PROJECT MANUAL

Replace Roofs & Renovate Building
Sheep Pavilion
Missouri State Fairgrounds
Sedalia, Missouri

DESIGNED BY: SBW/Esse Architects LLC
1409 W Broadway
Sedalia, MO  65301

DATE ISSUED: 8/1/2019

PROJECT NO.: F1907-01

FOR: State of Missouri
Office of Administration
Division of Facilities Management,
Design and Construction
SECTION 000107 – PROFESSIONAL SEALS AND CERTIFICATIONS

PROJECT NUMBER: (F1907-01)

THE FOLLOWING DESIGN PROFESSIONALS HAVE SIGNED AND SEALED THE ORIGINAL PLANS AND SPECIFICATIONS FOR THIS PROJECT, WHICH ARE ON FILE WITH THE DIVISION OF FACILITIES MANAGEMENT, DESIGN AND CONSTRUCTION:

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

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### 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:

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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. Replace Roofs & Renovate Building
   Sheep Pavilion
   Missouri State Fairgrounds
   Sedalia, Missouri

   Project No.: F1907-01

3.0 BIDS WILL BE RECEIVED:
A. Until: 1:30 PM, Tuesday, November 12, 2019

4.0 Only electronic bids on MissouriBUYS shall be accepted: https://missouribuys.mo.gov. Bidder must be registered to bid.

DESCRIPTION:
A. Scope: The project includes replacing the roof and renovating building, and sheep pavilion. Renovations will include superstructure painting, electrical, HVAC, and plumbing upgrades, repairs to the existing concrete floor, and remodeling the two-story building.

B. Estimate: $2,065,000 to $2,840,000

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: 10:00 AM; Tuesday, October 29, 2019; Missouri State Fairgrounds, 2503 W 16th Street, Sedalia, Missouri 65301.

6.0 HOW TO GET PLANS & SPECIFICATIONS:
A. Request: View Only Electronic bid sets are available at no cost or paper bid sets for a deposit of $100 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: SBW/Esser Architects LLC, Alan Green, phone # 660-826-1181, fax # 660-826-1698
B. Project Manager: Jared Cook, phone # 573-690-6733, 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.
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.

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 - http://oa.mo.gov/facilities/project-management.

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 will 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.
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

(Note: See Article 7.D below for submittal restrictions.)

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

B. Bids 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. Bids 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.

7.0 - RECEIVING BID SUBMITTALS: Only bids submitted on MissouriBUYS shall be accepted; no hard copy bids shall be accepted.

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.

B. Submittals will be received as shown in and required by the Bid Form. Submittals will be completed so as to include insertion of all amounts for alternate bids, unit prices and cost accounting data, etc. Failure to complete all required information may be cause for rejection of bid.

C. 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.
D. Bidders prices shall include all city, state and federal sales, excise and similar taxes which may be lawfully assessed in connection with his performance of work and purchase of materials to be incorporated in the work. THIS PROJECT IS NOT TAX EXEMPT.

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

F. The Owner reserves the right to waive informalities in bid submittals and to reject any or all bids.

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 at – http://oa.mo.gov/facilities/vendor-links/contractor-forms .
Information regarding a Memorandum of Understanding which is one form of appropriate documentation located at [https://www.uscis.gov/e-verify/](https://www.uscis.gov/e-verify/). Submittal of this form and appropriate documentation is required before the award of any contract. In addition the contractor shall be responsible for compliance of these requirements by all subcontractors and suppliers at any tier associated with this contract.

### 10.0 – SERVICE-DISABLED VETERANS

A. For the purposes of these instructions, the terms “service-disabled veteran” and “service-disabled veteran business” have the same meanings as set forth in section 34.074, RSMo.

B. The State of Missouri has a goal of awarding three percent of all construction projects to service-disabled veterans. Furthermore, service-disabled veteran businesses doing business as Missouri firms, corporations, or individuals, or which maintain Missouri offices or places 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 any service-disabled veteran business’s bid amount(s) by three percent of the lowest bid amount(s). 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.

C. Any bidder who is qualified as a Missouri service-disabled veteran pursuant to Section 34.074, RSMo, must complete and submit with the bid the MISSOURI SERVICE DISABLED VETERAN BUSINESS form and provide the specified documentation in accordance with the instructions provided therein. This form can be obtained at: [http://oa.mo.gov/facilities/vendor-links/contractor-forms](http://oa.mo.gov/facilities/vendor-links/contractor-forms).

### 11.0 - 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.

### 12.0 - 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.**

### 13.0 - 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:

SECTION 002213—SUPPLEMENTARY INSTRUCTIONS TO BIDDERS – MBE/WBE/SDVE INSTRUCTIONS

1.0 DEFINITIONS


2. "MINORITY":
   a. "Black Americans," which includes persons having origins in any of the black racial groups of Africa;
   b. "Hispanic Americans," which includes persons of Mexican, Puerto Rican, Cuban, Central or South American or other Spanish culture or origin regardless of race;
   c. "Native Americans," which includes persons who are American Indians, Eskimos, Aleuts, or Native Hawaiians;
   d. "Asian-Pacific Americans," which includes persons whose origins are from Japan, China, Taiwan, Korea, Vietnam, Laos, Cambodia, the Philippines, Samoa, Guam, the U.S. Trust Territories of the Pacific, or the Northern Marianas; or
   e. "Asian-Indian Americans," which includes persons whose origins are from India, Pakistan or Bangladesh.

3. "MINORITY BUSINESS ENTERPRISE": A business concern which is at least fifty-one percent (51%) owned by one (1) or more minority as defined in 2. "MINORITY" above or in the case of any publicly-owned business, fifty-one percent (51%) of the stock of which is owned by one (1) or more minority as defined in 2. "MINORITY" above AND whose management and daily business operations are controlled by one (1) or more minority as defined herein.


5. "WOMEN BUSINESS ENTERPRISE": A business concern which is at least fifty-one percent (51%) owned by one (1) or more women or in the case of any publicly-owned business at least fifty-one percent (51%) of the stock of which is owned by one (1) or more women AND whose management and daily business operations are controlled by one (1) or more women.


7. “SERVICE-DISABLED VETERAN”: Any individual who is service disabled as certified by the appropriate federal agency responsible for the administration of veterans’ affairs.

8. “SERVICE-DISABLED VETERANS ENTERPRISE”: A service disabled veteran business as defined by Section 34.074, RSMo, meaning a business concern which is at least fifty-one percent (51%) owned by one (1) or more service-disabled veterans or in the case of any publicly-owned business at least fifty-one percent (51%) of the stock of which is owned by one (1) or more service-disabled veterans AND whose management and daily business operations are controlled by one (1) or more service disabled veterans.

2.0 MBE/WBE/SDVE PROGRAM REQUIREMENTS

A. For bids where MBE, WBE and or SDVE goals are greater than zero percent (0%) as noted in the “Invitation for Bid,” the following provisions shall apply

1. MBE/WBE/SDVE Percentage Goals:
   a. The bidder shall have as a goal subcontracting not less than the percentages stated on the Bid Form for MBE, WBE and SDVE firms.

2. Computation of MBE/WBE/SDVE Percent Goal Participation:
   a. The total dollar value of the work granted to the MBE, WBE or SDVE by the successful bidder shall be counted towards the applicable goal of the entire contract.
   b. A bidder may count toward the MBE/WBE/SDVE goals only expenditures to certified MBE’s, WBE’s, or SDVE’s that perform a commercially useful function in the work of a contract. A MBE, WBE, or SDVE is considered to perform a commercially useful function when it is responsible for executing a distinct element of the work contract and carrying out its responsibilities by actually performing, managing and supervising the work or providing supplies or manufactured materials. A bidder who is a MBE, WBE or SDVE may count 100% of the contract towards the MBE, WBE or
SDVE goal. (NOTE: MBE firms who bid as general contractors are expected to obtain WBE and SDVE participation; WBE firms who bid as general contractors are expected to obtain MBE and SDVE participation; and SDVE firms who bid as general contractors are expected to obtain MBE and WBE participation to meet the project’s separate goals.)

c. Bidder may count toward its MBE/WBE/SDVE goals expenditures for materials and supplies obtained from certified MBE, WBE, or SDVE suppliers and manufacturers, provided that the MBE, WBE, or SDVE assumes the actual and contractual responsibility for the provision of the materials and supplies.

d. A bidder may count towards the MBE/WBE/SDVE goals that portion of the total dollar value of the work granted to a second or subsequent tier subcontractor or a supplier to any subcontractor at any tier, provided that the MBE, WBE, or SDVE properly assumes responsibility for the work as outlined in 2.A.2.b and 2.A.2.c above.

e. A bidder may count towards the MBE/WBE/SDVE goals that portion of the total dollar value 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.

3. Certification by bidder of MBE/WBE/SDVE Subcontractors:

a. The bidder shall submit with his bid 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 on the contract work.

b. The bidder may determine the status of certification of a proposed MBE or WBE subcontractor or supplier by referring to the Office of Equal Opportunity (OEO) MBE/WBE directory (https://apps1.mo.gov/MWBCertifiedFirms/); and the eligibility of a SDVE subcontractor or supplier by referring to the Division of Purchasing and Materials Management 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/). Additional information, clarifications, etc., regarding the listings in the Directory may be obtained by calling the Division at (573) 751-3339 and asking to speak to the Contract Specialist of record as shown in Section 007300, Supplementary Conditions.

c. If the proposed subcontractor is certified as a MBE/WBE firm by any other State of Missouri agency or any Missouri city or county government agency, the bidder shall so note and provide particulars. Other known State of Missouri entities providing certification are:

- Mountain Plains Minority Supplier Development Council 816-221-4200
- Human Relations Department, KCMO 816-274-1432
- Lambert International Airport 314-551-5000
- Metro (formerly Bi-State Development Agency) 314-982-1457
- St. Louis Development Corporation 314-622-3400 Ext. 362
- St. Louis Minority Business Council 314-241-1073
- SBA 8/St. Louis, MO 314-539-6600
- Missouri Department of Transportation 573-751-2859
- National Women Business Owners Corp. 561-848-5066

(Missouri firms only)

4. Waiver of MBE/WBE/SDVE Participation:

a. The bidder is required to make a good faith effort to locate and contract with MBE’s, WBE’s and SDVE’s. If a bidder has made a good faith effort to secure the required MBE’s, WBE’s and SDVE’s and has failed, he may submit with his bid the information requested in “MBE/WBE/SDVE Good
Faith Effort (GFE) Determination.” The Director will review the bidder’s actions as set forth in the bidder's Application for Waiver, the ability or success of other bidders to obtain MBE, WBE, or SDVE participation in their bids, and any other factors deemed relevant by the Director, to determine if a good faith effort has been made to meet the applicable percentage goals. If the bidder is judged not to have made 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 SDVE participation will be determined to be responsive to the MBE/WBE/SDVE participation goals of the contract regardless of the percent of MBE/WBE/SDVE participation, provided the bid is otherwise acceptable.

b. In reaching a determination of good faith, the Director may evaluate, but is not limited to, the following factors:

1. How subcontractors were contacted initially, the specific project information provided and the documentation to support that contact;
2. How project plans and specifications were provided to MBE/WBE/SDVE subcontractors;
3. The names, addresses, phone numbers, and dates of contact for MBE/WBE/SDVE firms contacted for specific categories of work;
4. Attempts to follow-up with MBE, WBE or SDVE subcontractors prior to bid to negotiate price, scope of work, or make other adjustments or clarifications;
5. Amount of bids received from any of these subcontractors;
6. Bid accepted from one of these subcontractors or reasons for rejecting bids;
7. The MBE, WBE, or SDVE suppliers contacted, date of contact, material or equipment, amounts of quotes;
8. The ability or success of other bidders to obtain the MBE/WBE/SDVE participation in their bids.

c. If MBE/WBE/SDVE goals have been identified on Section 004113-BID FORM, ALL bidders are required to submit all appropriate MBE/WBE/SDVE documentation before the stated time and date set forth in the “Invitation for Bid”. Failure to provide this information by the specified date and time will be grounds for rejecting the bid.

MBE/WBE/SDVE forms may be accessed at https://oa.mo.gov/facilities/vendor-links/contractor-forms. 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.”

d. The Director reserves the right to provide bidders the opportunity to correct or amplify the documented information received concerning MBE/WBE/SDVE goals. The additional information will be transmitted to Facilities Management Design and Construction within two (2) working days of a phone or facsimile or email request from the Director’s representative.

3.0 CONTRACTOR REQUIREMENTS

For contracts where there are MBE/WBE/SDVE participation goals as noted in the “Invitation for Bid,” the following provisions shall apply:

A. The Contractor is bound to subcontracting or obtaining materials in amounts not less than the dollar amount indicated in the awarded contract to MBE/WBE/SDVE (s) unless that amount is revised in writing by the Owner’s representative.

B. If the Contractor fails to meet or maintain the participation requirements contained in the Contractor’s bid, he must satisfactorily explain to the Director or his Designee why the requirement cannot be achieved and why meeting the requirement was beyond the Contractor's control.

C. If the Director finds the Contractor's explanation unsatisfactory, the Director may take any appropriate action including, but not limited to:
1. Declaring the Contractor ineligible to participate in any Facilities Management, Design and Construction contracts for a period not to exceed twelve (12) months; and

2. Directing that the Contractor be declared non-responsive to the “Invitation for Bid,” or in breach of this contract.

D. If a MBE, WBE, or SDVE is replaced during the course of this contract, the Contractor shall replace it with a similar MBE, WBE, or SDVE OR make a good faith effort to replace it with another MBE, WBE, or SDVE. All substitutions shall be approved by the Owners Representative.

E. The Contractor shall provide the Owner with regular reports on its progress in meeting its MBE/WBE/SDVE obligations. As a minimum, the dollar-value of work completed by each MBE, WBE, or SDVE subcontractor during the preceding month and as a cumulative total shall be reported with each monthly application for payment. A final report shall include the total dollar-value of work completed by each MBE, WBE, and SDVE subcontractor during the total 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 Agriculture, Missouri State Fair.

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:

<table>
<thead>
<tr>
<th>Project Name:</th>
<th>Replace Roofs &amp; Renovate Building</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Sheep Pavilion</td>
</tr>
<tr>
<td></td>
<td>Missouri State Fairgrounds</td>
</tr>
<tr>
<td></td>
<td>Sedalia, Missouri</td>
</tr>
</tbody>
</table>

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 completion date is May 31, 2020. 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 $1,000 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 5% 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 $
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., Acting Director  Contractor's Authorized Signature
Division of Facilities Management,  
Design and Construction

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: 

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): 

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

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

SPECIFICATION SECTION NO.

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>
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<td>VENDOR</td>
<td></td>
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PREVIOUS INSTALLATIONS

<table>
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<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

____________________________________________________

____________________________________________________

____________________________________________________

____________________________________________________

____________________________________________________

____________________________________________________

____________________________________________________

____________________________________________________
### 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/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
### MBE/WBE/SDVE Progress Report

**STATE OF MISSOURI**  
**OFFICE OF ADMINISTRATION**  
**DIVISION OF FACILITIES MANAGEMENT, DESIGN AND CONSTRUCTION**

**MBE/WBE/SDVE PROGRESS REPORT**  
SUBMIT WITH ALL INVOICES: (PLEASE CHECK APPROPRIATE BOX BELOW)

- ☐ CONSULTANT  
- ☐ CONSTRUCTION

**CHECK IF FINAL**  
☐ FINAL

**DATE**

---

**PROJECT TITLE**

**PROJECT LOCATION**

**FIRM**

**TOTAL CONTRACT AMOUNT**

$ 

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

% and $ 

---

<table>
<thead>
<tr>
<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>
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<tbody>
<tr>
<td>☐ MBE</td>
<td>☐ WBE</td>
<td>☐ SDVE</td>
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<td>☒ MBE</td>
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</tbody>
</table>

**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__
# GENERAL CONDITIONS

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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 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.

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

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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 there under 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 thereto. 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 Contractor 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 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 may 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 made and the equipment and system is finally accepted. 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 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: George Esser
SBW/Esser Architects LLC
1409 W Broadway
Sedalia, MO 65301
Telephone: 660-826-1181; Fax: 660-826-1698
Email: geser1183@gmail.com

Construction Representative: Randy Duncan
Division of Facilities Management, Design and Construction
709 Missouri Blvd, Jefferson City, Missouri 65109
Telephone: 573-619-4395; Fax: 573-751-7277
Email: Randy.Duncan@oa.mo.gov

Project Manager: Jared Cook
Division of Facilities Management, Design and Construction
301 West High Street, Room 730
Jefferson City, Missouri 65102
Telephone: 573-690-6733; Fax: 573-751-7277
Email: Jared.Cook2@oa.mo.gov

Contract Specialist: Mandy Roberson
Division of Facilities Management, Design and Construction
301 West High Street, Room 730
Jefferson City, Missouri 65102
Telephone: 573-522-0074; Fax: 573-751-7277
Email: mandy.roberson@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 10 complete sets of drawings and specifications at no charge.
B. The Owner will furnish the Contractor with approximately 10 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 080
PETTIS 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
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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.*
<table>
<thead>
<tr>
<th>OCCUPATIONAL TITLE</th>
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<th>Basic Hourly Rates</th>
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<td>Carpenter</td>
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<tr>
<td>Lineman - Tree Trimmer</td>
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<td>Groundman</td>
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<td>Group IV</td>
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</tbody>
</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.
OVER TIME
and
HOLIDAYS

OVER TIME

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.
SECTION 011000 – SUMMARY OF WORK

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 replace the roof and renovate the Sheep Pavilion at the Missouri State Fairgrounds.
   1. Project Location: 2503 West 16th Street, Sedalia, MO.
   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 07-31-19 were prepared for the Project by SBW/Esser Architects, LLC, 1409 West Broadway, Sedalia, MO 65301

The Work consists of replacing the roof, end panels, and wall panels, including a new guttering system to direct the flow of storm water beyond the limits of the Sheep Pavilion.

The renovations to the Sheep Pavilion shall include superstructure painting, electrical and plumbing upgrades, repairs to the existing concrete floor, and remodeling the two-story section including stripping, priming, and painting the superstructure of the Sheep Pavilion.

The existing cracking in the concrete floor shall be repaired throughout the Sheep Pavilion. The existing electrical service to the Sheep Pavilion shall be removed and replaced with an upgraded service, and the electrical distribution system for the Sheep Pavilion shall be replaced. (Branch wiring within the Sheep Pavilion serving the sheep pens was previously completed and shall be maintained.)

The lighting fixtures within the Sheep Pavilion shall be upgraded to an LED system with new fans in each pen area, sized to match the existing fan system in the Sheep Pavilion.

The two story section shall be replaced. The structural, electrical, plumbing, lighting and heating, ventilation, and air conditioning section shall be replaced (HVAC) components of the two-story section shall be upgraded to meet current applicable codes and standards.

HVAC system for the two-story section shall be mini-split system air conditioning units. The new construction shall include new men’s and women’s restrooms capable of being winterized by MSF personnel and with adequate ventilation to limit the occurrence of condensation within the restroom. The replaced two-story section shall provide capacities for sleeping and office areas.

C.

1. The Work includes demolition and removal of 2-story section, protection of elements to remain, new concrete, metal framing and siding, windows, doors, new HVAC, plumbing, electrical, and interior finishes.
D. The Work will be constructed under a single prime contract.

1.3 DESIGNER’S ESTIMATE OF CONSTRUCTION COSTS
A. Designers Cost Estimate Range: $2,065,000 - $2,840,000

1.4 WORK UNDER OTHER CONTRACTS
A. 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 FUTURE WORK (Not Applicable)

1.6 WORK SEQUENCE
A. The Work will be conducted in ONE phase.
   1. Phase 1: COMPLETE CONSTRUCTION. Work shall be substantially complete, ready for occupancy no later than 05-31-2020.

1.7 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 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.

1.8 OCCUPANCY REQUIREMENTS
A. Full Owner Occupancy: The Owner will occupy the site and existing building during the entire construction period. Cooperate with the Owner during construction operations to minimize conflicts and facilitate owner usage. Perform the Work so as not to interfere with the Owner’s operations.

B. 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.

1.9 OWNER-FURNISHED PRODUCTS (Not Applicable)

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 01 10 00
SECTION 01 23 00 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: Demo Wash building and slab. Rebuild structure including reuse of main frame from existing main building as shown and specified.
B. Alternate No. 2: Use oscillating fans in lieu of motion detecting fans specified.
C. Alternate No. 3: Replace judges stand and add bleachers.

END OF SECTION 01 23 00
SECTION 01 26 00 – CONTRACT MODIFICATION PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract including General and Supplementary Conditions and other Division 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 0, Section 007213, Article 3.1 "Acceptable Substitutions" for administrative procedures for handling Requests for Substitutions made after Contract award.
   2. 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 [oa.mo.gov/fmde/dc/aeforms.htm](http://oa.mo.gov/fmde/dc/aeforms.htm) or [oa.mo.gov/fmde/dc/contractorforms.htm](http://oa.mo.gov/fmde/dc/contractorforms.htm):

   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 01 26 00
SECTION 01 31 00 – COORDINATION

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 01 32 00, Section "Construction Progress Documentation" 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 01 31 00
SECTION 01 32 00 – SCHEDULE – BAR CHART

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 a Bar Chart Schedule for the project construction
      activities, schedule of submittals, and schedule for testing.

PART 2 - PRODUCTS – (Not Applicable)

PART 3 - EXECUTION

3.1 SUBMITTAL PROCEDURES
   A. The Contractor shall submit to the Designer, within ten (10) working days following the
      Notice to Proceed, a Progress Schedule showing the rate of progress the Contractor
      agrees to maintain and the order in which he proposed to carry out the various phases of
      Work. No payments shall be made to the Contractor until the Progress Schedule has been
      approved by the Owner.

   B. The Contractor shall submit an updated Schedule for presentation at each Monthly
      Progress Meeting. The Schedule shall be updated by the Contractor as necessary to
      reflect the current Schedule and its relationship to the original Schedule. The updated
      Schedule shall reflect any changes in the logic, sequence, durations, or completion date.
      Payments to the Contractor shall be suspended if the Progress Schedule is not adequately
      updated to reflect actual conditions.

   C. The Contractor shall submit Progress Schedules to Subcontractors to permit coordinating
      their Progress Schedules to the general construction Work. The Contractor shall
      coordinate preparation and processing of Schedules and reports with performance of
      other construction activities.

3.2 CONSTRUCTION PROGRESS SCHEDULE – BAR CHART SCHEDULE
   A. Bar-Chart Schedule: The Contractor shall prepare a comprehensive, fully developed,
      horizontal bar chart-type Contractor’s Construction Schedule. The Contractor for general
      construction shall prepare the Construction Schedule for the entire Project. The Schedule
      shall show the percentage of work to be completed at any time, anticipated monthly
      payments by Owner, as well as significant dates (such as completion of excavation,
      concrete foundation work, underground lines, superstructure, rough-ins, enclosure,
      hanging of fixtures, etc.) which shall serve as check points to determine compliance with
      the approved Schedule.

      1. The Contractor shall provide a separate time bar for each significant construction
         activity. Provide a continuous vertical line to identify the first working day of
         each week.
a. If practical, use the same Schedule of Values breakdown for schedule time bars.

2. The Contractor shall provide a base activity time bar showing duration for each construction activity. Each bar is to indicate start and completion dates for the activity. The Contractor is to place a contrasting bar below each original schedule activity time for indicating actual progress and planned remaining duration for the activity.

3. The Contractor shall prepare the Schedule on a minimal number of separate sheets to readily show the data for the entire construction period.

4. Secure time commitments for performing critical elements of the Work from parties involved. Coordinate each element on schedule with other construction activities. Include minor elements involved in the overall sequence of the Work. Show each activity in proper sequence. Indicate graphically the sequences necessary for completion of related portions of the Work.

5. Coordinate the Contractor’s Construction Schedule with the Schedule of Values, list of subcontracts, Submittal Schedule, progress reports, payment requests, and other required schedules and reports.

6. Indicate the Intent to Award and the Contract Substantial Completion dates on the schedule.

B. Phasing: Provide notations on the schedule to show how the sequence of the Work is affected by the following:

1. Requirement for Phased completion
2. Work by separate Contractors
3. Work by the Owner
4. Pre-purchased materials
5. Coordination with existing construction
6. Limitations of continued occupancies
7. Un-interruptible services
8. Partial Occupancy prior to Substantial Completion
9. Site restrictions
10. Provisions for future construction
11. Seasonal variations
12. Environmental control

C. Work Stages: Use crosshatched bars to indicate important stages of construction for each major portion of the Work. Such stages include, but are not necessarily limited to, the following:

1. Subcontract awards
2. Submittals
3. Purchases
4. Mockups
5. Fabrication
6. Sample testing
7. Deliveries
8. Installation
9. Testing
10. Adjusting
11. Curing
12. Startup and placement into final use and operation

D. Area Separations: Provide a separate time bar to identify each major area of construction for each major portion of the Work. For the purposes of this Article, a “major area” is a story of construction, a separate building, or a similar significant construction element.

1. Indicate where each construction activity within a major area must be sequenced or integrated with other construction activities to provide for the following:
   a. Structural completion.
   b. Permanent space enclosure
   c. Completion of mechanical installation
   d. Completion of the electrical portion of the Work
   e. Substantial Completion

3.3 SCHEDULE OF SUBMITTALS

A. Upon acceptance of the Construction Progress Schedule, prepare and submit a complete schedule of submittals. Coordinate the submittal schedule with Section 011300 SUBMITTALS, the approved Construction Progress Schedule, list of subcontracts, Schedule of Values and the list of products.

B. 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

C. 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.
D. 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.

3.4 SCHEDULE OF INSPECTIONS AND TESTS

A. Prepare a schedule of inspections, tests, and similar services required by the Contract Documents. Submit the schedule with (15) days of the date established for commencement of the Contract Work. The Contractor is to notify the testing agency at least (5) working days in advance of the required tests unless otherwise specified.

B. Form: This 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, Architect, and each party involved in performance of portions of the Work where inspections and tests are required.

END OF SECTION 01 32 00
SECTION 01 33 00 – 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 two (2) sets of prints, black and white, glossy; 8”x10” size; mounted on 8½”x11” soft card stock with left edge binding margin for 3-hole punch.

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.

