of seals.
   6. 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.
B. Fixed, Non-Operable Type:
   2. Glazing: Double; clear; low-e.
   4. Interior Finish: Class I natural anodized.
C. Outswinging Casement Type:
   2. Provide screens.
   3. Glazing: Double; clear; low-e.
   5. Interior Finish: Class I natural anodized.

2.03 PERFORMANCE REQUIREMENTS
A. Grade: AAMA/WDMA/CSA 101/I.S.2/A440 requirements for specific window type:
1. Performance Class (PC): LC.
2. Performance Grade (PG): 25, with minimum design pressure (DP) of 25.06 psf.

B. Member Deflection: Limit member deflection to flexure limit of glass in any direction, with full recovery of glazing materials.

2.04 COMPONENTS

A. Frames: 3.25 inch wide by 1.25 inch deep profile, of 0.125 inch thick section; thermally broken with interior portion of frame insulated from exterior portion; flush glass stops of snap-on type.

B. Glazing: As specified in Section 08 8000.

C. Insect Screens: Extruded aluminum frame with mitered and reinforced corners; screen mesh taut and secure to frame; secured to window with adjustable hardware allowing screen removal without use of tools.
   1. Hardware: Spring loaded steel pins; four per screen unit.
   2. Screen Mesh: Vinyl-coated fiberglass, window manufacturer's standard mesh.
   3. Frame Finish: Same as frame and sash.

D. Operable Sash Weatherstripping: Wool pile; permanently resilient, profiled to achieve effective weather seal.

E. Fasteners: Stainless steel.

F. Glazing Materials: As specified in Section 08 8000.

G. Sealant for Setting Sills and Sill Flashing: Non-curing butyl type.

2.05 MATERIALS

A. Extruded Aluminum: ASTM B221 (ASTM B221M), 6063 alloy, T6 temper.

2.06 HARDWARE

A. Sash lock: Lever handle with cam lock.

B. Operator: Lever action handle fitted to projecting sash arms with limit stops.

C. Pulls: Manufacturer's standard type.

2.07 FINISHES

A. Class I Natural Anodized Finish: AAMA 611 AA-M12C22A41 Clear anodic coating not less than 0.7 mils thick.

B. Finish Color: As selected by Architect from manufacturer's standard range.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that wall openings and adjoining air and vapor seal materials are ready to receive aluminum windows.

3.02 INSTALLATION

A. Install windows in accordance with manufacturer's instructions.

B. Attach window frame and shims to perimeter opening to accommodate construction tolerances and other irregularities.

C. Align window plumb and level, free of warp or twist. Maintain dimensional tolerances and alignment with adjacent work.

D. Install sill and sill end angles.

E. Provide thermal isolation where components penetrate or disrupt building insulation. Pack fibrous insulation in shim spaces at perimeter of assembly to maintain continuity of thermal barrier.

F. Install operating hardware not pre-installed by manufacturer.

G. Install glass and infill panels in accordance with requirements specified in Section 08 8000.
3.03 TOLERANCES
   A. Maximum Variation from Level or Plumb: 1/16 inches every 3 ft non-cumulative or 1/8 inches per 10 ft, whichever is less.

3.04 ADJUSTING
   A. Adjust hardware for smooth operation and secure weathertight closure.

3.05 CLEANING
   A. Remove protective material from factory finished aluminum surfaces.
   B. Wash surfaces by method recommended and acceptable to window manufacturer; rinse and wipe surfaces clean.
   C. Remove excess glazing sealant by moderate use of mineral spirits or other solvent acceptable to sealant and window manufacturer.

END OF SECTION
SECTION 08 7100

DOOR HARDWARE

PART 1 GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SECTION INCLUDES

A. Hardware for Wood, and Fiberglass doors.
C. Electrically operated and controlled hardware.

1.03 SUBMITTALS

A. See Section 013300 - Submittals, for submittal procedures.
B. Shop Drawings:
   1. Indicate locations and mounting heights of each type of hardware, schedules, catalog cuts.
   2. Submit manufacturer's parts lists.
C. Manufacturer's Installation Instructions: Indicate special procedures, perimeter conditions requiring special attention.
D. Project Record Documents: Record actual locations of concealed equipment, services, and conduit.
E. Maintenance Data: Include data on operating hardware, lubrication requirements, and inspection procedures related to preventative maintenance.
F. Keys: Deliver with identifying tags to Owner by security shipment direct from hardware supplier.
G. Warranty: Submit manufacturer's warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

1.04 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years of documented experience.
B. Hardware Supplier Qualifications: Company specializing in supplying commercial door hardware with 5 years of experience.

1.05 COORDINATION

A. Coordinate the work with other directly affected sections involving manufacture or fabrication of internal reinforcement for door hardware.
B. Furnish templates for door and frame preparation.
C. Sequence installation to ensure utility connections are achieved in an orderly and expeditious manner.
D. Coordinate Owner's keying requirements during the course of the Work.

1.07 MAINTENANCE PRODUCTS

A. Provide special wrenches and tools applicable to each different or special hardware component.
B. Provide maintenance tools and accessories supplied by hardware component manufacturer.
PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Hinges: Basis of design indicated in schedule is listed first below for comparison:
   1. Hager Companies: [www.hagerhinge.com](http://www.hagerhinge.com)

B. Interior Lock and Latch Sets: Basis of design indicated in schedule is listed first below for comparison:
   1. Schlage: ND Series, TLR Style: [https://us.allegion.com](https://us.allegion.com)
   2. Hager Companies: [www.hagerhinge.com](http://www.hagerhinge.com)

C. Lock Cores: Provide for all locking devices including lock and latch sets and exit devices.
   1. Manufacturer C keyway 6-pin core. All door hardware cores are to match. Verify core requirements with Owner prior to Order.

D. Exit Devices: Basis of design indicated in schedule is listed first below for comparison:
   1. Von Duprin: [www.vonduprin.com](http://www.vonduprin.com)
   2. Hager Companies: [www.hagerhinge.com](http://www.hagerhinge.com)

E. Closers: Basis of design indicated in schedule is listed first below for comparison: Always install closers on Secure Side of Door.
   1. LCN: [www.lcn closers.com](http://www.lcn closers.com)
   2. Hager Companies: [www.hagerhinge.com](http://www.hagerhinge.com)
   3. Dorma Kaba: [https://www.dormakaba.com](https://www.dormakaba.com)

F. Wall Stops/ Holders: Basis of design indicated in schedule is listed first below for comparison:
   1. Hager Companies: [www.hagerhinge.com](http://www.hagerhinge.com)
   3. Ives: [https://us.allegion.com](https://us.allegion.com)

G. Gasketing and Thresholds: Basis of design indicated in schedule is listed first below for comparison:
   1. Hager Companies: [www.hagerhinge.com](http://www.hagerhinge.com)
   3. NGP: [https://www.ngp.com/](https://www.ngp.com/)

2.02 GENERAL REQUIREMENTS FOR DOOR HARDWARE PRODUCTS

A. Provide products that comply with the following:
   1. Applicable provisions of Federal, State, and local codes.

2.03 FINISHES

A. Finish on All Exposed Metal Items: US26D (626), unless otherwise noted.
   1. Exceptions:
      a. Hinges: Where steel hinges are acceptable, use matching plated finish.
      b. As indicated for specific items.
   2. Items specified with the same finish shall match as closely as commercially possible.
   3. Provide finishes matching ANSI/BHMA A156.18 designations.

2.04 KEYING
A. Door Locks: Grand master keyed. All doors indicated to have locking hardware to be provided with 6-pin cores to match Owner’s existing lock systems-verify all requirements with Owner.

B. Supply keys in the following quantities:
   1. 5 master keys.
   2. 5 grand master keys.
   3. 5 change keys for each lock.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that doors and frames are ready to receive work and dimensions are as indicated on shop drawings.

B. Verify that electric power is available to power operated devices and of the correct characteristics.

3.02 INSTALLATION

A. Install hardware in accordance with manufacturer's instructions and applicable codes.

B. Use templates provided by hardware item manufacturer.

C. Install hardware on fire-rated doors and frames in accordance with code and NFPA 80.

D. Mounting heights for hardware from finished floor to center line of hardware item: As listed in Schedule, unless otherwise noted:
   1. For steel doors and frames: Comply with DHI "Recommended Locations for Architectural Hardware for Steel Doors and Frames."
   2. For wood doors: Comply with DHI "Recommended Locations for Architectural Hardware for Wood Flush Doors."

3.04 ADJUSTING

A. Adjust hardware for smooth operation.

3.05 PROTECTION OF FINISHED WORK

A. Do not permit adjacent work to damage hardware or finish.
### 3.06 HARDWARE SCHEDULE

The Electrical Contractor shall coordinate the wiring pathways for electric devices between electronic panic devices, electric strikes and card readers, between devices and power supplies and other devices. All wiring pathways are to be concealed in walls or above ceilings where applicable. Coordinate work for electronic devices with the Owner’s Representative and the Security Vendor.

**Hardware Group 1: Single Doors: A**

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 ea.</td>
<td>BB1199 4-1/2x4-1/2 NRP Butts Hager</td>
</tr>
<tr>
<td>1 ea.</td>
<td>4040 Closer LCN</td>
</tr>
<tr>
<td>1 ea.</td>
<td>ANSI F84 Lockset SCHLAGE</td>
</tr>
<tr>
<td>1 ea.</td>
<td>By Security Vendor Electric Strike</td>
</tr>
<tr>
<td>1 ea.</td>
<td>By Security Vendor Power Supply</td>
</tr>
<tr>
<td>1 ea.</td>
<td>810 DBA Drip Guard Hager</td>
</tr>
<tr>
<td>1 ea.</td>
<td>520S N Threshold Hager</td>
</tr>
<tr>
<td>1 ea.</td>
<td>881S N Weatherstrip Hager</td>
</tr>
<tr>
<td>1 ea.</td>
<td>By Security Vendor Card Reader</td>
</tr>
<tr>
<td>1 ea.</td>
<td>By Security Vendor Door Position Switch</td>
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**Hardware Group 2: Pair of Doors: B**

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<tr>
<td>3 pr.</td>
<td>BB1279 4-1/2x4-1/2 NRP Butts HAGER</td>
</tr>
<tr>
<td>2 ea.</td>
<td>4040 Closer LCN</td>
</tr>
<tr>
<td>2 ea.</td>
<td>9947NL-EL Exit Device Von Duprin</td>
</tr>
<tr>
<td>1 ea.</td>
<td>By Security Vendor Power Supply</td>
</tr>
<tr>
<td>1 ea.</td>
<td>By Security Vendor Card Reader</td>
</tr>
<tr>
<td>2 ea.</td>
<td>By Security Vendor Door Position Switch</td>
</tr>
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**Hardware Group 3: Pair of Doors: C**

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<td>3 pr.</td>
<td>BB1279 4-1/2x4-1/2 NRP Butts HAGER</td>
</tr>
<tr>
<td>1 ea.</td>
<td>ANSI F86 (Active Leaf) Lockset SCHLAGE</td>
</tr>
<tr>
<td>1 ea.</td>
<td>282D (Inactive leaf) Manual Flush Bolt HAGER</td>
</tr>
<tr>
<td>2 ea.</td>
<td>4040 Closer LCN</td>
</tr>
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</table>

**Hardware Group 4: Single Door: D**

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<th>Description</th>
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<tbody>
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<td>3 ea.</td>
<td>BB1199 4-1/2x4-1/2 NRP Butts HAGER</td>
</tr>
<tr>
<td>1 ea.</td>
<td>ANSI F86 Lockset SCHLAGE</td>
</tr>
</tbody>
</table>

**Hardware Group 5: Toilet Room Door: E**

<table>
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<th>Item</th>
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<tr>
<td>1 ea.</td>
<td>780-112HD RETW Cont. Hinge HAGER</td>
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<td>1 ea.</td>
<td>4041 Closer LCN</td>
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<tr>
<td>1 ea.</td>
<td>ANSI F76 Lockset SCHLAGE</td>
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<tr>
<td>2 ea.</td>
<td>ANSI E0151 Deadlock SCHLAGE</td>
</tr>
<tr>
<td>1 ea.</td>
<td>234W Wall Stop HAGER</td>
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*Install 1 deadlock 18” below the head of door and 1 deadlock 18” above finish floor.

**Hardware Group 6: Office Single Doors: F (Hinges are by pre-hung door manufacturer)**

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<th>Item</th>
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<tr>
<td>1 ea.</td>
<td>ANSI F109 Lockset SCHLAGE</td>
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<td>234W Wall Stop HAGER</td>
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<td>Hardware Group 7: Single Doors: H</td>
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<td>3 ea. BB1199 4-1/2x4-1/2 NRP</td>
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SECTION 08 8000
GLAZING

PART 1 GENERAL

1.01 RELATED DOCUMENTS
   A. Drawings and general provisions of the Contract including General and Supplementary
      Conditions and Division 1 Specification Sections apply to this Section.

1.02 SECTION INCLUDES
   A. Insulating glass units.
   B. Glazing units.
   C. Glazing compounds and accessories.

1.03 REFERENCE STANDARDS
   B. ANSI Z97.1 - American National Standard for Safety Glazing Materials Used in Buildings -
      Safety Performance Specifications and Methods of Test; 2015.
   C. ASTM C864 - Standard Specification for Dense Elastomeric Compression Seal Gaskets,
      Setting Blocks, and Spacers; 2005 (Reapproved 2015).
   E. ASTM C1048 - Standard Specification for Heat-Strengthened and Fully Tempered Flat Glass;
      2018.
   G. ASTM E2190 - Standard Specification for Insulating Glass Unit Performance and Evaluation;
      2010.
   K. IGMA TM-3000 - North American Glazing Guidelines for Sealed Insulating Glass Units for
      Commercial & Residential Use; 1990 (2016).

1.04 SUBMITTALS
   A. See Section 01 3300 - Submittals, for submittal procedures.
   B. Product Data on Insulating Glass Unit and Glazing Unit Glazing Types: Provide structural,
      physical and environmental characteristics, size limitations, special handling and installation
      requirements.
   C. Product Data on Glazing Compounds and Accessories: Provide chemical, functional, and
      environmental characteristics, limitations, special application requirements, and identify
      available colors.
   D. Samples: Submit two samples 6 by 6 inch in size of glass units.
   E. Certificate: Certify that products of this section meet or exceed specified requirements.
   F. 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), GANA (SM), GANA (LGRM), and IGMA TM-
      3000 for glazing installation methods.
1.06 FIELD CONDITIONS
   A. Do not install glazing when ambient temperature is less than 40 degrees F.
   B. Maintain minimum ambient temperature before, during and 24 hours after installation of glazing compounds.

1.07 WARRANTY
   A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.
   B. Insulating Glass Units: Provide a five (5) year manufacturer warranty to include coverage for seal failure, interpane dusting or misting, including providing products to replace failed units.

PART 2 PRODUCTS

2.01 MANUFACTURERS
   A. Float Glass Manufacturers:
      4. Substitutions: Equal Products approved by the Architect.

2.02 GLASS MATERIALS
   A. Float Glass: Provide float glass based glazing unless otherwise indicated.
      2. Fully Tempered Safety Glass: Complies with ANSI Z97.1 or 16 CFR 1201 criteria for safety glazing used in hazardous locations.

2.03 INSULATING GLASS UNITS
   A. Insulating Glass Units: Types as indicated.
      1. Durability: Certified by an independent testing agency to comply with ASTM E2190.
      2. Spacer Color: Aluminum.
      3. 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.
         b. Color: Black.
      4. Purge interpane space with dry air, hermetically sealed.
   B. Type IG-1 - Insulating Glass Units: Vision glass, double glazed.
      1. Applications: Exterior glazing unless otherwise indicated.
      2. Space between lites filled with air.
      3. Outboard Lite: Fully tempered float glass, 1/4 inch thick, minimum.
         a. Tint: Clear.
      4. Inboard Lite: Fully tempered float glass, 1/4 inch thick, minimum.
         a. Tint: Clear Low-E.
      5. Total Thickness: 1 inch minimum.

2.04 GLAZING UNITS
   A. Type G-2 - Monolithic Interior Vision Glazing:
      1. Applications: Interior glazing unless otherwise indicated for doors.
      2. Glass Type: Fully tempered float glass.
      3. Tint: Clear.
      4. Thickness: 1/4 inch, nominal.

2.05 GLAZING COMPOUNDS
   A. Type GC-5 - Silicone Sealant: Single component; neutral curing; capable of water immersion without loss of properties; non-bleeding, non-staining; ASTM C920, Type S, Grade NS, Class 25, Uses M, A, and G; with cured Shore A hardness range of 15 to 25; color as selected.
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 of glazing or minimum 4 inch by width of glazing rabbet
      space minus 1/16 inch by height to suit glazing method and pane weight and area.
   B. Spacer Shims: Neoprene, 50 to 60 Shore A durometer hardness; ASTM C864 Option II.
      Minimum 3 inch long by one half the height of the glazing stop by 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.
      1. Width: As required for application.
      2. Thickness: As required for application.
   D. Glazing Splines: Resilient silicone extruded shape to suit glazing channel retaining slot; ASTM
      C864 Option II; color black.

PART 3 EXECUTION
3.01 VERIFICATION OF CONDITIONS
   A. Verify that openings for glazing are correctly sized and within tolerances, including those for
      size, squareness, and offsets at corners.
   B. Verify that surfaces of glazing channels or recesses are clean, free of obstructions that may
      impede moisture movement, weeps are clear, and support framing is ready to receive glazing
      system.
3.02 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.
3.03 INSTALLATION, GENERAL
   A. Install glazing sealants in accordance with ASTM C1193, GANA (SM), and manufacturer's
      instructions.
3.04 INSTALLATION - DRY GLAZING METHOD (GASKET GLAZING)
   A. Application - Exterior and/or Interior Glazed: Set glazing infills from either the exterior or the
      interior of the building.
   B. Place setting blocks at 1/4 points with edge block no more than 6 inch from corners.
   C. Rest glazing on setting blocks and push against fixed stop with sufficient pressure on gasket to
      attain full contact.
   D. Install removable stops without displacing glazing gasket; exert pressure for full continuous
      contact.
3.05 CLEANING
   A. Remove excess glazing materials from finish surfaces immediately after application using
      solvents or cleaners recommended by manufacturers.
   B. Remove non-permanent 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.
3.06 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
PART 1 GENERAL

1.01 SECTION INCLUDES

A. This section applies to all floors identified in the contract documents as to receive the following types of floor coverings:
   1. Fluid-Applied Flooring specified in Section 09 6700-Alternate No.2.

B. Removal of existing floor coverings.

C. Preparation of existing concrete floor slabs for installation of floor coverings.

D. Testing of concrete floor slabs for moisture and alkalinity (pH).

E. Remediation of concrete floor slabs due to unsatisfactory moisture or alkalinity (pH) conditions.
   1. Contractor shall perform all specified remediation of concrete floor slabs. If such remediation is indicated by testing agency's report and is due to a condition not under Contractor's control or could not have been predicted by examination prior to entering into the contract, a contract modification will be issued.
   2. Coordination with ALL floor covering and adhesive manufacturers to verify compatibility of flooring, adhesive and remediation products recommended by testing agency.

F. Patching compound.

1.02 RELATED REQUIREMENTS

A. Section 01 2300 - Alternates: Alternate No.2.

1.03 REFERENCE STANDARDS


F. RFCI (RWP) - Recommended Work Practices for Removal of Resilient Floor Coverings; Resilient Floor Covering Institute; October 2011.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Coordinate scheduling of cleaning and testing, so that preliminary cleaning has been completed for at least 24 hours prior to testing.

B. Coordinate this work with the work of the following:
   1. Fluid-Applied Flooring specified in Section 09 6700.

1.05 SUBMITTALS

A. Visual Observation Report: For existing floor coverings to be removed.

B. Floor Covering and Adhesive Manufacturers' Product Literature: For each specific combination of substrate, floor covering, and adhesive to be used; showing:
   1. Moisture and alkalinity (pH) limits and test methods.
   2. Manufacturer's required bond/compatibility test procedure.

1. Description of areas tested; include floor plans and photographs if helpful.
2. Summary of conditions encountered.
3. Moisture and alkalinity (pH) test reports.
5. Submit report to Architect.
6. Submit report not more than two business days after conclusion of testing.

D. Adhesive Bond and Compatibility Test Report.
E. Remedial Materials Product Data: Manufacturer's published data on each product to be used for remediation.
   1. Manufacturer's qualification statement.
   2. Test reports indicating compliance with specified performance requirements, performed by nationally recognized independent testing agency.
   3. Manufacturer's installation instructions.
   4. Specimen Warranty: Copy of warranty to be issued by coating manufacturer and certificate of underwriter's coverage of warranty.

1.06 QUALITY ASSURANCE
A. Moisture and alkalinity (pH) testing shall be performed by an independent testing agency employed and paid by Contractor.
B. Contractor may perform adhesive and bond test with Contractor's own personnel or hire a testing agency.
C. Testing Agency Qualifications: Independent testing agency experienced in the types of testing specified.
   1. Submit evidence of experience consisting of at least 3 test reports of the type required, with project Owner's project contact information.
D. Contractor's Responsibility Relating to Independent Agency Testing:
   1. Provide access for and cooperate with testing agency.
   2. Confirm date of start of testing at least 10 days prior to actual start.
   3. Allow at least 4 business days on site for testing agency activities.
   4. Achieve and maintain specified ambient conditions.
   5. Notify Architect when specified ambient conditions have been achieved and when testing will start.
E. Remedial Coating Installer Qualifications: Company specializing in performing work of the type specified in this section, trained by or employed by coating manufacturer, and able to provide at least 3 project references showing at least 3 years' experience installing moisture emission coatings.

1.07 DELIVERY, STORAGE, AND HANDLING
A. Deliver, store, handle, and protect products in accordance with manufacturer's instructions and recommendations.
B. Deliver materials in manufacturer's packaging; include installation instructions.
C. Keep materials from freezing.

1.08 FIELD CONDITIONS
A. Maintain ambient temperature in spaces where concrete testing is being performed, and for at least 48 hours prior to testing, at not less than 65 degrees F or more than 85 degrees F.
B. Maintain relative humidity in spaces where concrete testing is being performed, and for at least 48 hours prior to testing, at not less than 40 percent and not more than 60 percent.

PART 2 PRODUCTS
2.01 MATERIALS
A. Topical Vapor Barrier
1. Water based silicate sealer that penetrates concrete preventing hydrostatic pressure, capillary action and moisture migration.
   b. Substitutions: Equal Products approved by the Architect.

B. Crack and Joint fill binder
1. Pre-mixed acrylic Co-polymer
   b. Substitutions: Equal Products approved by the Architect.

C. Patching Compound: Floor covering manufacturer's recommended product, suitable for conditions, and compatible with adhesive and floor covering. In the absence of any recommendation from flooring manufacturer, provide a product with the following characteristics:
1. Cementitious moisture-, mildew-, and alkali-resistant compound, compatible with floor, floor covering, and floor covering adhesive, and capable of being feathered to nothing at edges.
2. Compressive Strength: 3000 psi, minimum, after 28 days, when tested in accordance with ASTM C109/C109M or ASTM C472, whichever is appropriate.

PART 3 EXECUTION
3.01 CONCRETE SLAB PREPARATION
A. Coordinate substrate preparation including remedial measures proposed by the testing agency with:
   1. Fluid-Applied Flooring in Section 09 6700.
B. The flooring installer, flooring manufacturer, and adhesive manufacturer are responsible for reviewing and approving the testing agency's recommended remediation methods and products, OR recommending remediation methods and products that are acceptable to the testing agency.
C. Perform following operations in the order indicated:
   1. Existing concrete slabs on-grade with existing floor coverings:
      a. Visual observation of existing floor covering, for adhesion, water damage, alkaline deposits, and other defects.
      b. Removal of existing floor covering.
   2. Preliminary cleaning.
   3. Moisture vapor emission tests; 3 tests in the first 1000 square feet and one test in each additional 1000 square feet, unless otherwise indicated or required by flooring manufacturer.
   4. Internal relative humidity tests; in same locations as moisture vapor emission tests, unless otherwise indicated.
   5. Alkalinity (pH) tests; in same locations as moisture vapor emission tests, unless otherwise indicated.
   6. Specified remediation, if required.
   7. Patching, smoothing, and leveling, as required.
   8. Other preparation specified.
   10. Protection.
D. Remediations:
   1. Active Water Leaks or Continuing Moisture Migration to Surface of Slab: Correct this condition before doing any other remediation; re-test after correction.
   2. Excessive Moisture Emission or Relative Humidity: If an adhesive that is resistant to the level of moisture present is available and acceptable to flooring manufacturer, use that adhesive for installation of the flooring; if not, apply remedial floor coating over entire suspect floor area.
3. Excessive Alkalinity (pH): If remedial floor coating is necessary to address excessive moisture, no additional remediation is required; if not, if an adhesive that is resistant to the level present is available and acceptable to the flooring manufacturer, use that adhesive for installation of the flooring; otherwise, apply a skim coat of specified patching compound over entire suspect floor area.

3.02 REMOVAL OF EXISTING FLOOR COVERINGS
   A. Coordinate removal of existing floor coverings.
   B. Comply with local, State, and federal regulations and recommendations of RFCI Recommended Work Practices for Removal of Resilient Floor Coverings, as applicable to floor covering being removed.
   C. Dispose of removed materials in accordance with local, State, and federal regulations and as specified.

3.03 PRELIMINARY CLEANING
   A. Clean floors of dust, solvents, paint, wax, oil, grease, asphalt, residual adhesive, adhesive removers, film-forming curing compounds, sealing compounds, alkaline salts, excessive laitance, mold, mildew, and other materials that might prevent adhesive bond.
   B. Do not use solvents or other chemicals for cleaning.

3.04 MOISTURE VAPOR EMISSION TESTING
   A. Where the floor covering manufacturer's requirements conflict with either the referenced test method or this specification, comply with the manufacturer's requirements.
   B. Where this specification conflicts with the referenced test method, comply with the requirements of this section.
   C. Test in accordance with ASTM F1869 and as follows.
   D. Plastic sheet test and mat bond test may not be substituted for the specified ASTM test method, as those methods do not quantify the moisture content sufficiently.
   E. In the event that test values exceed floor covering manufacturer's limits, perform remediation as indicated. In the absence of manufacturer limits, perform remediation if test values exceed 3 pounds per 1000 square feet per 24 hours.
   F. Report: Report the information required by the test method.

3.05 INTERNAL RELATIVE HUMIDITY TESTING
   A. Where the floor covering manufacturer's requirements conflict with either the referenced test method or this specification, comply with the manufacturer's requirements.
   B. Where this specification conflicts with the referenced test method, comply with the requirements of this section.
   C. Test in accordance with ASTM F2170 Procedure A and as follows.
   D. Testing with electrical impedance or resistance apparatus may not be substituted for the specified ASTM test method, as the values determined are not comparable to the ASTM test values and do not quantify the moisture content sufficiently.
   E. In the event that test values exceed floor covering manufacturer's limits, perform remediation as indicated. In the absence of manufacturer limits, perform remediation if any test value exceeds 75 percent relative humidity.
   F. Report: Report the information required by the test method.

3.06 ALKALINITY TESTING
   A. Where the floor covering manufacturer's requirements conflict with either the referenced test method or this specification, comply with the manufacturer's requirements.
   B. The following procedure is the equivalent of that described in ASTM F710, repeated here for the Contractor's convenience.
C. Use a wide range alkalinity (pH) test paper, its associated chart, and distilled or deionized water.

D. Place several drops of water on a clean surface of concrete, forming a puddle approximately 1 inch in diameter. Allow the puddle to set for approximately 60 seconds, then dip the alkalinity (pH) test paper into the water, remove it, and compare immediately to chart to determine alkalinity (pH) reading.

E. In the event that test values exceed floor covering manufacturer's limits, perform remediation as indicated. In the absence of manufacturer limits, perform remediation if alkalinity (pH) test value is over 10.

3.07 PREPARATION
   A. See individual floor covering section(s) for additional requirements.
   B. Comply with mutual recommendations of testing agency, flooring installer, floor covering manufacturer and adhesive manufacturer.
   C. Fill and smooth surface cracks, grooves, depressions, control joints and other non-moving joints, and other irregularities with patching compound.
   D. Do not fill expansion joints, isolation joints, or other moving joints.

3.08 ADHESIVE BOND AND COMPATIBILITY TESTING
   A. Comply with requirements and recommendations of floor covering manufacturer.

3.09 APPLICATION OF REMEDIAL FLOOR COATING
   A. Comply with requirements and recommendations of coating manufacturer.

3.10 PROTECTION
   A. Cover prepared floors with building paper or other durable covering to prevent damage during subsequent construction operations.

END OF SECTION
SECTION 09 2116
GYPSUM BOARD ASSEMBLIES

PART 1 GENERAL
1.01 SECTION INCLUDES
A. Metal stud wall framing.
B. Acoustic insulation.
C. Gypsum wallboard.
D. Joint treatment and accessories.

1.02 REFERENCE STANDARDS
F. ASTM C1002 - Standard Specification for Steel Self-Piercing Tapping Screws for Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs; 2018.

1.03 SUBMITTALS
A. See Section 013300 - Submittals, for submittal procedures.
B. Product Data: Provide data on metal framing, gypsum board, accessories, and joint finishing system.

1.04 QUALITY ASSURANCE
A. Installer Qualifications: Company specializing in performing gypsum board installation and finishing, with minimum 3 years of experience.

PART 2 PRODUCTS
2.01 METAL FRAMING MATERIALS
A. Loadbearing Studs for Application of Gypsum Board: As specified in Section 05 4000.
B. Non-Loadbearing Framing System Components: ASTM C645; galvanized sheet steel, of size and properties necessary to comply with ASTM C754 for the spacing indicated, with maximum deflection of wall framing of L/120 at 5 psf.
   1. Studs: "C" shaped with flat or formed webs with knurled faces.
   2. Runners: U shaped, sized to match studs.

2.02 BOARD MATERIALS
A. Manufacturers - Gypsum-Based Board:
4. Substitutions: Equal Products approved by the Architect.

B. Gypsum Wallboard: Paper-faced gypsum panels as defined in ASTM C1396/C1396M; sizes to minimize joints in place; ends square cut.
   1. Application: Use for vertical surfaces and ceilings, unless otherwise indicated.
   2. All products mold and moisture resistant.
   3. Mold Resistance: Score of 10, when tested in accordance with ASTM D3273.
      a. Mold resistant board is required at all locations.
   4. Thickness:
   5. Mold Resistant Paper Faced Products:
      a. CertainTeed Corporation; M2Tech 5/8" Type C Moisture & Mold Resistant Drywall.
      b. Georgia-Pacific Gypsum; ToughRock Mold-Guard.
      c. National Gypsum Company; Gold Bond XP Gypsum Board.
      d. Substitutions: Equal Products approved by the Architect.

2.03 GYPSUM WALLBOARD ACCESSORIES
   A. Acoustic Insulation: ASTM C665; preformed glass fiber, friction fit type, unfaced. Thickness: 3 inch.
   B. Beads, Joint Accessories, and Other Trim: ASTM C1047, rigid plastic, galvanized steel, or rolled zinc, unless noted otherwise.
   C. Joint Materials: ASTM C475/C475M and as recommended by gypsum board manufacturer for project conditions.
   D. Screws for Fastening of Gypsum Panel Products to Cold-Formed Steel Studs Less than 0.033 inch in Thickness and Wood Members: ASTM C1002; self-piercing tapping screws, corrosion resistant.

PART 3 EXECUTION

3.01 EXAMINATION
   A. Verify that project conditions are appropriate for work of this section to commence.

3.02 ACOUSTIC ACCESSORIES INSTALLATION
   A. Acoustic Insulation: Place tightly within spaces, around cut openings, behind and around electrical and mechanical items within partitions, and tight to items passing through partitions.
   B. Acoustic Sealant: Install in accordance with manufacturer's instructions.

3.03 BOARD INSTALLATION
   A. Comply with ASTM C840, GA-216, and manufacturer's instructions. Install to minimize butt end joints, especially in highly visible locations.
   B. Single-Layer Non-Rated: Install gypsum board in most economical direction, with ends and edges occurring over firm bearing.

3.04 INSTALLATION OF TRIM AND ACCESSORIES
   A. Control Joints: Place control joints consistent with lines of building spaces and as indicated.
      1. Not more than 30 feet apart on walls and ceilings over 50 feet long.
   B. Corner Beads: Install at external corners, using longest practical lengths.
   C. Edge Trim: Install at locations where gypsum board abuts dissimilar materials.

3.05 JOINT TREATMENT
   A. Paper Faced Gypsum Board: Use paper joint tape, embed with drying type joint compound and finish with drying type joint compound.
   B. Finish gypsum board in accordance with levels defined in ASTM C840, as follows:
1. Level 4: Walls and ceilings to receive paint finish or wall coverings, unless otherwise indicated.
2. Level 1: Wall areas above finished ceilings, whether or not accessible in the completed construction.
C. Tape, fill, and sand exposed joints, edges, and corners to produce smooth surface ready to receive finishes.
   1. Feather coats of joint compound so that camber is maximum 1/32 inch.

3.06 TOLERANCES
   A. Maximum Variation of Finished Gypsum Board Surface from True Flatness: 1/8 inch in 10 feet in any direction.

END OF SECTION
PART 1 GENERAL

1.01 SECTION INCLUDES
A. Suspended metal grid ceiling system.
B. Acoustical units.

1.02 REFERENCE STANDARDS
E. ASTM E1264 - Standard Classification for Acoustical Ceiling Products; 2014.

1.03 ADMINISTRATIVE REQUIREMENTS
A. Sequence work to ensure acoustical ceilings are not installed until building is enclosed, sufficient heat is provided, dust generating activities have terminated, and overhead work is completed, tested, and approved.
B. Do not install acoustical units until after interior wet work is dry.

1.04 SUBMITTALS
A. See Section 013300 - Submittals, for submittal procedures.
B. Product Data: Provide data on suspension system components and acoustical units.

1.05 QUALITY ASSURANCE
A. Suspension System Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.
B. Acoustical Unit Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

1.06 FIELD CONDITIONS
A. Maintain uniform temperature of minimum 60 degrees F, and maximum humidity of 40 percent prior to, during, and after acoustical unit installation.

PART 2 PRODUCTS

2.01 MANUFACTURERS
A. Acoustic Tiles/Panels:
   4. Substitutions: Equal Products approved by the Architect.

2.02 ACOUSTICAL UNITS
A. Acoustical Units - General: ASTM E1264, Class A.
B. Acoustical Panels: Painted mineral fiber, with the following characteristics:
   1. Classification: ASTM E1264 Type III.
   2. Size: 24 by 24 inches.
5. Tile Edge: Square.
7. Suspension System: Exposed grid.
8. Products:
   b. USG Corporation; Radar: www.usg.com/ceilings/#sle.
   c. Certainteed; Baroque; www.certainteed.com/#sle.
   d. Substitutions: Equal Products approved by the Architect.

2.03 SUSPENSION SYSTEM(S)
   A. Metal Suspension Systems - General: Complying with ASTM C635/C635M; die cut and
      interlocking components, with perimeter moldings, hold down clips, stabilizer bars, clips, and
      splices as required.
      1. Materials:
         a. Steel Grid: ASTM A653/A653M, G30 coating, unless otherwise indicated.

2.04 ACCESSORIES
   A. Support Channels and Hangers: Galvanized steel; size and type to suit application and ceiling
      system flatness requirement specified.
   B. Hanger Wire: 12-gage 0.08 inch galvanized steel wire.
   C. Perimeter Moldings: Same metal and finish as grid.
   D. Touch-up Paint: Type and color to match acoustical and grid units.

PART 3 EXECUTION

3.01 EXAMINATION
   A. Verify existing conditions before starting work.
   B. Verify that layout of hangers will not interfere with other work.

3.02 PREPARATION
   A. Install after major above-ceiling work is complete.
   B. Coordinate the location of hangers with other work.

3.03 INSTALLATION - SUSPENSION SYSTEM
   A. Install suspension system in accordance with ASTM C636/C636M, ASTM E580/E580M, and
      manufacturer's instructions and as supplemented in this section.
   B. Rigidly secure system, including integral mechanical and electrical components, for maximum
      deflection of 1:360.
   C. Locate system on room axis according to reflected plan.
   D. Perimeter Molding: Install at intersection of ceiling and vertical surfaces and at junctions with
      other interruptions.
      1. Use longest practical lengths.
      2. Miter corners.
   E. Suspension System, Non-Seismic: Hang suspension system independent of walls, columns,
      ducts, pipes and conduit. Where carrying members are spliced, avoid visible displacement of
      face plane of adjacent members.
   F. Where ducts or other equipment prevent the regular spacing of hangers, reinforce the nearest
      affected hangers and related carrying channels to span the extra distance.
   G. Do not support components on main runners or cross runners if weight causes total dead load
      to exceed deflection capability.
H. Support fixture loads using supplementary hangers located within 6 inches of each corner, or support components independently.
I. Do not eccentrically load system or induce rotation of runners.

3.04 INSTALLATION - ACOUSTICAL UNITS
A. Install acoustical units in accordance with manufacturer's instructions.
B. Fit acoustical units in place, free from damaged edges or other defects detrimental to appearance and function.
C. Fit border trim neatly against abutting surfaces.
D. Install acoustical units level, in uniform plane, and free from twist, warp, and dents.
E. Cutting Acoustical Units:
   1. Make field cut edges of same profile as factory edges.

3.05 TOLERANCES
A. Maximum Variation from Flat and Level Surface: 1/8 inch in 10 feet.
B. Maximum Variation from Plumb of Grid Members Caused by Eccentric Loads: 2 degrees.

END OF SECTION
PART 1 GENERAL
1.01 SECTION INCLUDES
A. Resilient base.
B. Resilient transition accessories.
C. Installation accessories.
1.02 REFERENCE STANDARDS
1.03 SUBMITTALS
A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
B. Product Data: Provide data on specified products, describing physical and performance characteristics; including sizes, and colors available; and installation instructions.
C. Selection Samples: Submit manufacturer's complete set of color samples for Architect's initial selection.
D. Maintenance Data: Include maintenance procedures, recommended maintenance materials, and suggested schedule for cleaning, stripping, and re-waxing.
E. Maintenance Materials: Furnish the following for Owner’s use in maintenance of project.
   1. See Section 01 6000 - Product Requirements, for additional provisions.
   2. Extra Wall Base: 20 linear feet of each type and color.
1.04 QUALITY ASSURANCE
A. Manufacturer Qualifications: Company specializing in manufacturing specified flooring with minimum three years documented experience.
B. Installer Qualifications: Company specializing in installing specified flooring with minimum three years documented experience.
1.05 DELIVERY, STORAGE, AND HANDLING
A. Upon receipt, immediately remove any shrink-wrap and check materials for damage and the correct style, color, quantity and run numbers.
B. Store all materials off of the floor in an acclimatized, weather-tight space.
C. Maintain temperature in storage area between 55 degrees F and 90 degrees F.
D. Protect roll materials from damage by storing on end.

PART 2 PRODUCTS
2.01 RESILIENT BASE
A. Resilient Base: ASTM F1861, Type TS rubber, vulcanized thermoset; top set Style B, Cove.
   1. Manufacturers:
      c. Roppe Corp; Pinnacle: www.roppe.com/#sle.
      d. Substitutions: Equal Products approved by the Architect.
   2. Height: 4 inch.
   3. Thickness: 0.125 inch.
   5. Length: Roll.
   6. Color: To be selected by Architect from manufacturer's full range.
2.02 ACCESSORIES
   A. Adhesives: Waterproof; types recommended by manufacturer.
   B. Moldings, Transition and Edge Strips: Same Material as Base.

PART 3 EXECUTION
3.01 EXAMINATION
   A. Verify that wall surfaces are smooth and flat within the tolerances specified for that type of work, are dust-free, and are ready to receive resilient base.

3.02 INSTALLATION - GENERAL
   A. Starting installation constitutes acceptance of subfloor conditions.
   B. Install in accordance with manufacturer's written instructions.
   C. Adhesive-Applied Installation:
      1. Spread only enough adhesive to permit installation of materials before initial set.
      2. Fit joints and butt seams tightly.
   D. Install rubber edge strips at unprotected or exposed edges, where flooring terminates or changes, and where indicated.
      1. Resilient Strips: Attach to substrate using adhesive.

3.03 INSTALLATION - RESILIENT BASE
   A. Fit joints tightly and make vertical. Maintain minimum dimension of 18 inches between joints.
   B. Install base on solid backing. Bond tightly to wall and floor surfaces.
   C. Scribe and fit to door frames and other interruptions.

3.04 CLEANING
   A. Remove excess adhesive from floor, base, and wall surfaces without damage.
   B. Clean in accordance with manufacturer's written instructions.

END OF SECTION
PART 1 GENERAL

1.01 RELATED DOCUMENTS
   A. Drawings and general provisions of the Contract including General and Supplementary
      Conditions and Division 1 Specification Sections apply to this Section.

1.02 SECTION INCLUDES
   A. Fluid-applied flooring.

1.03 SUBMITTALS
   A. See Section 013300 - Submittals, for submittal procedures.
   B. Product Data: Provide data on specified products, describing physical and performance
      characteristics; sizes, patterns and colors available.
   C. Samples: Submit two samples, 4” by 4” inch in size illustrating color and pattern for each floor
      material for each color specified.
   D. Concrete Subfloor Test Report: Submit a copy of the moisture and alkalinity (pH) test reports.
   E. Manufacturer's Installation Instructions: Indicate special procedures.

1.04 QUALITY ASSURANCE
   A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this
      section with minimum three years documented experience.
   B. Applicator Qualifications: Company specializing in performing the work of this section.
      1. Minimum three years of documented experience.

1.05 MOCK-UP
   A. Construct mock-up(s) of fluid applied flooring to serve as basis for evaluation of texture and
      workmanship.
      1. Number of Mock-Ups to be Prepared: One.
      2. Use same materials and methods for use in the work.
      3. Locate where directed.
   B. Obtain approval of mock-up by Architect before proceeding with work.
   C. Approved mock-up may remain as part of the Work.

1.06 DELIVERY, STORAGE, AND HANDLING
   A. Store resin materials in a dry, secure area.
   B. Store materials for three days prior to installation in area of installation to achieve temperature
      stability.

1.07 FIELD CONDITIONS
   A. Maintain minimum temperature in storage area of 55 degrees F.
   B. Store materials in area of installation for minimum period of 24 hours prior to installation.
   C. Maintain ambient temperature required by manufacturer 72 hours prior to, during, and 24 hours
      after installation of materials.

PART 2 PRODUCTS

2.01 MANUFACTURERS
   A. Fluid-Applied Flooring:
      1. Tnemec; Hi Build Epoxoline Series 66: https://www.tnemec.com/
      2. Sherwin-Williams Company; High Build Epoxy-Polyamide Coating: https://www.sherwin-
         williams.com
3. PPG Paints; Aquapon High Build: [http://www.ppghighperformancecoatings.com](http://www.ppghighperformancecoatings.com)
4. Substitutions: Equal Products approved by the Architect.

### 2.02 FLUID-APPLIED FLOORING SYSTEMS

   1. System Thickness: Two Coats 8.0-12.0 mils minimum nominal, when dry.
   2. Texture: Smooth.

### 2.03 ACCESSORIES

A. Subfloor Filler: Type recommended by fluid-applied flooring manufacturer.
B. Primer: Type recommended by fluid-applied flooring manufacturer.