<table>
<thead>
<tr>
<th>SECTION</th>
<th>DESCRIPTION</th>
<th>TYPE OF SUBMITTAL</th>
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<tbody>
<tr>
<td>06 10 00</td>
<td>Carpentry</td>
<td>Shop Drawings</td>
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<tr>
<td>06 16 00</td>
<td>Sheathing</td>
<td>Product Data</td>
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<tr>
<td>06 20 13</td>
<td>Exterior Finish Carpentry</td>
<td>Sample</td>
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<tr>
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<td>08 91 00</td>
<td>Stationary Blade Wall Louvers</td>
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<tr>
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<td>09 51 00</td>
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<td>09 68 80</td>
<td>Carpet</td>
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<td>Exterior Paint</td>
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<td>10 16 00</td>
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<td>10 28 13.13</td>
<td>Commercial Toilet Accessories</td>
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<td>10 42 50</td>
<td>Signs</td>
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<td>22 33 13</td>
<td>Instantaneous Electric Domestic Water Heaters</td>
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<tr>
<td>22 42 16.03</td>
<td>Lavatories and Faucets</td>
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<td>Circulator Fans - Oscillating</td>
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<td>23 82 01</td>
<td>Exhaust Fans</td>
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<td>26 05 19</td>
<td>Conductors and Cables</td>
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<tr>
<td>26 05 33</td>
<td>Raceways and Boxes</td>
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</tr>
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</table>

**END OF SECTION 01 33 00**
SECTION 013513.28 – SITE SECURITY AND HEALTH REQUIREMENTS

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. A list of the names of all employees who will submit fingerprints for a background
         check, and the signed privacy documents identified below for each employee.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.1 ACCESS TO THE SITE
   A. The Contractor shall arrange with Facility Representatives to establish procedures for the
      controlled entry of workers and materials into the work areas at the Facility.
   B. The Contractor shall establish regular working hours with Facility Representatives. The
      Contractor must report changes in working hours or overtime to Facility Representatives
      and obtain approval twenty-four (24) hours ahead of time. The Contractor shall report
      emergency overtime to Facility Representatives as soon as it is evident that overtime is
      needed. The Contractor must obtain approval from Facility Representatives for all work
      performed after dark.
   C. The Contractor shall provide the name and phone number of the Contractor’s employee or
      agent who is in charge onsite; this individual must be able to be contacted in case of
      emergency. The Contractor must be able to furnish names and address of all employees
      upon request.
   D. All construction personnel shall visibly display issued identification cards.

3.2 FIRE PROTECTION, SAFETY, AND HEALTH CONTROLS
   A. The Contractor shall take all necessary precautions to guard against and eliminate possible
      fire hazards.
      1. Onsite burning is prohibited.
      2. The Contractor shall store all flammable or hazardous materials in proper
         containers located outside the buildings or offsite, if possible.
      3. The Contractor shall provide and maintain, in good order, during construction fire
         extinguishers as required by the National Fire Protection Association. In areas of
         flammable liquids, asphalt, or electrical hazards, 15-pound carbon dioxide or 20-
         pound dry chemical extinguishers shall be provided.
B. The Contractor shall not obstruct streets or walks without permission from the Owner’s Construction Representative and Facility Representatives.

C. The Contractor’s personnel shall not exceed the speed limit of 15 mph while at the Facility unless otherwise posted.

D. The Contractor shall take all necessary, reasonable measures to reduce air and water pollution by any material or equipment used during construction. The Contractor shall keep volatile wastes in covered containers, and shall not dispose of volatile wastes or oils in storm or sanitary drains.

E. The Contractor shall keep the project site neat, orderly, and in a safe condition at all times. The Contractor shall immediately remove all hazardous waste, and shall not allow rubbish to accumulate. The Contractor shall provide onsite containers for collection of rubbish and shall dispose of it at frequent intervals during the progress of the Work.

F. Fire exits, alarm systems, and sprinkler systems shall remain fully operational at all times, unless written approval is received from the Owner’s Construction Representative and the appropriate Facility Representative at least twenty-four (24) hours in advance. The Contractor shall submit a written time schedule for any proposed shutdowns.

G. 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.

H. Alcoholic beverages or illegal substances shall not be brought upon the Facility premises. The Contractor’s workers shall not be under the influence of any intoxicating substances while on the Facility premises.

3.3 SECURITY CLEARANCES AND RESTRICTIONS

A. FMDC REQUIRED FINGERPRINTING FOR CRIMINAL BACKGROUND AND WARRANTS CHECK

1. All employees of the Contractor are required to submit fingerprints to the Missouri State Highway Patrol to enable the Office of Administration, Division of Facilities Management, Design and Construction (FMDC) to receive state and national criminal background checks on such employees. FMDC will also check with law enforcement to determine if any of the Contractor’s employees has an outstanding warrant for his or her arrest. FMDC reserves the right to prohibit any employee of the Contractor from performing work in or on the premises of any facility owned, operated, or utilized by the State of Missouri for any reason.

2. The Contractor shall ensure all of its employees submit fingerprints to the Missouri State Highway Patrol and pay for the cost of such background checks. The Contractor shall submit to FMDC a list of the names of the Contractor’s employees who will be fingerprinted and a signed Missouri Applicant Fingerprint Privacy Notice, Applicant Privacy Rights and Privacy Act Statement for each employee. All employees of the Contractor approved by FMDC to work at a State facility must obtain a contractor ID badge from FMDC prior to beginning work on-site, unless the Director of FMDC, at the Director’s discretion, waives the requirement for a contractor ID badge. The Contractor and its employees must comply with
the process for background checks and contractor ID badges found on FMDC’s website at: https://oa.mo.gov/fmdc-contractor-id-badges

4. Pursuant to section 43.540, RSMo, FMDC participates in the Missouri Rap Back and National Rap Back programs as of August 28, 2018. This means that the Missouri State Highway Patrol, Central Records Repository, and the Federal Bureau of Investigation will retain the fingerprints submitted by each of the Contractor’s employees, and those fingerprints will be searched against other fingerprints on file, including latent fingerprints. While retained, an employee’s fingerprints may continue to be compared against other fingerprints submitted or retained by the Federal Bureau of Investigation, including latent fingerprints.

5. As part of the Missouri and National Rap Back programs, FMDC will receive notification if a new arrest is reported for an employee whose fingerprints have been submitted for FMDC after August 28, 2018. If the employee is performing work on a State contract at the time of the arrest notification, FMDC will request and receive the employee’s updated criminal history records. If the employee is no longer performing work on a State contract, FMDC will not obtain updated criminal records.

6. Pursuant to section 43.540, RSMo, the Missouri State Highway Patrol will provide the results of the employee’s background check directly to FMDC. FMDC may NOT release the results of a background check to the Contractor or provide the Contractor any information obtained from a background check, either verbally or in writing. FMDC will notify the Contractor only whether an employee is approved to work on State property.

Each employee who submits fingerprints to the Missouri State Highway Patrol has a right to obtain a copy of the results of his or her background check. The employee may challenge the accuracy and completeness of the information contained in a background check report and obtain a determination from the Missouri State Highway Patrol and/or the FBI regarding the validity of such challenge prior to FMDC making a final decision about his or her eligibility to perform work under a State contract.

7. The Contractor shall notify FMDC if an employee is terminated or resigns from employment with the Contractor. If the Contractor does not anticipate performing work on a State contract in the future, the Contractor may request that FMDC remove its employees from the Rap Back programs. However, if removed from the Rap Back programs, employees will be required to submit new fingerprints should the contractor be awarded another State contract.

8. Upon award of a Contract, the Contractor should contact FMDC to determine if its employees need to provide a new background check. If a Contractor’s employee has previously submitted a fingerprint background check to FMDC as part of the Missouri and National Rap Back programs, the employee may not need to submit another fingerprint search for a period of three to six years, depending upon the circumstances. The Contractor understands and agrees that FMDC may require more frequent background checks without providing any explanation to the Contractor. The fact that an additional background check is requested by FMDC does not indicate that the employee has a criminal record.

3.4 DISRUPTION OF UTILITIES
A. The Contractor shall give a minimum of seventy-two (72) hours written notice to the Construction Representative and the Facility Representative before disconnecting electric, gas, water, fire protection, or sewer service to any building.

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

END OF SECTION 013513.28
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: 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.

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: Except where the Owner authorizes use of the permanent system, provide vented, self-contained, LP gas or fuel-oil heaters with individual space thermostatic control.
   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 Telephones: The Owner will provide telephones within the facility. All construction personnel will be allowed access only to those specific telephones designated by the Construction Representative.

H. 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.
I. Temporary Toilets: Use of the Owner’s existing toilet facilities will be permitted, so long as facilities are cleaned and maintained in a condition acceptable to the Owner. All construction personnel will be allowed access only to those specific facilities designed by the Construction Representative. At substantial completion, restore these facilities to the condition prevalent at the time of initial use.

J. Temporary Toilets: The Owner will provide toilets and associated facilities within the building. All construction personnel will be allowed access only to those specific facilities designated by the Construction Representative.

K. Wash Facilities: Install 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.

L. Wash Facilities: The Owner will provide wash facilities within the building. All construction personnel will be allowed access only to those specific facilities designated by the Construction Representative.

M. Drinking-Water Facilities: Provide drinking-water fountains where indicated, including paper cup supply.

N. Drinking-Water Facilities: Provide containerized, tap-dispenser, bottled-water drinking-water units, including paper supply.
   1. Where power is accessible, provide electric water coolers to maintain dispensed water temperature at 45°F to 55°F (7°C to 13°C).

O. Drinking-Water Facilities: The Owner will provide drinking water facilities within the building. All construction personnel will be allowed access only to those specific facilities designated by the Construction Representative.

P. Provide earthen embankments and similar barriers in and around excavations and subgrade construction, sufficient to prevent flooding by runoff of storm water from heavy rains.

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. Field Offices: Provide insulated, weathertight temporary offices of sufficient size to accommodate required office personnel at the Project site. Keep the office clean and orderly for use for small progress meetings. Furnish and equip office as follows:
   1. Furnish with a desk and chairs, a 4-drawer file cabinet, plan table, plan rack, and a 6-shelf bookcase.
2. Equip with a water cooler and private toilet complete with water closet, lavatory, and medicine cabinet unit with a mirror.

C. Storage facilities: Install storage sheds sized, furnished, and equipped to accommodate materials and equipment involved, including temporary utility service. Sheds may be open shelters or fully enclosed spaces within the building or elsewhere onsite.

D. 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.

E. 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.

F. Storage Facilities: No areas for storage of building materials can be made available onsite except for on the roof. Loads shall not exceed the loading limits as stated on the drawings. Roofing materials must be craned onto the roof from dedicated parking spaces as arranged by the Contractor with the City; costs of all such arrangements shall be paid by the Contractor. The Contractor shall provide his own security as he finds necessary. Specific locations for storage and craning operations will be discussed at the Pre-Bid Meeting and the Pre-Construction Meeting.

G. Storage Facilities: No areas for storage of building materials can be made available onsite. The Contractor shall provide for all storage offsite. All off-site storage locations shall be approved by the Construction Representative. The Contractor shall provide his own security as he finds necessary. The Construction Representative shall have access to the off-site storage at all times.

H. Temporary Paving: Construct and maintain temporary roads and paving to support the indicated loading adequately and to withstand exposure to traffic during the construction period. Locate temporary paving for roads, storage areas, and parking where the same permanent facilities will be located. Review proposed modifications to permanent paving with the Designer.
   1. Paving: Comply with Division 2 Section “Hot-Mixed Asphalt Paving” for construction and maintenance of temporary paving.
   2. Coordinate temporary paving development with subgrade grading, compaction, installation and stabilization of subbase, and installation of base and finish courses of permanent paving.
   3. Install temporary paving to minimize the need to rework the installations and to result in permanent roads and paved areas without damage or deterioration when occupied by the Owner.
   4. Delay installation of the final course of permanent asphalt concrete paving until immediately before Substantial Completion. Coordinate with weather conditions to avoid unsatisfactory results.
   5. Extend temporary paving in and around the construction area as necessary to accommodate delivery and storage of materials, equipment usage, administration, and supervision.

I. Construction Parking: Parking at the site will be provided in the areas designated at the Pre-Construction Meeting.
J. 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. The Contractor will have to park on the street, in city-owned lots, or in commercial lots. Under no circumstances will any vehicle be parked in a fire lane. Parking on lawns shall be prohibited.

K. 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.

L. 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.

M. 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.

N. Temporary Elevator Use: Refer to Division 14 for Elevators.

O. Temporary Elevator Use: The Owner will allow use of elevators within the building. All construction personnel will be allowed access only to those specific elevators designated by the Construction Representative.

P. 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.

Q. Temporary Exterior Lighting: Install exterior yard and sign lights so signs are visible when Work is being performed.

R. 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.

S. Rodent Pest Control: Before deep foundation work has been completed, retain a local exterminator or pest control company to recommend practices to minimize attraction and harboring of rodents, roaches, and other pests. Employ this service to perform extermination and control procedures are regular intervals so the Project will be free of pests and their residues at Substantial Completion. Perform control operations lawfully, using environmentally safe materials.

T. 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. Enclosure Fence: Before excavation begins, install an enclosure fence with lockable entrance gates. Locate where indicated, or enclose the entire site or the portion determined sufficient to accommodate construction operations. Install in a manner that will prevent people, dogs, and other animals from easily entering the site, except by the entrance gates.

1. Provide open-mesh, chainlink fencing with posts set in a compacted mixture of gravel and earth.
2. Provide plywood fence, 8’ (2.5m) high, framed with (4) 2”x4” (50mm x 100mm) rails, and preservative-treated wood posts spaced not more than 8’ (2.5m) apart.

F. Covered Walkway: Erect a structurally adequate, protective covered walkway for passage of persons along the adjacent public street. Coordinate with entrance gates, other facilities, and obstructions. Comply with regulations of authorities having jurisdiction.

1. Construct covered walkways using scaffold or shoring framing. Provide wood plank overhead decking, protective plywood enclosure walls, handrails, barricades, warning signs, lights, safe and well-drained walkways, and similar provisions for protection and safe passage. Extend the back wall beyond the structure to complete the enclosure fence. Paint and maintain in a manner acceptable to the Owner and the Designer.

G. Security Enclosure and Lockup: Install substantial temporary enclosure of partially completed areas of construction. Provide locking entrances to prevent unauthorized entrance, vandalism, theft, and similar violations of security.

1. 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.

H. 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 01 74 00 – 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 once each month, and more often if necessary, completely remove all scrap, debris, and waste material from the job site.
4. Provide adequate storage for all items awaiting removal from the job site, 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 on the site. 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.

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 glass in doors and windows. Remove glazing compounds and other substances that are noticeable vision-obscuring materials. Replace chipped or broken glass and other damaged transparent materials. Polish 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, and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.
14. Replace disposable air filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grills.
15. Clean ducts, blowers, and coils if units were operated without filters during construction.
16. Clean, food-service equipment to a sanitary condition, ready and acceptable for its intended use in areas of work.
17. Clean light fixtures, lamps, globes, and reflectors of any construction dust or debris in areas of work.
18. 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 01 74 00
SECTION 02 07 00 - SELECTIVE DEMOLITION

PART 1 - GENERAL

1.1 General:

A. This Section describes the selective removal and subsequent off-site disposal.
   a. See drawings for materials to be removed.

B. Related work specified elsewhere:
   a. Construction work and patching are included within the respective sections of
      specifications, including removal of materials for reuse and incorporation into
      remodeling or new construction.

C. Condition of Structures
   a. Owner assumes no responsibility for actual condition of items or structures to be
      demolished.

D. Partial Demolition and Removal
   a. Items indicated to be removed but of salvageable value to Contractor may be removed
      from structure as work progresses. Transport salvaged items from site as they are
      removed.

E. Storage or sale of removed items on site will not be permitted.

F. Protections
   a. Provide temporary barricades and other forms of protection as required to protect
      Owner's personnel and general public from injury due to selective demolition work.
   b. Protect from damage existing finish work that is to remain in place and becomes exposed
      during demolition operations.
      i. Remove protections at completion of work.

G. Damages
   a. Promptly repair damages caused to adjacent facilities by demolition work at no cost to
      Owner.

H. Do not interrupt utilities serving occupied or used facilities, except when authorized in writing by
   authorities having jurisdiction. Provide temporary services during interruptions to existing
   utilities, as acceptable to governing authorities.
   a. Maintain fire protection services during selective demolition operations.
PART 2 – PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.1 Execution

A. Inspection
   a. Prior to commencement of selective demolition work, inspect areas in which work will be performed. Photograph existing conditions of structure surfaces, equipment, or surrounding properties that could be misconstrued as damage resulting from selective demolition work; file with Owner’s representative prior to starting work.

B. Demolition
   a. Perform selective demolition work in a systematic manner.

C. If unanticipated mechanical, electrical, or structural elements that conflict with intended function or design are encountered, investigate and measure both nature and extent of conflict. Submit report to Owner’s representative, rearrange selective demolition schedule as necessary to continue overall job progress without delay.

D. Disposal of Demolished Materials
   a. Remove debris, rubbish, and other materials resulting from demolition operations from building site. Transport and legally dispose of offsite.
   b. If hazardous materials are encountered during demolition operations, comply with applicable regulations, laws, and ordinances concerning removal, handling, and protection against exposure or environmental pollution.
   c. Burning of removed materials is not permitted on project site.

E. Cleanup and Repair
   a. Upon completion of demolition work, remove tools, equipment, and demolished materials from site. Remove protections and leave interior areas broom clean.
   b. Repair demolition performed in excess of that required. Return structures and surfaces to remain to condition existing prior to commencement of selective demolition work. Repair adjacent construction or surfaces soiled or damaged by selective demolition work.

END OF SECTION
PART 1 - GENERAL

A. Scope

a. The work to be done under this section shall consist of furnishing all services required to deliver and install all plain and reinforced concrete footings, foundation and retaining walls, drives, walks, curbs, floors, platforms, and/or necessary to complete the work in accordance with the intentions of drawings and specifications. Included is the furnishing of all slab dampproofing, reinforcing steel and mesh as called for on the drawings.

1.2 Submittal

A. Concrete Design Mixes. For standard and light weight.

PART 2 - PRODUCTS

A. 2.1 MATERIALS

a. Portland cement shall conform to Specifications for Portland Cement (ASTM C150); Specifications for Air-Entraining Portland Cement (ASTM C175); Specifications for Portland Blast-Furnace Slag Cement (ASTM C205); or Specifications for Portland Pozzolan Cement (ASTM C340) and shall be Type 1 and 1A. For white concrete, white Portland Cement must be used.

B. Aggregates

a. Concrete aggregates shall conform to Specifications for Concrete Aggregates (ASTM C33) or Specifications for Lightweight Aggregates for Structural Concrete (ASTM C330). Aggregates failing to meet these requirements but producing concrete of the required quality as shown by special test or actual service may be used as provided for under Concrete Quality Section B, where authorized by the Architect.

b. The maximum size of the aggregate shall be not larger than one-fifth of the narrowest dimension between sides of the forms within which the concrete is to be cast; or larger than three-fourths of the minimum clear spacing between reinforcing bars, or between reinforcing bars and forms. For unreinforced slabs, the maximum size of aggregate shall not be larger than one-third the slab thickness.

c. Sand for all interior slabs shall be approved sand without lignite/roweling sand.
d. Mixing Water – Water used in mixing concrete shall be potable.

C. Metal Reinforcement

a. Reinforcing bars shall conform to one of the following: Specifications for Billet-Steel Bars for Concrete reinforcement (ASTM A15); Specifications for Rail Steel bars for Concrete Reinforcement (ASTM A16); Specifications for Deformed Rail Steel Bars for Concrete Reinforcement with 60,000 PSI minimum yield strength (ASTM A61); Specifications for Axle-Steel Bars for Concrete Reinforcement (ASTM A160); Specifications for Special Large-Size Deformed Billet-Steel Bars for Concrete Reinforcement (ASTM A408); Specifications for Deformed Billet-Steel Bars for Concrete Reinforcement with 60,000 PSI minimum yield point (ASTM A432); Specifications for High-Strength Deformed Billet-Steel Bars for Concrete Reinforcement (ASTM A431).

D. Deformation of deformed bars shall conform to one of the following:

a. Specifications for Minimum Requirements for Deformations of Deformed Steel Bars for Concrete Reinforcement (ASTM A305); Specifications for Special-Large Size Deformed Billet-Steel Bars for Concrete Reinforcement (ASTM A408).

E. Bar and rod mats for concrete reinforcement shall conform to Specifications for Fabricated Steel Bar or Rod Mats for Concrete Reinforcement (ASTM A184).

F. Wire for concrete reinforcement shall conform to Specifications for Cold-Drawn Steel Wire for Concrete Reinforcement (ASTM A82).

G. Welded wire fabric for concrete reinforcement shall conform to Specifications for Welded Wire Fabric For Concrete reinforcement (ASTM A185) except that the weld shear strength requirement of Section D.2. of these specifications shall be extended to include a wire size differential up to and including six gauges.

H. Structural steel shall conform to Specifications for Steel for Bridges and Buildings (ASTM A7), Specifications for Structural Steel (ASTM A36) or Specifications for Structural Steel for Welding (ASTM A373).

I. Admixtures


b. Other admixtures, mid-range water reducing agent, high range water reducing agent, use as directed by manufacturer. Chloride content of admixtures
should not exceed .1%. No calcium chloride will be allowed in structural concrete or when steel reinforcement is required.

J. Storage of Materials

a. Cement and aggregates shall be stored in such a manner as to prevent deterioration or intrusion of foreign matter. Liquid admixtures shall be protected from freezing and from settling out of solution. Any deteriorated or damaged materials shall not be used for concrete.

2.2 Concrete Quality

A. Allowable Stresses

a. The allowable stresses for design of the structure are based on the specified 28-day compressive strength of the concrete, or on the specified compressive strength at the earlier age at which the concrete may be expected to receive its full load.
b. Concrete that is subject to freezing temperatures while wet shall have a water/cement ratio of .53 and shall contain entrained air.
c. All exterior concrete shall contain air entrainment at 6% (+/-1%).

B. Strength:

a. Minimum 3000 PSI compressive strength for footings and foundations and 4000 PSI compressive strength for slabs at 28 days and conforming to ACI 318 "Building Code Requirements for Reinforced Concrete". Maximum water/cement ratio of 0.50 by weight for foundations and 0.45 for slabs.
b. Lightweight concrete for 2nd and 3rd floor slabs to be 4000 psi; approximate 115 PCF using buildex aggregate or equal.

C. Concrete Proportions and Consistency

a. The proportions of the concrete shall produce a mixture that will work readily, with the placement method used, into the corners and angles of the forms and around reinforcement. Segregation of materials in the mixture shall not be permitted. Excess free water on the surface shall not be worked into the surface.
b. The slump of the concrete shall be the minimum that is practicable. When vibrators are used to consolidate the concrete, the slump shall not exceed 3”, otherwise, the slump shall not exceed 4”.
c. Some air entrainment may be added to interior concrete to avoid segregation but should not exceed 4%.

D. Tests On Concrete

a. Contractor shall secure from concrete supplier the mix designs to be utilized and compressive strength, slump, and air content test results obtained by an independent laboratory prior to starting work.

b. Slump test shall be made on each load by the contractor according to ASTM Method Test for Slump of Portland Cement Concrete (ATM C143).

c. Testing: The Contractor shall employ and pay for the services of an independent testing laboratory to perform all tests required for this project. Tests shall be made for the footings, floor slabs, exterior concrete, foundation and retaining walls.

d. Four standard 6” x 12” cylinders shall be made of each day concrete is placed and/or for each 50 cubic yards of concrete. Cylinders shall be made in accordance with the latest ASTM specifications. All test cylinders should be cured in a controlled environment within 24 to 48 hours of making the cylinder. One cylinder shall be tested at 7 days and two at 28 days, or as directed by the Architect (hold one back for possible future concerns). Report laboratory test results in writing to the Architect, Contractor, and Owner on the same day tests are made. Laboratory testing shall be at no additional costs to the Owner.

PART 3 - EXECUTION

A. Mixing and Placing Concrete

B. Preparation of Equipment and Place of Deposits

a. Before placement, all equipment for mixing and transporting the concrete shall be cleaned, and all debris and ice shall be removed from the places to be occupied by the concrete. Forms shall be thoroughly wetted (except in freezing weather) or oiled, and masonry filler units that will be in contact with concrete shall be well drenched (except in freezing weather). The reinforcement shall be thoroughly clean of ice, dirt, rust scale, or other coatings.

b. Water shall be removed from place of deposit before concrete is placed unless otherwise permitted by the Architect.
i. All laitance and other unsound material shall be removed from hardened concrete before additional concrete is added.

C. Mixing

a. Ready mixed concrete shall be mixed and delivered in accordance with Specifications for Ready-Mixed Concrete (ASTM C94). No water shall be added at the job site, unless permitted by the Architect, in person. If allowed, adding water may be permitted as long as the water/cement ratio is not compromised and the allowable slump is not exceeded. No water will be allowed to be added after test cylinders have been made and slump tested.

b. For job-mixed concrete, the mixer shall be rotated at a speed recommended by the manufacturer. Each batch of 1 cu. Yd. or less shall be mixed for at least one minute after all materials are in the mixer. The mixing time shall be increased 15 seconds for each additional cubic yard or fraction thereof. The entire batch shall be discharged before the mixer is recharged.

D. Conveying

a. Concrete shall be conveyed from the mixer to the place of final deposit by methods that will prevent separation or loss of materials.

b. Equipment for chuting, pumping, and pneumatically conveying concrete shall be of such size and design as to insure a practically continuous flow of concrete at the delivery and without separation of materials.

E. Placing

a. Concrete shall be deposited as nearly as practicable in its final position to avoid segregation due to rehandling or flowing. The placing concrete shall be carried on at such rate that concrete is at all times plastic and flows readily into the spaces between the bars. No concrete that has been contaminated by foreign material shall be used, nor shall retempered concrete be used unless approved by the Architect.

b. Once placing is started, it shall be carried on as a continuous operation until placement of the panel or section is completed. When construction joints are necessary, they shall be made in accordance with these specifications.

c. All concrete shall be thoroughly consolidated by suitable means during placement. It shall be thoroughly worked around reinforcement and embedded fixtures and into the corners of the forms.
d. No concrete shall be used if more than the allowable time has elapsed since the addition of water to the mixture. Forty-five minutes if temperatures exceed 95°, 1 hour at 75° – 95°; 1-1/4 hours if less that 75°.

e. No concrete shall have a free drop of over 6 feet while placing.

F. Curing

a. Provision shall be made for maintaining concrete in a moist condition for a period of at least 5 days after placement. For high-early strength concrete, however, moist curing shall be provided for at least the first 2 days when concrete and air temperatures are above 50°F; longer periods of curing shall be required when temperatures are below 50°F. If provisions are made for sufficient damp curing of the concrete to develop compressive strengths equal to those of Types I and IA, rowelin-type cement that conforms to the following standards may be used: Specifications for Portland Blast-Furnace Slag Cement (ASTM C205) and Specifications for Portland Pozzolan Cement (ASTM C340).

E. Cold Weather Requirements

b. Adequate equipment shall be provided for heating concrete materials and protecting concrete during freezing or near-freezing weather. No frozen materials or materials containing snow or ice shall be used.

c. All reinforcement, forms, fillers, and ground with which the concrete is to come in contact shall be free from snow and ice. Whenever the temperature of the surrounding air is below 40°F all concrete placed in the forms shall have a temperature of 45°F or higher after placement. Adequate means shall be provided for maintaining this temperature for four days. When high-early strength concrete is used, a temperature of at least 45° shall be maintained for 3 days. In either case, any additional time necessary to insure proper curing of the concrete shall be provided as directed by the Architect. The housing covering, or other protection used in connection with curing shall remain in place and intact at least 24 hours after the artificial heating is discontinued. No dependence shall be placed on salt or other chemicals for the prevention of freezing.

d. No concrete shall be placed in freezing weather unless permission has been granted by the Architect. Proper precaution shall be taken to prevent freezing of concrete after it is placed.

F. Hot-Weather Requirements

e. In hot weather, suitable precautions shall be taken to avoid drying of the concrete surface prior to finishing operations. Use of windbreaks, sunshades, fog sprays, or other devices shall be provided as directed by the Architect. Confilm or a like product may be used to retain moisture in the slab.
f. Concrete deposited in hot weather shall not have a placing temperature that will cause difficulty from loss of slump, flash set, or cold joints. Concrete temperature shall be less than 90°F unless higher temperatures are permitted by the Architect.

G. Finishing

g. All concrete floors, platforms and steps shall have a monolithic finish. The concrete shall be of the driest consistency possible to work with a sawing motion of a strike-off board. After striking off the concrete to an established grade, it shall be floated with a wood float to an even surface. The surfaces shall be tested with a straight edge for high and low spots which shall be eliminated. Exterior concrete to be magnesium floated, radius edged, followed by broom finish.

h. Floating shall be followed by steel troweling after the concrete has hardened sufficiently to prevent excess fine material from working to the surface. The floor shall be brought to a smooth surface free from defects and blemishes ready to receive resilient floor covering.

i. No dry cement or mixtures of dry cement and sand will be allowed to be sprinkled directly on the surface of the concrete to absorb moisture or stiffen the mix. After the surface has further hardened additional troweling may be necessary.

j. Where slabs are shown recessed to receive other wearing surfaces, recessed area shall be struck smooth with troweled finish.

G. Forms and Details of Construction

a. Design of Forms: Forms shall conform to shapes, lines, and dimensions of the members as called for on the plans, and shall be sufficiently tight to prevent leakage of mortar. They shall be properly braced or tied together so as to maintain position and shape.

b. Forms shall be clean and free of all dirt, chips, sawdust and debris before pouring. Water shall be removed before any concrete is deposited.

H. Removal of Forms: Forms shall not be removed until 48 hours after concrete has been placed. Ties may be loosened 24 hours after concrete has been placed to allow concrete to shrink away from wall surfaces, but no forcing of forms will be allowed until after 48 hours.

a. After removal of forms all wall ties shall be clipped and holes left by same shall be rammed tight with neat grout. Fill all honeycomb with grout making sure all loose aggregate has been removed from such section first.

I. Cleaning and Bending Reinforcement
a. At the time concrete is placed, metal reinforcement shall be free from rust scale or other coatings that will destroy or reduce the bond. All bars shall be bent cold, unless otherwise permitted by the Architect. No bars partially embedded in concrete shall be field-bent except as shown on plans as specifically permitted by the Architect.

J. Placing Reinforcing: Metal reinforcement shall be accurately placed according to the plans and adequately secured in position by concrete, metal or other approved chair, spacers or ties.

K. Splices In Reinforcement: No splices of reinforcement shall be made except as shown on plans, or as specified, or as authorized by the Architect. All welding shall conform to the American Welding Society’s Recommended Practices for Welding Reinforcing Steel, Metal Inserts and Connections in Reinforced Concrete Construction (AWSD12.1), unless otherwise authorized by the Architect. Minimum lap shall be 30 bar diameters.

L. Concrete Protection for Reinforcement

a. The reinforcement shall be protected by the thickness of concrete indicated in the plans. Where not otherwise shown, the thickness of concrete over the reinforcement shall be as follows:

   i. Where concrete is deposited against the ground without the use of forms – not less than 3 inches.

   ii. Where concrete is exposed to the weather or to the ground but placed in forms – not less than two inches for bars larger than No. 5 and 1 ½ inches for bars No. 5 or smaller.

   iii. In slabs and walls not exposed to the ground or to the weather – not less than 1 ¼ inches.

   iv. In all cases – at least equal to the diameter of the bars.

b. Exposed reinforcing bars intended for bonding with future extensions shall be protected from corrosion by concrete or other adequate covering.

M. Construction Joints

a. Joints not indicated on the plans shall be so made and located as to least impair the strength of the structure. Where a joint is to be made, the surface of the concrete shall be thoroughly cleaned and all laitance removed. In addition, vertical joints shall be thoroughly wetted and slushed with a coat of neat cement grout immediately before placement of new concrete. Saw cut joints as soon as it is practicable not to exceed 24 hours after placing and to avoid drying shrinkage.
cracking. Use 3/16" thick blade, cut into 1\4 depth of slab thickness unless soft cut. Soft cut saws are preferred. Joint spacing at 24 to 30 times the depth is desired never to exceed 15’. The length of a sawed slab should never exceed 150% of the width

a. A delay until the concrete is no longer plastic in columns or walls (generally at least two hours) must occur before concrete is placed in the beams, girders, or slabs to be supported. Beams, girders, brackets, column capitols, and haunches shall be considered as part of the floor system and shall be placed integrally with it.

b. Construction joints in floors shall be located near the middle of the spans of slabs, beams or girders. If a beam intersects a girder at this point, the joint in the girder shall be offset distance equal to twice the beam width and adequate shear reinforcement for cement provided.

N. Grades and Lines

a. Before footings are poured, set a line of rods along the center line of footing driven to proper grade to hold top of finished footing to a level grade.

O. Exterior Flatwork

a. Install all new concrete walks, parking and stoops as indicated on the Plans, and replace walks and curbs damaged by progress of work. Thickness and reinforcing as shown on Plans. Walks shall have contraction joints at 5 feet o.c., squared or as shown on Plans; broom finish with edges neatly troweled.

P. Interior Flatwork

a. Install vapor retarder under slab on grade. Lap joints minimum 6” and seal watertight by sealant applied between overlapping edges and ends taping edges and ends. Repair damage caused by placement or concrete reinforcing.

Q. Miscellaneous: Furnish concrete pads, etc. for mechanical and plumbing equipment.

R. Openings For Other Mechanics

a. Provide and install all inserts, ties, anchors, sleeves, etc., necessary for chases in concrete slabs, walls, etc., of the correct size and location.

b. Wherever holes are required for heating, water or gas or other pipes, sheet metal flanged thimbles supplied by the subcontractor shall be placed. The Contractor
shall cooperate with all other contractors in this work. (Where applicable, use joint filler Type A Asphalt impregnated fiberboard or felt, ½” thick.)

S. Expansion Joints: All exterior concrete paving and interior concrete floor slabs shall have expansion joints in locations as shown on the drawings. (Where applicable, use joint filler Type A Asphalt impregnated fiberboard or felt, ½” thick.)

T. Sealer for interior exposed concrete floors – Hillyard-Cem-Seal II or approved equivalent product.
   a. First Coat – 1 to 2 hours of final troweling.
   b. Second Coat – At completion of job
   c. Apply at the rate of 550 sq. ft. per gallon per coat or as directed by manufacturer.

END OF SECTION 03 10 00
SECTION 04 22 23.23 – PREFACED CONCRETE UNIT MASONRY

PART 1 – GENERAL

1.1 Submit color samples for selection from manufacturer’s series. Submit product literature, certifications, and test reports, full size sample of each color specified or selected. Custom colors are available. Contact Trenwyth (800-233-1924) for details.

1.2 QUALITY ASSURANCE

A. All glazed masonry units shall be equal to Trenwyth Astra-Glaze-SW+ units manufactured by Trenwyth manufacturing facilities. Glazed concrete blocks manufactured in Pennsylvania shall be lightweight units conforming to ASTM C90. Glazed concrete blocks manufactured in Arizona shall be medium weight units conforming to ASTM C90. The glazed surface shall have a smooth satin-gloss finish, externally heat-polymerized cast-on facing conforming to ASTM C744 and all applicable Federal Specifications. All Trenwyth units are manufactured with an approved integral water repellent CMU admixture.

B. Protection of Work: Cover walls each day after installation to keep open walls protected and dry. After units are installed they should be protected from damage by other trades performing operations that can stain or otherwise damage the finished surfaces by covering walls with plastic. Corners should be protected from damage after installation by covering them with plywood.

1.3 PROJECT SITE CONDITIONS

A. Glazed masonry units shall be delivered to the jobsite on banded pallets with individual protective covers on each glazed block face. Keep protective block covers on the blocks until installation. Store pallets in single stacks on level ground and cover with waterproof covering (e.g., tarpaulins) to protect the blocks from inclement weather. Handle blocks carefully to avoid breakage and damage to the finished surface.

1.4 DELIVERY, STORAGE AND HANDLING

A. A full size unit is required to illustrate color and texture for approval. Manufacturer requires that a sample panel be installed at the jobsite prior to installation of any Trenwyth product. This panel will represent both the quality of the product and the workmanship to be expected for the project. The panel must be approved by either the owner or architect for the project. Manufacturer will provide 4" units for a 4' by 4' sample panel at no cost for the material (excluding freight to site).

1. Field Constructed Mock-ups: Construct a sample panel, no less than 4’ x 4’, of units of each color and size to be used in the project.


3. The glazed facing is graffiti resistant and easy to clean (never paint or refinish). No VOC’s. Available in custom colors and unique shapes and sizes, Astra-Glaze-SW+ units are ideal for interior and exterior applications. The structural integrity of the backing (conforming to ASTM C90) results in a one-step, single trade installation process.

4. Lay units with full mortar coverage on head and bed joints taking care not to block cores to be grouted or filled with masonry insulation.

1.5 MORTAR BEDDING AND JOINTING

A. Holes, boxes, etc., with motor driven masonry saws, using either an abrasive or diamond blade. Cut neatly and locate for best appearance.

B. Floor tile is to be installed. For thicker flooring, raise cove base units to the desired height. Cutting: Make all unit cuts, including those for bonding,

C. Base Course:Align base course properly on the floor slab. Cove Base: Keep the cove base tight to the slab if vinyl

D. Lighting: Provide adequate lighting for masonry work by placing all lighting at a reasonable distance from the wall for even illumination. Do not use trough lighting.
PART 2– PRODUCTS

2.1 INSTALLATION
A. Lay blocks with the faces level, plumb and true to a line strung horizontally at the glazed face. Install only quality units; reject all defective units, as defined in ASTM C744. Units shall have uniform face joint dimensions of 1/4” both horizontally and vertically. Tool joints neatly after they are finger-hard to make them straight and uniform. Size and place cut pieces appropriately to maintain consistency and bond. Complete masonry construction using procedures and workmanship consistent with the best masonry practices.

2.2 RELATED MATERIALS
A. Colored matching or contrasting mortar is available from manufacturer. Consult NCMA TEK Notes, available at www.trenwyth.com, for mortar type and specifications. Use manufacturer-approved matching water-repellent mortar additive, following manufacturer’s instructions, in all exterior mortar. Consult manufacturer for recommendations.

2.3 SIZES AND SHAPES
A. In areas that are exposed to excessive moisture, joints to be raked and filled with EPOXY. See Mortar Bedding and Jointing for details.
B. Actual facing dimensions shall be 7-3/4” x 15-3/4” forming a 1/16” lip around the edges of a modular 7-5/8” x 15-5/8” block. Nominal 2”, 4”, 6”, 8”, 10” and 12” standard block thickness shall be used as required, as well as standard and special block shapes. Basic units may include stretchers, jambs, caps and cove bases. Other possible face dimensions are nominal 16” x 16”, 12” x 12”, 8” x 18”, 4” x 16”, and 8” x 8”. Semi-solid and solid units shall be used where specified and/or shown on the drawings.

2.4 MASONRY CLEANERS
A. Carefully following the manufacturer’s instructions, use Custom Burnished Masonry Cleaner by PROSOCO (dilute 1 part to 3 parts clean water). Available from manufacturer. Do not power wash.
B. CAUTION! The following solvents must never be used as they may damage block facings: paint remover, lacquer thinner, and epoxy thinner, methylene chloride, acetone, and muriatic acid. Contact your Trenwyth representative for recommendations for hard to clean areas.

PART 3 – EXECUTION

3.1 LAYING MASONRY WALLS
A. Draw blocks from more than one pallet at a time during installation. All exterior mortar shall include manufacturer-approved water-repellent additive added to each batch in the appropriate dosage rates for mortar type (M, S or N) per manufacturer’s instructions. Refer to NCMA TEK Notes, available at www.trenwyth.com, for Hot and Cold weather construction practices.
B. 4. Tuck-point the joints of scored units for proper appearance. All exterior scored units must be tuck-pointed to prevent water penetration. Rake back the joint when epoxy (Bonsal/Laticrete) is used on select jobs that require better moisture prevention.
C. 3. Care should be taken to remove mortar from the face of masonry units before it sets.
D. 2. Tool all mortar joints when thumbprint hard into a concave configuration.
E. Various masonry mortars may be used with Astra-Glaze-SW+ concrete masonry units depending on specific structural requirements for the finished walls. We recommend a matching water-repellent mortar additive (available for purchase from manufacturer). Follow manufacturer’s instructions in all mortar applications.

3.2 EPOXY FINISHED JOINTS
A. In areas exposed to excessive moisture, make sure to tool mortar joints with a minimum of 1/4” and tuck-point with an approved water-resistant grout. A typical tuck-pointing grout is BONSAL® POLYMER MODIFIED SANDED TILE GROUT mixed with the BONSAL B-7000 EPOXY. Do
not add water or anything else in addition to the B-7000, which will make it a 100% solid enabling it to be acid and stain resistant.

B. DO NOT FLOAT GROUT ACROSS GLAZED SURFACE. THE PROPER TECHNIQUE IS TO POINT OR USE A MORTAR GUN!

3.3 FLASHING OF MASONRY WORK
A. Install flashing at locations shown in the plans and in strict accordance with the details and the best masonry flashing practices.

3.4 WEEP HOLES AND VENTS
A. Install weep holes and vents at proper intervals at courses above grade and at any water stops over windows, doors and beams. Consult NCMA TEK Notes, available at www.trenwyth.com, for additional information on flashing.

3.5 INSPECTION
A. The glazed facing shall conform to the requirements of ASTM C744 when viewed from a distance of five (5) feet at right angles to the wall with normal lighting. The concrete masonry units on which the glaze is molded shall conform to the requirements of ASTM C90.

3.6 CLEANING
A. Keep walls clean daily during installation using brushes or rags and a clean damp cloth. Harsh cleaning methods after walls have been erected may mar the surface of the blocks. Do not allow excess mortar lumps or smears to harden on the glazed surfaces. Remove green mortar with a dry cloth. Do not use steel wool, sandpaper or other abrasives.

3.7 FINAL CLEANDOWN
A. Clean the completed walls with Burnished Custom Masonry Cleaner by PROSOCO 3:1 solution, carefully following manufacturer's wash-down instructions — including thorough rinsing. Do not use acid or abrasives on the glazed surfaces.

3.8 MAINTENANCE
A. Block units, properly installed and cleaned, need virtually no maintenance other than routine cleaning with typical non-abrasive household cleaner. Graffiti, paint or dye may need special cleaning methods and products such as Trenwyth Graffiti Wizard® environmentally friendly cleaner. Contact manufacturer for specific cleaning recommendations. Do not power wash.

3.9 INSTALLATION RECOMMENDATIONS
A. For walls with a glazed finish on both sides, use two single-faced units. Because masonry units are typically installed aligning one side, the second side of double faced units is almost invariably misaligned. Double-faced units are not recommended. Manufacturer accepts no responsibility for face alignment.
B. Cavity wall construction is recommended for exterior walls, with proper flashing, venting and weep holes.
C. For best appearance, use stack bond construction when stack bond appearance is desired (as opposed to scored units in running bond).
D. All exterior mortar joints must contain a manufacturer-approved water repellent additive.
E. For best appearance and water resistance, tuck-point scored joints on interior and exterior applications.

END OF SECTION 042223.23
SECTION 06 10 00 - ROUGH CARPENTRY

PART 1 - GENERAL

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

1.2 SUMMARY
   A. This Section includes the following:
      1. Framing with dimension lumber.
      2. Framing with timber.
      3. Framing with engineered wood products.
      4. Wood blocking and nailers.
      5. Plywood backing panels.
   B. Related Sections include the following:
      1. Division 06 Section "Sheathing."

1.3 DEFINITIONS
   A. Exposed Framing: Framing not concealed by other construction.
   B. Dimension Lumber: Lumber of 2 inches nominal or greater but less than 5 inches nominal in least dimension.
   C. Timber: Lumber of 5 inches nominal or greater in least dimension.
   D. Lumber grading agencies, and the abbreviations used to reference them, include the following:
      2. NLGA: National Lumber Grades Authority.
      3. RIS: Redwood Inspection Service.
      5. WCLIB: West Coast Lumber Inspection Bureau.

1.4 SUBMITTALS
   A. Product Data: For each type of process and factory-fabricated product. Indicate component materials and dimensions and include construction and application details.
1. Include data for wood-preservative treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Indicate type of preservative used and net amount of preservative retained.
2. Include copies of warranties from chemical treatment manufacturers for each type of treatment.

1.5 QUALITY ASSURANCE

A. Source Limitations for Engineered Wood Products: Obtain each type of engineered wood product through one source from a single manufacturer.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Stack lumber flat with spacers between each bundle to provide air circulation. Provide for air circulation around stacks and under coverings.

PART 2 - PRODUCTS

2.1 WOOD PRODUCTS, GENERAL

A. Lumber: DOC PS 20 and applicable rules of grading agencies indicated. If no grading agency is indicated, provide lumber that complies with the applicable rules of any rules-writing agency certified by the ALSC Board of Review. Provide lumber graded by an agency certified by the ALSC Board of Review to inspect and grade lumber under the rules indicated.

1. Factory mark each piece of lumber with grade stamp of grading agency.
2. For exposed lumber indicated to receive a stained or natural finish, mark grade stamp on end or back of each piece or omit grade stamp and provide certificates of grade compliance issued by grading agency.
3. Where nominal sizes are indicated, provide actual sizes required by DOC PS 20 for moisture content specified. Where actual sizes are indicated, they are minimum dressed sizes for dry lumber.
4. Provide dressed lumber, S4S, unless otherwise indicated.

B. 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 C2, except that lumber that is not in contact with the ground and is continuously protected from liquid water may be treated according to AWPA C31 with inorganic boron (SBX).
   1. Preservative Chemicals: Acceptable to authorities having jurisdiction and containing no arsenic or chromium.
   2. For exposed items indicated to receive a stained or natural finish, use chemical formulations that do not require incising, contain colorants, bleed through, or otherwise adversely affect finishes.

B. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent. Do not use material that is warped or does not comply with requirements for untreated material.

C. Mark lumber with treatment quality mark of an inspection agency approved by the ALSC Board of Review.

D. Application: Treat items indicated on Drawings, and the following:
   1. Wood cants, nailers, curbs, equipment support bases, blocking, stripping, and similar members in connection with roofing, flashing, vapor barriers, and waterproofing.
   2. Wood sills, sleepers, blocking, furring, 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 above the ground in crawlspaces or unexcavated areas.
   5. Wood floor plates that are installed over concrete slabs-on-grade.

2.3 DIMENSION LUMBER FRAMING

A. Maximum Moisture Content: 19 percent.

B. Non-Load-Bearing Interior Partitions: Construction or No. 2 grade of any species.

C. Exterior and Load-Bearing Walls, Joists, Rafters, and Other Framing Not otherwise Listed: No. 2 grade and any of the following species:
   1. Southern pine; SPIB.
   2. Douglas fir-larch; WCLIB or WWPA.
   3. Mixed southern pine; SPIB.
   4. Spruce-pine-fir; NLGA.
   5. Douglas fir-south; WWPA.
   6. Douglas fir-larch (north); NLGA.
   7. Spruce-pine-fir (south); NeLMA, WCLIB, or WWPA.

D. Exposed Exterior or Interior Framing Indicated to Receive a Natural Finish or Painted: 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. **Species and Grade:** As indicated above for load-bearing construction of same type or better. (Select Structural or No. 1)

### 2.4 TIMBER FRAMING

A. Provide timber framing complying with the following requirements, according to grading rules of grading agency indicated:

1. **Species and Grade:** Douglas fir-larch, Douglas fir-larch (north), or Douglas fir-south; Select Structural or No. 1 grade; NLGA, WCLIB, or WWPA.
2. **Species and Grade:** Southern pine, Select Structural or No. 1 grade; SPI.
3. **Maximum Moisture Content:** 19 percent.
4. **Additional Restriction:** Free of heart centers.

### 2.5 ENGINEERED WOOD PRODUCTS

A. **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. **Available Manufacturers:** Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
   b. Georgia-Pacific.
   c. Louisiana-Pacific Corporation.
   d. Weyerhaeuser Company.
2. **Provide I-joists manufactured without urea formaldehyde.**
3. **Web Material:** Either oriented strand board or plywood, complying with DOC PS 1 or DOC PS 2, Exposure 1.
4. **Structural Properties:** Provide units with depths and design values not less than those indicated.
5. **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.**

B. **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. **Manufacturer:** Provide products by same manufacturer as I-joists.
2. **Material:** All-veneer product, glued-laminated wood or product made from any combination solid lumber, wood strands, and veneers. Provide rim boards made without urea formaldehyde.
4. 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 MISCELLANEOUS LUMBER

A. General: Provide miscellaneous lumber indicated and lumber for support or attachment of other construction, including the following:
   1. Blocking.
   2. Nailers.
   3. Rooftop equipment bases and support curbs.
   4. Furring.
   5. Grounds.

B. For items of dimension lumber size, provide Construction or No. 2 grade lumber with 19 percent maximum moisture content and any of the following species:
   1. Hem-fir (north); NLGA.
   2. Mixed southern pine; SPIB.
   3. Spruce-pine-fir; NLGA.
   4. Hem-fir; WCLIB or WWPA.
   5. Spruce-pine-fir (south); NeLMA, WCLIB, or WWPA.
   6. Western woods; WCLIB or WWPA.
   7. Northern species; NLGA.
   8. Eastern softwoods; NeLMA.

C. For exposed boards, provide lumber with 19 percent maximum moisture content and any of the following species and grades:
   1. Eastern white pine, Idaho white, lodgepole, ponderosa, or sugar pine; Premium or 2 Common (Sterling) grade; NeLMA, NLGA, WCLIB, or WWPA.
   2. Mixed southern pine, No. 1 grade; SPIB.
   3. Hem-fir or hem-fir (north), Select Merchantable or No. 1 Common grade; NLGA, WCLIB, or WWPA.
   4. Spruce-pine-fir (south) or spruce-pine-fir, Select Merchantable or No. 1 Common grade; NeLMA, NLGA, WCLIB, or WWPA.

D. 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. Hem-fir or hem-fir (north), Construction or 2 Common grade; NLGA, WCLIB, or WWPA.
   3. Spruce-pine-fir (south) or spruce-pine-fir, Construction or 2 Common grade; NeLMA, NLGA, WCLIB, or WWPA.
   4. Eastern softwoods, No. 2 Common grade; NeLMA.
   5. Northern species, No. 2 Common grade; NLGA.
6. Western woods, Construction or No. 2 Common grade; WCLIB or WWPA.

E. For blocking not used for attachment of other construction, Utility, Stud, or No. 3 grade lumber of any species may be used provided that it is cut and selected to eliminate defects that will interfere with its attachment and purpose.

F. For blocking and nailers used for attachment of other construction, select and cut lumber to eliminate knots and other defects that will interfere with attachment of other work.

2.7 PLYWOOD BACKING PANELS

A. Telephone and Electrical Equipment Backing Panels: DOC PS 1, Exposure 1, C-D Plugged in thickness indicated or, if not indicated, not less than 1/2-inch nominal thickness.

2.8 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 of Type 304 stainless steel.

B. Nails, Brads, and Staples: ASTM F 1667.


D. Wood Screws: ASME B18.6.1.

E. Lag Bolts: ASME B18.2.1.

F. Bolts: Steel bolts complying with ASTM A 307, Grade A; with ASTM A 563 hex nuts and, where indicated, flat washers.

G. Expansion Anchors: Anchor bolt and sleeve assembly of material indicated below with capability to sustain, without failure, a load equal to 6 times the load imposed when installed in unit masonry assemblies and equal to 4 times the load imposed when installed in concrete as determined by testing per ASTM E 488 conducted by a qualified independent testing and inspecting agency.

   2. Material: Stainless steel with bolts and nuts complying with ASTM F 593 and ASTM F 594, Alloy Group 1 or 2.
2.9 METAL FRAMING ANCHORS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Alpine Engineered Products, Inc.
2. Cleveland Steel Specialty Co.
3. KC Metals Products, Inc.
4. Simpson Strong-Tie Co., Inc.
5. USP Structural Connectors.

B. Allowable Design Loads: Provide products with allowable design loads, as published by manufacturer, that meet or exceed those of products of manufacturers listed. 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 where stainless steel is not indicated.

D. Stainless-Steel Sheet: ASTM A 666, Type 304.

1. Use for exterior locations and where indicated.

E. I-Joist Hangers: U-shaped joist hangers with 2-inch-long seat and 1-3/4-inch-wide nailing flanges full depth of joist. Nailing flanges provide lateral support at joist top chord.

1. Thickness: 0.050 inch.

F. Bridging: Rigid, V-section, nailless type, 0.050 inch thick, length to suit joist size and spacing.

G. Post Bases: Adjustable-socket type for bolting in place with standoff plate to raise post 1 inch above base and with 2-inch-minimum side cover, socket 0.062 inch thick, and standoff and adjustment plates 0.108 inch thick.

H. Rafter Tie-Downs (Hurricane or Seismic Ties): Bent strap tie for fastening rafters or roof trusses to wall studs below, 2-1/4 inches wide by 0.062 inch thick. Tie fits over top of rafter or truss and fastens to both sides of rafter or truss, face of top plates, and side of stud below.

I. Wall Bracing: T-shaped bracing made for letting into studs in saw kerf, 1-1/8 inches wide by 9/16 inch deep by 0.034 inch thick with hemmed edges.

2.10 MISCELLANEOUS MATERIALS

A. Sill-Sealer Gaskets: Glass-fiber-resilient insulation, fabricated in strip form, for use as a sill sealer; 1-inch nominal thickness, compressible to 1/32 inch; selected from manufacturer's standard widths to suit width of sill members indicated.
B. Adhesives for Gluing Wood Blocking to Concrete or Masonry: Formulation complying with ASTM D 3498 that is approved for use indicated by adhesive manufacturer.

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

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 nailers, blocking, and similar supports to comply with requirements for attaching other construction.

B. Framing Standard: Comply with AF&PA's "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. Metal Framing Anchors: Install metal framing to comply with manufacturer's written instructions.

E. Do not splice structural members between supports, unless otherwise indicated.

F. Provide blocking and framing as indicated and as required to support facing materials, fixtures, specialty items, and trim.

1. Provide metal clips for fastening gypsum board or lath at corners and intersections where framing or blocking does not provide a surface for fastening edges of panels. Space clips not more than 16 inches o.c.

G. Provide fire blocking in furred spaces, stud spaces, and other concealed cavities as indicated and as follows:

1. Fire block furred spaces of walls, at each floor level, at ceiling, and at not more than 96 inches o.c. with solid wood blocking or noncombustible materials accurately fitted to close furred spaces.

2. Fire block concealed spaces of wood-framed walls and partitions at each floor level, at ceiling line of top story, and at not more than 96 inches o.c. Where fire blocking is not inherent in framing system used, provide closely fitted solid wood blocks of same width as framing members and 2-inch nominal-thickness.