### PART 3 EXECUTION

#### 3.01 EXAMINATION

A. Verify that subfloor surfaces are smooth and flat within the tolerances specified for that type of work and are ready to receive flooring.
B. Verify that wall surfaces are smooth and flat within the tolerances specified for that type of work, are dust-free, and are ready to receive flooring.
C. Verify that subfloor surfaces are dust-free and free of substances that could impair bonding of materials to subfloor surfaces.
D. Cementitious Subfloor Surfaces: Verify that substrates are ready for fluid-applied flooring installation by testing for moisture and alkalinity (pH).
   1. Test in accordance with Section 09 0561.
   2. Obtain instructions if test results are not within limits recommended by fluid-applied flooring manufacturer.
   3. Follow moisture and alkalinity remediation procedures in Section 09 0561.

#### 3.02 PREPARATION

A. Remove existing coatings to concrete substrate and properly prepare concrete surfaces in accordance with SSPC-SP13 and as required by the manufacturer of the new coating system.
B. Remove subfloor ridges and bumps. Fill low spots, cracks, joints, holes, and other defects with subfloor filler.
C. Remove existing sealants in existing joints and properly fill for application of new coatings as required by the manufacturer.
D. Apply, trowel, and float filler to achieve smooth, flat, hard surface. Grind irregularities above the surface level. Prohibit traffic until filler is cured.
E. Vacuum clean substrate.
F. Apply primer to surfaces required by flooring manufacturer.

#### 3.03 INSTALLATION - FLOORING

A. Apply in accordance with manufacturer's instructions.
B. Apply each coat to minimum thickness required by manufacturer.
C. Finish to smooth level surface.

#### 3.04 PROTECTION

A. Notify Owner of schedules for proper application and curing of products. Coordinate with the Owner regarding access and limitations of facility use for the application and curing process.
B. Prohibit traffic on floor finish as required by manufacturer after installation.
C. Barricade area to protect flooring until fully cured.

END OF SECTION
PART 1  GENERAL

1.01  SECTION INCLUDES

A. Carpet tile, fully adhered.

1.02  REFERENCE STANDARDS


1.03  SUBMITTALS

A. See Section 013300 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data on specified products, describing physical and performance characteristics; sizes, patterns, colors available, and method of installation.

C. Samples: Submit two carpet tiles illustrating color and pattern design for each carpet color selected.

D. Manufacturer's Installation Instructions: Indicate special procedures and perimeter conditions requiring special attention.

E. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.

   1. Extra Carpet Tiles: Quantity equal to 5 percent of total installed of each color and pattern installed.

1.04  QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing specified carpet tile with minimum three years documented experience.

B. Installer Qualifications: Company specializing in installing carpet tile with minimum three years documented experience and approved by carpet tile manufacturer.

PART 2  PRODUCTS

2.01  MANUFACTURERS

A. Tile Carpeting:

   1. Interface, Inc: www.interface.com/#sle.
   4. Substitutions: Equal Products approved by the Architect.

2.02  MATERIALS

A. Tile Carpeting: Tufted, manufactured in one color dye lot.

   1. Tile Size: 24 by 24 inch, nominal.
   2. Color: As selected by Architect.
   4. Critical Radiant Flux: Minimum of 0.22 watts/sq cm, when tested in accordance with ASTM E648 or NFPA 253.
   5. Surface Flammability Ignition: Pass ASTM D2859 (the "pill test").
   6. Maximum Electrostatic Charge: 3 Kv. at 20 percent relative humidity.
   7. Gage: 1/12 inch.
   8. Surface Texture: Textured Pattern Loop.
10. Density: 6,776 minimum.
12. Stitches per inch: 11.0 minimum.
13. Finished Pile thickness: .085”.
15. Primary Backing Material: Vinyl.

2.03 ACCESSORIES
A. Subfloor Filler: White premix latex; type recommended by flooring material manufacturer.
B. Edge Strips: Rubber, color as selected by Architect.
C. Carpet Tile Adhesive: Recommended by carpet tile manufacturer; releasable type.

PART 3 EXECUTION
3.01 EXAMINATION
A. Verify that subfloor surfaces are smooth and flat within tolerances specified for that type of work and are ready to receive carpet tile.
B. Verify that subfloor surfaces are dust-free and free of substances that could impair bonding of adhesive materials to subfloor surfaces.

3.02 PREPARATION
A. Prepare floor substrates as recommended by flooring and adhesive manufacturers.
B. Remove subfloor ridges and bumps. Fill minor or local low spots, cracks, joints, holes, and other defects with subfloor filler.
C. Apply, trowel, and float filler to achieve smooth, flat, hard surface. Prohibit traffic until filler is cured.
D. Vacuum clean substrate.

3.03 INSTALLATION
A. Starting installation constitutes acceptance of subfloor conditions.
B. Install carpet tile in accordance with manufacturer's instructions.
C. Blend carpet from different cartons to ensure minimal variation in color match.
D. Cut carpet tile clean. Fit carpet tight to intersection with vertical surfaces without gaps.
E. Lay carpet tile in square pattern, with pile direction parallel to next unit, set parallel to building lines.
F. Locate change of color or pattern between rooms under door centerline.
G. Fully adhere carpet tile to substrate.
H. Trim carpet tile neatly at walls and around interruptions.
I. Complete installation of edge strips, concealing exposed edges.

3.04 CLEANING
A. Remove excess adhesive without damage, from floor, base, and wall surfaces.
B. Clean and vacuum carpet surfaces.

END OF SECTION
SECTION 09 9123
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. Mechanical and Electrical:
      a. In finished areas, paint insulated and exposed pipes, conduits, electrical boxes, insulated and exposed ducts (except ducts exposed in Hangar Area), 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. Stainless steel, anodized aluminum, bronze, terne coated stainless steel, and lead items.
   6. Floors, unless specifically indicated.
   7. Glass.
   8. Concealed pipes, ducts, and conduits.

1.02 REFERENCE STANDARDS
C. MPI (APL) - Master Painters Institute Approved Products List; Master Painters and Decorators Association; Current Edition.
E. SSPC-SP 1 - Solvent Cleaning; 2015, with Editorial Revision (2016).

1.03 SUBMITTALS
A. See Section 013300 - Submittals, for submittal procedures.
B. 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. MPI product number (e.g. MPI #47).
   3. Cross-reference to specified paint system(s) product is to be used in; include description of each system.
   4. Manufacturer's installation instructions.
   5. If proposal of substitutions is allowed under submittal procedures, explanation of substitutions proposed.
C. Samples: Submit two paper chip samples, 3" by 3" inch in size illustrating range of colors and textures available for each surface finishing product scheduled.

D. Manufacturer's Instructions: Indicate special surface preparation procedures.

E. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
   1. Provide a complete schedule of all paint colors used noting the manufacturer, manufacturer’s color codes and numbers with sheen.
   2. Unused Stock; Label each container with color in addition to the manufacturer's label.

1.04 QUALITY ASSURANCE
A. Manufacturer Qualifications: Company specializing in manufacturing the products specified, with minimum three years documented experience.

B. Applicator Qualifications: Company specializing in performing the type of work specified with minimum 3 years’ experience and approved by manufacturer.

1.05 MOCK-UP
A. Provide door and frame assembly illustrating paint color, texture, and finish.

B. Mock-up may remain as part of the 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 paint, brand name, lot number, brand code, coverage, surface preparation, drying time, cleanup requirements, color designation, and instructions for mixing and reducing.

C. Paint Materials: Store at minimum ambient temperature of 45 degrees F and a maximum of 90 degrees F, in ventilated area, and as required by manufacturer's instructions.

1.07 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. Do not apply materials when relative humidity exceeds 85 percent; at temperatures less than 5 degrees F above the dew point; or to damp or wet surfaces.

D. Minimum Application Temperatures for Paints: 50 degrees F for interiors unless required otherwise by manufacturer's instructions.

E. Provide lighting level of 80 ft candles measured mid-height at substrate surface.

PART 2 PRODUCTS
2.01 MANUFACTURERS
A. Provide paints and finishes from the same manufacturer to the greatest extent possible.

B. Paints:
   2. PPG Paints: www.ppgpaints.com/#sle.
   4. Substitutions: Equal Products approved by the Architect.

C. Primer Sealers: Same manufacturer as top coats.

2.02 PAINTS AND FINISHES - GENERAL
A. Paints and Finishes: Ready mixed, unless intended to be a field-catalyzed paint.
   1. Where MPI paint numbers are specified, provide products listed in Master Painters Institute Approved Product List, current edition available at www.paintinfo.com, for specified MPI categories, except as otherwise indicated.
2. 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.
3. Supply each paint material in quantity required to complete entire project's work from a single production run.
4. Do not reduce, thin, or dilute paint or finishes or add materials unless such procedure is specifically described in manufacturer's product instructions.

B. Volatile Organic Compound (VOC) Content:
1. Provide paints and finishes that comply with the most stringent requirements specified in the following:
2. Determination of VOC Content: Testing and calculation in accordance with 40 CFR 59, Subpart D (EPA Method 24), exclusive of colorants added to a tint base and water added at project site; or other method acceptable to authorities having jurisdiction.

C. Sheens: Provide the sheens specified; where sheen is not specified, sheen will be selected later by Architect from the manufacturer's full line.

D. Colors: To be selected from manufacturer's full range of available colors.
1. Selection to be made by Architect after award of contract.
2. Allow for minimum of three colors for each system, unless otherwise indicated, without additional cost to Owner.
3. Extend colors to surface edges; colors may change at any edge as directed by Architect.
4. In finished areas, finish pipes, ducts, conduit, and equipment the same color as the wall/ceiling they are mounted on/under.

2.03 PAINT SYSTEMS - INTERIOR
   1. Two top coats and one coat primer.
   2. Top Coat(s): High Performance Architectural Interior Latex; MPI #138, 139, 140, or 141.

B. Paint WI-OP-3L - Wood Exposed Structure, Opaque, Latex, 3 Coat:
   1. One coat of latex primer sealer.
   2. Flat: Two coats of latex enamel.

C. Paint CI-OP-3L - Concrete/Masonry, Opaque, Latex, 3 Coat:
   1. One coat of block filler.
   2. Semi-gloss: Two coats of latex enamel.

D. Paint MI-OP-3L - Ferrous Metals, Unprimed, Latex, 3 Coat:
   1. One coat of latex primer.
   2. Semi-gloss: Two coats of latex enamel.

E. Paint MgI-OP-3L - Galvanized Metals, Latex, 3 Coat:
   1. One coat galvanize primer.
   2. Semi-gloss: Two coats of latex enamel.

F. Paint GI-OP-3L - Gypsum Board/Plaster, Latex, 3 Coat:
   1. One coat of Acrylic primer sealer.
   2. Eggshell: Two coats of latex enamel.

2.04 PRIMERS
A. Primers: Provide as recommended by manufacturer of top coats.

2.05 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. Do not begin application of paints and finishes until substrates have been properly prepared.
B. Verify that surfaces are ready to receive work as instructed by the product manufacturer.
C. Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially affect proper application.
D. Test shop-applied primer for compatibility with subsequent cover materials.
E. Measure moisture content of surfaces using an electronic moisture meter. Do not apply finishes unless moisture content of surfaces are below the following maximums:
   1. Gypsum Wallboard: 12 percent.
   2. Masonry, Concrete, and Concrete Masonry Units: 12 percent.
   3. Interior Wood: 15 percent, measured in accordance with ASTM D4442.

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 repair existing paints or finishes that exhibit surface defects.
D. Remove or mask surface appurtenances, including electrical plates, hardware, light fixture trim, escutcheons, and fittings, prior to preparing surfaces or finishing.
E. Seal surfaces that might cause bleed through or staining of topcoat.
F. Masonry:
   1. Remove efflorescence and chalk. Do not coat surfaces if moisture content or 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. Gypsum Board: Fill minor defects with filler compound. Spot prime defects after repair.
H. Galvanized Surfaces:
   1. Remove surface contamination and oils and wash with solvent according to SSPC-SP 1.
I. Ferrous Metal:
   1. Solvent clean according to SSPC-SP 1.
   3. Remove rust, loose mill scale, and other foreign substances using methods recommended in writing by paint manufacturer. Protect from corrosion until coated.
J. Wood Surfaces to Receive Opaque Finish: Wipe off dust and grit prior to priming. Seal knots, pitch streaks, and sappy sections with sealer. Fill nail holes and cracks after primer has dried; sand between coats. Back prime concealed surfaces before installation.
K. Metal Doors to be Painted: Prime metal door top and bottom edge surfaces.

3.03 APPLICATION
A. Remove unfinished louvers, grilles, covers, and access panels on mechanical and electrical components and paint separately.
B. Apply products in accordance with manufacturer's written instructions.
C. Where adjacent sealant is to be painted, do not apply finish coats until sealant is applied.
D. Do not apply finishes to surfaces that are not dry. Allow applied coats to dry before next coat is applied.
E. Apply each coat to uniform appearance in thicknesses specified by manufacturer.
F. Sand wood and metal surfaces lightly between coats to achieve required finish.
G. Vacuum clean surfaces of loose particles. Use tack cloth to remove dust and particles just prior to applying next coat.
H. Wood to Receive Transparent Finishes: Tint fillers to match wood. Work fillers into the grain before set. Wipe excess from surface.
I. Reinstall electrical cover plates, hardware, light fixture trim, escutcheons, and fittings removed prior to finishing.

3.04 CLEANING
A. Collect waste material that could constitute a fire hazard, place in closed metal containers, and remove daily from site.

3.05 PROTECTION
A. Protect finishes until completion of project.
B. Touch-up damaged finishes after Substantial Completion.

3.06 SCHEDULE - PAINT SYSTEMS
A. Gypsum Board: Finish surfaces exposed to view, except mechanical rooms or closets.
B. Wood and Cement Board Siding: Finish surfaces exposed to view, except wood door trim. See Section 09 9300 for Wood Door Trim.
C. Steel Fabrications: Finish surfaces exposed to view.
E. Shop-Primed Metal Items: Finish surfaces exposed to view.
F. Pipe and Duct Insulation Jackets: Finish surfaces exposed to view unless noted otherwise.

END OF SECTION
PART 1 GENERAL

1.01 SECTION INCLUDES
A. Surface preparation.
B. Field application of stains and transparent finishes.

1.02 REFERENCE STANDARDS

1.03 SUBMITTALS
A. See Section 013300 - Submittals, for submittal procedures.
B. 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.
C. Samples: Submit two samples, illustrating selected colors and sheens for each system with specified coats cascaded. Submit on actual wood substrate to be finished, 3" by 3" inch in size.
D. Manufacturer's Instructions: Indicate special surface preparation procedures.
E. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
   1. See Section 01 6000 - Product Requirements, for additional provisions.
   2. Extra Stain and Transparent Finish Materials: 1 gallon of each color and type; from the same product run, store where directed.
   3. Label each container with color and type in addition to the manufacturer's label.

1.04 QUALITY ASSURANCE
A. Manufacturer Qualifications: Company specializing in manufacturing the products specified, with minimum three years documented experience.
B. Applicator Qualifications: Company specializing in performing the type of work specified with minimum 3 years experience and approved by manufacturer.

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 stain or transparent finish, brand name, lot number, brand code, coverage, surface preparation, drying time, cleanup requirements, color designation, and instructions for mixing and reducing.
C. Stain and Transparent Finish Materials: Store at minimum ambient temperature of 45 degrees F and a maximum of 90 degrees F, in ventilated area, and as required by manufacturer's instructions.

1.06 FIELD CONDITIONS
A. Do not apply materials when surface and ambient temperatures are outside the temperature ranges required by manufacturer of stains and transparent finishes.
B. Follow manufacturer's recommended procedures for producing best results, including testing of substrates, moisture in substrates, and humidity and temperature limitations.
C. Do not apply materials when relative humidity exceeds 85 percent; at temperatures less than 5 degrees F above the dew point; or to damp or wet surfaces.
D. Minimum Application Temperature: 50 degrees F unless required otherwise by manufacturer's instructions.

E. Provide lighting level of 80 ft candles measured mid-height at substrate surface.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Provide finishes used in any individual system from the same manufacturer; no exceptions.

B. Transparent Finishes:
   2. PPG Paints ProLuxe Transparent Finishes: www.perfectwoodstains.com/#sle.
   4. Substitutions: Equal Products approved by the Architect.

C. Stains:
   4. Substitutions: Equal Products approved by the Architect.

2.02 STAINS AND TRANSPARENT FINISHES - GENERAL

A. Finishes:
   1. Provide finishes 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. Provide materials that are compatible with one another and the substrates indicated under conditions of service and application, as demonstrated by manufacturer based on testing and field experience.
   3. Supply each finish material in quantity required to complete entire project's work from a single production run.
   4. Do not reduce, thin, or dilute finishes or add materials unless such procedure is specifically described in manufacturer's product instructions.

2.03 INTERIOR STAIN AND TRANSPARENT FINISH SYSTEMS

A. Finish on Wood - Vertical Surfaces: Match existing door and trim color and sheen.
   3. Top Coat(s): Clear Water Based Varnish; MPI #129.

2.04 ACCESSORY MATERIALS

A. Accessory Materials: Cleaning agents, cleaning cloths, sanding materials, and clean-up materials as required for final completion of finished surfaces.

B. Patching Material: Latex filler.

C. Fastener Head Cover Material: Latex filler.

PART 3 EXECUTION

3.01 EXAMINATION

A. Do not begin application of stains and finishes until substrates have been properly prepared.

B. Verify that surfaces are ready to receive work as instructed by the product manufacturer.

C. Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially effect proper application.

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 repair existing finishes that exhibit surface defects.
D. Remove or mask surface appurtenances, including electrical plates, hardware, light fixture trim, escutcheons, and fittings, prior to preparing surfaces or finishing.
E. Seal surfaces that might cause bleed through or staining of topcoat.
F. Wood Surfaces to Receive Transparent Finish: Wipe off dust and grit prior to sealing, seal knots, pitch streaks, and sappy sections with sealer. Fill nail holes and cracks after sealer has dried; sand lightly between coats. Prime concealed surfaces with gloss varnish reduced 25 percent with thinner.

3.03 APPLICATION
A. Apply products in accordance with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual".
B. Do not apply finishes to surfaces that are not dry. Allow applied coats to dry before next coat is applied.
C. Apply each coat to uniform appearance in thicknesses specified by manufacturer.
D. Sand wood surfaces lightly between coats to achieve required finish.
E. Vacuum clean surfaces of loose particles. Use tack cloth to remove dust and particles just prior to applying next coat.
F. Wood to Receive Transparent Finishes: Tint fillers to match wood. Work fillers into the grain before set. Wipe excess from surface.
G. Reinstall items removed prior to finishing.

3.04 FIELD QUALITY CONTROL
A. See Section 01 4000 - Quality Requirements, for general requirements for field inspection.
B. Owner will provide field inspection.

3.05 CLEANING
A. Collect waste material that could constitute a fire hazard, place in closed metal containers, and remove daily from site.

3.06 PROTECTION
A. Protect finishes until completion of project.
B. Touch-up damaged finishes after Substantial Completion.

END OF SECTION
SECTION 10 1400
SIGNAGE

PART 1 GENERAL

1.01 SECTION INCLUDES
A. Room and door signs.

1.02 REFERENCE STANDARDS

1.03 SUBMITTALS
A. See Section 013300 - Administrative Requirements, for submittal procedures.
B. Product Data: Manufacturer's printed product literature for each type of sign, indicating sign styles, font, foreground and background colors, locations, overall dimensions of each sign.

1.04 QUALITY ASSURANCE
A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years of documented experience.

1.05 DELIVERY, STORAGE, AND HANDLING
A. Package signs as required to prevent damage before installation.
B. Package room and door signs in sequential order of installation, labeled by floor or building.
C. Store tape adhesive at normal room temperature.

1.06 FIELD CONDITIONS
A. Do not install tape adhesive when ambient temperature is lower than recommended by manufacturer.
B. Maintain this minimum temperature during and after installation of signs.

PART 2 PRODUCTS

2.01 MANUFACTURERS
A. Flat Signs:
   4. Substitutions: Equal Products approved by the Architect.

2.02 SIGNAGE APPLICATIONS
A. Accessibility Compliance: Signs are required to comply with ADA Standards and ICC A117.1 and applicable building codes, unless otherwise indicated; in the event of conflicting requirements, comply with the most comprehensive and specific requirements.
B. Room and Door Signs:
   1. Sign Type: Flat signs with engraved panel media as specified.
   2. Provide “tactile” signage, with letters raised minimum 1/32 inch and Grade II braille.
   3. Character Height: 1 inch.
   4. Main Level Rest Room Only: Identify with pictograms, the names "Unisex", and braille.

2.03 SIGN TYPES
A. Flat Signs: Signage media without frame.
   1. Edges: Square.
   2. Corners: Square.

B. Color and Font: Unless otherwise indicated:
   1. Character Font: Helvetica, Arial, or other sans serif font.
   2. Character Case: Upper case only.

2.04 TACTILE SIGNAGE MEDIA
   A. Applied Character Panels: Acrylic plastic base, with applied acrylic plastic letters and braille.
      1. Total Thickness: 1/8 inch.

2.05 ACCESSORIES
   A. Tape Adhesive: Double sided tape, permanent adhesive.

PART 3 EXECUTION
3.01 EXAMINATION
   A. Verify that substrate surfaces are ready to receive work.

3.02 INSTALLATION
   A. Install in accordance with manufacturer’s instructions.
   B. Install neatly, with horizontal edges level.
   C. Locate signs and mount at heights indicated on drawings and in accordance with ADA Standards and ICC A117.1.
   D. Protect from damage until Substantial Completion; repair or replace damaged items.

END OF SECTION
PART 1  GENERAL

1.01  SECTION INCLUDES
A. Commercial toilet accessories.

1.02  REFERENCE STANDARDS
A. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2015.

1.03  ADMINISTRATIVE REQUIREMENTS
A. Coordinate the work with the placement of internal wall reinforcement, concealed ceiling supports, and reinforcement of toilet partitions to receive anchor attachments.

1.04  SUBMITTALS
A. See Section 013300 - Administrative Requirements, for submittal procedures.
B. Product Data: Submit data on accessories describing size, finish, details of function, and attachment methods.
C. Manufacturer's Installation Instructions: Indicate special procedures and conditions requiring special attention.