3. Fire block concealed spaces behind combustible cornices and exterior trim at not more than 20 feet o.c.

H. Sort and select lumber so that natural characteristics will not interfere with installation or with fastening other materials to lumber. Do not use materials with defects that interfere with
function of member or pieces that are too small to use with minimum number of joints or optimum joint arrangement.

I. Comply with AWPA M4 for applying field treatment to cut surfaces of preservative-treated lumber.
   1. Use inorganic boron for items that are continuously protected from liquid water.
   2. Use copper naphthenate for items not continuously protected from liquid water.

J. 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.
   4. Table 602.3(1), "Fastener Schedule for Structural Members," and Table 602.3(2), "Alternate Attachments," in ICC's International One- and Two-Family Dwelling Code.

K. Use common wire nails, unless otherwise indicated. Select fasteners of size that will not fully penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections between members. Install fasteners without splitting wood; do not countersink nail heads, unless otherwise indicated.

L. For exposed work, arrange fasteners in straight rows parallel with edges of members, with fasteners evenly spaced, and with adjacent rows staggered.
   1. Comply with approved fastener patterns where applicable. Before fastening, mark fastener locations, using a template made of sheet metal, plastic, or cardboard.
   2. Use finishing nails, unless otherwise indicated. Countersink nail heads and fill holes with wood filler.

3.2 WOOD BLOCKING, AND NAILER INSTALLATION

A. Install where indicated and where required for attaching other work. Form to shapes indicated and cut as required for true line and level of attached work. Coordinate locations with other work involved.

B. Attach items to substrates to support applied loading. Recess bolts and nuts flush with surfaces, unless otherwise indicated.

C. Provide permanent grounds of dressed, pressure-preservative-treated, key-beveled lumber not less than 1-1/2 inches wide and of thickness required to bring face of ground to exact thickness of finish material. Remove temporary grounds when no longer required.
3.3 WALL AND PARTITION FRAMING INSTALLATION

A. General: Provide single bottom plate and double top plates using members of 2-inch nominal thickness whose widths equal that of studs, except single top plate may be used for non-load-bearing partitions. Fasten plates to supporting construction, unless otherwise indicated.

1. For exterior walls, provide 2-by-6-inch nominal-size wood studs spaced 16 inches o.c., unless otherwise indicated.
2. For interior partitions and walls, 2-by-4-inch nominal-size wood studs spaced 16 inches o.c., unless otherwise indicated.
3. Provide continuous horizontal blocking at midheight of partitions more than 96 inches high, using members of 2-inch nominal thickness and of same width as wall or partitions.

B. Construct corners and intersections with three or more studs, except that two studs may be used for interior non-load-bearing partitions.

C. Frame openings with multiple studs and headers. Provide nailed header members of thickness equal to width of studs. Support headers on jamb studs.

1. For non-load-bearing partitions, provide double-jamb studs and headers not less than 4-inch nominal depth for openings 48 inches and less in width, 6-inch nominal depth for openings 48 to 72 inches in width, 8-inch nominal depth for openings 72 to 120 inches in width, and not less than 10-inch nominal depth for openings 10 to 12 feet in width.
2. For load-bearing walls, provide double-jamb studs for openings 60 inches and less in width, and triple-jamb studs for wider openings. Provide headers of depth indicated or, if not indicated, according to Table R502.5(1) or Table R502.5(2), as applicable, in ICC's International Residential Code for One- and Two-Family Dwellings.

D. Provide diagonal bracing in exterior walls, at both walls of each external corner, at 45-degree angle, full-story height with metal wall bracing, let into studs in saw kerf or use a full sheet of at least ½” thick plywood sheathing extending both ways from corners instead of metal bracing.

3.4 FLOOR JOIST FRAMING INSTALLATION

A. General: Install floor joists with crown edge up and support ends of each member with not less than 1-1/2 inches of bearing on wood or metal, or 3 inches on masonry. Attach floor joists as follows:

1. Where supported on wood members, by toe nailing or by using metal framing anchors.
2. Where framed into wood supporting members, by using wood ledgers as indicated or, if not indicated, by using metal joist hangers.

B. Frame openings with headers and trimmers supported by metal joist hangers; double headers and trimmers where span of header exceeds 48 inches.

C. Do not notch in middle third of joists; limit notches to one-sixth depth of joist, one-third at ends. Do not bore holes larger than 1/3 depth of joist; do not locate closer than 2 inches from top or bottom.
D. Provide solid blocking of 2-inch nominal thickness by depth of joist at ends of joists unless nailed to header or band.

E. Lap members framing from opposite sides of beams, girders, or partitions not less than 4 inches or securely tie opposing members together. Provide solid blocking of 2-inch nominal thickness by depth of joist over supports.

F. Provide solid blocking between joists under jamb studs for openings.

G. Under non-load-bearing partitions, provide double joists separated by solid blocking equal to depth of studs above.
   1. Provide triple joists separated as above, under partitions receiving ceramic tile and similar heavy finishes or fixtures.

H. Provide bridging of type indicated below, at intervals of 96 inches o.c., between joists.
   1. Diagonal wood bridging formed from bevel-cut, 1-by-3-inch nominal-size lumber, double-crossed and nailed at both ends to joists.
   2. Steel bridging installed to comply with bridging manufacturer's written instructions.

### 3.5 CEILING JOIST AND RAFTER FRAMING INSTALLATION

A. Ceiling Joists: Install ceiling joists with crown edge up and complying with requirements specified above for floor joists. Face nail to ends of parallel rafters.
   1. Where ceiling joists are at right angles to rafters, provide additional short joists parallel to rafters from wall plate to first joist; nail to ends of rafters and to top plate and nail to first joist or anchor with framing anchors or metal straps. Provide 1-by-8-inch nominal-size or 2-by-4-inch nominal-size stringers spaced 48 inches o.c. crosswise over main ceiling joists.

B. Rafters: Notch to fit exterior wall plates and toe nail or use metal framing anchors. Double rafters to form headers and trimmers at openings in roof framing, if any, and support with metal hangers. Where rafters abut at ridge, place directly opposite each other and nail to ridge member or use metal ridge hangers.
   1. At valleys, provide double-valley rafters of size indicated or, if not indicated, of same thickness as regular rafters and 2 inches deeper. Bevel ends of jack rafters for full bearing against valley rafters.
   2. At hips, provide hip rafter of size indicated or, if not indicated, of same thickness as regular rafters and 2 inches deeper. Bevel ends of jack rafters for full bearing against hip rafter.

C. Provide collar beams (ties) as indicated or, if not indicated, provide 1-by-6-inch nominal-size boards between every third pair of rafters, but not more than 48 inches o.c. Locate below ridge member, at third point of rafter span. Cut ends to fit roof slope and nail to rafters.

D. Provide special framing as indicated for eaves, overhangs, dormers, and similar conditions, if any.
3.6 TIMBER FRAMING INSTALLATION

A. Install timber with crown edge up and provide not less than 4 inches of bearing on supports. Provide continuous members, unless otherwise indicated; tie together over supports as indicated if not continuous.

B. Where beams or girders are framed into pockets of exterior concrete or masonry walls, provide 1/2-inch air space at sides and ends of wood members.

C. Install wood posts using metal anchors indicated.

D. Treat ends of timber beams and posts exposed to weather by dipping in water-repellent preservative for 15 minutes.

3.7 WOOD I-JOIST INSTALLATION

A. General: Install Wood I-Joists and Rim Joist for floor construction in strict accordance with manufacturer’s written instructions.

B. Provide I-Joist framing members of size, space, and configuration indicated or, if not indicated, to comply with the following requirements:

1. Joist Size: 9 ½” depth x 1 3/4” flange width, minimum.
2. Spacing: 16-inch on center unless otherwise indicated.
3. Rim Joist Size: 9 ½” depth x 1 1/4” wide.

C. Comply with all written instructions and details for bearing, fastening, bridging, bracing and allowable hole placement.

3.8 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 wet, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.

END OF SECTION 06 10 00
SECTION 06 16 00 - SHEATHING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes the following:

1. Wall sheathing.
2. Roof sheathing.
3. Composite nail base insulated roof sheathing.
4. Subflooring.
5. Underlayment.

B. Related Sections include the following:

1. Division 06 Section "Rough Carpentry" for related wood products.

1.3 SUBMITTALS

A. Product Data: For each type of process and factory-fabricated product. Indicate component materials and dimensions and include construction and application details.

1. Include data for wood-preservative treatment from chemical treatment manufacturer and certification by treating plant that treated plywood complies with requirements. Indicate type of preservative used and net amount of preservative retained.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Stack plywood and other panels flat with spacers between each bundle to provide air circulation. Provide for air circulation around stacks and under coverings.

PART 2 - PRODUCTS

2.1 WOOD PANEL PRODUCTS, GENERAL

A. Plywood: Either DOC PS 1 or DOC PS 2, unless otherwise indicated.
B. Oriented Strand Board: DOC PS 2.

C. Thickness: As needed to comply with requirements specified, but not less than thickness indicated.

D. Factory mark panels to indicate compliance with applicable standard.

2.2 PRESERVATIVE-TREATED PLYWOOD


1. Preservative Chemicals: Acceptable to authorities having jurisdiction and containing no arsenic or chromium.

B. Mark plywood with appropriate classification marking of an inspection agency acceptable to authorities having jurisdiction.

2.3 WALL SHEATHING


1. Span Rating: Not less than 16/0.
2. Nominal Thickness: Not less than 1/2 inch.

2.4 ROOF SHEATHING

A. Plywood Roof Sheathing: Exterior sheathing.

1. Span Rating: Not less 24/0.
2. Nominal Thickness: Not less than 5/8 inch.

2.5 SUBFLOORING AND UNDERLAYMENT

A. Plywood Subflooring: Exterior, Structural I single-floor panels or sheathing.

1. Span Rating: Not less than 16 o.c..
3. Edge Detail: Tongue and groove.
4. Fully sanded face.

B. Underlayment, General: Provide underlayment in nominal thicknesses indicated or, if not indicated, not less than 1/4 inch over smooth subfloors and not less than 3/8 inch over board or uneven subfloors.

C. Plywood Underlayment for Resilient Flooring: DOC PS 1, Exterior A-C with fully sanded face.

D. Plywood Underlayment for Ceramic Tile: Use cementitious backer units as specified in Division 09 Section “Tiling.”
E. Plywood Underlayment for Carpet: DOC PS 1, Exterior, C-C Plugged.

2.6 FASTENERS

A. General: Provide fasteners of size and type indicated that comply with requirements specified in this Article for material and manufacture.

1. For roof and wall sheathing, provide fasteners with hot-dip zinc coating complying with ASTM A 153/A 153M.

B. Nails, Brads, and Staples: ASTM F 1667.


D. Wood Screws: ASME B18.6.1.

2.7 WEATHER-RESISTANT SHEATHING WRAP

A. Building Wrap: ASTM E 1677, Type I air retarder; with flame-spread and smoke-developed indexes of less than 25 and 450, respectively, when tested according to ASTM E 84; UV stabilized; and acceptable to authorities having jurisdiction.

1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:

   a. Dow Chemical Company (The); Styrofoam Weathermate Plus Brand Housewrap.
   b. DuPont (E. I. du Pont de Nemours and Company); Tyvek.
   c. Ludlow Coated Products; Air Stop Housewrap.
   d. Pactiv, Inc.; GreenGuard Classic Wrap.
   e. Raven Industries Inc.; Rufco-Wrap.

2. Water-Vapor Permeance: Not less than 63g through 1 sq. m of surface in 24 hours per ASTM E 96, Desiccant Method (Procedure A).

3. Allowable UV Exposure Time: Not less than three months.

B. Building-Wrap Tape: Pressure-sensitive plastic tape recommended by building-wrap manufacturer for sealing joints and penetrations in building wrap.

2.8 MISCELLANEOUS MATERIALS

A. Adhesives for Field Gluing Panels to Framing: Formulation complying with APA AFG-01 and ASTM D 3498 that is approved for use with type of construction panel indicated by manufacturers of both adhesives and panels.

1. Use adhesives that have a VOC content of 70 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Do not use materials with defects that impair quality of sheathing or pieces that are too small to use with minimum number of joints or optimum joint arrangement.

B. Cut panels at penetrations, edges, and other obstructions of work; fit tightly against abutting construction, unless otherwise indicated.

C. Securely attach to substrate by fastening as indicated, complying with the following:

1. NES NER-272 for power-driven fasteners.
2. Table 2304.9.1, "Fastening Schedule," in ICC's "International Building Code."

D. Use common wire nails, unless otherwise indicated. Select fasteners of size that will not fully penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections. Install fasteners without splitting wood.

E. Coordinate wall and roof sheathing installation with flashing and joint-sealant installation so these materials are installed in sequence and manner that prevent exterior moisture from passing through completed assembly.

F. Do not bridge building expansion joints; cut and space edges of panels to match spacing of structural support elements.

G. Coordinate sheathing installation with installation of materials installed over sheathing so sheathing is not exposed to precipitation or left exposed at end of the workday when rain is forecast.

3.2 WOOD STRUCTURAL PANEL INSTALLATION


B. Fastening Methods: Fasten panels as indicated below:

1. Subflooring:
   a. Interlock tongue and groove edges.
   b. Glue and screw to wood framing.

2. Wall and Roof Sheathing:
   a. Nail to wood framing.
   b. Space panels 1/8 inch apart at edges and ends.

3. Underlayment:
a. Nail or screw to subflooring.
b. Space panels 1/32 inch apart at edges and ends.
c. Fill and sand edge joints of underlayment receiving resilient flooring right before installing flooring.

3.3 WEATHER-RESISTANT SHEATHING WRAP INSTALLATION

A. General: Cover sheathing with weather-resistant sheathing wrap as follows:

1. Cut back barrier 1/2 inch on each side of the break in supporting members at expansion- or control-joint locations.
2. Apply barrier to cover vertical flashing with a minimum 4-inch overlap, unless otherwise indicated.

B. Building Wrap: Comply with manufacturer's written instructions.

1. Seal seams, edges, fasteners, and penetrations with tape.
2. Extend into jambs of openings and seal corners with tape.

3.4 PROTECTION

A. Sheathing: Protect sheathing by covering exposed exterior surface of sheathing with weather-resistant sheathing paper or wrap securely fastened to sheathing. Apply covering immediately after sheathing is installed.

END OF SECTION 06 16 00
SECTION 06 20 13 - EXTERIOR FINISH CARPENTRY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes the following:
   1. Exterior standing and running trim.
   2. Exterior railings components.
   3. Other exterior wood ornament.

B. Related Sections include the following:
   1. Division 06 Section "Rough Carpentry" for blocking, and other carpentry work not exposed to view.
   2. Division 07 Section "Siding" for fiber-cement siding.

1.3 DEFINITIONS

A. Lumber grading agencies, and the abbreviations used to reference them, include the following:
   2. NLGA: National Lumber Grades Authority.
   3. RIS: Redwood Inspection Service.
   5. WCLIB: West Coast Lumber Inspection Bureau.

1.4 SUBMITTALS

A. Product Data: For each type of process and factory-fabricated product. Indicate component materials, dimensions, profiles, textures, and colors and include construction and application details.

B. Samples for Verification:
1. For each species and cut of lumber, with 1/2 of exposed surface finished; for lumber provide nominal dimensions by 12 inches long.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Protect materials against weather and contact with damp or wet surfaces. Stack lumber, plywood, and other panels flat with spacers between each bundle to provide air circulation. Provide for air circulation within and around stacks and under temporary coverings.

1.6 PROJECT CONDITIONS

A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit work to be performed and at least one coat of specified finish can be applied without exposure to rain, snow, or dampness.

B. Do not install finish carpentry materials that are wet, moisture damaged, or mold damaged.

1. Indications that materials are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.

2. Indications that materials are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

A. Lumber: DOC PS 20 and applicable grading rules of inspection agencies certified by ALSC’s Board of Review.

1. Factory mark each piece of lumber with grade stamp of inspection agency indicating grade, species, moisture content at time of surfacing, and mill.

2. For exposed lumber, mark grade stamp on end or back of each piece, or omit grade stamp and provide certificates of grade compliance issued by inspection agency.

2.2 WOOD-PRESERVATIVE-TREATED MATERIALS

A. Preservative Treatment by Pressure Process:

1. Lumber: AWPA C2 except that lumber that is not in contact with the ground and is continuously protected from liquid water may be treated according to AWPA C31 with inorganic boron (SBX). Kiln dry after treatment to a maximum moisture content of 19 percent.

2. Preservative Chemicals: Acceptable to authorities having jurisdiction and containing no arsenic or chromium.
3. For exposed items indicated to receive transparent finish, do not use chemical formulations that contain colorants or that bleed through or otherwise adversely affect finishes.

4. Do not use material that is warped or does not comply with requirements for untreated material.

5. Mark lumber with treatment quality mark of an inspection agency approved by ALSC's Board of Review.
   
   a. For exposed lumber indicated to receive a stained or natural finish, mark end or back of each piece or omit marking and provide certificates of treatment compliance issued by inspection agency.

6. Application: Where indicated or shown on drawings.

2.3 STANDING AND RUNNING TRIM

A. Lumber Trim for Opaque-Stained or Painted Finish:
   
   1. Species and Grade: Redwood, Clear; RIS.
   2. Species and Grade: Western red cedar, Grade A; NLGA, WCLIB, or WWPA.
   3. Species and Grade: Hem-fir, Prime or D finish; NLGA, WCLIB, or WWPA.
   4. Maximum Moisture Content: 19 percent or less.
   5. Finger Jointing: Not allowed.
   6. Face Surface: Rough Sawn textured.

B. Moldings for Opaque-Stained or Painted Finish: WMMPA WM 4, P-grade wood moldings. Made from kiln-dried stock to patterns included in WMMPA WM 12.
   
   1. Species: Redwood, Western red cedar, Eastern white, Idaho white, lodgepole, ponderosa, radiata, or sugar pine.
   2. Finger Jointing: Not allowed.

2.4 RAILINGS COMPONENTS

A. Railings: Clear, kiln-dried, solid lumber in same species as listed above for lumber trim; railing stock of pattern indicated or sizes indicated.

B. Balusters: Clear, kiln-dried, solid lumber in same species as listed above for lumber trim; of pattern and sizes indicated.

C. Newel Posts: Clear, kiln-dried, solid lumber in same species as listed above for lumber trim; of pattern and sizes indicated.
2.5 MISCELLANEOUS MATERIALS

A. Fasteners for Exterior Finish Carpentry: Provide nails or screws, in sufficient length to penetrate not less than 1-1/2 inches into wood substrate.

1. For all applications not otherwise indicated, provide stainless-steel or hot-dip galvanized steel fasteners.

B. Wood Glue: Waterproof resorcinol glue recommended by manufacturer for exterior carpentry use.

C. Flashing: Comply with requirements in Division 07 Section "Sheet Metal Flashing and Trim" for flashing materials installed in exterior finish carpentry.

D. Insect Screening for Soffit Vents: Aluminum, 18-by-16 mesh or Stainless steel, 18-by-18 mesh.

E. Sealants: Latex, complying with ASTM C 834, Type P, Grade NF and with applicable requirements in Division 07 Section "Joint Sealants," recommended by sealant manufacturer and manufacturer of substrates for intended application.

2.6 FABRICATION

A. Back out or kerf backs of standing and running trim wider than 5 inches, except members with ends exposed in finished work.

B. Ease edges of lumber less than 1 inch in nominal thickness to 1/16-inch radius and edges of lumber 1 inch or more in nominal thickness to 1/8-inch radius.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance.

B. Examine finish carpentry materials before installation. Reject materials that are wet, moisture damaged, and mold damaged.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Clean substrates of projections and substances detrimental to application.
B. Prime lumber to be painted, including both faces and edges. Cut to required lengths and prime ends. Comply with requirements in Division 09 Section "Exterior Painting."

3.3 INSTALLATION, GENERAL

A. Do not use materials that are unsound, warped, improperly treated or finished, inadequately seasoned, or too small to fabricate with proper jointing arrangements.

1. Do not use manufactured units with defective surfaces, sizes, or patterns.

B. Install exterior finish carpentry level, plumb, true, and aligned with adjacent materials. Use concealed shims where necessary for alignment.

1. Scribe and cut exterior finish carpentry to fit adjoining work. Refinish and seal cuts as recommended by manufacturer.

2. Install to tolerance of 1/8 inch in 96 inches for level and plumb. Install adjoining exterior finish carpentry with 1/32-inch maximum offset for flush installation and 1/16-inch maximum offset for reveal installation.

3. Install stairs with no more than 3/16-inch variation between adjacent treads and risers and with no more than 3/8-inch variation between largest and smallest treads and risers within each flight.

4. Coordinate exterior finish carpentry with materials and systems in or adjacent to it. Provide cutouts for mechanical and electrical items that penetrate exterior finish carpentry.

3.4 STANDING AND RUNNING TRIM INSTALLATION

A. Install flat grain lumber with bark side exposed to weather.

B. Install trim with minimum number of joints practical, using full-length pieces from maximum lengths of lumber available. Do not use pieces less than 24 inches long except where necessary.

1. Use scarf joints for end-to-end joints.

2. Stagger end joints in adjacent and related members.

C. Fit exterior joints to exclude water. Cope at returns and miter at corners to produce tight-fitting joints with full-surface contact throughout length of joint. Plane backs of casings to provide uniform thickness across joints, where necessary for alignment.

D. Unless otherwise indicated, countersink fasteners, fill surface flush, and sand where face fastening is unavoidable.

3.5 STAIR AND RAILING INSTALLATION

A. Balusters: Fit balusters to treads, glue, and nail in place. Countersink nail heads, fill flush, and sand filler. Let into railings and glue in place.
B. Newel Posts: Secure newel posts to stringers and risers with through bolts or lag screws countersunk-head wood screws and glue.

C. Railings: Secure wall rails with metal brackets. Fasten freestanding railings to newel posts and to trim at walls with countersunk-head wood screws or rail bolts, and glue.

3.6 ADJUSTING
A. Replace exterior finish carpentry that is damaged or does not comply with requirements. Exterior finish carpentry may be repaired or refinished if work complies with requirements and shows no evidence of repair or refinishing. Adjust joinery for uniform appearance.

3.7 CLEANING
A. Clean exterior finish carpentry on exposed and semi-exposed surfaces. Touch up factory-applied finishes to restore damaged or soiled areas.

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

B. Remove and replace finish carpentry materials that are wet, moisture damaged, and mold damaged.

1. Indications that materials are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.

2. Indications that materials are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

END OF SECTION 06 20 13
PART 1 - GENERAL

1.0 REFERENCES


1.1 DELIVERY, STORAGE AND HANDLING

A. Handle Products carefully, ensuring board corners are not broken and boards are not damaged.

B. Do not store Product exposed to direct sunlight. If stored outdoors, cover Product with light-colored opaque tarpaulins to protect from solar radiation.

C. Store Products away from construction activity and sources of ignition.

1.2 ENVIRONMENTAL REQUIREMENTS

A. Apply insulation only when surfaces and ambient temperatures are within manufacturer’s prescribed limits.

PART 2 PRODUCTS

2.0 MATERIALS

A. Roof Insulation: Extruded polystyrene board to ASTM C578, Type IV, rigid, closed cell type, with integral high density skin.
   1. Aged Thermal Resistance (ASTM C518): R-5 per inch (RSI 0.87 per 25 mm).
   2. Board Size: 24 inch (610 mm) 2" thick.
   4. Water Absorption (ASTM C272): 0.1% by volume maximum.
   5. Edges: Square.
   6. Water Vapor Permeance (ASTM E96): less than 1.0 perm (60 ng/Pa•s•m2) for products greater than 1 inch thick.
   8. Manufacturer and Product Name: Styrofoam Deckmate Plus by The Dow Chemical Company.

B. Thermal Barrier: 1/2 inch fire rated Type X board meeting UL Class A; Dens-Deck by G-P Gypsum.

C. Mechanical Fasteners: screw-type, 6 ga. (4.8 mm) 3] diameter, self-tapping, galvanized steel; sufficient length to securely anchor system into place and to withstand all super-imposed loads; complete with 1-1/2 inch (38 mm) diameter PVC discs.
PART 3 - EXECUTION

3.0 EXAMINATION

A. Verify that substrate is flat, sound, clean, and free of oil, grease, irregularities, materials or substances that may impede adhesive bond.

B. Apply no more roof insulation boards than can be covered with roofing in same day.

C. Keep roof insulation boards minimum 3 inches (75 mm) from heat emitting devices, and minimum 2 inches (50 mm) from sidewalls of Type A chimneys and Type B and L vents.

END OF SECTION 072216
SECTION 07 41 20 - FLAT, STRUCTURAL, STANDING-SEAM METAL ROOF PANELS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes the following:

1. Flat, Standing-seam roof panels.

1.3 DEFINITIONS

A. Roofing Terminology: Refer to ASTM D 1079 for definitions of terms related to roofing work not otherwise defined in this Section.

1.4 PERFORMANCE REQUIREMENTS

A. General: Provide manufactured roof panel assemblies complying with performance requirements indicated and capable of withstanding structural movement, thermally induced movement, and exposure to weather without failure or infiltration of water into the building interior.

B. Water Penetration: Provide manufactured roof panel assemblies with no water penetration as defined in the test method when tested according to ASTM E 1646 at a minimum differential pressure of 20 percent of inward acting, wind-load design pressure of not less than 6.24 lb/sq. ft. (300 Pa) and not more than 12.0 lb/sq. ft. (575 Pa).

C. Wind-Uplift Resistance: Provide roof panel assemblies that meet requirements of UL 580 for Class 90 wind-uplift resistance.

D. Structural Performance: Provide manufactured roof panel assemblies capable of safely supporting design loads indicated under in-service conditions with vertical deflection no greater than the following, based on testing manufacturer’s standard units according to ASTM E 1592 by a qualified independent testing and inspecting agency.


E. Loading Requirements: Provide all panels, supports, trims, and accessories to meet the following: BOCA Building Code, 1996 Edition

1. Roof Snow Load: 20 lbs. No tributary load reductions allowed.
2. Wind Load: 70 MPH - Exposure Factor B - Importance Factor 1
3. Sesmic Zone 1 - Importance Factor B
4. Collateral Load: 0 lbs.

1.5 SUBMITTALS
A. Product Data: Include manufacturer's product specifications, standard details, certified product test results, and general recommendations, as applicable to materials and finishes for each component and for total panel assemblies.

B. Shop Drawings: Show layouts of panels on roof, details of edge conditions, joints, panel profiles, supports, anchorages, trim, flashings, underlayment, closures, snow guards, and special details. Distinguish between factory- and field-assembled work.

C. For installed products indicated to comply with certain design loadings, include structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

D. Samples for Initial Selection: Manufacturer's color charts or chips showing the full range of colors, textures, and patterns available for roof panels with factory-applied finishes.

E. Qualification Data: For firms and persons specified in the "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.

F. Product Test Reports: Indicate compliance of manufactured roof panel assemblies and materials with performance and other requirements based on comprehensive testing of current products.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: Engage an experienced installer who has completed metal roof panel projects similar in material, design, and extent to that indicated for this Project and with a record of successful in-service performance.

B. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in the State of Missouri and who is experienced in providing engineering services of the kind indicated.

C. Fire-Test-Response Characteristics: Where fire-resistance-rated roof panel assemblies are indicated, provide materials and construction identical to those of assemblies tested for fire resistance per ASTM E 119 by an independent testing and inspecting agency acceptable to authorities having jurisdiction.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver panels and other components so they will not be damaged or deformed. Package panels for protection against damage during transportation or handling.

B. Handling: Exercise care in unloading, storing, and erecting roof panels to prevent bending, warping, twisting, and surface damage.

C. Stack materials on platforms or pallets, covered with tarpaulins or other suitable weathertight and ventilated covering. Store panels to ensure dryness. Do not store panels in contact with their materials that might cause staining, denting, or other surface damage. Slope panels to drain.

1.8 PROJECT CONDITIONS

FLAT STRUCTURAL STANDING-SEAM METAL ROOFING PANELS

Replace Roof & Renovate Stock Pens- Sheep Pavilion
Missouri State Fairgrounds
1907-01
A. Field Measurements: Verify location of structural members and openings in substrates by field measurements before fabrication and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

1.9 WARRANTY

A. General Warranty: Special warranties specified in this Article shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by the Contractor under requirements of the Contract Documents.

B. Special Finish Warranty: Submit a written warranty, signed by manufacturer, covering failure of the factory-applied exterior finish on metal roof panels within the specified warranty period and agreeing to repair finish or replace roof panels that show evidence of finish deterioration. Deterioration of finish includes, but is not limited to, color fade, chalking, cracking, peeling, and loss of film integrity.

C. Finish Warranty Period: 20 years from date of Substantial Completion.

D. Special Weathertight System Warranty: Submit a written warranty, signed by roofing system manufacturer agreeing to promptly repair leaks in the complete system including roof membrane and flashings, penetrations, curbs, accessories, etc., resulting from defects in materials or workmanship for the warranty period listed below. The manufacturer's liability shall not exceed the original installed cost of the roofing system. Indicate by letter that "All roofing components contained in the system proposed are approved and compatible with the warranty requirements of the roof system as specified, and that the warranty specified will be issued at completion of the project if system is installed as designed.

1. Warranty Period: 20 years.

The State of Missouri is prohibited by law from entering into binding arbitration. No warranty shall be submitted with any arbitration clause.

E. Special Project Warranty: Submit roofing Installer's warranty, on warranty form at end of this Section, signed by Installer, covering roofing, insulation, fasteners, flashings, penetrations, curbs, accessories, etc, if any, for the following warranty period:

1. Warranty Period: 5 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering metal roof systems that are considered acceptable and may be incorporated into the Work include, but are not limited to, the following:

1. American Buildings Roofing and Architectural Products. - Loc-Seam panel
2. Butler Manufacturing Co. - VSR Roof System
3. Metal Building Components, Inc. SuperLok System
4. Steelox Roofing Systems, Inc - LRK (Steelox Panel)
5. Centria - System SDP-200
B. Substitutions: Any proposed substitution to the list above must be approved a minimum of 10 days in advance of bid date by submitting the "SUBSTITUTION REQUEST" form inclosed with bidding documents.

The product specifications listed in SECTIONS 2.2, and 2.3 are performance specifications indicating the minimum level of quality required to be considered as an "Acceptable Substitution."

2.2 PANEL FINISH

A. 24 gage Metallic-Coated Steel Sheet Prepainted with Coil Coating: Steel sheet metallic coated by the hot-dip process and prepainted by the coil-coating process to comply with ASTM A 755. Color to be selected from manufacturer's full range of colors.

B. Pre-Painting to be Fluoropolymer 2-Coat Coating System: Manufacturer's standard 2-coat, thermocured system composed of specially formulated inhibitive primer and fluoropolymer color topcoat containing not less than 70 percent polyvinylidene fluoride resin by weight with a total minimum dry film thickness of 0.9 mil (0.023 mm) and 30 percent reflective gloss when tested according to ASTM D 523.

1. Durability: Provide coating field tested under normal range of weather conditions for a minimum of 20 years without significant peel, blister, flake, chip, crack, or check in finish; without chalking in excess of a chalk rating of 8 according to ASTM D 4214; and without fading in excess of 5 Hunter units.

OR

C. 24 GAGE, Aluminum-Zinc Alloy-Coated Steel Sheet: (Galvalume or ALZN) ASTM A 792, Class AZ-50 coating, Grade 40 (ASTM A 792M, Class AZ-150 coating, Grade 275); structural quality.

2.3 PANEL CONSTRUCTION

A. Flat, Standing-Seam Roof Panels: Panels shall be 16 inch wide, factory-formed, standing-seam roof panel assembly designed for concealed mechanical attachment of panels to roof purlins or deck. Panels shall be field seamed by machine creating a vertical lock seam. Panel seam must contain factory applied sealant. Panel seam must be a minimum of 2 inches above flat of panel.

B. Panel clips must be designed to allow for a minimum of one inch thermal expansion in each direction from nominal centered clip, two inches total expansion and contraction.

C. Purlin insulation blocks shall be installed along all roof structural members.

2.4 THERMAL INSULATION

A. Metal Building Insulation: NAIMA 202-96, glass-fiber-blanket insulation, thickness as indicated, with a flame-spread rating of 25 or less, and 3-inch- (50-mm-) wide, continuous, vapor-tight edge tabs.

Facing: CL 5010 OR WMP-10 Metallized, Polypropylene/scrim/kraft.

1. Perm rating shall be .02 perm.

B. Support system: Insulation shall be installed using Central Glass Insulation, "INSUL BASKET" system or Thermal Design's, "Simple Saver System."
OR

C. Support system: Insulation shall be installed using Central Glass Insulation, "PERFECT R" system or Owens Corning, "Elaminator 300 Series"

2.5 ROOF ACCESSORIES

A. General: Provide materials and accessories required for a complete roof assembly and as recommended by manufacturer, unless otherwise indicated.

B. Accessories: Unless otherwise specified, provide components required for a complete roof panel assembly including trim, copings, fasciae, mullions, sills, corner units, ridge closures, clips, seam covers, battens, flashings, gutters, sealants, gaskets, fillers, closure strips, and similar items. Match materials and finishes of panels.

C. Closure Strips: Closed-cell, self-extinguishing, expanded, cellular, rubber or cross-linked, polyolefin-foam flexible closure strips. Cut or premold to match configuration of panels. Provide closure strips where indicated or necessary to ensure weathertight construction.

D. Snow Guards: Prefabricated, noncorrosive units designed to use with roof panels and complete with attachment to seam mechanism.

2.6 FABRICATION

A. General: Fabricate and finish panels and accessories at the factory to greatest extent possible, by manufacturer's standard procedures and processes, as necessary to fulfill indicated performance requirements demonstrated by laboratory testing. Comply with indicated profiles and with dimensional and structural requirements.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Installer present, for compliance with requirements indicated or conditions affecting performance of metal panel roofing.

Panel Supports and Anchorage: Examine roof framing to verify that purlins, angles, channels, and other secondary structural panel support members and anchorage have been installed according to written instructions of panel manufacturer.

Do not proceed with roof panel installation until unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Coordinate metal panel roofing with rain drainage work; flashing; trim; and construction of decks, parapets, walls, and other adjoining work to provide a leakproof, secure, and noncorrosive installation.

B. Promptly remove protective film, if any, from exposed surfaces of metal panels and accessories. Strip with care to avoid damage to finish.
C. Secondary Structural Supports: Install purlins, bracing, and other secondary structural panel support members and anchorage according to the Light Gage Structural Institute's "Guide Specifications," Section 07410, "Manufactured Roof and Wall Panels."

3.3 PANEL INSTALLATION

A. General: Comply with panel manufacturer's written instructions and recommendations for installation, as applicable to project conditions and supporting substrates. Anchor panels and other components of the Work securely in place, with provisions for thermal and structural movement.

Field cutting exterior panels by torch is not permitted.

Install panels over a minimum 1/2:12 slope.

Accessories: Install components required for a complete roof panel assembly including trim, copings, fasciae, ridge closures, clips, seam covers, battens, flashings, gutters, sealants, gaskets, fillers, closure strips, and similar items.

B. Separate dissimilar metals by painting each metal surface in area of contact with a bituminous coating, by applying rubberized-asphalt underlayment to each metal surface, or by other permanent separation as recommended by manufacturers of dissimilar metals.

C. Install weatherseal under ridge cap. Flash and seal panels at eave and rake with rubber, neoprene, or other closures to exclude weather.

Seal panel end laps with double beads of tape or sealant, full width of panel.

D. Standing-Seam Roof Panel Assembly: Fasten panels to supports with concealed clip according to panel manufacturer's written instructions. Install clips at each support with self-drilling/self-tapping fasteners.

E. Seaming: Complete seaming of panel joints by operating portable power-driven equipment of type recommended by panel manufacturer to provide a weathertight joint.

Installation Tolerances: Shim and align panel units within installed tolerance of 1/4 inch in 20 feet (6 mm in 6 m) on slope and location lines as indicated and within 1/8-inch (3-mm) offset of adjoining faces and of alignment of matching profiles.

3.4 CLEANING AND PROTECTING

A. Damaged Units: Replace panels and other components of the Work that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

B. Cleaning: Remove temporary protective coverings and strippable films, if any, as soon as each panel is installed. On completion of panel installation, clean finished surfaces as recommended by panel manufacturer and maintain in a clean condition during construction.

END OF SECTION 07 41 20
PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes the following:
   1. Fiber-cement siding.
   2. Fiber-cement accessories and trim.

B. Related Sections include the following:
   1. Division 06 Section "Rough Carpentry" for building wrap.
   2. Division 06 Section "Sheathing" for substrates underneath siding.
   3. Division 07 Section "Sheet Metal Flashing and Trim" for flashing, gutters, and other sheet metal work.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Samples for Verification: For each type, color, texture, and pattern required.
   1. 12-inch- long-by-actual-width Sample of siding.
   2. 12-inch- long-by-actual-width Sample of trim.

1.4 QUALITY ASSURANCE

A. Source Limitations for Siding: Obtain each type, color, texture, and pattern of siding, including related accessories, through one source from a single manufacturer.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Store materials in a dry, well-ventilated, weathertight place.
1.6 PROJECT CONDITIONS
A. Weather Limitations: Proceed with siding installation only if substrate is completely dry and if existing and forecasted weather conditions permit siding to be installed according to manufacturer's written instructions.

1.7 SEQUENCING
A. Coordinate installation with flashings and other adjoining construction to ensure proper sequencing.

1.8 WARRANTY
A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace siding that does not comply with requirements or that fails within specified warranty period. Failures include, but are not limited to, cracking, deforming, fading, or otherwise deteriorating beyond normal weathering.

1. Fading is defined as loss of color, after cleaning with product recommended by manufacturer, of more than 5 Hunter color-difference units as measured according to ASTM D 2244.
2. Warranty Period: 50 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS
A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:

1. Basis-of-Design Product: The design for each siding is based on the product named. Subject to compliance with requirements, provide either the named product or a comparable product by one of the other manufacturers specified.

2.2 SIDING
A. Fiber-Cement Siding: Siding made from fiber-cement board that does not contain asbestos fibers; complies with ASTM C 1186, Type A, Grade II; is classified as noncombustible when tested according to ASTM E 136; and has a flame-spread index of 25 or less when tested according to ASTM E 84.

1. Basis-of-Design Product: James Hardie Inc.; Hardiplank and Hardipanel fiber-cement sidings or a comparable product by one of the following:

2. Acceptable Manufacturers:
   a. Cemplank, Inc.
b. CertainTeed Corp.
c. GAF Materials Corporation.
d. James Hardie Inc. (Basis-of-Design)
e. MaxiTtile, Inc.

3. Horizontal Pattern: 9-1/4 to 9-1/2 inches wide (8” exposure) in plain edge and wood grain style.
   a. Horizontal Lap Siding: Where indicated on the drawings use Hardiplank Cedarmill Lap Siding in 5/16” thickness x 9 ½” width with factory primed finish.
   b. Texture: Wood grain.


2.3 ACCESSORIES

A. Siding Accessories: Provide starter strips, edge trim, corner cap, and other items as recommended by siding manufacturer for building configuration.
   1. Provide accessories made from same material as adjacent siding, unless otherwise indicated.
   2. Provide accessories matching color and texture of adjacent siding, unless otherwise indicated.

B. Batten Strips: Where batten strips are indicated for vertical sidings applications, provide integrally colored fiber-cement Hardie Trim Rustic Batten Boards.
   1. Texture: Wood grain.
   2. Size: 3/4 inch thickness by 2 ½ inch width fiber-cement boards.

C. Wood Trim: Provide wood trim components complying with Division 06 Section “Exterior Finish Carpentry.”

D. Flashing: Provide flashing complying with Division 07 Section "Sheet Metal Flashing and Trim" at window and door heads and where indicated.

E. Elastomeric Joint Sealant: Single-component urethane joint sealant complying with requirements in Division 07 Section "Joint Sealants" for Use NT (nontraffic) and for Uses M, G, A, and, as applicable to joint substrates indicated, O joint substrates.

F. Fasteners:
1. For fastening to wood, use siding nails or ribbed bugle-head screws of sufficient length to penetrate a minimum of 1 inch into substrate.
2. For fastening fiber-cement siding, use hot-dip galvanized or stainless-steel fasteners.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates for compliance with requirements for installation tolerances and other conditions affecting performance of siding. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Clean substrates of projections and substances detrimental to application.

3.3 INSTALLATION

A. General: Comply with siding manufacturer's written installation instructions applicable to products and applications indicated unless more stringent requirements apply. Center nails in elongated nailing slots without binding siding to allow for thermal movement. Overlap joints to shed water away from direction of prevailing wind.

3.4 ADJUSTING AND CLEANING

A. Remove damaged, improperly installed, or otherwise defective siding materials and replace with new materials complying with specified requirements.

B. Clean finished surfaces according to siding manufacturer's written instructions and maintain in a clean condition during construction.

END OF SECTION 07 46 00
SECTION 07 54 23 - THERMOPLASTIC POLYOLEFIN (TPO) ROOFING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Adhered TPO membrane roofing system.
2. Roof insulation.

1.3 PERFORMANCE REQUIREMENTS

A. General Performance: Installed membrane roofing and base flashings shall withstand specified uplift pressures, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Membrane roofing and base flashings shall remain watertight.

B. Material Compatibility: Provide roofing materials that are compatible with one another under conditions of service and application required, as demonstrated by membrane roofing manufacturer based on testing and field experience.

C. Roofing System Design: Provide membrane roofing system that is identical to systems that have been successfully tested by a qualified testing and inspecting agency to resist uplift pressure calculated according to ASCE/SEI 7.

D. FM Approvals Listing: Provide membrane roofing, base flashings, and component materials that comply with requirements in FM Approvals 4450 and FM Approvals 4470 as part of a membrane roofing system, and that are listed in FM Approvals' "RoofNav" for Class 1 or noncombustible construction, as applicable. Identify materials with FM Approvals markings.

1. Fire/Windstorm Classification: Class 1A-90.

1.4 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Shop Drawings: For roofing system. Include plans, sections, details, and attachments to other work.

1. Base flashings and membrane terminations.
2. Roof plan showing orientation of membrane.
3. Insulation fastening patterns for corner, perimeter, and field-of-roof locations.

C. Samples for Verification: For the following products:
1. Sheet roofing, of color specified, including T-shaped side and end lap seam.
2. Roof insulation.
3. Walkway pads.
4. Metal termination bars.
5. Six insulation fasteners of each type, length, and finish.

D. Qualification Data: For qualified Installer and manufacturer.

E. Manufacturer Certificates: Signed by roofing manufacturer certifying that roofing system complies with requirements specified in "Performance Requirements" Article.

F. Warranties: Sample of special warranties.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications: A qualified manufacturer that is FM approved for membrane roofing system identical to that used for this Project.

B. Installer Qualifications: A qualified firm that is approved, authorized, or licensed by membrane roofing system manufacturer to install manufacturer's product and that is eligible to receive manufacturer's special warranty.

C. Exterior Fire-Test Exposure: ASTM E 108, Class A; for application and roof slopes indicated, as determined by testing identical membrane roofing materials by a qualified testing agency. Materials shall be identified with appropriate markings of applicable testing agency.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver roofing materials to Project site in original containers with seals unbroken and labeled with manufacturer's name, product brand name and type, date of manufacture, approval or listing agency markings, and directions for storing and mixing with other components.

B. Store liquid materials in their original undamaged containers in a clean, dry, protected location and within the temperature range required by roofing system manufacturer. Protect stored liquid material from direct sunlight.

1. Discard and legally dispose of liquid material that cannot be applied within its stated shelf life.

C. Protect roof insulation materials from physical damage and from deterioration by sunlight, moisture, soiling, and other sources. Store in a dry location. Comply with insulation manufacturer's written instructions for handling, storing, and protecting during installation.

D. Handle and store roofing materials and place equipment in a manner to avoid permanent deflection of deck.
1.7 PROJECT CONDITIONS

A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit roofing system to be installed according to manufacturer's written instructions and warranty requirements.

1.8 WARRANTY

A. Special Warranty: Manufacturer's standard or customized form, without monetary limitation, in which manufacturer agrees to repair or replace components of membrane roofing system that fail in materials or workmanship within specified warranty period.

1. Special warranty includes membrane roofing, base flashings, roof insulation, fasteners, cover boards, roofing accessories, and other components of membrane roofing system.
2. Warranty Period: 20 years from date of Substantial Completion.

B. Special Project Warranty: Submit roofing Installer's warranty, on warranty form at end of this Section, signed by Installer, covering the Work of this Section, including all components of membrane roofing system such as membrane roofing, base flashing, roof insulation, fasteners, cover boards, substrate boards, vapor retarders, roof pavers, and walkway products, for the following warranty period:

1. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 TPO MEMBRANE ROOFING


1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. Firestone Building Products Company.
   b. GAF Materials Corporation.
   c. GenFlex Roofing Systems.
   d. Johns Manville.
   e. Mule-Hide Products Co., Inc.

2. Thickness 60 mils nominal.

2.2 AUXILIARY MEMBRANE ROOFING MATERIALS

A. General: Auxiliary membrane roofing materials recommended by roofing system manufacturer for intended use, and compatible with membrane roofing.
1. Liquid-type auxiliary materials shall comply with VOC limits of authorities having jurisdiction.

B. Sheet Flashing: Manufacturer's standard unreinforced thermoplastic polyolefin sheet flashing, 55 mils thick, minimum, of same color as sheet membrane.

C. Bonding Adhesive: Manufacturer's standard.

D. Metal Termination Bars: Manufacturer's standard, predrilled stainless-steel or aluminum bars, approximately 1 by 1/8 inch thick; with anchors.

E. Fasteners: Factory-coated steel fasteners and metal or plastic plates complying with corrosion-resistance provisions in FM Approvals 4470, designed for fastening membrane to substrate, and acceptable to membrane roofing system manufacturer.

F. Miscellaneous Accessories: Provide pourable sealers, preformed cone and vent sheet flashings, preformed inside and outside corner sheet flashings, T-joint covers, lap sealants, termination reglets, and other accessories.

2.3 ROOF INSULATION

A. General: Preformed roof insulation boards manufactured or approved by TPO membrane roofing manufacturer, selected from manufacturer's standard sizes suitable for application, of thicknesses indicated and that produce FM Approvals-approved roof insulation.

B. Polyisocyanurate Board Insulation: ASTM C 1289, Type II, Class 1, Grade 2, felt or glass-fiber mat facer on both major surfaces.

C. Provide preformed saddles, crickets, tapered edge strips, and other insulation shapes where indicated for sloping to drain. Fabricate to slopes indicated.

2.4 INSULATION ACCESSORIES

A. General: Furnish roof insulation accessories recommended by insulation manufacturer for intended use and compatibility with membrane roofing.

B. Fasteners: Factory-coated steel fasteners and metal or plastic plates complying with corrosion-resistance provisions in FM Approvals 4470, designed for fastening roof insulation and cover boards to substrate, and acceptable to roofing system manufacturer.

C. Cover Board: Fiberboard high density, 1/4 inch thick, R.3.

2.5 WALKWAYS

A. Flexible Walkways: Factory-formed, nonporous, heavy-duty, slip-resisting, surface-textured walkway pads or rolls, approximately 3/16 inch thick and acceptable to membrane roofing system manufacturer.

1. Exposed Face Color: White
PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with the following requirements and other conditions affecting performance of roofing system:

1. Verify that roof openings and penetrations are in place and curbs are set and braced and that roof drain bodies are securely clamped in place.
2. Verify that wood blocking, curbs, and nailers are securely anchored to roof deck at penetrations and terminations and that nailers match thicknesses of insulation.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Clean substrate of dust, debris, moisture, and other substances detrimental to roofing installation according to roofing system manufacturer's written instructions. Remove sharp projections.

B. Prevent materials from entering and clogging roof drains and conductors and from spilling or migrating onto surfaces of other construction. Remove roof-drain plugs when no work is taking place or when rain is forecast.

C. Complete terminations and base flashings and provide temporary seals to prevent water from entering completed sections of roofing system at the end of the workday or when rain is forecast. Remove and discard temporary seals before beginning work on adjoining roofing.

3.3 INSULATION INSTALLATION

A. Coordinate installing membrane roofing system components so insulation is not exposed to precipitation or left exposed at the end of the workday.

B. Comply with membrane roofing system and insulation manufacturer's written instructions for installing roof insulation.

C. Install insulation under area of roofing to achieve required thickness. Where overall insulation thickness is 3 inches or greater, install two or more layers with joints of each succeeding layer staggered from joints of previous layer a minimum of 6 inches in each direction.

D. Trim surface of insulation where necessary at roof drains so completed surface is flush and does not restrict flow of water.

E. Install insulation with long joints of insulation in a continuous straight line with end joints staggered between rows, abutting edges and ends between boards. Fill gaps exceeding 1/4 inch with insulation.

1. Cut and fit insulation within 1/4 inch of nailers, projections, and penetrations.
F. Mechanically Fastened Insulation: Install each layer of insulation and secure to deck using mechanical fasteners specifically designed and sized for fastening specified board-type roof insulation to deck type.

1. Fasten insulation according to requirements in FM Approvals' "RoofNav" for specified Windstorm Resistance Classification.
2. Fasten insulation to resist uplift pressure at corners, perimeter, and field of roof.

G. Install cover boards over insulation with long joints in continuous straight lines with end joints staggered between rows. Offset joints of insulation below a minimum of 6 inches in each direction. Loosely butt cover boards together and adhere to roof insulation.

1. Fasten cover boards according to requirements in FM Approvals' "RoofNav" for specified Windstorm Resistance Classification.
2. Fasten cover boards to resist uplift pressure at corners, perimeter, and field of roof.

3.4 ADHERED MEMBRANE ROOFING INSTALLATION

A. Adhere membrane roofing over area to receive roofing and install according to membrane roofing system manufacturer's written instructions.

B. Start installation of membrane roofing in presence of membrane roofing system manufacturer's technical personnel.

C. Accurately align membrane roofing and maintain uniform side and end laps of minimum dimensions required by manufacturer. Stagger end laps.

D. Bonding Adhesive: Apply to substrate and underside of membrane roofing at rate required by manufacturer and allow to partially dry before installing membrane roofing. Do not apply to splice area of membrane roofing.

E. In addition to adhering, mechanically fasten membrane roofing securely at terminations, penetrations, and perimeter of roofing.

F. Apply membrane roofing with side laps shingled with slope of roof deck where possible.

G. Seams: Clean seam areas, overlap membrane roofing, and hot-air weld side and end laps of membrane roofing and sheet flashings according to manufacturer's written instructions to ensure a watertight seam installation.

1. Test lap edges with probe to verify seam weld continuity. Apply lap sealant to seal cut edges of sheet membrane.
2. Verify field strength of seams a minimum of twice daily and repair seam sample areas.
3. Repair tears, voids, and lapped seams in roofing that does not comply with requirements.

H. Spread sealant bed over deck drain flange at roof drains and securely seal membrane roofing in place with clamping ring.
3.5 BASE FLASHING INSTALLATION

A. Install sheet flashings and preformed flashing accessories and adhere to substrates according to membrane roofing system manufacturer's written instructions.

B. Apply bonding adhesive to substrate and underside of sheet flashing at required rate and allow to partially dry. Do not apply to seam area of flashing.

C. Flash penetrations and field-formed inside and outside corners with cured or uncured sheet flashing.

D. Clean seam areas, overlap, and firmly roll sheet flashings into the adhesive. Hot-air weld side and end laps to ensure a watertight seam installation.

E. Terminate and seal top of sheet flashings.

3.6 WALKWAY INSTALLATION

A. Flexible Walkways: Install walkway products in locations indicated. Heat weld to substrate or adhere walkway products to substrate with compatible adhesive according to roofing system manufacturer's written instructions.

3.7 FIELD QUALITY CONTROL

A. Final Roof Inspection: Arrange for roofing system manufacturer's technical personnel to inspect roofing installation on completion.

B. Repair or remove and replace components of membrane roofing system where inspections indicate that they do not comply with specified requirements.

C. Additional inspections, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

3.8 PROTECTING AND CLEANING

A. Protect membrane roofing system from damage and wear during remainder of construction period. When remaining construction will not affect or endanger roofing, inspect roofing for deterioration and damage, describing its nature and extent in a written report, with copies to Architect and Owner.

B. Correct deficiencies in or remove membrane roofing system that does not comply with requirements; repair substrates; and repair or reinstall membrane roofing system to a condition free of damage and deterioration at time of Substantial Completion and according to warranty requirements.
3.9 ROOFING INSTALLER'S WARRANTY

A. WHEREAS <Insert name> of <Insert address>, herein called the "Roofing Installer," has performed roofing and associated work ("work") on the following project:

1. Owner: <Insert name of Owner>.
2. Address: <Insert address>.
3. Building Name/Type: <Insert information>.
4. Address: <Insert address>.
5. Area of Work: <Insert information>.
6. Acceptance Date: <Insert date>.
7. Warranty Period: <Insert time>.
8. Expiration Date: <Insert date>.

B. AND WHEREAS Roofing Installer has contracted (either directly with Owner or indirectly as a subcontractor) to warrant said work against leaks and faulty or defective materials and workmanship for designated Warranty Period,

C. NOW THEREFORE Roofing Installer hereby warrants, subject to terms and conditions herein set forth, that during Warranty Period he will, at his own cost and expense, make or cause to be made such repairs to or replacements of said work as are necessary to correct faulty and defective work and as are necessary to maintain said work in a watertight condition.

D. This Warranty is made subject to the following terms and conditions:

1. Specifically excluded from this Warranty are damages to work and other parts of the building, and to building contents, caused by:
   a. Lightning;
   b. Peak gust wind speed exceeding 72 mph;
   c. Fire;
   d. Failure of roofing system substrate, including cracking, settlement, excessive deflection, deterioration, and decomposition;
   e. Faulty construction of parapet walls, copings, chimneys, skylights, vents, equipment supports, and other edge conditions and penetrations of the work;
   f. Vapor condensation on bottom of roofing; and
   g. Activity on roofing by others, including construction contractors, maintenance personnel, other persons, and animals, whether authorized or unauthorized by Owner.

2. When work has been damaged by any of foregoing causes, Warranty shall be null and void until such damage has been repaired by Roofing Installer and until cost and expense thereof have been paid by Owner or by another responsible party so designated.

3. Roofing Installer is responsible for damage to work covered by this Warranty but is not liable for consequential damages to building or building contents resulting from leaks or faults or defects of work.

4. During Warranty Period, if Owner allows alteration of work by anyone other than Roofing Installer, including cutting, patching, and maintenance in connection with penetrations, attachment of other work, and positioning of anything on roof, this Warranty shall become null and void on date of said alterations, but only to the extent said alterations affect work covered by this Warranty. If Owner engages Roofing
Installer to perform said alterations, Warranty shall not become null and void unless Roofing Installer, before starting said work, shall have notified Owner in writing, showing reasonable cause for claim, that said alterations would likely damage or deteriorate work, thereby reasonably justifying a limitation or termination of this Warranty.

5. During Warranty Period, if original use of roof is changed and it becomes used for, but was not originally specified for, a promenade, work deck, spray-cooled surface, flooded basin, or other use or service more severe than originally specified, this Warranty shall become null and void on date of said change, but only to the extent said change affects work covered by this Warranty.

6. Owner shall promptly notify Roofing Installer of observed, known, or suspected leaks, defects, or deterioration and shall afford reasonable opportunity for Roofing Installer to inspect work and to examine evidence of such leaks, defects, or deterioration.

7. This Warranty is recognized to be the only warranty of Roofing Installer on said work and shall not operate to restrict or cut off Owner from other remedies and resources lawfully available to Owner in cases of roofing failure. Specifically, this Warranty shall not operate to relieve Roofing Installer of responsibility for performance of original work according to requirements of the Contract Documents, regardless of whether Contract was a contract directly with Owner or a subcontract with Owner's General Contractor.

E. IN WITNESS THEREOF, this instrument has been duly executed this <Insert day> day of <Insert month>, <Insert year>.

1. Authorized Signature: <Insert signature>.
2. Name: <Insert name>.
3. Title: <Insert title>.

END OF SECTION 075423
SECTION 07 60 00 - FLASHING AND SHEET METAL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Formed Products:
   a. Formed roof drainage sheet metal fabrications.
   b. Formed steep-slope roof sheet metal fabrications.
   c. Formed through-wall flashing.
   d. Formed wall sheet metal fabrications.

B. Related Sections:

1. Division 06 Section "Rough Carpentry" for wood blocking and framing.

1.3 PERFORMANCE REQUIREMENTS

A. General: Sheet metal flashing and trim assemblies as indicated shall withstand wind loads, structural movement, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Completed sheet metal flashing and trim shall not rattle, leak, or loosen, and shall remain watertight.

B. Fabricate and install roof edge flashing capable of resisting the following forces according to recommendations in FMG Loss Prevention Data Sheet 1-49:

1. Wind Zone 1: For velocity pressures of 21 to 30 lbf/sq. ft.: 60-lbf/sq. ft. perimeter uplift force, 90-lbf/sq. ft. corner uplift force, and 30-lbf/sq. ft. outward force.

C. Thermal Movements: Provide sheet metal flashing and trim that allows for thermal movements from ambient and surface temperature changes.

1. Temperature Change (Range): 120 deg F, ambient; 180 deg F, material surfaces.
1.4 SUBMITTALS

A. Product Data: For each type of product indicated. Include construction details, material
descriptions, dimensions of individual components and profiles, and finishes for each
manufactured product and accessory.

B. Shop Drawings: Show fabrication and installation layouts of sheet metal flashing and trim,
including plans, elevations, expansion-joint locations, and keyed details. Distinguish between
shop- and field-assembled work. Include the following:

1. Identification of material, thickness, weight, and finish for each item and location in
   Project.
2. Details for forming sheet metal flashing and trim, including profiles, shapes, seams, and
dimensions.
3. Details for joining, supporting, and securing sheet metal flashing and trim, including
   layout of fasteners, cleats, clips, and other attachments. Include pattern of seams.
4. Details of termination points and assemblies, including fixed points.
5. Details of edge conditions, including eaves, ridges, valleys, rakes, crickets, and
   counterflashings as applicable.
6. Details of special conditions.
7. Details of connections to adjoining work.
8. Detail formed flashing and trim at a scale of not less than 3 inches per 12 inches.

C. Samples for Initial Selection: For each type of sheet metal flashing, trim, and accessory
indicated with factory-applied color finishes involving color selection.

D. Samples for Verification: For each type of exposed finish required, prepared on Samples of size
indicated below:

1. Sheet Metal Flashing: 12 inches long by actual width of unit, including finished seam
   and in required profile. Include fasteners, cleats, clips, closures, and other attachments.
2. Trim and Miscellaneous Fabrications: 12 inches long and in required profile. Include
   fasteners and other exposed accessories.
3. Accessories and Miscellaneous Materials: Full-size Sample.

1.5 QUALITY ASSURANCE

A. Sheet Metal Flashing and Trim Standard: Comply with SMACNA's "Architectural Sheet Metal
Manual" unless more stringent requirements are specified or shown on Drawings.

B. Copper Sheet Metal Standard: Comply with CDA's "Copper in Architecture Handbook."
Conform to dimensions and profiles shown unless more stringent requirements are indicated.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Do not store sheet metal flashing and trim materials in contact with other materials that might
cause staining, denting, or other surface damage. Store sheet metal flashing and trim materials
away from uncured concrete and masonry.
B. Protect strippable protective covering on sheet metal flashing and trim from exposure to sunlight and high humidity, except to the extent necessary for the period of sheet metal flashing and trim installation.

PART 2 - PRODUCTS

2.1 SHEET METALS

A. General: Protect mechanical and other finishes on exposed surfaces from damage by applying a strippable, temporary protective film before shipping.

B. Copper Sheet: ASTM B 370, cold-rolled copper sheet, H00 or H01 temper.
   1. Non-Patinated Exposed Finish: Mill.

C. Metallic-Coated Steel Sheet: Restricted flatness steel sheet, metallic coated by the hot-dip process and prepainted by the coil-coating process to comply with ASTM A 755/A 755M.
   1. Aluminum-Zinc Alloy-Coated Steel Sheet: ASTM A 792/A 792M, Class AZ50 coating designation, Grade 40 (Class AZM150 coating designation, Grade 275); structural quality.
   2. Surface: Smooth, flat and with manufacturer's standard clear acrylic coating on both sides.
   3. Exposed Coil-Coated Finish:
      a. Four-Coat Fluoropolymer: AAMA 621. Fluoropolymer finish containing not less than 70 percent PVDF resin by weight in color coat and clear coats. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
   4. Color: As selected by Architect from manufacturer's full range.
   5. Concealed Finish: Pretreat with manufacturer's standard white or light-colored acrylic or polyester backer finish, consisting of prime coat and wash coat with a minimum total dry film thickness of 0.5 mil.

2.2 UNDERLAYMENT MATERIALS


B. Felt: ASTM D 226, Type II (No. 30), asphalt-saturated organic felt, nonperforated.

C. Self-Adhering, High-Temperature Sheet: Minimum 30 to 40 mils thick, consisting of slip-resisting polyethylene-film top surface laminated to layer of butyl or SBS-modified asphalt adhesive, with release-paper backing; cold applied. Provide primer when recommended by underlayment manufacturer.
   2. Low-Temperature Flexibility: ASTM D 1970; passes after testing at minus 20 deg.
3. **Products:** Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

   a. Carlisle Coatings & Waterproofing Inc.; CCW WIP 300HT.
   c. Henry Company; Blueskin PE200 HT.
   d. Metal-Fab Manufacturing, LLC; MetShield.
   e. Owens Corning; WeatherLock Metal High Temperature Underlayment.

D. **Slip Sheet:** Building paper, 3-lb/100 sq. ft. minimum, rosin sized.

### 2.3 MISCELLANEOUS MATERIALS

A. **General:** Provide materials and types of fasteners, solder, welding rods, protective coatings, separators, sealants, and other miscellaneous items as required for complete sheet metal flashing and trim installation and recommended by manufacturer of primary sheet metal or manufactured item unless otherwise indicated.

B. **Fasteners:** Wood screws, annular threaded nails, self-tapping screws, self-locking rivets and bolts, and other suitable fasteners designed to withstand design loads and recommended by manufacturer of primary sheet metal or manufactured item.

1. **General:** Blind fasteners or self-drilling screws, gasketed, with hex-washer head.
   a. Exposed Fasteners: Heads matching color of sheet metal using plastic caps or factory-applied coating.
   b. Blind Fasteners: High-strength aluminum or stainless-steel rivets suitable for metal being fastened.
   c. Spikes and Ferrules: Same material as gutter; with spike with ferrule matching internal gutter width.

2. **Fasteners for Copper Sheet:** Copper, hardware bronze or Series 300 stainless steel.

3. **Fasteners for Aluminum-Zinc Alloy-Coated Steel Sheet:** Hot-dip galvanized steel according to ASTM A 153/A 153M or ASTM F 2329 or Series 300 stainless steel.

C. **Solder:**

1. For Copper: ASTM B 32, Grade Sn50, 50 percent tin and 50 percent lead.

D. **Sealant Tape:** Pressure-sensitive, 100 percent solids, gray polyisobutylene compound sealant tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape 1/2 inch wide and 1/8 inch thick.

E. **Elastomeric Sealant:** ASTM C 920, elastomeric polyurethane polymer sealant; low modulus; of type, grade, class, and use classifications required to seal joints in sheet metal flashing and trim and remain watertight.

F. **Butyl Sealant:** ASTM C 1311, single-component, solvent-release butyl rubber sealant; polyisobutylene plasticized; heavy bodied for hooked-type expansion joints with limited movement.
G. Epoxy Seam Sealer: Two-part, noncorrosive, aluminum seam-cementing compound, recommended by aluminum manufacturer for exterior nonmoving joints, including riveted joints.

H. Bituminous Coating: Cold-applied asphalt emulsion complying with ASTM D 1187.


2.4 FABRICATION, GENERAL

A. General: Custom fabricate sheet metal flashing and trim to comply with recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to design, dimensions, geometry, metal thickness, and other characteristics of item indicated. Fabricate items at the shop to greatest extent possible.

1. Fabricate sheet metal flashing and trim in thickness or weight needed to comply with performance requirements, but not less than that specified for each application and metal.
2. Obtain field measurements for accurate fit before shop fabrication.
3. Form sheet metal flashing and trim without excessive oil canning, buckling, and tool marks and true to line and levels indicated, with exposed edges folded back to form hems.
4. Conceal fasteners and expansion provisions where possible. Exposed fasteners are not allowed on faces exposed to view.

B. Fabrication Tolerances: Fabricate sheet metal flashing and trim that is capable of installation to a tolerance of 1/4 inch in 20 feet on slope and location lines as indicated and within 1/8-inch offset of adjoining faces and of alignment of matching profiles.

C. Sealed Joints: Form nonexpansion but movable joints in metal to accommodate elastomeric sealant.

D. Expansion Provisions: Where lapped expansion provisions cannot be used, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with butyl sealant concealed within joints.

E. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal.

F. Fabricate cleats and attachment devices of sizes as recommended by SMACNA's "Architectural Sheet Metal Manual" and by FMG Loss Prevention Data Sheet 1-49 for application, but not less than thickness of metal being secured.

G. Seams: Fabricate nonmoving seams in copper with flat-lock seams. Tin edges to be seamed, form seams, and solder.

H. Seams: Fabricate nonmoving seams with flat-lock seams. Form seams and seal with elastomeric sealant unless otherwise recommended by sealant manufacturer for intended use. Rivet joints where necessary for strength.

I. Do not use graphite pencils to mark metal surfaces.
2.5 STEEP-SLOPE ROOF SHEET METAL FABRICATIONS

A. Apron, Step, Cricket, and Backer Flashing: Fabricate from the following materials:
   1. Copper: 16 oz./sq. ft.

B. Valley Flashing: Fabricate from the following materials:
   1. Aluminum-Zinc Alloy-Coated Steel: 0.028 inch, (24 gauge) thick.

C. Drip Edges: Fabricate from the following materials:
   1. Aluminum-Zinc Alloy-Coated Steel: 0.028 inch, (24 gauge) thick.

D. Eave and Rake Flashings: Fabricate from the following materials:
   1. Aluminum-Zinc Alloy-Coated Steel: 0.028 inch, (24 gauge) thick.

E. Counterflashing: Fabricate from the following materials:
   1. Copper: 16 oz./sq. ft.

F. Flashing Receivers: Fabricate from the following materials:
   1. Copper: 16 oz./sq. ft.

G. Roof-Penetration Flashing: Fabricate from the following materials:
   1. Aluminum-Zinc Alloy-Coated Steel: 0.028 inch, (24 gauge) thick.

2.6 WALL SHEET METAL FABRICATIONS

A. Through-Wall Flashing: Fabricate continuous flashings in minimum 96-inch- (2400-mm-) long, but not exceeding 12-foot- (3.6-m-) long, sections, under copings, at shelf angles, and where indicated. Fabricate discontinuous lintel, sill, and similar flashings to extend 6 inches (150 mm) beyond each side of wall openings. Form with 2-inch- (50-mm-) high, end dams where flashing is discontinuous. Fabricate from the following materials:
   1. Copper: 16 oz./sq. ft. (0.55 mm thick).

B. Opening Flashings in Frame Construction: Fabricate head, sill and similar flashings to extend 4 inches beyond wall openings. Form head and sill flashing with 2-inch- high, end dams. Fabricate from the following materials:
   1. Aluminum-Zinc Alloy-Coated Steel: 0.028 inch, (24 gauge) thick.
PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, to verify actual locations, dimensions and other conditions affecting performance of the Work.
   1. Verify compliance with requirements for installation tolerances of substrates.
   2. Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and securely anchored.

B. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 UNDERLAYMENT INSTALLATION

A. General: Install underlayment as indicated on Drawings.

B. Polyethylene Sheet: Install polyethylene sheet with adhesive for anchorage to minimize use of mechanical fasteners under sheet metal flashing and trim. Apply in shingle fashion to shed water, with lapped and taped joints of not less than 2 inches.

C. Felt Underlayment: Install felt underlayment with adhesive for temporary anchorage to minimize use of mechanical fasteners under sheet metal flashing and trim. Apply in shingle fashion to shed water, with lapped joints of not less than 2 inches.

D. Self-Adhering Sheet Underlayment: Install self-adhering sheet underlayment, wrinkle free. Apply primer if required by underlayment manufacturer. Comply with temperature restrictions of underlayment manufacturer for installation; use primer rather than nails for installing underlayment at low temperatures. Apply in shingle fashion to shed water, with end laps of not less than 6 inches staggered 24 inches between courses. Overlap side edges not less than 3-1/2 inches. Roll laps with roller. Cover underlayment within 14 days.

3.3 INSTALLATION, GENERAL

A. General: Anchor sheet metal flashing and trim and other components of the Work securely in place, with provisions for thermal and structural movement. Use fasteners, solder, welding rods, protective coatings, separators, sealants, and other miscellaneous items as required to complete sheet metal flashing and trim system.
   1. Install sheet metal flashing and trim true to line and levels indicated. Provide uniform, neat seams with minimum exposure of solder, welds, and sealant.
   2. Install sheet metal flashing and trim to fit substrates and to result in watertight performance. Verify shapes and dimensions of surfaces to be covered before fabricating sheet metal.
3. Space cleats not more than 12 inches apart. Anchor each cleat with two fasteners. Bend tabs over fasteners.
4. Install exposed sheet metal flashing and trim without excessive oil canning, buckling, and tool marks.
5. Install sealant tape where indicated.
6. Torch cutting of sheet metal flashing and trim is not permitted.
7. Do not use graphite pencils to mark metal surfaces.

B. Metal Protection: Where dissimilar metals will contact each other or corrosive substrates, protect against galvanic action by painting contact surfaces with bituminous coating or by other permanent separation as recommended by SMACNA.

1. Coat back side of sheet metal flashing and trim with bituminous coating where flashing and trim will contact wood, ferrous metal, or cementitious construction.
2. Underlayment: Where installing metal flashing directly on cementitious or wood substrates, install a course of felt underlayment and cover with a slip sheet or install a course of polyethylene sheet.

C. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at a maximum of 10 feet with no joints allowed within 24 inches of corner or intersection. Where lapped expansion provisions cannot be used or would not be sufficiently watertight, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with sealant concealed within joints.

D. Fastener Sizes: Use fasteners of sizes that will penetrate wood sheathing not less than 1-1/4 inches for nails and not less than 3/4 inch for wood screws metal decking not less than recommended by fastener manufacturer to achieve maximum pull-out resistance.

E. Seal joints as shown and as required for watertight construction.

1. Where sealant-filled joints are used, embed hooked flanges of joint members not less than 1 inch into sealant. Form joints to completely conceal sealant. When ambient temperature at time of installation is moderate, between 40 and 70 deg F, set joint members for 50 percent movement each way. Adjust setting proportionately for installation at higher ambient temperatures. Do not install sealant-type joints at temperatures below 40 deg F.

F. Soldered Joints: Clean surfaces to be soldered, removing oils and foreign matter. Pre-tin edges of sheets to be soldered to a width of 1-1/2 inches, except reduce pre-tinning where pre-tinned surface would show in completed Work.

1. Do not solder metallic-coated steel sheet.
2. Do not use torches for soldering. Heat surfaces to receive solder and flow solder into joint. Fill joint completely. Completely remove flux and spatter from exposed surfaces.
3. Copper Soldering: Tin edges of uncoated copper sheets using solder for copper.

G. Rivets: Rivet joints in where indicated or where necessary for strength.
3.4 ROOF FLASHING INSTALLATION

A. General: Install sheet metal flashing and trim to comply with performance requirements, sheet metal manufacturer's written installation instructions, and SMACNA's "Architectural Sheet Metal Manual." Provide concealed fasteners where possible, set units true to line, and level as indicated. Install work with laps, joints, and seams that will be permanently watertight and weather resistant.

B. Roof Edge Flashing: Anchor to resist uplift and outward forces according to recommendations in SMACNA's "Architectural Sheet Metal Manual" and as indicated. Interlock bottom edge of roof edge flashing with continuous cleat anchored to substrate at staggered 3-inch centers.

C. Counterflashing: Coordinate installation of counterflashing with installation of base flashing. Insert counterflashing in reglets or receivers and fit tightly to base flashing. Extend counterflashing 4 inches over base flashing. Lap counterflashing joints a minimum of 4 inches and bed with sealant. Secure in a waterproof manner by means of snap-in installation and sealant or lead wedges and sealant interlocking folded seam or blind rivets and sealant anchor and washer at 36-inch centers.

D. Roof-Penetration Flashing: Coordinate installation of roof-penetration flashing with installation of roofing and other items penetrating roof. Seal with elastomeric sealant and clamp flashing to pipes that penetrate roof.

3.5 WALL FLASHING INSTALLATION

A. General: Install sheet metal wall flashing to intercept and exclude penetrating moisture according to SMACNA recommendations and as indicated. Coordinate installation of wall flashing with installation of wall-opening components such as windows, doors, and louvers.

B. Through-Wall Flashing: Installation of through-wall flashing is specified in Division 04 Section Stone Masonry."

C. Opening Flashings in Frame Construction: Install continuous head, sill and similar flashings to extend 4 inches beyond wall openings.

3.6 ERECTION TOLERANCES

A. Installation Tolerances: Shim and align sheet metal flashing and trim within installed tolerance of 1/4 inch in 20 feet on slope and location lines as indicated and within 1/8-inch offset of adjoining faces and of alignment of matching profiles.

3.7 CLEANING AND PROTECTION

A. Clean exposed metal surfaces of substances that interfere with uniform oxidation and weathering.

B. Clean and neutralize flux materials. Clean off excess solder.
C. Clean off excess sealants.

D. Remove temporary protective coverings and strippable films as sheet metal flashing and trim are installed unless otherwise indicated in manufacturer's written installation instructions. On completion of installation, remove unused materials and clean finished surfaces. Maintain in a clean condition during construction.

E. Replace sheet metal flashing and trim that have been damaged or that have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION 07 60 00
PART 1 – GENERAL

1.1 Reference
   A. Requirements of the General Conditions and Division One of these specifications shall govern
      the work of this section.

1.2 Work Included
   A. Preparation of surfaces to receive sealants.
   B. Protection of adjacent surfaces.
   C. Installation of backing material at all sealant joints.
   D. Installation of sealants in areas shown on the plans and as required to insure a complete,
      watertight job.

1.3 Related Work
   A. Section 04320 - Veneer Masonry System
   B. Section 07600 - Flashing and Trim
   C. Section 09260 - Gypsum Board Systems
   D. Section 09900 - Painting

1.4 Submittals
   A. Manufacturer’s specification data sheets.
   B. Applied samples for Architect’s color selection.

PART 2 - PRODUCTS

2.1 Materials
   A. Sealant - Silicone manufactured by:
      a. Dow Corning 790
      b. G.E. Silpruf
      c. Or equal

   B. Two Part Polyurethane base as manufactured by:
      a. Tremco “Dymeric”
      b. Pecora “Dynatrol”
      c. Or equal.

   C. One Part Polyurethane sealant as manufactured by:
      a. Tremco “Moro”
b. Pecora “GC-9” polysulfied
c. Or equal.

D. Touch up caulking around interior hollow metal frames shall be equal to:
E. Pecora #AC-20 Acrylic latex.
F. Joint Backing (where applicable): Closed cell polyethylene.
G. Primer: Type recommended by manufacturer for each different material.
H. Bond Breakers: Pressure sensitive polyethylene tape.

2.3 Mixing
A. Mix in accordance with approved manufacturer’s specification data sheets.

2.4 Product Usage

A. Exterior Joint Types:

1. Masonry Expansion Joints Two-part polyurethane
2. Metal to Masonry Two-part polyurethane
3. Metal to Metal Two-part polyurethane
4. General Flashing and Flashing to Masonry One-part polyurethane
5. Sleeves in wall One-part polyurethane
6. Concrete Joints Precompressed foam sealer, Urethane with water repellent

B. Interior Joint Types:

1. Gypsum Board or Plaster to Masonry or Wood Acrylic
2. Interior Hollow Metal frames in Masonry Walls Acrylic
3. Metal to Drywall, plaster, masonry Acrylic
4. Metal to Masonry Two-part polyurethane
5. Perimeter of Plumbing Fixtures Silicone Base

EXECUTION

3.1 Surface Preparation

A. Surfaces to be sealed shall be smooth, dry, sound. Brush and wipe surfaces dust free. Remove oil, grease, release agents, coatings or other contaminants from surfaces.

B. Prime and prepare surfaces in strict accordance with sealant manufacturer’s written recommendations.
3.2 Joint Sizes

A. Sealant: Use joint backing material where applicable to control depth of joints. In joints 1/2” and wider, depth equal to 1/2 width with minimum depth of 1/4”.

3.3 Application

A. Joint Backer: Where applicable. Install joint backer to achieve required depth of joints. Where not used, install a bond preventive material in joint.

B. Sealant: Mask surface areas adjacent to joint with masking tape as required to assure a neat job. Apply sealant to joints prior to water repellent or clear coating operations. Apply sealant within 8 hours after primer has dried. Gun-apply sealant, completely filling joint. Tool joints smooth and wrinkle free to form slight concave surface. Allow curing time as recommended by clear coating manufacturer.

3.4 CLEANING

A. Remove excess sealant and caulking materials and smears from adjacent surfaces as work progresses.

B. Repair joints which have shrunk, sagged, run or have thin spots.

END OF SECTION 07 90 00
SECTION 08 10 00 - METAL DOORS AND FRAMES

PART 1 - GENERAL

1.1 Scope

A. Provide all labor material, equipment and transportation necessary to fabricate, furnish and deliver metal doors and door frames as called for on the drawings and / or as herein specified, including:

1. Metal doors and frames (Labeled and Unlabeled)

1.2 Shop Drawings

A. Shall be submitted, based on the drawings and specifications, shop drawings shall show at large scale all dimensions, gauges, reinforcements, cutouts, attachments to adjacent construction and other pertinent data.

1.3 Storage

A. Frames shall be stored in an upright position under cover on the building site on wood sills or on floors in a manner that will prevent rust damage. Avoid creating a humidity chamber by using plastic or canvas shelter and not venting the area covered.

PART 2 - PRODUCTS

2.1 Materials

A. All materials used in the fabrication of frames and metal doors shall be free from defects impairing their strength, durability or appearance. Doors and frames shall conform to Commercial Standard CS242-62 or CS211-57 and be manufactured by:

a. Amweld Building Products
b. Ceco Steel Products Corp.
c. Fenestra
d. Steeckraft
e. Republic
f. Kewanee

B. Metal Door Frames - Welded frames as manufactured by Kewanee, Ceco or equal.

a. Hardware Preparation - shall be mortised, reinforced, drilled and tapped to receive hardware as specified in the hardware schedule. Plaster guards shall be installed in back of all hardware cutouts. Frames shall be reinforced for surface applied hardware. Strike jambs shall be punched to receive two rubber bumper silencers. (Supply silencers with frames or hardware.)

b. Anchors - Frames shall be equipped with one weld- in floor anchor in each
jamb. Three steel snap-in anchors for field insertion at a maximum of 24" o.c. shall also be provided for each jamb. Anchors shall be of the proper type for the particular construction involved (i.e. wood frames, masonry, concrete, steel stud or metal building structural members.)

C. Doors - Shall be fabricated from two sheets of 16 gauge steel with no visible seams on face or vertical edge. Welds on 2" centers shall occur around the perimeter of the door. Doors shall be reinforced by laminating panels to a 3/4" cell honeycomb core completely filling the inside of the door. Tops and bottoms of doors shall be closed with not less than 16 gauge channels. Tops of doors shall be completely closed.

a. Label - Where noted or required provide for the doors and frames Underwriters' Laboratories, Inc., labels with appropriate fire resistance ratings for the class of opening indicated. Construction details and hardware applications authorized by the Underwriters' Laboratories shall take precedence over project details or specifications.

b. Thermal - Rated (Insulating) Assemblies - At exterior locations and elsewhere as shown or scheduled, provide doors which have been fabricated as thermal insulating door assemblies and test in accordance with ASTM C236. Unless, otherwise indicated, provide thermal-rated assemblies with U-factor of 0.24 BTU/hr sq. ft., deg F or better.

c. Hardware Locations - Unless otherwise specified, the location of locks latches, push-pull plates and bars, exit devices, handle sets, closer reinforcing, roller latches and arm pulls shall conform to the recommendations of the National Builders Hardware Association.

PART 3 - EXECUTION

3.1 Installation

A. Steel frames shall be installed plum, straight and true; rigidly secured in place and properly braced. Frames shall be anchored to concrete floors with power actuated bolts. The frame installer shall be responsible for the squareness of the frames in place.