PART 2  PRODUCTS

2.01  MANUFACTURERS
A. Commercial Toilet Accessories:
4. Substitutions: Equal Products approved by the Architect.

2.02  MATERIALS
A. Accessories - General: Shop assembled, free of dents and scratches and packaged complete with anchors and fittings, steel anchor plates, adapters, and anchor components for installation.
B. Keys: Provide 2 keys for each accessory to Owner.
C. Stainless Steel Sheet: ASTM A666, Type 304.
D. Mirror Glass: Annealed float glass, ASTM C1036 Type I, Class 1, Quality Q2, with silvering, protective and physical characteristics complying with ASTM C1503.
E. Fasteners, Screws, and Bolts: Hot dip galvanized; tamper-proof; security type.

2.03  FINISHES
A. Stainless Steel: Satin finish, unless otherwise noted.

2.04  COMMERCIAL TOILET ACCESSORIES
A. Toilet Paper Dispenser: Single roll, surface mounted bracket type, stainless steelchrome plated plastic spindle.
B. Paper Towel Dispenser: Folded paper type, stainless steel, surface-mounted, with viewing slots on sides as refill indicator and tumbler lock.
1. Capacity: 300 C-fold minimum.
C. Mirrors: Stainless steel framed, 1/4 inch thick annealed float glass; ASTM C1036, 24" wide x 36" high.
1. Frame: 0.05 inch channel shapes, with mitered and welded and ground corners, and tamperproof hanging system; satin finish.

D. Grab Bars: Stainless steel, smooth surface.
   1. Standard Duty Grab Bars:
      a. Push/Pull Point Load: 250 pound-force, minimum.
      b. Dimensions: 1-1/2 inch outside diameter, minimum 0.05 inch wall thickness, exposed flange mounting, 1-1/2 inch clearance between wall and inside of grab bar.
      c. Finish: Satin.
      d. Length and Configuration: As indicated on drawings.

PART 3 EXECUTION

3.01 EXAMINATION
   A. Verify existing conditions before starting work.
   B. Verify exact location of accessories for installation.

3.02 PREPARATION
   A. Provide templates and rough-in measurements as required.

3.03 INSTALLATION
   A. Install accessories in accordance with manufacturers' instructions in locations indicated on drawings.
   B. Install plumb and level, securely and rigidly anchored to substrate.
   C. Mounting Heights: As required by accessibility regulations, unless otherwise indicated.
      1. Grab Bars: As indicated on drawings.
      2. Mirrors: 40 inch, measured from floor to bottom of mirrored surface.
      3. Other Accessories: As indicated on drawings.

3.04 PROTECTION
   A. Protect installed accessories from damage due to subsequent construction operations.

END OF SECTION
SECTION 10 4400
FIRE PROTECTION SPECIALTIES

PART 1 GENERAL
1.01 SECTION INCLUDES
   A. Fire extinguishers.
   B. Accessories.

1.02 REFERENCE STANDARDS

1.03 SUBMITTALS
   A. See Section 013300 - Submittals, for submittal procedures.
   B. Product Data: Provide extinguisher operational features.
   C. Maintenance Data: Include test, refill or recharge schedules and re-certification requirements.

1.04 FIELD CONDITIONS
   A. Do not install extinguishers when ambient temperature may cause freezing of extinguisher ingredients.

PART 2 PRODUCTS
2.01 MANUFACTURERS
   A. Fire Extinguishers:
      4. Substitutions: Equal Products approved by the Architect.

2.02 FIRE EXTINGUISHERS
   A. Fire Extinguishers - General: Comply with product requirements of NFPA 10 and applicable codes, whichever is more stringent.
   B. Multipurpose Dry Chemical Type Fire Extinguishers: Carbon steel tank, with pressure gauge.
      2. Size: 2.5 pound.
      3. Finish: Baked polyester powder coat, red color.

2.03 ACCESSORIES
   A. Extinguisher Brackets: Formed steel, galvanized and enamel finished.

PART 3 EXECUTION
3.01 EXAMINATION
   A. Verify existing conditions before starting work.

3.02 INSTALLATION
   A. Install in accordance with manufacturer's instructions.
   B. Place extinguishers on wall brackets. Locations as indicated on drawings.

END OF SECTION
SECTION 22 05 29
HANGERS AND SUPPORTS FOR PLUMBING PIPING AND EQUIPMENT

PART 1 GENERAL

1.01 RELATED DOCUMENTS
1.01.A. Drawings and general provisions of the Contract including General and Supplementary Conditions and Division 1 Specifications Sections apply to this Section.

1.02 SECTION INCLUDES
1.02.A. Support and attachment components for equipment, piping, and other plumbing work.

1.03 REFERENCE STANDARDS
1.03.D. MFMA-4 - Metal Framing Standards Publication 2004.

1.04 ADMINISTRATIVE REQUIREMENTS
1.04.A. Coordination:
1. Coordinate sizes and arrangement of supports and bases with the actual equipment and components to be installed.
2. Coordinate the work with other trades to provide additional framing and materials required for installation.
3. Coordinate compatibility of support and attachment components with mounting surfaces at the installed locations.
4. Coordinate the arrangement of supports with ductwork, piping, equipment and other potential conflicts installed under other sections or by others.
5. Notify Engineer of any conflicts with or deviations from Contract Documents. Obtain direction before proceeding with work.

1.04.B. Sequencing:
6. Do not install products on or provide attachment to concrete surfaces until concrete has fully cured in accordance with Section 03 30 00.

1.05 QUALITY ASSURANCE
1.05.A. Comply with applicable building code.

PART 2 PRODUCTS

2.01 SUPPORT AND ATTACHMENT COMPONENTS
2.01.A. General Requirements:
1. Provide all required hangers, supports, anchors, fasteners, fittings, accessories, and hardware as necessary for the complete installation of plumbing work.
2. Provide products listed, classified, and labeled as suitable for the purpose intended, where applicable.
3. Where support and attachment component types and sizes are not indicated, select in accordance with manufacturer's application criteria as required for the load to be supported with a minimum safety factor of 2. Include consideration for vibration, equipment operation, and shock loads where applicable.

4. Do not use wire, chain, perforated pipe strap or wood for permanent supports unless specifically indicated or permitted.

5. Steel Components: Use corrosion resistant materials suitable for the 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.
   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.

2.01.B. Metal Channel (Strut) Framing Systems:
   1. Manufacturers:
      d. Substitutions: Equal Products Approved by Engineer.
   2. Comply with MFMA-4.

2.01.C. Hanger Rods: Threaded zinc-plated steel unless otherwise indicated.

2.01.D. Anchors and Fasteners:
   1. Unless otherwise indicated and where not otherwise restricted, use the anchor and fastener types indicated for the specified applications.

PART 3 EXECUTION

3.01 INSTALLATION

3.01.A. Install products in accordance with manufacturer's instructions.

3.01.B. Provide independent support from building structure. Do not provide support from piping, ductwork, conduit, or other systems.

3.01.C. Unless specifically indicated or approved by Engineer, do not provide support from suspended ceiling support system or ceiling grid.

3.01.D. Unless specifically indicated or approved by Engineer, do not provide support from roof deck.

3.01.E. Do not penetrate or otherwise notch or cut structural members without approval of Structural Engineer.

3.01.F. 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.
3.01.G. Secure fasteners according to manufacturer's recommended torque settings.
3.01.H. Remove temporary supports.

**3.02 FIELD QUALITY CONTROL**

3.02.A. See Section 01 40 00 - Quality Requirements, for additional requirements.
3.02.B. Inspect support and attachment components for damage and defects.
3.02.C. Repair cuts and abrasions in galvanized finishes using zinc-rich paint recommended by manufacturer. Replace components that exhibit signs of corrosion.
3.02.D. Correct deficiencies and replace damaged or defective support and attachment components.

END OF SECTION
SECTION 22 05 53
IDENTIFICATION FOR PLUMBING PIPING AND EQUIPMENT

PART 1 GENERAL
1.01 RELATED DOCUMENTS
   1.01.A. Drawings and general provisions of the Contract including General and Supplementary Conditions and Division 1 Specifications Sections apply to this Section.

1.02 SECTION INCLUDES
   1.02.A. Tags.
   1.02.B. Pipe markers.

1.03 REFERENCE STANDARDS

1.04 SUBMITTALS
   1.04.A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
   1.04.B. List: Submit list of wording, symbols, letter size, and color coding for mechanical identification.

PART 2 PRODUCTS
2.01 IDENTIFICATION APPLICATIONS
   2.01.A. Piping: Pipe markers.

2.02 TAGS
2.03 PIPE MARKERS
   2.03.A. Manufacturers:
           4. Substitutions: Equal Products Approved by Engineer.
   2.03.B. Plastic Tape Pipe Markers: Flexible, vinyl film tape with pressure sensitive adhesive backing and printed markings.

PART 3 EXECUTION
3.01 PREPARATION
   3.01.A. Degrease and clean surfaces to receive adhesive for identification materials.

3.02 INSTALLATION
   3.02.A. Install plastic nameplates with corrosive-resistant mechanical fasteners, or adhesive. Apply with sufficient adhesive to ensure permanent adhesion and seal with clear lacquer.
   3.02.B. Install plastic pipe markers in accordance with manufacturer's instructions.
   3.02.C. Install plastic tape pipe markers complete around pipe in accordance with manufacturer's instructions.

END OF SECTION
SECTION 22 07 19
PLUMBING PIPING INSULATION

PART 1 GENERAL

1.01 RELATED DOCUMENTS
   1.01A Drawings and general provisions of the Contract including General and Supplementary
       Conditions and Division 1 Specifications Sections apply to this Section.

1.02 SECTION INCLUDES
   1.02.A Piping insulation.
   1.02.B Jackets and accessories.

1.03 RELATED REQUIREMENTS
   1.03.A Section 07 84 00 - Firestopping.
   1.03.B Section 22 10 05 - Plumbing Piping: Placement of hangers and hanger inserts.

1.04 REFERENCE STANDARDS
       Thermal Insulation in Sheet and Tubular Form 2016.
       Materials 2018b.
       2016.
   1.04.D UL 723 - Standard for Test for Surface Burning Characteristics of Building Materials

1.05 SUBMITTALS
   1.05.A See Section 01 30 00 - Administrative Requirements, for submittal procedures.
   1.05.B Product Data: Provide product description, thermal characteristics, list of materials and
       thickness for each service, and locations.
   1.05.C Manufacturer's Instructions: Indicate installation procedures that ensure acceptable
       workmanship and installation standards will be achieved.

PART 2 PRODUCTS

2.01 REGULATORY REQUIREMENTS
   2.01.A Surface Burning Characteristics: Flame spread index/Smoke developed index of 25/50,
       maximum, when tested in accordance with ASTM E84 or UL 723.

2.02 FLEXIBLE ELASTOMERIC CELLULAR INSULATION
   2.02.A Manufacturer:
      4. Substitutions: Equal Products Approved by Engineer.
   2.02.B Insulation: Preformed flexible elastomeric cellular rubber insulation complying with ASTM
       C534/C534M Grade 1; use molded tubular material wherever possible.
      1. Minimum Service Temperature: Minus 40 degrees F.
      2. Maximum Service Temperature: 220 degrees F.
PART 3 EXECUTION

3.01 EXAMINATION

3.01.A. Verify that piping has been tested before applying insulation materials.
3.01.B. Verify that surfaces are clean and dry, with foreign material removed.

3.02 INSTALLATION

3.02.A. Install in accordance with manufacturer's instructions.
3.02.B. Exposed Piping: Locate insulation and cover seams in least visible locations.
3.02.C. Insulated pipes conveying fluids below ambient temperature: Insulate entire system including fittings, valves, unions, flanges, strainers, flexible connections, pump bodies, and expansion joints.
3.02.D. For hot piping conveying fluids 140 degrees F or less, do not insulate flanges and unions at equipment, but bevel and seal ends of insulation.
3.02.E. Continue insulation through walls, sleeves, pipe hangers, and other pipe penetrations. Finish at supports, protrusions, and interruptions. At fire separations, refer to Section 07 84 00.
3.02.F. Pipe Exposed in Mechanical Equipment Rooms or Finished Spaces (less than 10 feet above finished floor): Finish with PVC jacket and fitting covers.

3.03 SCHEDULES

3.03.A. Plumbing Systems:
   1. Domestic Hot Water Supply:
      a. Cellular Foam Insulation:
   2. Plumbing Vents Within 10 Feet of the Exterior:

END OF SECTION
SECTION 22 10 05
PLUMBING PIPING

PART 1 GENERAL

1.01 RELATED DOCUMENTS
1.01.A. Drawings and general provisions of the Contract including General and Supplementary Conditions and Division 1 Specifications Sections apply to this Section.

1.02 SECTION INCLUDES
1.02.A. Pipe, pipe fittings, specialties, and connections for piping systems.
   1. Sanitary sewer.
   2. Domestic water.
   3. Flanges, unions, and couplings.
   4. Pipe hangers and supports.
   5. Valves.

1.03 RELATED REQUIREMENTS
1.03.A. Section 09 91 23 - Interior Painting.
1.03.B. Section 22 05 16 - Expansion Fittings and Loops for Plumbing Piping.
1.03.C. Section 22 05 53 - Identification for Plumbing Piping and Equipment.
1.03.D. Section 22 07 19 - Plumbing Piping Insulation.
1.03.E. Section 33 01 10.58 - Disinfection of Water Utility Piping Systems.

1.04 REFERENCE STANDARDS


1.04.Y. PPI TR-4 - PPI Listing of Hydrostatic Design Basis (HDB), Hydrostatic Design Stress (HDS), Strength Design Basis (SDB), Pressure Design Basis (PDB), and Minimum Required Strength (MRS) Ratings For Thermoplastic Piping Materials or Pipe 2017.

1.05 SUBMITTALS

1.05.A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

1.05.B. Product Data: Provide data on pipe materials, pipe fittings, valves, and accessories. Provide manufacturers catalog information. Indicate valve data and ratings.

PART 2 PRODUCTS

2.01 GENERAL REQUIREMENTS

2.01.A. Potable Water Supply Systems: Provide piping, pipe fittings, and solder and flux (if used), that comply with NSF 61 and NSF 372 for maximum lead content; label pipe and fittings.

2.02 SANITARY SEWER PIPING, ABOVE GRADE

2.02.A. Cast Iron Pipe: CISPI 301, hubless, service weight.
   1. Fittings: Cast iron.

2.02.B. PVC Pipe: ASTM D2729.
   1. Fittings: PVC.

2.03 DOMESTIC WATER PIPING, ABOVE GRADE

2.03.A. Copper Tube: ASTM B88 (ASTM B88M), Type K (A), Drawn (H).
   1. Fittings: ASME B16.18, cast copper alloy or ASME B16.22, wrought copper and bronze.

2.03.B. Cross-Linked Polyethylene (PEX) Pipe: ASTM F876 or ASTM F877.
   1. Manufacturers:
      b. Viega LLC: www.viega.us/#sle.
d. Substitutions: Equal Products Approved by Engineer.

2. PPI TR-4 Pressure Design Basis:
   a. 160 psig at maximum 73 degrees F.
   b. 100 psig at maximum 180 degrees F.
   c. 80 psig at maximum 200 degrees F.


2.04 FLANGES, UNIONS, AND COUPLINGS
2.04.A. Unions for Pipe Sizes 3 Inches and Under:
   1. Ferrous pipe: Class 150 malleable iron threaded unions.

2.05 PIPE HANGERS AND SUPPORTS
2.05.A. Provide hangers and supports that comply with MSS SP-58.
   1. If type of hanger or support for a particular situation is not indicated, select
      appropriate type using MSS SP-58 recommendations.
   2. Overhead Supports: Individual steel rod hangers attached to structure or to trapeze
      hangers.
   3. Trapeze Hangers: Welded steel channel frames attached to structure.

2.05.B. Plumbing Piping - Drain, Waste, and Vent:
   1. Hangers for Pipe Sizes 1/2 Inch to 1-1/2 Inches: Carbon steel, adjustable swivel, split
      ring.
   2. Hangers for Pipe Sizes 2 Inches and Over: Carbon steel, adjustable, clevis.

2.05.C. Plumbing Piping - Water:
   1. Hangers for Pipe Sizes 1/2 Inch to 1-1/2 Inches: Carbon steel, adjustable swivel, split
      ring.
   2. Hangers for Cold Pipe Sizes 2 Inches and Over: Carbon steel, adjustable, clevis.

2.06 BALL VALVES
2.06.A. Manufacturers:
   1. Nibco, Inc: www.nibco.com/#sle
   5. Substitutions: Equal Products Approved by Engineer.

PART 3 EXECUTION

3.01 PREPARATION
   3.01.B. Remove scale and dirt, on inside and outside, before assembly.
   3.01.C. Prepare piping connections to equipment with flanges or unions.

3.02 INSTALLATION
   3.02.A. Install in accordance with manufacturer's instructions.
3.02.B. Provide non-conducting dielectric connections wherever jointing dissimilar metals.
3.02.C. Route piping in orderly manner and maintain gradient. Route parallel and perpendicular to walls.
3.02.D. Install piping to maintain headroom, conserve space, and not interfere with use of space.
3.02.E. Install piping to allow for expansion and contraction without stressing pipe, joints, or connected equipment. Refer to Section 22 05 16.
3.02.F. Provide clearance in hangers and from structure and other equipment for installation of insulation and access to valves and fittings.
3.02.G. Provide access where valves and fittings are not exposed.
3.02.H. Prepare exposed, unfinished pipe, fittings, supports, and accessories ready for finish painting.
   1. Painting of interior plumbing systems and components is specified in Section 09 91 23.
3.02.I. Install water piping to ASME B31.9.
3.02.J. Copper Pipe and Tube: Make soldered joints in accordance with ASTM B828, using specified solder, and flux meeting ASTM B813; in potable water systems use flux also complying with NSF 61 and NSF 372.
3.02.K. PVC Pipe: Make solvent-welded joints in accordance with ASTM D2855.

3.03 DISINFECTION OF DOMESTIC WATER PIPING SYSTEM
3.03.A. Disinfect water distribution system in accordance with Section 33 01 10.58.
3.03.B. Prior to starting work, verify system is complete, flushed and clean.

3.04 SERVICE CONNECTIONS
3.04.A. Provide new sanitary sewer services. Before commencing work check invert elevations required for sewer connections, confirm inverts and ensure that these can be properly connected with slope for drainage and cover to avoid freezing.

3.05 SCHEDULES
3.05.A. Pipe Hanger Spacing:
   1. Metal Piping:
      a. Pipe Size: 1/2 inches to 1-1/4 inches:
         1) Maximum Hanger Spacing: 6.5 ft.
         2) Hanger Rod Diameter: 3/8 inches.
      b. Pipe Size: 1-1/2 inches to 2 inches:
         1) Maximum Hanger Spacing: 10 ft.
         2) Hanger Rod Diameter: 3/8 inch.
      c. Pipe Size: 2-1/2 inches to 3 inches:
         1) Maximum Hanger Spacing: 10 ft.
         2) Hanger Rod Diameter: 1/2 inch.

END OF SECTION
SECTION 22 40 00
PLUMBING FIXTURES

PART 1 GENERAL

1.01 RELATED DOCUMENTS
1.01.A. Drawings and general provisions of the Contract including General and Supplementary
Conditions and Division 1 Specifications Sections apply to this Section.

1.02 SECTION INCLUDES
1.02.A. Water closets.
1.02.B. Lavatories.
1.02.C. Service sinks.
1.02.D. Under-lavatory pipe supply covers.

1.03 RELATED REQUIREMENTS
1.03.A. Section 22 10 05 - Plumbing Piping.
1.03.B. Section 22 10 06 - Plumbing Piping Specialties.
1.03.C. Section 22 30 00 - Plumbing Equipment.

1.04 REFERENCE STANDARDS
1.04.A. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design
2010.
1.04.B. ASME A112.18.9 - Protectors/Insulators for Exposed Waste and Supplies on Accessible
Fixtures 2011 (Reaffirmed 2017).
1.04.C. ASTM C1822 - Standard Specification for Insulating Covers on Accessible Lavatory
Piping 2015.
1.04.F. ASSE 1070 - Performance Requirements for Water Temperature Limiting Devices 2015.

1.05 SUBMITTALS
1.05.A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
1.05.B. Product Data: Provide catalog illustrations of fixtures, sizes, rough-in dimensions, utility
sizes, trim, and finishes.
1.05.C. Warranty: Submit manufacturer warranty and ensure forms have been completed in
Owner's name and registered with manufacturer.

1.06 DELIVERY, STORAGE, AND HANDLING
1.06.A. Accept fixtures on site in factory packaging. Inspect for damage.
1.06.B. Protect installed fixtures from damage by securing areas and by leaving factory
packaging in place to protect fixtures and prevent use.

1.07 WARRANTY
1.07.A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.
1.07.B. Provide five year manufacturer warranty for electric water cooler.

1.08.C.

PART 2 PRODUCTS

Interior and Exterior Repairs and Improvements
Missouri State Highway Patrol Hangar
2.01 GENERAL REQUIREMENTS

2.01.A. Potable Water Systems: Provide plumbing fittings and faucets that comply with NSF 61 and NSF 372 for maximum lead content; label pipe and fittings.

2.02 REGULATORY REQUIREMENTS

2.02.A. Comply with applicable codes for installation of plumbing systems.

2.03 TANK TYPE WATER CLOSETS

2.03.A. Tank Type Water Closet Manufacturers:
4. Substitutions: Equal Products Approved by Engineer.

2.03.B. Bowl: ASME A112.19.2; floor mounted, siphon jet, vitreous china, 16.5 inches high, close-coupled closet combination with elongated rim, insulated vitreous china closet tank with fittings and lever flushing valve, bolt caps.

2.03.C. Seat Manufacturers:
4. Substitutions: Equal Products Approved by Engineer.

2.03.D. Seat: Solid white plastic, open front, extended back, less cover, complete with self-sustaining hinge.

2.04 LAVATORIES

2.04.A. Lavatory Manufacturers:
4. Substitutions: Equal Products Approved by Engineer.

2.04.B. Vitreous China Wall Hung Basin: ASME A112.19.2; vitreous china wall hung lavatory, 20x18 minimum, with 4 inch high back, rectangular basin with splash lip, front overflow, and soap depression.

2.04.C. Supply Faucet Manufacturers:
4. Substitutions: Equal Products Approved by Engineer.

2.04.D. Supply Faucet: ASME A112.18.1; chrome plated combination supply fitting with open grid strainer, water economy aerator with maximum flow of 2.2 gallons per minute, indexed handles.

2.04.E. Thermostatic Mixing Valve: Thermostatic mixing valve, ASSE 1070 listed, with combination stop, strainer, and check valves, and flexible stainless steel connectors.
1. Manufacturers:
   d. Substitutions: Equal Products Approved by Engineer.
2.05 UNDER-LAVATORY PIPE SUPPLY COVERS

2.05.A. Manufacturers:
2. IPS Corp: https://www.ipscorp.com
3. Oatey: https://www.oatey.com
4. Substitutions: Equal Products Approved by Engineer.

2.05.B. General:
1. Insulate exposed drainage piping including hot, cold and tempered water supplies under lavatories or sinks per ADA Standards.
2. Construction: 1/8 inch PVC with antimicrobial, antifungal and UV resistant properties.
   a. Comply with ASME A112.18.9 for covers on accessible lavatory piping.

PART 3 EXECUTION

3.01 EXAMINATION

3.01.A. Verify that walls and floor finishes are prepared and ready for installation of fixtures.

3.02 PREPARATION

3.02.A. Rough-in fixture piping connections in accordance with minimum sizes indicated in fixture rough-in schedule for particular fixtures.

3.03 INSTALLATION

3.03.A. Install each fixture with trap, easily removable for servicing and cleaning.
3.03.B. Provide stainless steel flexible supplies to fixtures with quarter-turn stops, reducers, and escutcheons.
3.03.C. Install components level and plumb.
3.03.D. Solidly attach water closets to floor with lag screws. Lead flashing is not intended held fixture in place.

3.04 ADJUSTING

3.04.A. Adjust stops or valves for intended water flow rate to fixtures without splashing, noise, or overflow.

3.05 CLEANING

3.05.A. Clean plumbing fixtures and equipment.

3.06 PROTECTION

3.06.A. Protect installed products from damage due to subsequent construction operations.
3.06.B. Do not permit use of fixtures by construction personnel.
3.06.C. Repair or replace damaged products before Date of Substantial Completion.

END OF SECTION
SECTION 23 05 93
TESTING, ADJUSTING, AND BALANCING FOR HVAC

PART 1 GENERAL

1.01 RELATED DOCUMENTS

1.01.A. Drawings and general provisions of the Contract including General and Supplementary Conditions and Divisions 1 Specifications Sections apply to this Section.

1.02 SECTION INCLUDES

1.02.A. Testing, adjustment, and balancing of air systems.

1.03 REFERENCE STANDARDS

1.03.E. SMACNA (TAB) - HVAC Systems Testing, Adjusting and Balancing 2002.

1.04 SUBMITTALS

1.04.A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
1.04.B. TAB Plan: Submit a written plan indicating the testing, adjusting, and balancing standard to be followed and the specific approach for each system and component.
   1. Submit to Engineer.
   2. Include at least the following in the plan:
      a. List of all air flow, water flow, sound level, system capacity and efficiency measurements to be performed and a description of specific test procedures, parameters, formulas to be used.
      b. Copy of field checkout sheets and logs to be used, listing each piece of equipment to be tested, adjusted and balanced with the data cells to be gathered for each.
      c. Discussion of what notations and markings will be made on the duct and piping drawings during the process.
      d. Final test report forms to be used.
      e. Procedures for formal deficiency reports, including scope, frequency and distribution.
1.04.C. Final Report: Indicate deficiencies in systems that would prevent proper testing, adjusting, and balancing of systems and equipment to achieve specified performance.
   1. Revise TAB plan to reflect actual procedures and submit as part of final report.
   2. Submit draft copies of report for review prior to final acceptance of Project. Provide final copies for Architect and for inclusion in operating and maintenance manuals.
   3. Include actual instrument list, with manufacturer name, serial number, and date of calibration.
   4. Form of Test Reports: Where the TAB standard being followed recommends a report format use that; otherwise, follow ASHRAE Std 111.
   5. Units of Measure: Report data in I-P (inch-pound) units only.

PART 2 EXECUTION

Interior and Exterior Repairs and Improvements
Missouri State Highway Patrol Hangar
Project # R2007-01
Testing, Adjusting, and Balancing for HVAC
23 05 93/1
**2.01 GENERAL REQUIREMENTS**

2.01.A. Perform total system balance in accordance with one of the following:

2. SMACNA (TAB).

2.01.B. Begin work after completion of systems to be tested, adjusted, or balanced and complete work prior to Substantial Completion of the project.

2.01.C. Where HVAC systems and/or components interface with life safety systems, including fire and smoke detection, alarm, and control, coordinate scheduling and testing and inspection procedures with the authorities having jurisdiction.

2.01.D. TAB Agency Qualifications:

1. Company specializing in the testing, adjusting, and balancing of systems specified in this section.

**2.02 EXAMINATION**

2.02.A. Verify that systems are complete and operable before commencing work. Ensure the following conditions:

1. Systems are started and operating in a safe and normal condition.
2. Final filters are clean and in place. If required, install temporary media in addition to final filters.
3. Duct systems are clean of debris.
4. Fans are rotating correctly.
5. Fire and volume dampers are in place and open.
6. Access doors are closed and duct end caps are in place.
7. Air outlets are installed and connected.
8. Duct system leakage is minimized.

2.02.B. Beginning of work means acceptance of existing conditions.

**2.03 PREPARATION**

2.03.A. Hold a pre-balancing meeting at least one week prior to starting TAB work.

1. Require attendance by all installers whose work will be tested, adjusted, or balanced.

2.03.B. Provide instruments required for testing, adjusting, and balancing operations. Make instruments available to Engineer to facilitate spot checks during testing.

2.03.C. Provide additional balancing devices as required.

**2.04 ADJUSTMENT TOLERANCES**

2.04.A. Air Outlets and Inlets: Adjust total to within plus 10 percent and minus 10 percent of design to space. Adjust outlets and inlets in space to within plus or minus 10 percent of design.

**2.05 RECORDING AND ADJUSTING**

2.05.A. Field Logs: Maintain written logs including:

1. Running log of events and issues.
2. Discrepancies, deficient or uncompleted work by others.
4. Lists of completed tests.

2.05.B. Ensure recorded data represents actual measured or observed conditions.

2.05.C. Permanently mark settings of valves, dampers, and other adjustment devices allowing settings to be restored. Set and lock memory stops.
2.05.D. Mark on drawings the locations where traverse and other critical measurements were taken and cross reference the location in the final report.

2.05.E. After adjustment, take measurements to verify balance has not been disrupted or that such disruption has been rectified.

2.05.F. Leave systems in proper working order, replacing belt guards, closing access doors, closing doors to electrical switch boxes, and restoring thermostats to specified settings.

2.06 AIR SYSTEM PROCEDURE

2.06.A. Measure air quantities at air inlets and outlets.

2.06.B. Provide system schematic with required and actual air quantities recorded at each outlet or inlet.

END OF SECTION
PART 1 GENERAL

1.01 RELATED DOCUMENTS

1.01.A. Drawings and general provisions of the Contract including General and Supplementary Conditions and Division 1 Specifications Sections apply to this Section.

1.02 SECTION INCLUDES

1.02.A. Duct insulation.
1.02.B. Duct liner.

1.03 REFERENCE STANDARDS


1.04 SUBMITTALS

1.04.A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
1.04.B. Product Data: Provide product description, thermal characteristics, list of materials and thickness for each service, and locations.

1.05 DELIVERY, STORAGE, AND HANDLING

1.05.A. Accept materials on site in original factory packaging, labelled with manufacturer’s identification, including product density and thickness.
1.05.B. Protect insulation from weather and construction traffic, dirt, water, chemical, and mechanical damage, by storing in original wrapping.

1.06 FIELD CONDITIONS

1.06.A. Maintain ambient temperatures and conditions required by manufacturers of adhesives, mastics, and insulation cements.
1.06.B. Maintain temperature during and after installation for minimum period of 24 hours.

PART 2 PRODUCTS

2.01 REGULATORY REQUIREMENTS

2.01.A. Surface Burning Characteristics: Flame spread index/Smoke developed index of 25/50, maximum, when tested in accordance with ASTM E84 or UL 723.

2.02 GLASS FIBER, FLEXIBLE

2.02.A. Manufacturer:
6. Substitutions: Equal ProductsApproved by Engineer.

2.02.B. Insulation: ASTM C553; flexible, noncombustible blanket.
1. K value: 0.36 at 75 degrees F, when tested in accordance with ASTM C518.

2.02.C. Vapor Barrier Jacket:
1. Kraft paper with glass fiber yarn and bonded to aluminized film.

2.03 DUCT LINER
2.03.A. Manufacturers:
1. Armacell LLC; AP Coilflex: www.armacell.us.
6. Substitutions: Equal Products Approved by Engineer.

2.03.B. Glass Fiber.

2.03.C. Elastomeric Foam Insulation: Preformed flexible elastomeric cellular rubber insulation complying with ASTM C534/C534M Grade 1, in sheet form.
1. Minimum Service Temperature: Minus 40 degrees F.
2. Maximum Service Temperature: 180 degrees F.

2.03.D. Glass Fiber Insulation: Non-corrosive, incombustible glass fiber complying with ASTM C1071; flexible blanket, rigid board and preformed round liner board; impregnated surface and edges coated with poly vinyl acetate polymer, acrylic polymer or black composite.
1. Fungal Resistance: No growth when tested according to ASTM G21.
2. Apparent Thermal Conductivity: Maximum of 0.31 at 75 degrees F.
3. Service Temperature: Up to 250 degrees F.
4. Rated Velocity on Coated Air Side for Air Erosion: 5,000 fpm, minimum.
5. Minimum Noise Reduction Coefficients:
   a. 1 inch Thickness: 0.45.

2.03.E. Adhesive: Waterproof, fire-retardant type, ASTM C916.

2.03.F. Liner Fasteners: Galvanized steel, self-adhesive pad with integral head.

PART 3 EXECUTION

3.01 EXAMINATION
3.01.A. Verify that ducts have been tested before applying insulation materials.
3.01.B. Verify that surfaces are clean, foreign material removed, and dry.

3.02 INSTALLATION
3.02.A. Install in accordance with manufacturer’s instructions.
3.03 SCHEDULES

3.03.A. Exhaust Ducts Within 10 ft of Exterior Openings: 1.5" fiberglass wrap.
3.03.B. Supply Ducts: 1" liner
3.03.C. Return Ducts: 1" liner

END OF SECTION
PART 1 GENERAL

1.01 RELATED DOCUMENTS
- 1.01.A. Drawings and general provisions of the Contract including General and Supplementary Conditions and Division 1 Specifications Sections apply to this Section.

1.02 SECTION INCLUDES
- 1.02.A. Metal ductwork.

1.03 RELATED REQUIREMENTS
- 1.03.A. Section 23 05 93 - Testing, Adjusting, and Balancing for HVAC.
- 1.03.B. Section 23 07 13 - Duct Insulation: External insulation and duct liner.
- 1.03.C. Section 23 37 00 - Air Outlets and Inlets.

1.04 REFERENCE STANDARDS

1.05 FIELD CONDITIONS
- 1.05.A. Do not install duct sealants when temperatures are less than those recommended by sealant manufacturers.
- 1.05.B. Maintain temperatures within acceptable range during and after installation of duct sealants.

PART 2 PRODUCTS

2.01 DUCT ASSEMBLIES
- 2.01.A. Regulatory Requirements: Construct ductwork to comply with NFPA 90A standards.
- 2.01.B. Ducts: Galvanized steel, unless otherwise indicated.
- 2.01.C. Medium and High Pressure Supply: 1 inch w.g. pressure class, galvanized steel.
- 2.01.D. Return and Relief: 1 inch w.g. pressure class, galvanized steel.
  - General Exhaust: 1/2 inch w.g. pressure class, galvanized steel.

2.02 MATERIALS
- 2.02.A. Galvanized Steel for Ducts: Hot-dipped galvanized steel sheet, ASTM A653/A653M FS Type B, with G60/Z180 coating.
- 2.02.B. Joint Sealers and Sealants: Non-hardening, water resistant, mildew and mold resistant.
  - 1. Type: Heavy mastic or liquid used alone or with tape, suitable for joint configuration and compatible with substrates, and recommended by manufacturer for pressure class of ducts.
  - 2. Surface Burning Characteristics: Flame spread index of zero and smoke developed index of zero, when tested in accordance with ASTM E84.
2.03 DUCTWORK FABRICATION

2.03.A. Fabricate and support in accordance with SMACNA (DCS) and as indicated.
2.03.B. Provide duct material, gages, reinforcing, and sealing for operating pressures indicated.
2.03.C. Increase duct sizes gradually, not exceeding 15 degrees divergence wherever possible; maximum 30 degrees divergence upstream of equipment and 45 degrees convergence downstream.
2.03.D. Fabricate continuously welded round and oval duct fittings in accordance with SMACNA (DCS).

2.04 MANUFACTURED DUCTWORK AND FITTINGS

2.04.A. Round Ducts: Round lockseam duct with galvanized steel outer wall.
   1. Manufacture in accordance with SMACNA (DCS).
   2. Manufacturers:
      d. Substitutions: Equal Products Approved by Engineer.

2.04.B. Flexible Ducts: Two ply vinyl film supported by helically wound spring steel wire.
   1. Pressure Rating: 10 inches WG positive and 1.0 inches WG negative.
   3. Temperature Range: Minus 10 degrees F to 160 degrees F.
   4. Manufacturers:
      c. Thermaflex: www.thermaflex.net.
      d. Substitutions: Equal Products Approved by Engineer.

PART 3 EXECUTION

3.01 INSTALLATION

3.01.A. Install, support, and seal ducts in accordance with SMACNA (DCS).
3.01.B. Install in accordance with manufacturer's instructions.
3.01.C. During construction provide temporary closures of metal or taped polyethylene on open ductwork to prevent construction dust from entering ductwork system.
3.01.D. Duct sizes indicated are inside clear dimensions. For lined ducts, maintain sizes inside lining.
3.01.E. Locate ducts with sufficient space around equipment to allow normal operating and maintenance activities.
3.01.F. Connect diffusers or boots to low pressure ducts directly or within 8 feet maximum length of flexible duct held in place with strap or clamp.

END OF SECTION
SECTION 23 33 00
AIR DUCT ACCESSORIES

PART 1 GENERAL

1.01 RELATED DOCUMENTS
1.01.A. Drawings and general provisions of the Contract including General and Supplementary Conditions and Division 1 Specifications Sections apply to this Section.

1.02 SECTION INCLUDES
1.02.A. Air turning devices/extractors.
1.02.B. Backdraft dampers - metal.
1.02.C. Backdraft dampers - fabric.
1.02.D. Duct test holes.
1.02.E. Flexible duct connections.
1.02.F. Volume control dampers.

1.03 RELATED REQUIREMENTS
1.03.A. Section 23 31 00 - HVAC Ducts and Casings.
1.03.B. Section 26 05 83 - Wiring Connections: Electrical characteristics and wiring connections.

1.04 REFERENCE STANDARDS
1.04.B. SMACNA (DCS) - HVAC Duct Construction Standards Metal and Flexible 2005 (Revised 2009).

1.05 QUALITY ASSURANCE
1.05.A. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum three years of documented experience.

PART 2 PRODUCTS

2.01 AIR TURNING DEVICES/EXTRACTORS
2.01.A. Multi-blade device with blades aligned in short dimension; steel construction; with individually adjustable blades, mounting straps.

2.02 BACKDRAFT DAMPERS - METAL
2.02.A. Multi-Blade, Parallel Action Gravity Balanced Backdraft Dampers: Galvanized steel, with center pivoted blades of maximum 6 inch width, with felt or flexible vinyl sealed edges, linked together in rattle-free manner with 90 degree stop, steel ball bearings, and plated steel pivot pin; adjustment device to permit setting for varying differential static pressure.

2.03 BACKDRAFT DAMPERS - FABRIC
2.03.A. Fabric Backdraft Dampers: Factory-fabricated.
   2. Birdscreen: 1/2 inch nominal mesh of galvanized steel or aluminum.
   3. Maximum Velocity: 1000 fpm (5 mps) face velocity.

2.04 DUCT TEST HOLES
2.04.A. Temporary Test Holes: Cut or drill in ducts as required. Cap with neat patches, neoprene plugs, threaded plugs, or threaded or twist-on metal caps.
2.05 FLEXIBLE DUCT CONNECTIONS
   2.05.A. Fabricate in accordance with SMACNA (DCS) and as indicated.
   2.05.B. Flexible Duct Connections: Fabric crimped into metal edging strip.

2.06 VOLUME CONTROL DAMPERS
   2.06.A. Fabricate in accordance with SMACNA (DCS) and as indicated.
   2.06.B. Splitter Dampers:
      1. Material: Same gage as duct to 24 inches size in either direction, and two gages heavier for sizes over 24 inches.
      2. Blade: Fabricate of single thickness sheet metal to streamline shape, secured with continuous hinge or rod.
   2.06.C. Single Blade Dampers:
      1. Fabricate for duct sizes up to 6 by 30 inch.
      2. Blade: 24 gage, 0.0239 inch, minimum.
   2.06.D. Multi-Blade Damper: Fabricate of opposed blade pattern with maximum blade sizes 8 by 72 inch. Assemble center and edge crimped blades in prime coated or galvanized channel frame with suitable hardware.
      1. Blade: 18 gage, 0.0478 inch, minimum.
   2.06.E. End Bearings: Except in round ducts 12 inches and smaller, provide end bearings. On multiple blade dampers, provide oil-impregnated nylon, thermoplastic elastomer, or sintered bronze bearings.

PART 3 EXECUTION

3.01 INSTALLATION
   3.01.A. Install accessories in accordance with manufacturer's instructions, NFPA 90A, and follow SMACNA (DCS). Refer to Section 23 31 00 for duct construction and pressure class.
   3.01.B. Provide backdraft dampers on exhaust fans or exhaust ducts nearest to outside and where indicated.
   3.01.C. Provide duct test holes where indicated and required for testing and balancing purposes.
   3.01.D. At fans and motorized equipment associated with ducts, provide flexible duct connections immediately adjacent to the equipment.
   3.01.E. At equipment supported by vibration isolators, provide flexible duct connections immediately adjacent to the equipment.
   3.01.F. Use splitter dampers only where indicated.

END OF SECTION
SECTION 23 34 13
AXIAL HVAC FANS

PART 1 GENERAL
1.01 RELATED DOCUMENTS
   1.01.A. Drawings and general provisions of the Contract including General and Supplementary Conditions and Division 1 Specifications Sections apply to this Section.

1.02 SECTION INCLUDES
   1.02.A. Tubeaxial fans.

1.03 RELATED REQUIREMENTS
   1.03.A. Section 23 33 00 - Air Duct Accessories: Backdraft dampers.
   1.03.B. Section 26 05 83 - Wiring Connections: Electrical characteristics and wiring connections.

1.04 REFERENCE STANDARDS
   1.04.B. SMACNA (DCS) - HVAC Duct Construction Standards Metal and Flexible 2005 (Revised 2009).

1.05 SUBMITTALS
   1.05.A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
   1.05.B. Product Data: Provide data on axial fans and accessories including fan curves with specified operating point clearly plotted, power, RPM, sound power levels for both fan inlet and outlet at rated capacity, and electrical characteristics and connection requirements.

PART 2 PRODUCTS
2.01 MANUFACTURERS
   2.01.A. Soler & Palau; www.solerpalau-usa.com
   2.01.D. Substitutions: Equal Products Approved by Engineer.

PART 3 EXECUTION
3.01 INSTALLATION
   3.01.A. Install in accordance with manufacturer's instructions.
   3.01.B. Provide backdraft dampers on discharge of exhaust fans and as indicated.

END OF SECTION
PART 1 GENERAL

1.01 RELATED DOCUMENTS
   1.01.A. Drawings and general provisions of the Contract including General and Supplementary Conditions and Division 1 Specifications Sections apply to this Section.

1.02 SECTION INCLUDES
   1.02.A. Diffusers.
   1.02.B. Registers/grilles.
   1.02.C. Door grilles.

1.03 REFERENCE STANDARDS

1.04 SUBMITTALS
   1.04.A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
   1.04.B. Product Data: Provide data for equipment required for this project. Review outlets and inlets as to size, finish, and type of mounting prior to submission. Submit schedule of outlets and inlets showing type, size, location, application, and noise level.

PART 2 PRODUCTS

2.01 MANUFACTURERS
   2.01.D. Substitutions: Equal Products Approved by Engineer.

2.02 RECTANGULAR CEILING DIFFUSERS
   2.02.A. Type: Provide square and rectangular, adjustable pattern diffuser to discharge air in 360 degree and four way pattern.
   2.02.B. Color: As indicated on drawings (verify with architect).
   2.02.C. Accessories: Provide butterfly volume control damper; with damper adjustable from diffuser face.

2.03 CEILING SUPPLY REGISTERS/GRILLES
   2.03.A. Manufacturers:
       4. Substitutions: Equal Products Approved by Engineer.
   2.03.B. Type: Streamlined and individually adjustable curved blades to discharge air along face of grille, one-way deflection.
   2.03.C. Color: As indicated on drawings (verify with architect).

2.04 CEILING EXHAUST AND RETURN REGISTERS/GRILLES
   2.04.A. Manufacturers:
4. Substitutions: Equal Products Approved by Engineer.