B. All exposed surfaces shall be cleaned, phosphatized and given one baked-on shop coat of zinc chromate primer.

C. All work shall be shop fabricated to required profiles by forming and welding with corners, angles and edges straight and sharp unless covered by bull nose, etc. Fit and fabricate accurately with corners, joints, seams and surfaces free from warp, wave, buckle or other defects.
SECTION 08 51 13 - ALUMINUM WINDOWS

PART 1 - GENERAL

1.1 Scope

A. Furnish all material, labor and equipment as required to complete installation of aluminum windows as shown on plans and as hereinafter specified.

1.2 Related Work

A. Section 06100 - Rough Carpentry
B. Section 07900 - Joint Sealers

PART 2 - PRODUCTS

2.1 Aluminum Thermal Barrier Windows with outswing casement, Architectural Grade with 4 bar arm, cam handle, roto operator, lift locks, 1” insulated glass, screens and weather stripping. Frame is constructed from .062” nominal material wall thickness aluminum of 6063-T5 or T6 alloy with a depth of 2”. An equal leg frame is standard. Corners are mortised and tenoned, and back sealed with small-joint seam sealer. Manufactured by EFCO Series 2500 Thermal windows, or approved equal. Color to be selected from manufacturer’s standard colors.

2.2 Aluminum Thermal Barrier Windows, fixed unit, Architectural Grade, with 1” insulated glass. Frame is constructed from .062” nominal material wall thickness aluminum of 6063-T5 or T6 alloy with a depth of 2”. An equal leg frame is standard. Corners are mortised and tenoned, and back sealed with small-joint seam sealer. Manufactured by EFCO Series 2500 Thermal windows, or approved equal. Color to be selected from manufacturer’s standard colors.

2.3 Refer to Window Schedule on Sheet A411.0 for model number and window types and sizes. Refer to construction documents for quantities and locations. Color to be selected from manufacturer’s standard colors.

PART 3 - EXECUTION

3.1 Erection

A. All units to be erected in prepared openings in accordance with manufacturer’s recommendations and installation drawings. Frames must be securely fastened, set plumb and level without twisting, bowing or springing.

END OF SECTION 08 51 13
SECTION 08 71 00 - HARDWARE

PART 1 - GENERAL

1.1 REFERENCE

A. Requirements of the General Conditions, and Division One of these specifications shall govern the work of this section.

1.2 WORK INCLUDED

A. Provide Hardware Items designated as specified.

1.3 RELATED WORK

A. Section 06200 - Finish Carpentry and Millwork
B. Section 08100 - Metal Doors and Frames
C. Section 08210 - Wood Doors

1.4 SUBMITTALS

A. Submit final hardware schedule organized by “sets”, to indicate specifically the product to be furnished for each item required on each door.

PART 2 - PRODUCTS

2.1 PRODUCT DESIGNATIONS

A. Product designations indicating hardware items are those of the manufacturer listed. Furnish any manufacturer’s product which is equivalent in quality, design and function (as judged by the Architect) to the indicated product.

B. Finish and Base Material Designations: Numbers indicate the BHMA Code, or the nearest traditional U.S. Commercial finish.

2.2 HARDWARE PRODUCTS

A. Acceptable Manufacturers.
   a. Hinges: Stanley, McKinney
   b. Locks & latches: Best 73K, Schlage AL IC Series
   c. Exit Devices: Precision, Von Duprin 98 Series
   d. Closers: Ryobi, LCN 1460 Series
   e. Weatherstrip: Pemko, Zero, Reese
   f. Flat goods: Rockwood, Hiawatha
   g. Misc: ABH, Glynn-Johnson
B. Locks & Keying:
   a. Three each change keys for each lock or cylinder. Supplier to submit suggested keying schedule for approval by owner. Supplier will meet with owner as required to finalize keying details.

C. Hinges.
   a. Provide full mortise type ball bearing hinges in each door.
   b. All ball bearing hinges to furnished as 5 knuckle concealed bearing design.
   c. Provide stainless steel pins, non-rising, flat bottom, with matching plugs.

D. Striker.
   a. Provide box strikes with extended lip for latch bolts.

E. Note: UFAS Retrofit Manual by the USATBCB shall be recognized as a guide for all ADA requirements.

F. Verify: All door labels per CODE as applicable to hardware as shown. All door hardware must meet UL 10C Positive Pressure requirements.

EXECUTION

3.1 INSTALLATION

A. Hardware Mounting Heights: Door and Hardware Institute “Recommended Locations for Builders Hardware for Standard Steel Doors and Frames”, except as noted otherwise.

B. Install each hardware item to comply with manufacturer’s instructions and recommendations.

C. Hardware Adjustment: Return to project one month after Owner’s occupancy and adjust hardware for proper operation and function. Instruct Owner’s personnel in proper maintenance and adjustment.

3.2 HARDWARE SCHEDULE:

A. All finishes to be satin chromium plated US26D or satin stainless steel US32D

B. Set # 1

Each opening to have:

   6 ea. CB191 4.5 x 4.5 x NRP x 626 Hinges Stanley
   1 ea. 1608 x 29LA x 626 RHR Exit Precision
   1 ea. 1602 x 29LA x 626 LHR Exit Precision
   1 ea. 1E74 x 626 Cylinder Best
   2 ea. D-3550 EDA S x SNB x AL Closer/stop Ryobi
   2 ea. P45HD-110 x AL (as required) Spacer Ryobi
   2 ea. P45HD-112 x AL (as required) Angle bracket Ryobi
   2 ea. K1050 8” x 2” LDW x CS x B3E x 630 Kick plate Rockwood
1 ea. 171A x DW Threshold Pemko
2 ea. 345AV x DW Sweep Pemko
1 set 303AV x DW x DH Weatherstrip Pemko
2 ea. 303AV x DH Astragal Pemko
1 ea. 346C x 4" + DW Drip cap Pemko

C. Set #2

Each opening to have:

6 ea. CB191 4.5 x 4.5 x NRP x 626 Hinges Stanley
6 ea. CB199 5 x 4.5 x NRP x 626 (Dr # 224 only) Hinges Stanley
1 ea. 1208 x 39LA x 626 RHR Exit Precision
1 ea. 1202 x 39LA x 626 LHR Exit Precision
1 ea. 1E72 x 626 Cylinder Best
2 ea. D-3550 EDA S x SNB x AL Closer/stop Ryobi
2 ea. P45HD-110 x AL (as required) Spacer Ryobi
2 ea. P45HD-112 x AL (as required) Angle bracket Ryobi
2 ea. K1050 8" x 2" LDW x CS x B3E x 630 Kick plate Rockwood
1 ea. 171A x DW Threshold Pemko
2 ea. 345AV x DW Sweep Pemko
1 set 303AV x DW x DH Weatherstrip Pemko
2 ea. 303AV x DH Astragal Pemko
1 ea. 346C x 4" + DW Drip cap Pemko

D. Set #3

Each opening to have:

3 ea. CB191 4.5 x 4.5 x NRP x 626 Hinges Stanley
1 ea. 1108 x 39LA x 626 Exit Precision
1 ea. 1E72 x 626 Cylinder Best
1 ea. D-3550 EDA S x SNB x AL Closer/stop Ryobi
1 ea. P45HD-110 x AL (as required) Spacer Ryobi
1 ea. P45HD-112 x AL (as required) Angle bracket Ryobi
1 ea. K1050 8" x 2" LDW x CS x B3E x 630 Kick plate Rockwood
1 ea. 171A x DW Threshold Pemko
1 ea. 345AV x DW Sweep Pemko
1 set 303AV x DW x DH Weatherstrip Pemko
1 ea. 346C x 4" + DW Drip cap Pemko

E. Set #4

Each opening to have:

3 ea. F179 4.5 x 4.5 x 652 Hinges Stanley
1 ea. 73KC 0 L 15C S3 x 626 Privacy Best
1 ea. 4400 x 652 Overhead stop ABH
3 ea. 608 x grey Silencers Rockwood

END OF SECTION 08 71 00

HARDWARE
SECTION 08 80 00 - GLASS AND GLAZING

PART 1 - GENERAL

1.1 Reference

A. Requirements of the General Conditions and Division One of these specifications shall govern the work of this section.

1.2 Work Included

A. Install glazing in frames as shown on drawings.

B. Install wall mirrors, frameless as shown on drawings and as specified.

C. Two-way glass film application as shown on drawings and as specified.

1.3 Quality Standards

A. Provisions of this section are specified for general compliance with the following standards, which are applicable except as otherwise indicated.

1. CPSC Safety Glass - 16 CFR 1201

2. ANSI Safety Glazing: ANSI Z97.1

PART 2 - PRODUCTS

2.1 Glass Types and Qualities

A. Interior fixed window units: Safety, tempered, ¼”. See plans for locations/quantities/sizes.

B. Interior door glass: Safety, tempered, ¼”. See plans for locations/quantities/sizes.

C. Mirrors shall be No. 1 quality, 1/4" (6-mm) float/plate glass. All mirror edges shall be seamed. Galvanized steel hanging brackets for mounting on concealed one-piece rectangular wall hanger(s) to be provided with mirrors. (7) 4’ x 6’ and (2) 2’ x 6’ mirror units with hanging brackets required in multi-purpose room.

2.2 Glazing Materials

A. Sealant: Silglaze as manufactured by General Electric or equal. Color by Architect.
B. Setting Blocks: 70-90 durometer hardness neoprene.

C. Spacers: 40-50 durometer hardness, neoprene unless otherwise selected for compatibility.

D. Filler Rod: Flexible, resilient, closed-cell or jacketed foam, compatible with sealants required, 5-10 psi compression for 25% deflection.

E. Joint Cleaners, Primers, Sealers: Type recommended by manufacturer of sealants/gaskets for use on indicated glazing channel surfaces.

PART 3 - EXECUTION

3.1 Installation

A. General: Except as otherwise indicated, comply with glass manufacturer’s instructions, glazing materials manufacturer’s instructions, and “Glazing Manual” by FGMA and other technical publications of recognized authorities in the industry. Install each piece to achieve watertight and airtight performance, and to minimize breakage.

   1. Insulating Glass: Comply with SIGMA recommendations.

B. Clean channel surfaces and primer or seal surfaces where recommended by sealant manufacturer.

C. Cut glass to proper size, except cut processed/fabricated glass units to proper size prior to processing/fabricating; provide for adequate edge clearance and bite on glass.

D. Inspect glass edges at time of setting, and discard pieces of significant edge damage.

E. Locate setting blocks, 2 per light side, at 25% of glass width, measured from corners. Set in thin bed of sealant if heel or toe bead is required.

END OF SECTION 08 80 00
SECTION 08 91 00 - STATIONARY BLADE WALL LOUVERS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Extruded aluminum stationary louvers with drainable blades.

1.2 RELATED SECTIONS

A. Section 05 10 00 - Structural Metal Framing.
B. Section 06 10 00 - Rough Carpentry.
C. Section 07 42 00 - Metal Wall Panels.
D. Section 07 60 00 - Flashing and Sheet Metal.
E. Section 07 92 00 - Joint Sealants.
F. Section 09 91 00 - Paints.

1.3 REFERENCES

C. AMCA 500 - Test Methods for Louvers, Dampers and Shutters.

1.4 DEFINITIONS

A. Louver Terminology: Definitions of terms for metal louvers contained in AMCA 501 apply to this Section unless otherwise defined in this Section or in referenced standards.

B. Horizontal Louver: Louver with horizontal blades; i.e., the axes of the blades are horizontal.
C. Drainable-Blade Louver: Louver with blades having gutters that collect water and drain it to channels in jambs and mullions, which carry it to bottom of unit and away from opening.

D. Rain-Resistant Louver: Louver that provides specified wind-driven rain performance, as determined by testing according to AMCA 500-L.

1.5 ACTION SUBMITTALS

A. Submit under provisions of Section 01 30 00.

B. Product Data: For each product to be used, including:
   1. Manufacturer's product data including performance data.
   2. Preparation instructions and recommendations.
   3. Storage and handling requirements and recommendations.
   4. Installation methods.

C. Shop Drawings:
   1. Submit shop drawings indicating materials, construction, dimensions, accessories, and installation details.

D. Product Schedule: For louvers. Use same designations indicated on Drawings.

E. Samples: Submit sample of louver to show frame, blades, bird screen, gutters, downspouts, vertical supports, sill, accessories, finish, and color.

1.6 INFORMATIONAL SUBMITTALS

A. Qualification Data: For manufacturer and Installer.

B. Product Test Reports: For each type of louver, for tests performed by a qualified testing agency.

C. Field quality-control reports.

D. Sample Warranties: For manufacturer's warranties.

1.7 QUALITY ASSURANCE

A. Manufacturer Qualifications:
   1. The manufacturer shall have implemented the management of quality objectives, continual improvement, and monitoring of customer satisfaction to assure that customer needs and expectations are met.
   2. Manufacturer shall be International Organization for Standardization (ISO) 9001 accredited.

B. Installer Qualifications:
   1. USGBC LEED Compliance: The Work of this section shall be in accordance with applicable portions of the U.S. Green Building Council’s LEED Green Building Rating System. Refer to Divisions 23 and 26 Sections and other related documents bound herein for purposes of complying with this requirement.

C. Product Qualifications:
   1. Louver licensed to bear AMCA Certified Ratings Seal. Ratings based on tests and procedures performed in accordance with AMCA 511 and comply with AMCA Certified Ratings Program. AMCA Certified Ratings Seal applies to air performance and water penetration ratings.
2. Louvers shall be factory engineered to withstand the specified seismic loads.
   a. Minimum design loads shall be calculated to comply with ASCE-7, or local
      requirements of Authority Having Jurisdiction (AHJ).

3. Recycled Content: Provide shutter that incorporate recycled content materials. The shutter shall
   consist of the following recycled content:
   a. Fabricated aluminum recycled content 73% by weight, 18% post-consumer, 55% pre-
      consumer.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Store products in manufacturer's unopened packaging until ready for installation.

B. Store materials in a dry area indoors, protected from damage and in accordance with manufacturer's
   instructions.

C. Handling: Protect materials and finishes during handling and installation to prevent damage.

D. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in
   accordance with requirements of local authorities having jurisdiction.

1.9 PROJECT CONDITIONS

A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits
   recommended by manufacturer for optimum results. Do not install products under environmental
   conditions outside manufacturer's absolute limits.

1.10 WARRANTY

A. Manufacturer shall provide standard limited warranty for shutter systems for a period of five years (60
   months) from date of installation, no more than 60 months after shipment from manufacturing plant. When
   notified in writing from the Owner of a manufacturing defect, manufacturer shall promptly
   correct deficiencies without direct financial cost to the Owner.

B. Manufacturer shall provide 20 year limited warranty for fluoropolymer-based finish on extruded
   aluminum substrates.
   1. Finish coating shall not peel, blister, chip, crack or check.
   2. Chalking, fading or erosion of finish when measured by the following tests:
      a. Finish coating shall not chalk in excess of 8 numerical ratings when measured in
         accordance with ASTM D4214.
      b. Finish coating shall not change color or fade in excess of 5 NBS units as determined by
         ASTM D2244 and ASTM D822.
      c. Finish coating shall not erode at a rate in excess of 10%/5 year as determined by
         Florida test sample.

C. Manufacturer shall provide a 5 year limited warranty for Class I and a 3 year limited warranty for
   Class II anodized finish on extruded aluminum substrates.
   1. Seller warrants the Finish under normal atmospheric conditions.
      a. Will not crack, craze, flake or blister
      b. Will not change or fade more than (5) Delta-E Hunter units as determined by ASTM
         method D-2244
      c. Will not chalk in excess of ASTM D-4214-07 number (8) rating, determined by the
         procedure outlined in ASTM D-4214-07 specification test.
   2. Any forming or welding must be done prior to finishing. Post forming or welding will void
      the warranty.
3. This Warranty applies only if the anodized aluminum product is installed in strict accordance with Seller’s recommended practices and maintained in accordance with AAMA (American Architectural Manufacturers Association) publication number 609 and 610-09 (“Cleaning and Maintenance Guide for Architecturally Finished Aluminum”).

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturers equal to: Ruskin Company; 3900 Dr. Greaves Road, Kansas City, Missouri 64030. Tel: (816) 761-7476.

B. Requests for substitutions will be considered in accordance with provisions of Section 01600.

2.2 STATIONARY BLADE LOUVER

A. Model: ELF375DX as manufactured by Ruskin Company.

B. Model: ELF375DXH as manufactured by Ruskin Company.

C. Fabrication:

1. Design: Stationary drainable louver type with drain gutters in each blade and head with downspouts in jambs and mullions with all welded construction. Hidden vertical supports to allow continuous line appearance up to 120 inches (3,048 mm). Steeply angled integral sill.

2. Frame:
   a. Frame Depth: 4 inches (102 mm).
   b. Wall Thickness: 0.081 inch (2.1 mm), nominal.
   c. Wall Thickness: 0.125 inch (3.2 mm), nominal.

3. Blades:
   a. Style: Drainable. 37.5 degrees at 5-3/32 inches (129 mm), nominal.
   b. Wall Thickness: 0.081 inch (2.1 mm), nominal.
   c. Wall Thickness: 0.125 inch (3.2 mm), nominal.

4. Minimum Assembly Size: 12 inches wide by 12 inches high (305 mm x 305 mm).

5. Maximum Factory Assembly Size: Single sections shall not exceed 120 inches wide by 90 inches high (3048 mm x 2286 mm) or 90 inches wide by 120 inches high (2286 mm x 3048). Louvers larger than the maximum single size shall be require field assembly of smaller sections.

6. Recycled Content: 18% post-consumer. 55% pre-consumer, post-industrial, total 73% by weight.

D. Performance Data:

1. Based on testing 48 inch x 48 inch (1,219 mm x 1,219 mm) size unit in accordance with AMCA 500.

2. Free Area: 54 percent, nominal.

3. Free Area Size: 8.58 square feet (0.79 m²).

4. Maximum Recommended Air Flow through Free Area: 873 feet per minute (4.4 m/s).

5. Air Flow: 7490 cubic feet per minute (212 m³/s).

6. Maximum Pressure Drop (Intake): 0.15 inches w.g. (0.035 kPa).

7. Water Penetration: Maximum of 0.01 ounces per square foot (3.1 g/m²) of free area at an air flow of 873 feet per minute (4.4 m/s) free area velocity when tested for 15 minutes.
E. Design Windload: Per Code.

F. Design Windload: Incorporate structural supports required to withstand wind load of _____ pounds per square foot (_______ kPa).

G. Louvers shall be factory engineered to withstand the specified seismic loads.
   1. Minimum design loads shall be calculated to comply with ASCE–7, or local requirements of Authority Having Jurisdiction (AHJ).

2.3 ACCESSORIES

A. Blank-Off Panels: 0.040 (1 mm) aluminum sheet, factory installed with removable fasteners and neoprene gaskets.

B. Insulated Blank-Off Panels: 0.040 (1 mm) aluminum sheet, 1 inch (25 mm) and 2 inches (51 mm) as scheduled or indicated, aluminum skin insulated core, factory installed with removable fasteners and neoprene gaskets.

C. Hinged Frame: Continuous piano hinge attached to angle subframe.

D. Hinged Frame: Continuous piano hinge attached to channel subframe.

E. Aluminum Filter Racks: Formed channel racks to accept standard thick filters. Unused bottom portion blanked off with 0.040 inch (1 mm) aluminum sheet.
   1. Filter: 1 inch (25 mm) thick.
   2. Filter: 2 inch (51 mm) thick.

F. Bird Screen:
   1. Aluminum: Aluminum, 5/8 inches by 0.040 inch (16 mm by 1 mm), expanded and flattened.

G. Extended Sills:
   1. Extruded aluminum, Alloy 6063-T6. Minimum nominal thickness 0.060 inch (1.5 mm).
   2. Formed aluminum, Alloy 3003. Minimum nominal thickness 0.081 inch (2.1 mm).

H. Visible Mullions: Manufacturer's standard horizontal or vertical visible mullions for architectural accent as indicated on drawings.

2.4 FINISHES

A. Finish: 70 percent PVDF: Finish shall be applied at 1.2 mil total dry film thickness.
   1. Coating shall conform to AAMA 2605. Apply coating following cleaning and pretreatment.
      Cleaning: AA-C12C42R1X.
      a. Standard 2-coat.
      b. Pearledize 70 (2-coat mica).
      c. 3-coat metallic.
      d. 3-coat exotic.
   2. 20-year finish warranty.

B. Finish: Prime Coat:
   1. Apply alkyd prime coat following chemical cleaning and pretreatment.
   2. Primer preparation for field painting.

C. Finish: Epoxy-Based Painted Finish.
D. Color: Custom. Refer to Drawings.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Inspect areas to receive louvers. Notify the Architect of conditions that would adversely affect the installation or subsequent utilization of the louvers. Do not proceed with installation until unsatisfactory conditions are corrected.

B. If opening preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 PREPARATION

A. Clean opening thoroughly prior to installation.

B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.3 INSTALLATION

A. Install louvers at locations indicated on the drawings and in accordance with manufacturer’s instructions.

B. Install louvers plumb, level, in plane of wall, and in alignment with adjacent work.

C. The supporting structure shall be designed to accommodate the point loads transferred by the louvers when subject to the design wind loads.

D. Install joint sealants as specified in Section 07 92 00.

E. Apply field topcoat within 6 months of application of shop prime coat. Apply field topcoat as specified in Section 09 91 00.

3.4 CLEANING

A. Clean louver surfaces in accordance with manufacturer’s instructions.

B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION 08 91 00
SECTION 09 21 00 - GYPSUM BOARD SYSTEMS

PART 1 - GENERAL

1.1 Section Includes

A. Acoustical insulation.

B. Gypsum board.
   
   i. Taped and sanded joint treatment.

1.2 Related Sections

A. Section 06100 - Rough Carpentry

B. Section 07200 - Insulation

C. Section 08100 - Metal Doors and Frames.

D. Section 09900 - Painting

1.3 References

A. ASTM C36 - Gypsum Wallboard.

B. ASTM C475 - Joint Treatment Materials for Gypsum wallboard Construction.

C. ASTM C514 - Nails for the Application of Gypsum Wallboard.

D. ASTM C557 - Adhesive for Fastening Gypsum Wallboard to Wood Framing.

E. ASTM C630 - Water Resistant Gypsum Backing board.

F. ASTM C645 - Non-Load (Axial) Bearing Steel Studs, Runners (Track), and Rigid Furring Channels for Screw Application of Gypsum Board.


H. ASTM C754 - Installation of Framing Members to receive Screw Attached Gypsum Wallboard, Backing Board, or Water Resistant Backing Board.

I. ASTM C840 - Application and Finishing of Gypsum Board.
J. ASTM C1002 - Steel Drill Screws for the Application of gypsum Board.


L. GA-201 - Gypsum Board for Walls and Ceilings.

M. M.GA-216 - Recommended Specifications for the Application and Finishing of Gypsum Board.


1.4 Submittals

A. Submit under provisions of Section 01100.

1.5 Quality Assurance

A. Perform Work in accordance with ASTM C840, GA-201, GA-216 and GA-600.

B. Maintain one copy of each document on site.

PRODUCTS

2.1 Manufacturers - Gypsum Board System

A. Gold Bold.

B. Other acceptable manufacturers offering equivalent products.

1. US Gypsum or equal.

2.2 Gypsum Board Materials

A. Fire Rated Gypsum Board Type X: ASTM C36; fire resistive type, UL rated; 5/8 inch thick, maximum permissible length; ends square cut, tapered square edges.

B. Moisture Resistant Gypsum Board: ASTM C630; 5/8 inch thick, maximum permissible length; ends square cut, tapered square edges. (Install at all walls with plumbing fixtures and on locker room walls.)

2.3 Accessories

A. Corner Beads: Metal, and metal and paper combination.
B. Edge Trim: GA 201 and GA 216; Type U exposed reveal bead.

C. Joint Materials: ASTM C475; GA 201 and GA 216; reinforcing tape, joint compound, adhesive, and water.

D. Fasteners: ASTM C1002, Type S12 W and GA-216.

EXECUTION

3.1 Examination

A. Verify that site conditions are ready to receive work and opening dimensions are as indicated on shop drawings.

3.2 Preparation

A. Install gypsum board in accordance with manufacturer’s instructions.

B. Erect single layer standard gypsum board vertically, with ends and edges occurring over firm bearing.

C. Erect single layer fire rated gypsum board vertically, with edges and ends occurring over firm bearing.

D. Use screws when fastening gypsum board to wood studs or furring.

E. Double Layer Applications: Secure second layer to first with sufficient support fasteners to hold in place.

F. Place second layer perpendicular to first layer. Offset joints of second layer from joints of first layer.

G. Place corner beads at external corners. Use longest practical length. Place edge trim where gypsum board abuts dissimilar materials.

H. Apply gypsum board to curved walls in accordance with GA-216.

3.3 Joint Treatment

A. Tape, fill, and sand exposed joints, edges, and corners to produce smooth surface ready to receive finishes.

B. Feather coats onto adjoining surfaces so that camber is maximum 1/16 inch (1.6 mm).
C. Taping, filling, and sanding is not required at surfaces behind adhesive applied ceramic tile.

D. Tape joints and corners of cementitious backing board.

E. Form control joints with 1/2” space between boards. Install sealant at base of space, and apply trim accessory at face.

F. Isolate drywall work from abutting structural and masonry work; provide edge trim and acoustical sealant as recommended by manufacturer.

3.4 Tolerances

A. Maximum Variation of Finished Gypsum Board Surface from True Flatness: 1/8 inch in 10 feet (3 mm in 3 m) in any direction.

END OF SECTION 09 21 00
SECTION 09 51 00 - ACOUSTICAL CEILINGS

PART 1 - GENERAL

1.1 Reference

A. Requirements of the General Conditions, Supplementary Conditions and Division One of these specifications shall govern the work of this section.

1.2 Summary

A. Extent of acoustical ceilings are shown and scheduled on drawings.

1.3 Submittals

A. Product Data: Manufacturer’s product specifications and installation instructions for each acoustical ceiling material required, and for each suspension system, including certified laboratory test reports and other data as required to show compliance with these specifications.

1. Include manufacturer’s recommendations for cleaning and refinishing acoustical units, including precautions against materials and methods which may be detrimental to finishes and acoustical performances.

B. Samples: Set of 6”x 4” square samples for each acoustical unit required, showing full range of exposed color and texture to be expected in completed work.

1. Set of 12” long samples of each exposed runner and molding.

1.4 Quality Assurance

A. Installer Qualifications: Firm with not less than 3 years of successful experience in installation of acoustical ceiling similar to requirements for this project and which is acceptable to manufacturer of acoustical units, as shown by current written statement from manufacturer.

B. Fire Performance Characteristics: Provide acoustical ceiling components that are identical to those tested for the following fire performance characteristics, according to ASTM test method indicated, by UL or other testing and inspecting agency acceptable to authorities having jurisdiction. Identify acoustical ceiling components with appropriate marking of applicable testing and inspecting agency.
1. Surface Burning Characteristics: As follows, tested per ASTM E 84.

   Flame Spread: 25 or less, Class A.
   Smoke Developed: 50 or less.

2. Where required, 1 hour fire rated tile and suspension system.

C. Coordination of Work: Coordinate layout and installation of acoustical ceiling units and suspension system components with other work supported by or penetrating through ceilings, including light fixtures, HVAC equipment, fire-suppression system components (if any), and partition system (if any).