2.04.B. Type: Streamlined blades, 3/4 inch minimum depth, 3/4 inch maximum spacing, with blades set at 45 degrees, vertical face.

2.04.C. Color: As indicated on drawings (verify with architect).

2.05 DOOR GRILLES

2.05.A. Manufacturers:
4. Substitutions: Equal Products Approved by Engineer.

2.05.B. Type: V-shaped louvers of 20 gage, 0.0359 inch thick steel, 1 inch deep on 1/2 inch centers.

2.05.C. Frame: 20 gage, 0.0359 inch steel with auxiliary frame to give finished appearance on both sides of door, with factory prime coat finish.

PART 3 EXECUTION

3.01 INSTALLATION

3.01.A. Install in accordance with manufacturer's instructions.

3.01.B. Check location of outlets and inlets and make necessary adjustments in position to comply with architectural features, symmetry, and lighting arrangement.

3.01.C. Provide balancing dampers on duct take-off to diffusers, and grilles and registers, despite whether dampers are specified as part of the diffuser, or grille and register assembly.

3.01.D. Paint ductwork visible behind air outlets and inlets matte black. Refer to Section 09 91 23.

END OF SECTION
PART 1 GENERAL
1.01 RELATED DOCUMENTS
1.01.A. Drawings and general provisions of the Contract including General and Supplementary Conditions and Division 1 Specifications Sections apply to this Section.

1.02 SECTION INCLUDES
1.02.A. Electrical demolition.

PART 2 PRODUCTS
2.01 MATERIALS AND EQUIPMENT
2.01.A. Materials and equipment for patching and extending work: As specified in individual sections.

PART 3 EXECUTION
3.01 EXAMINATION
3.01.A. Verify field measurements and circuiting arrangements are as indicated.
3.01.B. Verify that abandoned wiring and equipment serve only abandoned facilities.
3.01.C. Report discrepancies to Engineer before disturbing existing installation.
3.01.D. Beginning of demolition means installer accepts existing conditions.

3.02 PREPARATION
3.02.A. Disconnect electrical systems in walls, floors, and ceilings to be removed.
3.02.B. Coordinate utility service outages with utility company.
3.02.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.
3.02.D. Existing Electrical Service: Maintain existing system in service until new system is complete and ready for service. 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.

3.03 DEMOLITION AND EXTENSION OF EXISTING ELECTRICAL WORK
3.03.A. Perform work for removal and disposal of equipment and materials containing toxic substances regulated under the Federal Toxic Substances Control Act (TSCA) in accordance with applicable federal, state, and local regulations. Applicable equipment and materials include, but are not limited to:
   1. Mercury-containing lamps and tubes, including fluorescent lamps, high intensity discharge (HID), arc lamps, ultra-violet, high pressure sodium, mercury vapor, ignitron tubes, neon, and incandescent.
3.03.B. Remove, relocate, and extend existing installations to accommodate new construction.
3.03.C. Remove abandoned wiring to source of supply.
3.03.D. Remove exposed abandoned conduit, including abandoned conduit above accessible ceiling finishes. Cut conduit flush with walls and floors, and patch surfaces.
3.03.E. 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.
3.03.F. Disconnect and remove abandoned luminaires. Remove brackets, stems, hangers, and other accessories.
3.03.G. Repair adjacent construction and finishes damaged during demolition and extension work.
3.03.H. Maintain access to existing electrical installations that remain active. Modify installation or provide access panel as appropriate.

3.04 CLEANING AND REPAIR

3.04.A. See Section 01 74 19 - Construction Waste Management and Disposal for additional requirements.

3.04.B. Clean and repair existing materials and equipment that remain or that are to be reused.

3.04.C. Panelboards: Clean exposed surfaces and check tightness of electrical connections. Replace damaged circuit breakers and provide closure plates for vacant positions. Provide typed circuit directory showing revised circuiting arrangement.

END OF SECTION
PART 1 GENERAL

1.01 RELATED DOCUMENTS

1.01.A. Drawings and general provisions of the Contract including General and Supplementary Conditions and Division 1 Specifications Sections apply to this Section.

1.02 SECTION INCLUDES

1.02.A. Single conductor building wire.
1.02.B. Nonmetallic-sheathed cable.
1.02.C. Underground feeder and branch-circuit cable.
1.02.D. Metal-clad cable.
1.02.E. Wiring connectors.
1.02.F. Electrical tape.
1.02.G. Wire pulling lubricant.
1.02.H. Cable ties.

1.03 RELATED REQUIREMENTS

1.03.A. Section 07 84 00 - Firestopping.
1.03.B. Section 26 05 05 - Selective Demolition for Electrical: Disconnection, removal, and/or extension of existing electrical conductors and cables.
1.03.C. Section 26 05 26 - Grounding and Bonding for Electrical Systems: Additional requirements for grounding conductors and grounding connectors.
1.03.D. Section 26 05 53 - Identification for Electrical Systems: Identification products and requirements.

1.04 REFERENCE STANDARDS

1.04.G. NECA 120 - Standard for Installing Armored Cable (AC) and Metal-Clad Cable (MC) 2012.
1.04.H. NECA 121 - Standard for Installing Nonmetallic-Sheathed Cable (Type NM-B) and Underground Feeder and Branch-Circuit Cable (Type UF) 2007.


1.05 Administrative Requirements

1.05.A. Coordination:
1. Coordinate sizes of raceways, boxes, and equipment enclosures installed under other sections with the actual conductors to be installed, including adjustments for conductor sizes increased for voltage drop.
2. Coordinate with electrical equipment installed under other sections to provide terminations suitable for use with the conductors to be installed.

1.06 Quality Assurance

1.06.A. Comply with requirements of NFPA 70.

1.07 Delivery, Storage, and Handling

1.07.A. Receive, inspect, handle, and store conductors and cables in accordance with manufacturer's instructions.

Part 2 Products

2.01 Conductor and Cable Applications

2.01.A. Do not use conductors and cables for applications other than as permitted by NFPA 70 and product listing.

2.01.B. Provide single conductor building wire installed in suitable raceway unless otherwise indicated, permitted, or required.

2.01.C. Nonmetallic-sheathed cable is permitted only as follows:
   1. Permitted on Upper Level only.

2.01.D. Metal-clad cable is permitted.

2.02 Conductor and Cable General Requirements

2.02.A. Provide products that comply with requirements of NFPA 70.

2.02.B. Provide products listed, classified, and labeled as suitable for the purpose intended.

2.02.C. Unless specifically indicated to be excluded, provide all required conduit, boxes, wiring, connectors, etc. as required for a complete operating system.

2.02.D. Comply with NEMA WC 70.

2.02.E. Thermoplastic-Insulated Conductors and Cables: Listed and labeled as complying with UL 83.

2.02.F. Thermoset-Insulated Conductors and Cables: Listed and labeled as complying with UL 44.

2.02.G. 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.
   3. Tinned Copper Conductors: Comply with ASTM B33.

2.02.H. 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.
   a. Conductors size 4 AWG and larger may have black insulation color coded using vinyl color coding electrical tape.

3. Color Code:
   a. 240/120 V High-Leg Delta, 3 Phase, 4 Wire System:
      1) Phase A: Black.
      2) Phase B (High-Leg): Orange.
      3) Phase C: Blue.
      4) Neutral/Grounded: White.

2.03 SINGLE CONDUCTOR BUILDING WIRE

2.03.A. Manufacturers:
   1. Copper Building Wire:
      d. Substitutions: Equal Products Approved by Engineer.

2.03.B. Description: Single conductor insulated wire.

2.03.C. Conductor Stranding:
   1. Feeders and Branch Circuits:
      b. Size 8 AWG and Larger: Stranded.

2.03.D. Insulation Voltage Rating: 600 V.

2.03.E. Insulation:
   1. Copper Building Wire: Type THHN/THWN or THHN/THWN-2, except as indicated below.

2.04 NONMETALLIC-SHEATHED CABLE

2.04.A. Manufacturers:
   4. Substitutions: Equal Products Approved by Engineer.

2.04.B. Description: NFPA 70, Type NM multiple-conductor cable listed and labeled as complying with UL 719, Type NM-B.

2.04.C. Conductor Stranding:
   2. Size 8 AWG and Larger: Stranded.

2.04.D. Insulation Voltage Rating: 600 V.

2.05 METAL-CLAD CABLE

2.05.A. Manufacturers:
   4. Substitutions: Equal Products Approved by Engineer.

2.05.B. Description: NFPA 70, Type MC cable listed and labeled as complying with UL 1569, and listed for use in classified firestop systems to be used.
2.05.C. Conductor Stranding:
   2. Size 8 AWG and Larger: Stranded.
2.05.D. Insulation Voltage Rating: 600 V.
2.05.E. Insulation: Type THHN, THHN/THWN or THHN/THWN-2.
2.05.F. Grounding: Full-size integral equipment grounding conductor.
2.05.G. Armor: Steel, interlocked tape.

2.06 WIRING CONNECTORS
2.06.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.
2.06.B. Connectors for Grounding and Bonding: Comply with Section 26 05 26.

2.07 ACCESSORIES
2.07.A. Electrical Tape:
   1. Vinyl Color Coding Electrical Tape: Integrially 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.
2.07.B. Wire Pulling Lubricant: Listed; suitable for use with the conductors or cables to be installed and suitable for use at the installation temperature.
2.07.C. Cable Ties: Material and tensile strength rating suitable for application.

PART 3 EXECUTION

3.01 EXAMINATION
3.01.A. Verify that interior of building has been protected from weather.
3.01.B. Verify that work likely to damage wire and cable has been completed.
3.01.C. Verify that raceways, boxes, and equipment enclosures are installed and are properly sized to accommodate conductors and cables in accordance with NFPA 70.
3.01.D. Verify that field measurements are as indicated.
3.01.E. Verify that conditions are satisfactory for installation prior to starting work.

3.02 INSTALLATION
3.02.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.
   4. Common Neutrals: Unless otherwise indicated, sharing of neutral/grounded conductors among single phase branch circuits of different phases installed in the same raceway is not permitted. Provide dedicated neutral/grounded conductor for each individual branch circuit.
3.02.B. Install products in accordance with manufacturer's instructions.
3.02.C. Perform work in accordance with NECA 1 (general workmanship).
3.02.D. Install nonmetallic-sheathed cable (Type NM-B) in accordance with NECA 121.
3.02.E. Install metal-clad cable (Type MC) in accordance with NECA 120.
3.02.F. 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.

3.02.G. Paralleled Conductors: Install conductors of the same length and terminate in the same manner.

3.02.H. 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.

3.02.I. Terminate cables using suitable fittings.
1. Metal-Clad Cable (Type MC):
   a. Use listed fittings.
   b. Cut cable armor only using specialized tools to prevent damaging conductors or insulation. Do not use hacksaw or wire cutters to cut armor.

3.02.J. Install conductors with a minimum of 12 inches of slack at each outlet.

3.02.K. Neatly train and bundle conductors inside boxes, wireways, panelboards and other equipment enclosures.

3.02.L. Group or otherwise identify neutral/grounded conductors with associated ungrounded conductors inside enclosures in accordance with NFPA 70.

3.02.M. 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.

3.02.N. 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 uninsulated conductors.

3.02.O. Insulate ends of spare conductors using vinyl insulating electrical tape.

3.02.P. Field-Applied Color Coding: Where vinyl color coding electrical tape is used in lieu of integrally colored insulation as permitted in Part 2 under "Color Coding", apply half overlapping turns of tape at each termination and at each location conductors are accessible.

3.02.Q. Install firestopping to preserve fire resistance rating of partitions and other elements, using materials and methods specified in Section 07 84 00.

3.02.R. 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.

END OF SECTION
SECTION 26 05 26
GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.01 RELATED DOCUMENTS

1.01.A. Drawings and general provisions of the Contract including General and Supplementary Conditions and Division 1 Specifications Sections apply to this Section.

1.02 SECTION INCLUDES

1.02.A. Grounding and bonding requirements.
1.02.B. Conductors for grounding and bonding.
1.02.C. Connectors for grounding and bonding.

1.03 RELATED REQUIREMENTS

1.03.A. Section 26 05 19 - Low-Voltage Electrical Power Conductors and Cables: Additional requirements for conductors for grounding and bonding, including conductor color coding.
1.03.B. Section 26 05 53 - Identification for Electrical Systems: Identification products and requirements.

1.04 REFERENCE STANDARDS


1.05 QUALITY ASSURANCE

1.05.A. Comply with requirements of NFPA 70.

PART 2 PRODUCTS

2.01 GROUNDING AND BONDING REQUIREMENTS

2.01.A. Existing Work: Where existing grounding and bonding system components are indicated to be reused, they may be reused only where they are free from corrosion, integrity and continuity are verified, and where acceptable to the authority having jurisdiction.

2.01.B. Do not use products for applications other than as permitted by NFPA 70 and product listing.

2.01.C. 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.

2.01.D. Where conductor size is not indicated, size to comply with NFPA 70 but not less than applicable minimum size requirements specified.

2.01.E. 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.

2.02 GROUNDING AND BONDING COMPONENTS

2.02.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.

2.02.B. Conductors for Grounding and Bonding, in Addition to Requirements of Section 26 05 26:
1. Use insulated copper conductors unless otherwise indicated.
   a. Exceptions:
      1) Use bare copper conductors where installed underground in direct contact with earth.
      2) Use bare copper conductors where directly encased in concrete (not in raceway).

2.02.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 exothermic welded connections for underground, concealed and other inaccessible connections.
3. Unless otherwise indicated, use mechanical connectors, compression connectors or exothermic welded connections for accessible connections.

PART 3 EXECUTION

3.01 INSTALLATION

3.01.A. Install products in accordance with manufacturer's instructions.
3.01.B. Perform work in accordance with NECA 1 (general workmanship).
3.01.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. Exothermic Welds: Make connections using molds and weld material suitable for the items to be connected in accordance with manufacturer's recommendations.
   4. Mechanical Connectors: Secure connections according to manufacturer's recommended torque settings.
   5. Compression Connectors: Secure connections using manufacturer's recommended tools and dies.
3.01.D. Identify grounding and bonding system components in accordance with Section 26 05 53.

END OF SECTION
SECTION 26 05 29  
HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.01 RELATED DOCUMENTS
1.01.A. Drawings and general provisions of the Contract including General and Supplementary Conditions and Division 1 Specifications Sections apply to this Section.

1.02 SECTION INCLUDES
1.02.A. Support and attachment requirements and components for equipment, conduit, cable, boxes, and other electrical work.

1.03 RELATED REQUIREMENTS
1.03.A. Section 03 30 00 - Cast-in-Place Concrete: Concrete equipment pads.
1.03.B. Section 26 05 33.13 - Conduit for Electrical Systems: Additional support and attachment requirements for conduits.
1.03.C. Section 26 05 33.16 - Boxes for Electrical Systems: Additional support and attachment requirements for boxes.
1.03.D. Section 26 51 00 - Interior Lighting: Additional support and attachment requirements for interior luminaires.

1.04 REFERENCE STANDARDS
1.04.F. NFPA 70 - National Electrical Code Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

1.05 ADMINISTRATIVE REQUIREMENTS
1.05.A. Coordination:
   1. Coordinate sizes and arrangement of supports and bases with the actual equipment and components to be installed.
   2. Coordinate the work with other trades to provide additional framing and materials required for installation.
   3. Coordinate compatibility of support and attachment components with mounting surfaces at the installed locations.
   4. Coordinate the arrangement of supports with ductwork, piping, equipment and other potential conflicts installed under other sections or by others.
   5. Notify Architect of any conflicts with or deviations from Contract Documents. Obtain direction before proceeding with work.

1.05.B. Sequencing:
   1. Do not install products on or provide attachment to concrete surfaces until concrete has fully cured in accordance with Section 03 30 00.

1.06 QUALITY ASSURANCE
1.06.A. Comply with NFPA 70.
1.06.B. Comply with applicable building code.

PART 2 PRODUCTS

2.01 SUPPORT AND ATTACHMENT COMPONENTS

2.01.A. General Requirements:
1. Provide all required hangers, supports, anchors, fasteners, fittings, accessories, and hardware as necessary for the complete installation of electrical work.
2. Provide products listed, classified, and labeled as suitable for the purpose intended, where applicable.
3. Where support and attachment component types and sizes are not indicated, select in accordance with manufacturer's application criteria as required for the load to be supported with a minimum safety factor of 2. Include consideration for vibration, equipment operation, and shock loads where applicable.
4. Do not use products for applications other than as permitted by NFPA 70 and product listing.
5. Do not use wire, chain, perforated pipe strap or wood for permanent supports unless specifically indicated or permitted.
   a. Zinc-Plated Steel: Electroplated in accordance with ASTM B633.
   b. Galvanized Steel: Hot-dip galvanized after fabrication in accordance with ASTM A123/A123M or ASTM A153/A153M.

2.01.B. Conduit and Cable Supports: Straps, clamps, etc. suitable for the 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.

2.01.C. Outlet Box Supports: Hangers, brackets, etc. suitable for the boxes to be supported.

2.01.D. Metal Channel (Strut) Framing Systems: 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.
3. Minimum Channel Thickness: Steel sheet, 12 gage, 0.1046 inch.

2.01.E. Hanger Rods: Threaded zinc-plated steel unless otherwise indicated.
1. Minimum Size, Unless Otherwise Indicated or Required:
   a. Equipment Supports: 1/2 inch diameter.
   b. Single Conduit up to 1 inch (27 mm) trade size: 1/4 inch diameter.
   c. Single Conduit larger than 1 inch (27 mm) trade size: 3/8 inch diameter.
   d. Trapeze Support for Multiple Conduits: 3/8 inch diameter.
   e. Outlet Boxes: 1/4 inch diameter.
   f. Luminaires: 1/4 inch diameter.

2.01.F. Anchors and Fasteners:
1. Unless otherwise indicated and where not otherwise restricted, use the anchor and fastener types indicated for the specified applications.

PART 3 EXECUTION

3.01 EXAMINATION

3.01.A. Verify that field measurements are as indicated.
3.01.B. Verify that mounting surfaces are ready to receive support and attachment components.
3.01.C. Verify that conditions are satisfactory for installation prior to starting work.

3.02 INSTALLATION

3.02.A. Install products in accordance with manufacturer's instructions.
3.02.B. Perform work in accordance with NECA 1 (general workmanship).
3.02.C. Provide independent support from building structure. Do not provide support from piping, ductwork, or other systems.
3.02.D. Unless specifically indicated or approved by Architect, do not provide support from suspended ceiling support system or ceiling grid.
3.02.E. Unless specifically indicated or approved by Architect, do not provide support from roof deck.
3.02.F. Do not penetrate or otherwise notch or cut structural members without approval of Structural Engineer.
3.02.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.
3.02.H. Secure fasteners according to manufacturer's recommended torque settings.
3.02.I. Remove temporary supports.

3.03 FIELD QUALITY CONTROL

3.03.A. See Section 01 40 00 - Quality Requirements, for additional requirements.
3.03.B. Inspect support and attachment components for damage and defects.
3.03.C. Repair cuts and abrasions in galvanized finishes using zinc-rich paint recommended by manufacturer. Replace components that exhibit signs of corrosion.
3.03.D. Correct deficiencies and replace damaged or defective support and attachment components.

END OF SECTION
PART 1 GENERAL

1.01 RELATED DOCUMENTS

1.01.A. Drawings and general provisions of the Contract including General and Supplementary Conditions and Division 1 Specifications Sections apply to this Section.

1.02 SECTION INCLUDES

1.02.A. Galvanized steel rigid metal conduit (RMC).
1.02.B. Intermediate metal conduit (IMC).
1.02.C. Flexible metal conduit (FMC).
1.02.D. Electrical metallic tubing (EMT).
1.02.E. Rigid polyvinyl chloride (PVC) conduit.
1.02.F. Conduit fittings.

1.03 REFERENCE STANDARDS

1.03.A. ANSI C80.1 - American National Standard for Electrical Rigid Steel Conduit (ERSC) 2015.
1.03.B. ANSI C80.3 - American National Standard for Electrical Metallic Tubing -- Steel (EMT-S) 2015.
1.03.C. ANSI C80.6 - American National Standard for Electrical Intermediate Metal Conduit (EIMC) 2005.
1.03.D. NECA 1 - Standard for Good Workmanship in Electrical Construction 2015.
1.03.E. NECA 101 - Standard for Installing Steel Conduits (Rigid, IMC, EMT) 2013.
1.03.F. NECA 111 - Standard for Installing Nonmetallic Raceways (RNC, ENT, LFNC) 2003.
1.03.G. NEMA FB 1 - Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit, Electrical Metallic Tubing, and Cable 2014.
1.03.H. NEMA TC 2 - Electrical Polyvinyl Chloride (PVC) Conduit 2013.
1.03.I. NFPA 70 - National Electrical Code Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
1.03.J. UL 1 - Flexible Metal Conduit Current Edition, Including All Revisions.
1.03.K. UL 6 - Electrical Rigid Metal Conduit-Steel Current Edition, Including All Revisions.
1.03.L. UL 360 - Liquid-Tight Flexible Steel Conduit Current Edition, Including All Revisions.
1.03.M. UL 514B - Conduit, Tubing, and Cable Fittings Current Edition, Including All Revisions.
1.03.N. UL 797 - Electrical Metallic Tubing-Steel Current Edition, Including All Revisions.
1.03.O. UL 1242 - Electrical Intermediate Metal Conduit-Steel Current Edition, Including All Revisions.

1.04 ADMINISTRATIVE REQUIREMENTS

1.04.A. Coordination:

1. Coordinate minimum sizes of conduits with the actual conductors to be installed, including adjustments for conductor sizes increased for voltage drop.
2. Coordinate the arrangement of conduits with structural members, ductwork, piping, equipment and other potential conflicts installed under other sections or by others.
3. Verify exact conduit termination locations required for boxes, enclosures, and equipment installed under other sections or by others.
4. Coordinate the work with other trades to provide roof penetrations that preserve the integrity of the roofing system and do not void the roof warranty.

5. Notify Engineer of any conflicts with or deviations from Contract Documents. Obtain direction before proceeding with work.

1.04.B. Sequencing:
1. Do not begin installation of conductors and cables until installation of conduit is complete between outlet, junction and splicing points.

1.05 QUALITY ASSURANCE
1.05.A. Comply with requirements of NFPA 70.

PART 2 PRODUCTS

2.01 CONDUIT APPLICATIONS
2.01.A. Do not use conduit and associated fittings for applications other than as permitted by NFPA 70 and product listing.

2.01.B. Unless otherwise indicated and where not otherwise restricted, use the conduit types indicated for the specified applications. Where more than one listed application applies, comply with the most restrictive requirements. Where conduit type for a particular application is not specified, use galvanized steel rigid metal conduit.

2.01.C. Concealed Within Hollow Stud Walls: Use galvanized steel rigid metal conduit, intermediate metal conduit (IMC) or electrical metallic tubing (EMT).

2.01.D. Concealed Above Accessible Ceilings: Use galvanized steel rigid metal conduit, intermediate metal conduit (IMC) or electrical metallic tubing (EMT).

2.01.E. Interior, Damp or Wet Locations: Use galvanized steel rigid metal conduit.

2.01.F. Exposed, Interior, Not Subject to Physical Damage: Use galvanized steel rigid metal conduit, intermediate metal conduit (IMC) or electrical metallic tubing (EMT).

2.01.G. Exposed, Interior, Subject to Physical Damage: Use galvanized steel rigid metal conduit or intermediate metal conduit (IMC).

2.01.H. Connections to Luminaires Above Accessible Ceilings: Use flexible metal conduit.
1. Maximum Length: 6 feet.

2.01.I. Connections to Vibrating Equipment:
1. Dry Locations: Use flexible metal conduit.
2. Maximum Length: 6 feet unless otherwise indicated.

2.02 CONDUIT REQUIREMENTS
2.02.A. Provide all conduit, fittings, supports, and accessories required for a complete raceway system.

2.02.B. Provide products listed, classified, and labeled as suitable for the purpose intended.

2.02.C. Where conduit size is not indicated, size to comply with NFPA 70 but not less than applicable minimum size requirements specified.

2.03 GALVANIZED STEEL RIGID METAL CONDUIT (RMC)
2.03.A. Manufacturers:
4. Substitutions: Equal Products Approved by Engineer.

2.03.B. Description: NFPA 70, Type RMC galvanized steel rigid metal conduit complying with ANSI C80.1 and listed and labeled as complying with UL 6.
2.03.C. Fittings:
   1. Manufacturers:
      d. Substitutions: Equal Products Approved by Engineer.
   2. Non-Hazardous Locations: Use fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B.
   4. Connectors and Couplings: Use threaded type fittings only. Threadless set screw and compression (gland) type fittings are not permitted.

2.04 INTERMEDIATE METAL CONDUIT (IMC)

2.04.A. Manufacturers:
   4. Substitutions: Equal Products Approved by Engineer.

2.04.B. Description: NFPA 70, Type IMC galvanized steel intermediate metal conduit complying with ANSI C80.6 and listed and labeled as complying with UL 1242.

2.04.C. Fittings:
   1. Manufacturers:
      d. Substitutions: Equal Products Approved by Engineer.
   2. Non-Hazardous Locations: Use fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B.
   4. Connectors and Couplings: Use threaded type fittings only. Threadless set screw and compression (gland) type fittings are not permitted.

2.05 FLEXIBLE METAL CONDUIT (FMC)

2.05.A. Manufacturers:
   4. Substitutions: Equal Products Approved by Engineer.

2.05.B. 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 to be used.

2.05.C. Fittings:
   1. Manufacturers:
d. Substitutions: Equal Products Approved by Engineer.

2. Description: Fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B.


2.06 ELECTRICAL METALLIC TUBING (EMT)

2.06.A. Manufacturers:
4. Substitutions: Equal Products Approved by Engineer.

2.06.B. Description: NFPA 70, Type EMT steel electrical metallic tubing complying with ANSI C80.3 and listed and labeled as complying with UL 797.

2.06.C. Fittings:
1. Manufacturers:
   d. Substitutions: Equal Products Approved by Engineer.
2. Description: Fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B.
4. Connectors and Couplings: Use compression (gland) or set-screw type.
   a. Do not use indenter type connectors and couplings.

PART 3 EXECUTION

3.01 EXAMINATION

3.01.A. Verify that field measurements are as indicated.
3.01.B. Verify that mounting surfaces are ready to receive conduits.
3.01.C. Verify that conditions are satisfactory for installation prior to starting work.

3.02 INSTALLATION

3.02.A. Install products in accordance with manufacturer’s instructions.
3.02.B. Perform work in accordance with NECA 1 (general workmanship).
3.02.C. Install galvanized steel rigid metal conduit (RMC) in accordance with NECA 101.
3.02.D. Install intermediate metal conduit (IMC) in accordance with NECA 101.
3.02.E. Conduit Routing:
   1. Unless dimensioned, conduit routing indicated is diagrammatic.
   2. When conduit destination is indicated without specific routing, determine exact routing required.
   3. Conceal all conduits unless specifically indicated to be exposed.
   4. Conduits in the following areas may be exposed, unless otherwise indicated:
   5. Arrange conduit to maintain adequate headroom, clearances, and access.
   6. Route conduits above water and drain piping where possible.
7. Arrange conduit to prevent moisture traps. Provide drain fittings at low points and at sealing fittings where moisture may collect.

3.02.F. Conduit Support:
1. Secure and support conduits in accordance with NFPA 70 and Section 26 05 29 using suitable supports and methods approved by the authority 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.

3.02.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. Terminate threaded conduits in boxes and enclosures using threaded hubs or double lock nuts for dry locations and raintight hubs for wet locations.
5. Provide insulating bushings or insulated throats at all conduit terminations to protect conductors.
6. Secure joints and connections to provide maximum mechanical strength and electrical continuity.

3.02.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 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. Seal interior of conduits entering the building from underground at first accessible point to prevent entry of moisture and gases.
6. Where conduits penetrate waterproof membrane, seal as required to maintain integrity of membrane.
7. 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. Include proposed locations of penetrations and methods for sealing with submittals.
8. Install firestopping to preserve fire resistance rating of partitions and other elements, using materials and methods specified in Section 07 84 00.

3.02.I. 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.
2. Where conduits are subject to earth movement by settlement or frost.

3.02.J. Condensation Prevention: Where conduits cross barriers between areas of potential substantial temperature differential, provide sealing fitting or approved sealing compound.
at an accessible point near the penetration to prevent condensation. This includes, but is not limited to:

1. Where conduits pass from outdoors into conditioned interior spaces.
2. Where conduits pass from unconditioned interior spaces into conditioned interior spaces.

3.02.K. Provide grounding and bonding in accordance with Section 26 05 26.

3.03 FIELD QUALITY CONTROL

3.03.A. See Section 01 40 00 - Quality Requirements, for additional requirements.
3.03.B. Repair cuts and abrasions in galvanized finishes using zinc-rich paint recommended by manufacturer. Replace components that exhibit signs of corrosion.
3.03.C. Correct deficiencies and replace damaged or defective conduits.

3.04 CLEANING

3.04.A. Clean interior of conduits to remove moisture and foreign matter.

END OF SECTION
SECTION 26 05 33.16
BOXES FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.01 RELATED DOCUMENTS

1.01.A. Drawings and general provisions of the Contract including General and Supplementary Conditions and Division 1 Specifications Sections apply to this Section.

1.02 SECTION INCLUDES

1.02.A. Outlet and device boxes up to 100 cubic inches, including those used as junction and pull boxes.
1.02.B. Cabinets and enclosures, including junction and pull boxes larger than 100 cubic inches.
1.02.C. Boxes and enclosures for integrated power, data, and audio/video.

1.03 RELATED REQUIREMENTS

1.03.A. Section 08 31 00 - Access Doors and Panels: Panels for maintaining access to concealed boxes.
1.03.B. Section 26 05 26 - Grounding and Bonding for Electrical Systems.
1.03.C. Section 26 05 29 - Hangers and Supports for Electrical Systems.
1.03.D. Section 26 05 33.13 - Conduit for Electrical Systems:
   1. Conduit bodies and other fittings.
1.03.E. Section 26 05 53 - Identification for Electrical Systems: Identification products and requirements.
1.03.F. Section 26 27 26 - Wiring Devices:
   1. Wall plates.
   2. Additional requirements for locating boxes for wiring devices.
1.03.G. Section 27 10 00 - Structured Cabling: Additional requirements for communications systems outlet boxes.

1.04 REFERENCE STANDARDS

1.04.C. NEMA FB 1 - Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit, Electrical Metallic Tubing, and Cable 2014.
1.04.D. NEMA OS 1 - Sheet-Steel Outlet Boxes, Device Boxes, Covers, and Box Supports 2013.
1.04.F. NFPA 70 - National Electrical Code Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

1.05 ADMINISTRATIVE REQUIREMENTS

1.05.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 Architect of any conflicts with or deviations from Contract Documents. Obtain direction before proceeding with work.

1.06 QUALITY ASSURANCE

1.06.A. Comply with requirements of NFPA 70.

1.07 DELIVERY, STORAGE, AND HANDLING

1.07.A. Receive, inspect, handle, and store products in accordance with manufacturer's instructions.

PART 2 PRODUCTS

2.01 BOXES

2.01.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.

2.01.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. Use suitable concrete type boxes where flush-mounted in concrete.

4. Use suitable masonry type boxes where flush-mounted in masonry walls.

5. Use raised covers suitable for the type of wall construction and device configuration where required.

6. Use shallow boxes where required by the type of wall construction.

7. Do not use “through-wall” boxes designed for access from both sides of wall.
8. Sheet-Steel Boxes: Comply with NEMA OS 1, and list and label as complying with UL 514A.

9. Cast Metal Boxes: Comply with NEMA FB 1, and list and label as complying with UL 514A; furnish with threaded hubs.

10. Boxes for Supporting Luminaires and Ceiling Fans: Listed as suitable for the type and weight of load to be supported; furnished with fixture stud to accommodate mounting of luminaire where required.


2.01.C. Cabinets and Enclosures, Including Junction and Pull Boxes Larger Than 100 cubic inches:
   1. Comply with NEMA 250, and list and label as complying with UL 50 and UL 50E, or UL 508A.
   2. NEMA 250 Environment Type, Unless Otherwise Indicated:
      a. Junction and Pull Boxes Larger Than 100 cubic inches:
         i. Provide screw-cover or hinged-cover enclosures unless otherwise indicated.

PART 3 EXECUTION

3.01 EXAMINATION

3.01.A. Verify that field measurements are as indicated.
3.01.B. Verify that mounting surfaces are ready to receive boxes.
3.01.C. Verify that conditions are satisfactory for installation prior to starting work.

3.02 INSTALLATION

3.02.A. Install products in accordance with manufacturer's instructions.
3.02.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.
3.02.C. Arrange equipment to provide minimum clearances in accordance with manufacturer’s instructions and NFPA 70.
3.02.D. Unless otherwise indicated, provide separate boxes for line voltage and low voltage systems.
3.02.E. Flush-mount boxes in finished areas unless specifically indicated to be surface-mounted.
3.02.F. Unless otherwise indicated, boxes may be surface-mounted where exposed conduits are indicated or permitted.
3.02.G. Box Locations:
   1. Locate boxes to be accessible. Provide access panels in accordance with Section 08 31 00 as required where approved by the Architect.
   2. Unless dimensioned, box locations indicated are approximate.
   3. Locate boxes as required for devices installed under other sections or by others.
      a. Switches, Receptacles, and Other Wiring Devices: Comply with Section 26 27 26.
      b. Communications Systems Outlets: Comply with Section 27 10 00.
   4. Locate junction and pull boxes in the following areas, unless otherwise indicated or approved by the Architect:
      a. Concealed above accessible suspended ceilings.
      b. Within joists in areas with no ceiling.
c. Electrical rooms.
d. Mechanical equipment rooms.

3.02.H. Box Supports:
   1. Secure and support boxes in accordance with NFPA 70 and Section 26 05 29 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.
   3. Installation Above Suspended Ceilings: Do not provide support from ceiling grid or ceiling support system.

3.02.I. Install boxes plumb and level.

3.02.J. Flush-Mounted Boxes:
   1. Install boxes in noncombustible materials such as concrete, tile, gypsum, plaster, etc. so that front edge of box or associated raised cover is not set back from finished surface more than 1/4 inch or does not project beyond finished surface.
   2. Install boxes in combustible materials such as wood so that front edge of box or associated raised cover is flush with finished surface.
   3. Repair rough openings around boxes in noncombustible materials such as concrete, tile, gypsum, plaster, etc. so that there are no gaps or open spaces greater than 1/8 inch at the edge of the box.

3.02.K. Install boxes as required to preserve insulation integrity.

3.02.L. Install permanent barrier between ganged wiring devices when voltage between adjacent devices exceeds 300 V.

3.02.M. Install firestopping to preserve fire resistance rating of partitions and other elements, using materials and methods specified in Section 07 84 00.

3.02.N. Close unused box openings.

3.02.O. Install blank wall plates on junction boxes and on outlet boxes with no devices or equipment installed or designated for future use.

3.02.P. Provide grounding and bonding in accordance with Section 26 05 26.

3.02.Q. Identify boxes in accordance with Section 26 05 53.

3.03 CLEANING
   3.03.A. Clean interior of boxes to remove dirt, debris, plaster and other foreign material.

END OF SECTION
SECTION 26 05 53
IDENTIFICATION FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.01 RELATED DOCUMENTS
1.01.A. Drawings and general provisions of the Contract including General and Supplementary Conditions and Division 1 Specifications Sections apply to this Section.

1.02 SECTION INCLUDES
1.02.A. Electrical identification requirements.
1.02.B. Identification nameplates and labels.
1.02.C. Voltage markers.
1.02.D. Warning signs and labels.

1.03 RELATED REQUIREMENTS
1.03.A. Section 26 05 19 - Low-Voltage Electrical Power Conductors and Cables: Color coding for power conductors and cables 600 V and less; vinyl color coding electrical tape.
1.03.B. Section 26 27 26 - Wiring Devices - Lutron: Device and wallplate finishes; factory pre-marked wallplates.

1.04 REFERENCE STANDARDS

1.05 QUALITY ASSURANCE
1.05.A. Comply with requirements of NFPA 70.

PART 2 PRODUCTS

2.01 IDENTIFICATION REQUIREMENTS
2.01.A. Existing Work: Unless specifically excluded, identify existing elements to remain whose designations are changed as part of the new work.
2.01.B. 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 power source and circuit number. Include location.
         2) Use typewritten circuit directory to identify load(s) served for panelboards with a door. Identify spares and spaces using pencil.
         3) For power panelboards without a door, use identification nameplate to identify load(s) served for each branch device. Do not identify spares and spaces.
   2. Emergency System Equipment:
      a. Use identification nameplate or voltage marker to identify emergency system equipment in accordance with NFPA 70.
b. Use identification nameplate at each piece of service equipment to identify type and location of on-site emergency power sources.

3. Available Fault Current Documentation: Use identification label to identify the available fault current and date calculations were performed at locations requiring documentation by NFPA 70 including but not limited to the following.
   a. Service equipment.
   b. Industrial control panels.
   c. Motor control centers.
   d. Elevator control panels.
   e. Industrial machinery.

4. Arc Flash Hazard Warning Labels: Use warning labels to identify arc flash hazards for electrical equipment, such as switchboards, panelboards, industrial control panels, meter socket enclosures, and motor control centers that are likely to require examination, adjustment, servicing, or maintenance while energized.
   a. Minimum Size: 3.5 by 5 inches.
   b. Legend: Include orange header that reads "WARNING", followed by the word message "Arc Flash and Shock Hazard; Appropriate PPE Required; Do not operate controls or open covers without appropriate personal protection equipment; Failure to comply may result in injury or death; Refer to NFPA 70E for minimum PPE requirements" or approved equivalent.

2.01.C. Identification for Conductors and Cables:
   1. Color Coding for Power Conductors 600 V and Less: Comply with Section 26 05 19.
   2. Use identification nameplate or identification label to identify color code for ungrounded and grounded power conductors inside door or enclosure at each piece of feeder or branch-circuit distribution equipment when premises has feeders or branch circuits served by more than one nominal voltage system.

2.01.D. Identification for Devices:
   2. Use identification label to identify serving branch circuit for all receptacles.
   3. Use identification label to identify receptacles protected by upstream GFI protection, where permitted.

2.02 IDENTIFICATION NAMEPLATES AND LABELS

2.02.A. Identification Nameplates:
   1. Materials:
      a. Indoor Clean, Dry Locations: Use plastic nameplates.
      b. Outdoor Locations: Use plastic, stainless steel or aluminum 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. Aluminum Nameplates: Anodized; minimum thickness of 1/32 inch; engraved or laser-etched text.
   5. Mounting Holes for Mechanical Fasteners: Two, centered on sides for sizes up to 1 inch high; Four, located at corners for larger sizes.

2.02.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.

2.02.C. Format for Equipment Identification:
1. Minimum Size: 1 inch by 2.5 inches.
2. Legend:
   a. System designation where applicable:
   b. Equipment designation or other approved description.
3. Text: All capitalized unless otherwise indicated.
4. Minimum Text Height:
   a. System Designation: 1 inch.
   b. Equipment Designation: 1/2 inch.
5. Color:

2.02.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.
   a. Include voltage and phase for other than 120 V, single phase circuits.
3. Text: All capitalized unless otherwise indicated.
5. Color: Black text on clear background.

2.03 VOLTAGE MARKERS
2.03.A. Minimum Size:
2.03.B. Legend:
2.03.C. Color: Black text on orange background unless otherwise indicated.

2.04 WARNING SIGNS AND LABELS
2.04.A. Comply with ANSI Z535.2 or ANSI Z535.4 as applicable.
2.04.B. Warning Signs:
1. Materials:
   a. Indoor Dry, Clean Locations: Use factory pre-printed rigid plastic or self-adhesive vinyl signs.
   b. Outdoor Locations: Use factory pre-printed rigid aluminum signs.
2. Rigid Signs: Provide four mounting holes at corners for mechanical fasteners.
3. Minimum Size: 7 by 10 inches unless otherwise indicated.
2.04.C. Warning Labels:
1. Materials: Use factory pre-printed or machine-printed self-adhesive polyester or self-adhesive vinyl labels; UV, chemical, water, heat, and abrasion resistant; produced using materials recognized to UL 969.
   a. Do not use labels designed to be completed using handwritten text.
3. Minimum Size: 2 by 4 inches unless otherwise indicated.
PART 3 EXECUTION

3.01 INSTALLATION

3.01.A. Install products in accordance with manufacturer's instructions.

3.01.B. Install identification products to be plainly visible for examination, adjustment, servicing, and maintenance. Unless otherwise indicated, locate products as follows:

3. Free-Standing Equipment: Enclosure front; also enclosure rear for equipment with rear access.
4. Elevated Equipment: Legible from the floor or working platform.
5. Branch Devices: Adjacent to device.
6. Interior Components: Legible from the point of access.
7. Conductors and Cables: Legible from the point of access.
8. Devices: Outside face of cover.

3.01.C. Install identification products centered, level, and parallel with lines of item being identified.

3.01.D. Secure nameplates to exterior surfaces of enclosures using stainless steel screws and to interior surfaces using self-adhesive backing or epoxy cement.

3.01.E. Install self-adhesive labels and markers to achieve maximum adhesion, with no bubbles or wrinkles and edges properly sealed.

3.01.F. Secure rigid signs using stainless steel screws.

3.01.G. Mark all handwritten text, where permitted, to be neat and legible.

3.02 FIELD QUALITY CONTROL

3.02.A. See Section 01 40 00 - Quality Requirements, for additional requirements.

3.02.B. Replace self-adhesive labels and markers that exhibit bubbles, wrinkles, curling or other signs of improper adhesion.

END OF SECTION
SECTION 26 09 23
LIGHTING CONTROL DEVICES

PART 1 GENERAL

1.01 RELATED DOCUMENTS
   Drawings and general provisions of the Contract including General and Supplementary Conditions and Division 1 Specifications Sections apply to this Section.

1.02 SECTION INCLUDES
   1.02.A. Occupancy sensors.
   1.02.B. Outdoor motion sensors.

1.03 RELATED REQUIREMENTS
   1.03.A. Section 26 05 26 - Grounding and Bonding for Electrical Systems.
   1.03.B. Section 26 05 29 - Hangers and Supports for Electrical Systems
   1.03.C. Section 26 05 33.16 - Boxes for Electrical Systems.
   1.03.D. Section 26 05 53 - Identification for Electrical Systems: Identification products and requirements.
   1.03.E. Section 26 27 26 - Wiring Devices: Devices for manual control of lighting, including wall switches, wall dimmers and fan speed controllers.
   1.03.F. Section 26 51 00 - Interior Lighting.

1.04 REFERENCE STANDARDS

1.05 ADMINISTRATIVE REQUIREMENTS
   1.05.A. Coordination:
      1. Coordinate the placement of lighting control devices with millwork, furniture, equipment, etc. installed under other sections or by others.
      2. Coordinate the placement of wall switch occupancy sensors with actual installed door swings.
      3. Coordinate the placement of occupancy sensors with millwork, furniture, equipment or other potential obstructions to motion detection coverage installed under other sections or by others.
      4. Notify Architect of any conflicts or deviations from Contract Documents to obtain direction prior to proceeding with work.

1.06 SUBMITTALS
   1.06.A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
   1.06.B. Product Data: Include ratings, configurations, standard wiring diagrams, dimensions, colors, service condition requirements, and installed features.
   1.06.C. Shop Drawings:
      1. Occupancy Sensors: Provide lighting plan indicating location, model number, and orientation of each occupancy sensor and associated system component.
1.07 QUALITY ASSURANCE
1.07.A. Comply with requirements of NFPA 70.

1.08 DELIVERY, STORAGE, AND PROTECTION
1.08.A. Store products in a clean, dry space in original manufacturer's packaging in accordance with manufacturer's written instructions until ready for installation.

1.09 WARRANTY
1.09.A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.
1.09.B. Provide one year manufacturer warranty for all occupancy sensors.

PART 2 PRODUCTS

2.01 LIGHTING CONTROL DEVICES - GENERAL REQUIREMENTS
2.01.A. Provide products listed, classified, and labeled as suitable for the purpose intended.
2.01.B. Unless specifically indicated to be excluded, provide all required conduit, wiring, connectors, hardware, components, accessories, etc. as required for a complete operating system.

2.02 OCCUPANCY SENSORS
2.02.A. Manufacturers:
3. Hubbell, Inc: https://www.hubbell.com
4. Substitutions: Equal Products Approved by Engineer.
2.02.B. All Occupancy Sensors:
1. Description: Factory-assembled commercial specification grade devices for indoor use capable of sensing both major motion, such as walking, and minor motion, such as small desktop level movements, according to published coverage areas, for automatic control of load indicated.
2. Sensor Technology:
   a. Passive Infrared (PIR) Occupancy Sensors: Designed to detect occupancy by sensing movement of thermal energy between zones.
   b. Passive Infrared/Ultrasonic Dual Technology Occupancy Sensors: Designed to detect occupancy using a combination of both passive infrared and ultrasonic technologies.
3. Provide LED to visually indicate motion detection with separate color LEDs for each sensor type in dual technology units.
4. Operation: Unless otherwise indicated, occupancy sensor to turn load on when occupant presence is detected and to turn load off when no occupant presence is detected during an adjustable turn-off delay time interval.
5. Turn-Off Delay: Field adjustable, with time delay settings up to 30 minutes.
6. Compatibility (Non-Dimming Sensors): Suitable for controlling incandescent lighting, low-voltage lighting with electronic and magnetic transformers, fluorescent lighting with electronic and magnetic ballasts, and fractional motor loads, with no minimum load requirements.
2.02.C. Wall Switch Occupancy Sensors:
1. All Wall Switch Occupancy Sensors:
   a. Description: Occupancy sensors designed for installation in standard wall box at standard wall switch mounting height with a field of view of 180 degrees,
integrated manual control capability, and no leakage current to load in off mode.

b. Operation: Field selectable to operate either as occupancy sensor (automatic on/off) or as vacancy sensor (manual-on/automatic off).

c. Manual-Off Override Control: When used to turn off load while in automatic-on mode, unit to revert back to automatic mode after no occupant presence is detected during the delayed-off time interval.

2.02.D. Ceiling Mounted Occupancy Sensors:
1. All Ceiling Mounted Occupancy Sensors:
   a. Description: Low profile occupancy sensors designed for ceiling installation.
   b. Unless otherwise indicated or required to control the load indicated on drawings, provide low voltage units, for use with separate compatible accessory power packs.
   c. Occupancy sensor to be field selectable as either manual-on/automatic-off or automatic on/off.

PART 3 EXECUTION

3.01 EXAMINATION

3.01.A. Verify that field measurements are as indicated.
3.01.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.
3.01.C. Verify that openings for outlet boxes are neatly cut and will be completely covered by devices or wall plates.
3.01.D. Verify that final surface finishes are complete, including painting.
3.01.E. Verify that branch circuit wiring installation is completed, tested, and ready for connection to lighting control devices.
3.01.F. Verify that the service voltage and ratings of lighting control devices are appropriate for the service voltage and load requirements at the location to be installed.
3.01.G. Verify that conditions are satisfactory for installation prior to starting work.

3.02 PREPARATION

3.02.A. Provide extension rings to bring outlet boxes flush with finished surface.
3.02.B. Clean dirt, debris, plaster, and other foreign materials from outlet boxes.

3.03 INSTALLATION

3.03.A. Install lighting control devices in accordance with NECA 1 (general workmanship) and, where applicable, NECA 130, including mounting heights specified in those standards unless otherwise indicated.
3.03.B. Coordinate locations of outlet boxes provided under Section 26 05 33.16 as required for installation of lighting control devices provided under this section.
   1. Mounting Heights: Unless otherwise indicated, as follows:
      a. Wall Switch Occupancy Sensors: 48 inches above finished floor.
3.03.C. Install lighting control devices in accordance with manufacturer’s instructions.
3.03.D. Unless otherwise indicated, connect lighting control device grounding terminal or conductor to branch circuit equipment grounding conductor and to outlet box with bonding jumper.
3.03.E. Install lighting control devices plumb and level and held securely in place.
3.03.F. Where required and not furnished with lighting control device, provide wall plate in accordance with Section 26 27 26.

3.03.G. Provide required supports in accordance with Section 26 05 29.

3.03.H. Where applicable, install lighting control devices and associated wall plates to fit completely flush to mounting surface 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.

3.03.I. Occupancy Sensor Locations:
1. Location Adjustments: Locations indicated are diagrammatic and only intended to indicate which rooms or areas require devices. Provide quantity and locations as required for complete coverage of respective room or area based on manufacturer's recommendations for installed devices.

3.04 FIELD QUALITY CONTROL
3.04.A. See Section 01 40 00 - Quality Requirements, for additional requirements.
3.04.B. Inspect each lighting control device for damage and defects.
3.04.C. Test occupancy sensors to verify proper operation, including time delays and ambient light thresholds where applicable. Verify optimal coverage for entire room or area.
3.04.D. Correct wiring deficiencies and replace damaged or defective lighting control devices.

3.05 ADJUSTING
3.05.A. Adjust devices and wall plates to be flush and level.
3.05.B. Adjust occupancy sensor settings to minimize undesired activations while optimizing energy savings, and to achieve desired function as indicated or as directed by Architect.
3.05.C. Where indicated or as directed by Architect, install factory masking material or adjust integral blinders on passive infrared (PIR) and dual technology occupancy sensor lenses to block undesired motion detection.

3.06 CLEANING
3.06.A. Clean exposed surfaces to remove dirt, paint, or other foreign material and restore to match original factory finish.

3.07 CLOSEOUT ACTIVITIES
3.07.A. Training: Train Owner's personnel on operation, adjustment, programming, and maintenance of lighting control devices.
1. Use operation and maintenance manual as training reference, supplemented with additional training materials as required.

END OF SECTION
PART 1 GENERAL

1.01 RELATED DOCUMENTS
   1.01.A. Drawings and general provisions of the Contract including General and Supplementary Conditions and Division 1 Specifications Sections apply to this Section.

1.02 SECTION INCLUDES
   1.02.A. Wall switches.
   1.02.B. Receptacles.
   1.02.C. Wall plates.

1.03 RELATED REQUIREMENTS
   1.03.A. Section 26 05 19 - Low-Voltage Electrical Power Conductors and Cables: Manufactured wiring systems for use with access floor boxes with compatible pre-wired connectors.
   1.03.B. Section 26 05 26 - Grounding and Bonding for Electrical Systems.
   1.03.C. Section 26 05 33.16 - Boxes for Electrical Systems.
   1.03.D. Section 26 05 53 - Identification for Electrical Systems: Identification products and requirements.
   1.03.E. Section 26 05 83 - Wiring Connections: Cords and plugs for equipment.
   1.03.F. Section 26 09 23 - Lighting Control Devices: Devices for automatic control of lighting, including occupancy sensors, in-wall time switches and in-wall interval timers.

1.04 REFERENCE STANDARDS
   1.04.B. FS W-S-896 - Switches, Toggle (Toggle and Lock), Flush-mounted (General Specification) 2017g.
   1.04.E. NEMA WD 1 - General Color Requirements for Wiring Devices 1999 (Reaffirmed 2015).
   1.04.F. NEMA WD 6 - Wiring Devices - Dimensional Specifications 2016.

1.05 ADMINISTRATIVE REQUIREMENTS
   1.05.A. Coordination:
      1. Coordinate the placement of outlet boxes with millwork, furniture, equipment, etc. installed under other sections or by others.
      2. Coordinate wiring device ratings and configurations with the electrical requirements of actual equipment to be installed.
      3. Coordinate the installation and preparation of uneven surfaces, such as split face block, to provide suitable surface for installation of wiring devices.
4. Notify Engineer of any conflicts or deviations from Contract Documents to obtain direction prior to proceeding with work.

1.06 SUBMITTALS
1.06.A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
1.06.B. Product Data: Provide manufacturer's catalog information showing dimensions, colors, and configurations.

1.07 QUALITY ASSURANCE
1.07.A. Comply with requirements of NFPA 70.
1.07.B. Products: Listed, classified, and labeled as suitable for the purpose intended.

1.08 DELIVERY, STORAGE, AND PROTECTION
1.08.A. Store in a clean, dry space in original manufacturer's packaging until ready for installation.

PART 2 PRODUCTS

2.01 WIRING DEVICE APPLICATIONS
2.01.A. Provide wiring devices suitable for intended use and with ratings adequate for load served.
2.01.B. For single receptacles installed on an individual branch circuit, provide receptacle with ampere rating not less than that of the branch circuit.
2.01.C. Provide weather resistant GFCI receptacles with specified weatherproof covers for receptacles installed outdoors or in damp or wet locations.
2.01.D. Provide tamper resistant receptacles.

2.02 WIRING DEVICE FINISHES
2.02.A. Provide wiring device finishes as described below unless otherwise indicated.
2.02.B. Wiring Devices, Unless Otherwise Indicated: Ivory with white nylon wall plate (verify with architect).
2.02.C. Wiring Devices Installed in Upper Level: White with white nylon wall plate.
2.02.D. Wiring Devices Installed in Lower Level: Gray with galvanized steel wall plate.

2.03 WALL SWITCHES
2.03.A. Wall Switches - General Requirements: AC only, quiet operating, general-use snap switches with silver alloy contacts, complying with NEMA WD 1 and NEMA WD 6, and listed as complying with UL 20 and where applicable, FS W-S-896; types as indicated on the drawings.
   1. Wiring Provisions: Terminal screws for side wiring and screw actuated binding clamp for back wiring with separate ground terminal screw.
2.03.B. Standard Wall Switches: Commercial specification grade, 20 A, 120/277 V with standard toggle type switch actuator and maintained contacts; single pole single throw, double pole single throw, three way or four way as indicated on the drawings.

2.04 RECEPTACLES
2.04.A. Manufacturers:
   5. Substitutions: Equal Products Approved by Engineer.
2.04.B. Receptacles - 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.
1. Wiring Provisions: Terminal screws for side wiring or screw actuated binding clamp for back wiring with separate ground terminal screw.
2. NEMA configurations specified are according to NEMA WD 6.

2.04.C. Convenience Receptacles:
1. Isolated Ground Convenience Receptacles: Commercial specification grade, 20A, 125V, NEMA 5-20R, with ground contacts isolated from mounting strap; isolated ground triangle mark on device face; single or duplex as indicated on the drawings.

2.04.D. GFCI Receptacles:
1. GFCI Receptacles - General Requirements: Self-testing, with feed-through protection and light to indicate ground fault tripped condition and loss of protection; listed as complying with UL 943, class A.

2.05 WALL PLATES

2.05.A. Wall Plates: Comply with UL 514D.
1. Configuration: One piece cover as required for quantity and types of corresponding wiring devices.
3. Screws: Metal with slotted heads finished to match wall plate finish.

PART 3 EXECUTION

3.01 EXAMINATION

3.01.A. Verify that field measurements are as indicated.
3.01.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.
3.01.C. Verify that wall openings are neatly cut and will be completely covered by wall plates.
3.01.D. Verify that final surface finishes are complete, including painting.
3.01.E. Verify that branch circuit wiring installation is completed, tested, and ready for connection to wiring devices.
3.01.F. Verify that conditions are satisfactory for installation prior to starting work.

3.02 PREPARATION

3.02.A. Provide extension rings to bring outlet boxes flush with finished surface.
3.02.B. Clean dirt, debris, plaster, and other foreign materials from outlet boxes.

3.03 INSTALLATION

3.03.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.
3.03.B. Coordinate locations of outlet boxes provided under Section 26 05 33.16 as required for installation of wiring devices provided under this section.
3.03.C. Install wiring devices in accordance with manufacturer's instructions.
3.03.D. Install permanent barrier between ganged wiring devices when voltage between adjacent devices exceeds 300 V.
3.03.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.
3.03.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.

3.03.G. Unless otherwise indicated, connect wiring device grounding terminal to branch circuit equipment grounding conductor and to outlet box with bonding jumper.

3.03.H. For isolated ground receptacles, connect wiring device grounding terminal only to identified branch circuit isolated equipment grounding conductor. Do not connect grounding terminal to outlet box or normal branch circuit equipment grounding conductor.

3.03.I. Install wiring devices plumb and level with mounting yoke held rigidly in place.

3.03.J. Install wall switches with OFF position down.

3.03.K. Install vertically mounted receptacles with grounding pole on top and horizontally mounted receptacles with grounding pole on left.

3.03.L. 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.

3.03.M. Install blank wall plates on junction boxes and on outlet boxes with no wiring devices installed or designated for future use.

3.04 FIELD QUALITY CONTROL

3.04.A. See Section 01 40 00 - Quality Requirements, for additional requirements.

3.04.B. Inspect each wiring device for damage and defects.

3.04.C. Operate each wall switch, wall dimmer and fan speed controller with circuit energized to verify proper operation.

3.04.D. Test each receptacle to verify operation and proper polarity.

3.04.E. Test each GFCI receptacle for proper tripping operation according to manufacturer's instructions.

3.04.F. Correct wiring deficiencies and replace damaged or defective wiring devices.

3.05 ADJUSTING

3.05.A. Adjust devices and wall plates to be flush and level.

3.06 CLEANING

3.06.A. Clean exposed surfaces to remove dirt, paint, or other foreign material and restore to match original factory finish.

END OF SECTION
PART 1 GENERAL

1.01 RELATED DOCUMENTS
1.01.A. Drawings and general provisions of the Contract including General and Supplementary Conditions and Division 1 Specifications Sections apply to this Section.

1.02 SECTION INCLUDES
1.02.A. Interior luminaires.
1.02.B. Exit signs.

1.03 RELATED REQUIREMENTS
1.03.A. Section 26 05 29 - Hangers and Supports for Electrical Systems.
1.03.B. Section 26 05 33.16 - Boxes for Electrical Systems.
1.03.C. Section 26 05 53 - Identification for Electrical Systems: Identification products and requirements.
1.03.D. Section 26 06 50.16 - Lighting Fixture Schedule.
1.03.E. Section 26 09 23 - Lighting Control Devices: Automatic controls for lighting including occupancy sensors, outdoor motion sensors, time switches, outdoor photo controls and daylighting controls.

1.04 REFERENCE STANDARDS
1.04.F. NFPA 70 - National Electrical Code Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

1.05 ADMINISTRATIVE REQUIREMENTS
1.05.A. Coordination:
1. Coordinate the installation of luminaires with mounting surfaces installed under other sections or by others. Coordinate the work with placement of supports, anchors, etc. required for mounting. Coordinate compatibility of luminaires and associated trims with mounting surfaces at installed locations.
2. Coordinate the placement of luminaires with structural members, ductwork, piping, equipment, diffusers, fire suppression system components, and other potential conflicts installed under other sections or by others.
3. Coordinate the placement of exit signs with furniture, equipment, signage or other potential obstructions to visibility installed under other sections or by others.
4. Notify Architect of any conflicts or deviations from Contract Documents to obtain direction prior to proceeding with work.

1.06 SUBMITTALS

1.06.A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

1.06.B. Product Data: Provide manufacturer's standard catalog pages and data sheets including detailed information on luminarie construction, dimensions, ratings, finishes, mounting requirements, listings, service conditions, photometric performance, installed accessories, and ceiling compatibility; include model number nomenclature clearly marked with all proposed features.

1. LED Luminaires:
   a. Include estimated useful life, calculated based on IES LM-80 test data.

2. Lamps: Include rated life, color temperature, color rendering index (CRI), and initial and mean lumen output.

1.07 QUALITY ASSURANCE

1.07.A. Comply with requirements of NFPA 70.

1.08 DELIVERY, STORAGE, AND PROTECTION

1.08.A. Receive, handle, and store products according to NECA/IESNA 500 (commercial lighting), NECA/IESNA 502 (industrial lighting) and manufacturer's written instructions.

1.08.B. Keep products in original manufacturer's packaging and protect from damage until ready for installation.

1.09 WARRANTY

1.09.A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.

1.09.B. Provide five year manufacturer warranty for LED luminaires, including drivers.

PART 2 PRODUCTS

2.01 LUMINAIRES

2.01.A. Manufacturers:

   1. H.E. Williams Lighting: https://www.hew.com/
   4. Substitutions: Equal Products Approved by Engineer.

2.01.B. Provide products that comply with requirements of NFPA 70.

2.01.C. Provide products that are listed and labeled as complying with UL 1598, where applicable.

2.01.D. Provide products listed, classified, and labeled as suitable for the purpose intended.

2.01.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.

2.01.F. Unless specifically indicated to be excluded, provide all required conduit, boxes, wiring, connectors, hardware, supports, trims, accessories, etc. as necessary for a complete operating system.

2.01.G. Provide products suitable to withstand normal handling, installation, and service without any damage, distortion, corrosion, fading, discoloring, etc.

2.01.H. 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.

2.02 EXIT SIGNS

2.02.A. Manufacturers - Powered and Self-Luminous Signs:
   1. H.E. Williams Lighting: [https://www.hew.com/]
   4. Substitutions: Equal Products Approved by Engineer.

2.02.B. Description: Internally illuminated exit signs with LEDs unless otherwise indicated; complying with NFPA 101 and all applicable state and local codes, and listed and labeled as complying with UL 924.
   1. Number of Faces: Single or double as indicated or as required for the installed location.
   2. Directional Arrows: As indicated or as required for the installed location.

2.02.C. Self-Powered Exit Signs:
   1. Operation: Upon interruption of normal power source or brownout condition exceeding 20 percent voltage drop from nominal, solid-state control automatically switches connected lamps to integral battery power for minimum of 90 minutes of rated emergency illumination, and automatically recharges battery upon restoration of normal power source.
   2. Battery: Sealed maintenance-free nickel cadmium unless otherwise indicated.
   3. Diagnostics: Provide power status indicator light and accessible integral test switch to manually activate emergency operation.
   4. Provide low-voltage disconnect to prevent battery damage from deep discharge.

PART 3 EXECUTION

3.01 EXAMINATION

3.01.A. Verify that field measurements are as indicated.
3.01.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.
3.01.C. Verify that suitable support frames are installed where required.
3.01.D. Verify that branch circuit wiring installation is completed, tested, and ready for connection to luminaires.
3.01.E. Verify that conditions are satisfactory for installation prior to starting work.

3.02 PREPARATION

3.02.A. Provide extension rings to bring outlet boxes flush with finished surface.
3.02.B. Clean dirt, debris, plaster, and other foreign materials from outlet boxes.

3.03 INSTALLATION

3.03.A. Coordinate locations of outlet boxes provided under Section 26 05 33.16 as required for installation of luminaires provided under this section.
3.03.B. Perform work in accordance with NECA 1 (general workmanship).
3.03.C. Install products in accordance with manufacturer’s instructions.
3.03.D. Install luminaires securely, in a neat and workmanlike manner, as specified in NECA 500 (commercial lighting) and NECA 502 (industrial lighting).
3.03.E. Provide required support and attachment in accordance with Section 26 05 29.
3.03.F. Install luminaires plumb and square and aligned with building lines and with adjacent luminaires.

3.03.G. Suspended Ceiling Mounted Luminaires:
   1. Do not use ceiling tiles to bear weight of luminaires.
   2. Do not use ceiling support system to bear weight of luminaires unless ceiling support system is certified as suitable to do so.
   3. Secure surface-mounted and recessed luminaires to ceiling support channels or framing members or to building structure.
   4. Secure lay-in luminaires to ceiling support channels using listed safety clips at four corners.
   5. In addition to ceiling support wires, provide two galvanized steel safety wire(s), minimum 12 gage, connected from opposing corners of each recessed luminaire to building structure.
   6. See appropriate Division 9 section where suspended grid ceiling is specified for additional requirements.

3.03.H. Suspended Luminaires:
   1. Unless otherwise indicated, specified mounting heights are to bottom of luminaire.
   2. Install using the suspension method indicated, with support lengths and accessories as required for specified mounting height.

3.03.I. Wall-Mounted Luminaires: Unless otherwise indicated, specified mounting heights are to center of luminaire.

3.03.J. Install accessories furnished with each luminaire.

3.03.K. Bond products and metal accessories to branch circuit equipment grounding conductor.

3.03.L. Exit Signs:
   1. Unless otherwise indicated, connect unit to unswitched power from same circuit feeding normal lighting in same room or area. Bypass local switches, contactors, or other lighting controls.

3.03.M. Install lamps in each luminaire.

3.04 FIELD QUALITY CONTROL
   3.04.A. See Section 01 40 00 - Quality Requirements, for additional requirements.
   3.04.B. Inspect each product for damage and defects.
   3.04.C. Operate each luminaire after installation and connection to verify proper operation.
   3.04.D. Test self-powered exit signs, emergency lighting units and fluorescent emergency power supply units to verify proper operation upon loss of normal power supply.
   3.04.E. Correct wiring deficiencies and repair or replace damaged or defective products. Repair or replace excessively noisy ballasts as determined by Architect.

3.05 ADJUSTING
   3.05.A. Aim and position adjustable luminaires to achieve desired illumination as indicated or as directed by Architect. Secure locking fittings in place.
   3.05.B. Exit Signs with Field-Selectable Directional Arrows: Set as indicated or as required to properly designate egress path as directed by Architect or authority having jurisdiction.

3.06 CLEANING
   3.06.A. Clean surfaces according to NECA 500 (commercial lighting), NECA 502 (industrial lighting) and manufacturer's instructions to remove dirt, fingerprints, paint, or other foreign material and restore finishes to match original factory finish.