1.5 Delivery, Storage, and Handling

A. Deliver acoustical ceiling units to project site in original, unopened packages and store them in a fully enclosed space where they will be protected against damage from moisture, direct sunlight, surface contamination or other causes.

B. Before installing acoustical ceiling units, permit them to reach room temperature and a stabilized moisture content.

C. Handle acoustical ceiling units carefully to avoid chipping edges or damaging units in any way.

1.6 Project Conditions

A. Space Enclosure: Do not install interior acoustical ceilings until space is enclosed and weatherproof, wet-work in space is completed and nominally dry, work above ceilings is complete, and ambient conditions of temperature and humidity will be continuously maintained at values near those indicated for final occupancy.

PRODUCTS

2.1 Acoustical Ceiling Units, General

A. Standard for Acoustical Ceiling Units: Provide manufacturer’s standard units of configuration indicated which are prepared for mounting method designated and which comply with FS SS-S-118 requirements, including those indicated by reference to type, form, pattern, grade (NRC) light reflectance coefficient (LR), edge detail, and joint detail.

B. Colors, Textures, and Patterns: Provide products to match appearance characteristics indicated, and exposed metal suspension system members of quality designated.
2.2 Acoustical Panels

A. Mineral composition panels

1. Tundra by Armstrong (medium texture)
   b. Grade: NRC.55
   c. STC Range: 30-35
   d. Edge Detail: Square-cut lay-in
   e. Size: 24”x24”x5/8”.

2. Manufacturer: Subject to compliance with requirements, provide Armstrong or approved equal.

3. Item number 301 nonrated applications and item number 839 fireguard rated applications.

2.3 Metal Suspension Systems, General

A. Standard for Metal Suspension Systems: Provide metal suspension systems of type, structural classification and finish indicated which comply with applicable ASTM C 635 requirements. 15/16” grid face.

B. Finish and Colors: For exposed suspension members and accessories with painted finish, white.

C. Attachment Devices: Size for 5 times design load indicated in ASTM C635, Table 1, Direct Hung, unless otherwise indicated.

D. Hanger wire: Galvanized carbon steel wire, ASTM A641, soft temper, prestretched, Class 1 coating, sized so that stress at 3-times hanger design load (ASTM C635, Table 1, Direct Hung), will be less than yield stress of wire, but provide not less than 12 gauge.

E. Rod Hangers: Mild steel, zinc or cadmium coated.

F. Flat Hangers: Mild steel, zinc or cadmium coated.

G. Edge Moldings and Trim: Metal of types and profiles indicated or, if not indicated, provide manufacturer’s standard molding for edges and penetrations of ceiling which fits with type of edge detail and suspension system indicated.

H. Acceptable Manufacturers:

   i. Eastern Products Div., Armstrong World Industries, Inc.
EXECUTION

3.1 Preparation

A. Coordination: Furnish layouts for inserts, clips, or other supports required to be installed by other trades for support of acoustical ceilings.

B. Measure each ceiling area and establish layout of acoustical units to balance border widths at opposite edges of each ceiling. Avoid use of less-than-half width units at borders, and comply with reflected ceiling plans wherever possible.

3.2 Installation

A. General: Install materials in accordance with manufacturer’s printed instructions, and to comply with governing regulations, fire-resistance rating requirements as indicated, and industry standards applicable to work.

B. Install suspension systems to comply with ASTM C636, with hangers supported only from building structural members. Locate hangers not less than 6” from each end spaced 4’-0” along each carrying channel or direct-hung runner, unless otherwise indicated, leveling to tolerance of 1/8” in 12’-0”.

1. Secure wire hangers by looping and wire-tying, either directly to structures or to inserts, eye-screws, or other devices which are secure and appropriate for substrate, and which will not deteriorate or fail with age or elevated temperatures.

2. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum which are not part of supporting structural or ceiling suspension system. Splay hangers only where required to miss obstructions and offset resulting horizontal force by bracing, countersplaying of other equally effective means.

C. Install edge moldings to type indicated at perimeter of acoustical ceiling area and at locations necessary to conceal edges of acoustical units.

1. Sealant Bed: Apply continuous ribbon of acoustical sealant, concealed on back of vertical leg before installing moldings.
2. Screw attach moldings to substrate at intervals not over 16” o.c. and not more than 3” from ends, leveling with ceiling suspension system to tolerance of 1/8” in 12’-0”. Miter corners accurately and connect securely.

D. Install acoustical panels in coordination with suspension system, with edges concealed by support of suspension members. Scribe and cut panels to fit accurately at borders and at penetrations.

1. Install hold-down clips at exterior entry area ceilings (lobby); space as recommended by panel manufacturer, unless otherwise indicated or required.

E. Contractor shall note that the architectural reflected ceiling plan is based on a rigid grid system related to room dimension and fixture locations. Therefore, any deviation from said plan must be approved by Architect.

F. The architectural/engineering reflected ceiling plan shall govern the final location of electrical, mechanical devices related to ceiling work.

3.3 Adjust and Clean

A. Clean exposed surfaces of acoustical ceilings, including trim, edge, moldings, and suspension members; comply with manufacturer’s instructions for cleaning and touch-up of minor finish damage. Remove and replace work which cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.

END OF SECTION 09 51 00
SECTION 09 65 00 - RESILIENT FLOORING

PART 1 - GENERAL

1.1 Scope

A. Furnish all materials, labor, and equipment required to complete all resilient flooring. Vinyl work shall occur in all areas as noted on plans and schedules.

B. Samples of all products to be used and color charts shall be submitted to the Architect/Owner for approval of the material and selection of the colors.

PART 2 - PRODUCTS

2.1 Materials

A. Base – Armstrong or approved equal

B. Rubber Base with Cove 4”. Include inside and outside premolded corners.

C. Adhesives - As recommended by flooring manufacturer for specific use. Submittals shall be sent to Architect and shall be approved prior to installation.

D. Flooring and adhesives shall be stored in a protected, dry area. Job site, all products including adhesives, shall be at a minimum 65°F for at least 48 hours before installation, during installation, and for 48 hours after installation.

E. Cleaning - Contractor shall clean and protect after installation.

PART 3 – EXECUTION

3.1 Workmanship

F. Before starting installation of the finish base the flooring contractor shall thoroughly inspect surfaces to be covered and shall notify the Architect in writing of any defects. Failure to do so will constitute acceptance of the subsurface and he will be held responsible for any irregularities which appear in the finished work and will be required to repair same.

G. The Contractor will be held responsible for correcting all imperfections in the wall/slab.

H. It is the intention to have smooth, even walls with the rubber base fitting neatly to the floor, and the Contractor will be held responsible to that end.
I. D. At the completion of the work the Contractor shall replace all areas with damaged base.

J. Install all products according to manufacturer’s direction for installation over various wall types.

END OF SECTION 09 65 00
SECTION 09 68 80 - CARPET

PART 1 - GENERAL

1.1 Section Includes

A. Wall and floor carpet placed with tackifier.

B. Accessories.

1.2 References


B. ASTM E84 - Surface Burning Characteristics of Building Materials.


D. NFPA 253 - Test for Critical Radiant Flux of Floor Covering Systems.

1.3 Submittals

A. Shop Drawings: Indicate seaming plan, method of joining seams, and direction of carpet.

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 samples 12 x 12 inch in size illustrating color and pattern for each carpet material specified.

D. Manufacturer’s Installation Instructions: Indicate special procedures, and perimeter conditions requiring special attention.

1.4 Qualifications

A. Manufacturer: Company specializing in manufacturing specified carpet with minimum three years experience.

1. Installer: Company specializing in installing carpet with minimum three years documented experience. (Qualified/certified to install brand specified.)
1.5 Regulatory Requirements
   A. Conform to applicable code for flame/smoke rating requirements.

1.6 Environmental Requirements
   A. Store materials for 3 days prior to installation in area of installation to achieve temperature stability.
   B. Maintain minimum 70°F (21°C) ambient temperature 1 day prior to, during and 24 hours after installation.

1.7 Extra Material
   A. Provide 100 sq. ft. of carpeting of each type, color, and pattern specified.

PART 2 - PRODUCTS

2.1 Acceptable Manufacturers - Carpeting
   A. J & J Industries Floor Carpet or approved equal.

2.2 Materials – Carpet (Floor)
   A. Strategy Style 2275 (offices, corridor/stairs, meeting room)
      Yarn – 100% Nylon J&J Encore SD Ultima
      Dye Method - Colorloc® Plus – Solution dye technology
      Pile – Surface – Dense Textured Loop
      Gauge – 1/8
      Yarn Weight – 26 oz./sq. yd.
      Density - Finished Pile Thickness - .150 inch (ASTM D-418)
      Density – 6,240
      Secondary Backing – Action Back
      Special Treatment - Fluorochemical
      Physical Testing - Flammability – Radiant Panel (Class 1)
      Pill Test (passes)
      Smoke- Smoke Density (less than 450 – flaming)
      Static Generation- Less than 3.0 KV
ADA Compliance (compliant for accessible routes)  
CRI Indoor air quality testing program product type: 27425055

Width - 12 ft.

Warranty – Encore SD Ultima Lifetime Fiber Performance for: stain removal, colorfastness, wear and static protection.

2.3 Accessories

A. Adhesive: Compatible with carpet material and as recommended by carpet manufacturer.

B. Edge Strips: type, finish, and color as selected.

PART 3 - EXECUTION

3.1 Examination

A. Verify that surfaces are smooth and flat with maximum variation of 1/4 inch in 10 ft. (6 mm in 3m), and are ready to receive work.

B. Verify concrete floors are dry to a maximum moisture content of 7 percent; and exhibit negative alkalinity, carbonization, or dusting.

3.2 Preparation

A. Remove sub-floor ridges and bumps. Fill minor or local low spots, cracks, joints, holes, and other defects with sub-floor filler.

B. Apply, trowel, and float filler to achieve smooth, flat, hard surface. Prohibit traffic until filler is cured.

C. Vacuum clean substrate.

3.3 Installation

A. Apply carpet in accordance with manufacturers’ instructions.

B. Verify carpet match before cutting to ensure minimal variation between dye lots.

C. Double cut carpet, to allow intended seam and pattern match. Make cuts straight, true, and unfrayed. Edge seam carpet at public areas and at top and bottom of wall carpet to achieve a clean and finished appearance.
D. Locate seams in area of least traffic.

E. Join seams by hand sewing, latexed and taped, or hot melt method. Form seams straight, not overlapped or peaked, and free of gaps.

F. Lay carpet tight and flat on subfloor, well fastened at edges, with a uniform appearance. Provide monolithic color, pattern, and texture match within any one area.

G. Do not change run of pile in any room where carpet is continuous through a wall opening into another room. Locate change of color or pattern between rooms under door centerline.

H. Cut and fit carpet around interruptions.

I. Fit carpet tight to intersection with vertical surfaces without gaps.

J. Where wall bases are scheduled, cut carpet tight to walls. Fit carpet tight to vertical interruptions, leaving no gaps. Current design intent including running carpet vertically up stair risers. Provide and install floor carpet in elevator cab.

3.4 Cleaning

A. Clean and vacuum carpet surfaces.

END OF SECTION 09 68 80
SECTION 09 91 01 - EXTERIOR PAINTING

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes surface preparation and the application of paint systems on the following exterior substrates:

1. Fiber-cement siding.
3. Wood.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Samples for Initial Selection: For each type of topcoat product indicated.

C. Samples for Verification: For each type of paint system and each color and gloss of topcoat indicated.

1. Submit Samples on rigid backing, 8 inches square.
2. Step coats on Samples to show each coat required for system.
3. Label each coat of each Sample.
4. Label each Sample for location and application area.

D. Product List: For each product indicated, include the following:

1. Cross-reference to paint system and locations of application areas. Use same designations indicated on Drawings and in schedules.
2. Printout of current "MPI Approved Products List" for each product category specified in Part 2, with the proposed product highlighted.

1.4 QUALITY ASSURANCE

A. MPI Standards:

1. Products: Complying with MPI standards indicated and listed in "MPI Approved Products List."
2. Preparation and Workmanship: Comply with requirements in "MPI
1.5 DELIVERY, STORAGE, AND HANDLING

A. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F.
   1. Maintain containers in clean condition, free of foreign materials and residue.
   2. Remove rags and waste from storage areas daily.

1.6 PROJECT CONDITIONS

A. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 95 deg F.

B. Do not apply paints in snow, rain, fog, or mist; when relative humidity exceeds 85 percent; at temperatures less than 5 deg F above the dew point; or to damp or wet surfaces.

1.7 EXTRA MATERIALS

A. Furnish extra materials described below that are from same production run (batch mix) as materials applied and that are packaged for storage and identified with labels describing contents.
   1. Quantity: Furnish an additional 5 percent, but not less than 1 gallon of each material and color applied.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
   1. Benjamin Moore & Co.
   2. Cloverdale Paint.
   3. Coronado Paint.
   5. ICI Paints.
   8. PPG Architectural Finishes, Inc.
   10. Tnemec.
2.2 **PAINT, GENERAL**

A. Material Compatibility:

1. Provide materials for use within each paint system that are compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
2. For each coat in a paint system, provide products recommended in writing by manufacturers of topcoat for use in paint system and on substrate indicated.

B. Colors: As selected by Architect from manufacturer's full range.

2.3 **PRIMERS/SEALERS**

A. Alkali-Resistant Primer: MPI #3.

B. Bonding Primer (Water Based): MPI #17.

C. Bonding Primer (Solvent Based): MPI #69.

D. Wood-Knot Sealer: Sealer recommended in writing by topcoat manufacturer for use in paint system indicated.

2.5 **WOOD PRIMERS**


B. Exterior Alkyd Wood Primer: MPI #5.

C. Exterior Oil Wood Primer: MPI #7.
2.6 EXTERIOR LATEX PAINTS

1. Exterior Latex (Semigloss): MPI #11 (Gloss Level 5).

2. Exterior Latex (Gloss): MPI #119 (Gloss Level 6, except minimum gloss of 65 units at 60 deg).

2.7 EXTERIOR ALKYD PAINTS

1. Exterior Alkyd Enamel (Semigloss): MPI #94 (Gloss Level 5).

2. Exterior Alkyd Enamel (Gloss): MPI #9 (Gloss Level 6).

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of work.

3.2 Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:

1. Fiber-cement siding: 12 percent.
2. Wood: 15 percent.

   a. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers.

   b. Begin coating application only after unsatisfactory conditions have been corrected and surfaces are dry.

3. Beginning coating application constitutes Contractor's acceptance of substrates and conditions.

3.3 PREPARATION

A. Comply with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual" applicable to substrates and paint systems indicated.

B. Remove plates, machined surfaces, and similar items already in place that are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.
C. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection if any.
D. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.
E. Clean substrates of substances that could impair bond of paints, including dirt, oil, grease, and incompatible paints and encapsulants.
F. Remove incompatible primers and reprime substrate with compatible primers as required to produce paint systems indicated.
G. Fiber-Cement Substrates: Remove release agents, curing compounds, efflorescence, and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces to be painted exceeds that permitted in manufacturer's written instructions.
H. Steel Substrates: Remove rust and loose mill scale. Clean using methods recommended in writing by paint manufacturer.
I. Galvanized-Metal Substrates: Remove grease and oil residue from galvanized sheet metal fabricated from coil stock by mechanical methods to produce clean, lightly etched surfaces that promote adhesion of subsequently applied paints.
J. Wood Substrates:
K. Scrape and clean knots, and apply coat of knot sealer before applying primer.
L. Sand surfaces that will be exposed to view, and dust off.
M. Prime edges, ends, faces, undersides, and backsides of wood.
N. After priming, fill holes and imperfections in the finish surfaces with putty or plastic wood filler. Sand smooth when dried.

3.4 APPLICATION

A. Apply paints according to manufacturer's written instructions.
   1. Use applicators and techniques suited for paint and substrate indicated.
   2. Paint surfaces behind movable items same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed items with prime coat only.
B. Tint each undercoat a lighter shade to facilitate identification of each coat if multiple coats of same material are to be applied. Tint undercoats to match color of topcoat, but provide sufficient difference in shade of undercoats to distinguish each separate coat.
C. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.
D. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.
3.5 FIELD QUALITY CONTROL

A. Testing of Paint Materials: Owner reserves the right to invoke the following procedure at any time and as often as Owner deems necessary during the period when paints are being applied:

3.6 CLEANING AND PROTECTION

A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.

B. After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.

C. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.

D. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

3.7 EXTERIOR PAINTING SCHEDULE

A. Fiber-cement Siding, Cementious Nontraffic Surfaces:

1. Latex over Alkali-Resistant Primer System: MPI EXT 3.1K.
   a. Prime Coat (maybe omitted if siding is factory primed): Alkali-resistant primer.

B. Galvanized-Metal Substrates:

   c. Topcoat: Acrolon 218 HS (Semi-gloss).

C. Dressed Lumber Substrates: Including architectural woodwork, windows, doors, battens, and miscellaneous trim.

1. Latex System: MPI EXT 6.3L.
   c. Topcoat: Exterior latex (semigloss).

END OF SECTION 09 91 01
SECTION 10 16 00 - METAL TOILET COMPARTMENTS

PART 1 - GENERAL

1.1 Section Includes

A. Metal toilet compartments, floor mounted, head rail braced.

B. Urinal screens; wall mounted.

1.2 References


B. FS RR-P-1352 - Partitions, Toilet, Complete.

1.3 Submittals

A. Shop Drawings: Indicate partition plan, elevation views, dimensions, details of wall and floor, supports, door swings.

B. Product Data: Provide data on panel construction, hardware, and accessories.

1.4 Regulatory Requirements

A. Conform to ADAAG code for access for the handicapped.

1.5 Field Measurements

A. Verify that field measurements are as indicated on shop drawings.

1.6 Coordination

A. Coordinate the work with placement of support framing and anchors in walls and floors.
PRODUCTS

2.1 Acceptable Manufacturers

A. Metpar - product - Corinthian.


C. All American Metal Corporation - product - H/B.

2.2 Materials

A. Steel Sheet: ASTM A526, with G90 zinc coating. ASTM A167, Type 304 stainless steel.

2.3 Accessories

A. Pilaster Shoe: Formed, ASTM A167 type 304 stainless steel with No. 4 finish, 3 inch (175 mm) high, with adjustable screw jack.

B. Head Rails: aluminum tube, 1 x 1-5/8 inch (25 x 41 mm) size, with anti-grip strips and cast socket wall brackets.

C. Attachments, Screws, and Bolts: Stainless steel; tamper proof type, heavy duty extruded aluminum brackets.

D. Hardware: Chrome plated non-ferrous cast metal:
   1. Pivot hinges, gravity type, adjustable for door close positioning.
   2. Nylon bearings.
   3. Slide door latch with exterior emergency access feature.
   4. Door strike and keeper with rubber bumper.
   5. Coat hook with rubber bumper.
   6. Door pull for outswinging doors.

2.4 Fabrication

A. Fabricate partitions in accordance with FS RR-P-1352.

B. Fabricate components of steel sheet as follows:

   1. Panel and Door Faces: 20 gage (0.9 mm).
   2. Pilaster Faces: 18 gage (1.2 mm).
   3. Reinforcement: 12 gage (2.5 mm).
C. Doors and Panels:

1. Thickness: 1 inch (25 mm)
2. Door Width: 24 inch (610 mm)
3. Door Width for Handicapped Use: 36 inch (915 mm).
4. Height: 58 inch (1473 mm)

D. Pilasters: 1-1/4 inch (32 mm) thick, of sizes required to suit cubicle width and spacing.

E. Door, Panel, and Pilaster Construction: Sheet steel face, pressure bonded to sound deadening core, form and close edges, miter and weld corners, grind smooth.

F. Internal Reinforcement: Provide in areas of attached hardware and fittings. Mark locations of reinforcement for partition mounted washroom accessories.

2.5 Finishing

A. Clean, degrease, and neutralize panels.

B. Follow immediately with a phosphatizing treatment, prime coat and two finish coats baked enamel.

C. Color: To be chosen from standard colors.

EXECUTION

3.1 Examination

A. Verify correct spacing of and between plumbing fixtures.

B. Verify correct location of built-in framing, anchorage, and bracing.

3.2 Installation

A. Install partitions secure, rigid, plumb, and level in accordance with manufacturer’s instructions.

B. Maintain 3/8 to 1/2 inch space between wall and panels and between wall and end pilasters.

C. Attached panel brackets securely to walls using anchor devices.
D. Attach panels and pilasters to brackets with tamper proof through bolts and nuts. Locate head rail joints at pilaster center lines.

E. Anchor urinal screen panels to walls with two panel brackets.

F. Provide adjustment for floor variations with screw jack through steel saddles integral with pilaster. Conceal floor fastenings with pilaster shoes.

3.3 Erection Tolerances

A. Maximum Variation From True Position: 1/4 inch (6 mm).

B. Maximum Variation From Plumb: 1/8 inch (3 mm).

3.4 Adjusting

A. Adjust and align hardware to uniform clearance at vertical edge of doors, not exceeding 3/16 inch (5 mm).

B. Adjust hinges to position doors in full closed position when unlatched. Return out swinging doors to closed position.

C. Adjust adjacent components for consistency of line or plane.

END OF SECTION 10 16 00
SECTION 10 28 13.13 - COMMERCIAL TOILET ACCESSORIES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes

1. Public-use washroom accessories.
2. Childcare accessories.
3. Custodial accessories.

1.2 REFERENCES

A. American National Standards Institute (ANSI):


B. ASTM International (ASTM):

1. ASTM A 653/A 653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
2. ASTM A 666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar.

C. US Federal Government:


1.3 ACTION SUBMITTALS

A. Product Data: For each product:

1. Manufacturer's product data sheets indicating operating characteristics, materials and finishes. Mark each sheet with product designation.
2. Mounting requirements and rough-in dimensions.
1.4 INFORMATION SUBMITTALS
   A. Sample warranty.
   B. Operation, care and cleaning instructions.

1.5 MAINTENANCE SUBMITTALS
   A. Furnish indicated spare parts that are packaged with identifying labels listing associated products.
   B. Operation and Maintenance data.
   C. Keys for lockable units.

1.6 QUALITY ASSURANCE
   A. Source Limitations: For products listed together in the same Part 2 articles, obtain products from single source from single manufacturer.
   B. Manufacturer Qualifications: Approved manufacturer listed in this section, with minimum five years' experience in the manufacture of product types in use in similar facilities. Manufacturers seeking approval must submit the following:
      1. Product data, including test data from qualified independent testing agency indicating compliance with requirements.
      2. Samples of each component of product specified.
      3. List of successful installations of similar products available for evaluation by Architect.
      4. Submit substitution request not less than 15 days prior to bid date.

1.7 WARRANTY
   A. Special Mirror Warranty: Manufacturer's standard form in which manufacturer agrees to replace mirrors that develop visible silver spoilage or frame corrosion defects within specified warranty period.
      1. Warranty Period: [15] years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS
   A. Basis-of-Design Products: Subject to compliance with requirements, provide commercial toilet accessories manufactured by Bradley Corporation, Menomonee Falls, WI 53051, (800) 272-3539, fax: (262) 251-5817; Email info@BradleyCorp.com; Website: www.bradleycorp.com.
      1. Submit comparable products of one of the following for approval by Architect:
a. American Specialties

2.2 PERFORMANCE REQUIREMENTS
1. Accessibility Requirements: Comply with requirements of ADA/ABA and authorities having jurisdiction.

2.3 PUBLIC-USE WASHROOM ACCESSORIES

2. Single-roll with spare roll, non-controlled delivery, vandal resistant hinged locking cover, Satin finish stainless steel.

B. Shared, Partition Mounted Toilet Tissue Dispensers TTD:

2. Description: <insert description from above>.

C. Toilet Tissue Jumbo Roll Dispenser, Surface Mount TTJ:

2. Description: Single-roll, up to 10-inch diameter; vandal resistant hinged locking cover; Satin finish stainless steel; surface mounted.

D. Combination Paper Towel (Folded) Dispenser/Waste Receptacle PTFW:

2. Description: Towel dispenser for 1100 single fold, 800 multi-fold, or 600 C-fold towels and 11.2-gallon removable plastic waste receptacle, Satin finish stainless steel, [recessed -00] [semi-recessed -10] [surface-mounted -11].

E. Liquid-Soap Dispenser, Deck Mounted SD:

2. Description: Deck mounted, hand pump operated liquid soap dispenser. 4-inch spout. Pump only. Plunger and spout fabricated from stainless steel. 16 oz. stainless steel soap bottle. Will accommodate a maximum counter thickness of 3-1/2”. [32 oz. soap capacity -68].

F. Fixed Grab Bars

2. Description: 36 inches long. Concealed mounting 1-1/4 inch o.d. 18 ga satin finish stainless steel tubing. 3-1/8 inch diameter 13 ga flanges; 22 ga stainless steel escutcheons, intermediate supports. Third party tested to 1250 pounds. [Safety-grip satin finish -2].

G. Sanitary Product Vendor SPV:

2. Description: Stainless steel cabinet with satin finish. One vending mechanism each for sanitary napkins and tampons. Vending mechanisms can be selected from free, $0.10,
$0.25, $0.50, or $1.00. Vend capacity: 18 sanitary napkins and 28 tampons. Hinged door includes two vandal resistant locks. Coin box lock is different than cabinet key [recessed mount -00] [surface mount -11].

H. Sanitary Product Disposal Unit SDU:
2. Description: Stainless steel with satin finish; 1.5-gallon waste container; push flap door; vandal resistant lock; [recessed mount -00] [semi recessed mount -10] [surface mount -11].

I. Seat-Cover Dispenser SCD:

J. Shelf PS:

K. Towel Shelf TS:
1. Basis of Design: Bradley Corp., Model 9094
2. Description: Stainless Steel Shelf: 5-inch deep, satin finish concealed mounting shelf. Standard length: 24-inches.

L. Mirror Unit MG:
2. Description: Angle Frame Mirror: Stainless steel frame with stiffeners and bevel on front of frame to secure frame is flush against mirror surface. Galvanized steel back secured to frame with concealed fasteners. Mirror: 1/4 inch float glass, triple silver plated with electro copper plated layer and thermosetting, infrared cured paint backing with Poly-Glaze finish. All edges protected by shock-absorbing neoprene tubing. Includes cold rolled steel wall hangers, laminted glass Polished No. 8 stainless steel Bright annealed stainless steel. Maximum size is 120" W x 72" H but must not exceed 40 square feet.
3. Size: 18 by 30-inches (457 by 762 mm).

2.4 CHILDCARE ACCESSORIES

A. Diaper-Changing Stations DCS:
2. Description: Surface Mounted HD Polyethylene Station: Steel support hinges, molded liner dispenser, ADA compliant nylon buckle. Cream. Rated to support a static load of 250 lbs.
B. Utility Shelf US:
   2. Description: <insert description from above.
   3. Application: One unit per janitor closet and where indicated

C. Tumbler and Toothbrush Holder TTH:
   1. Basis of Design: Bradley Corp., Model 9044
   2. Description: Surface mounted, satin stainless steel.

2.5 MATERIALS

A. Stainless Steel: ASTM A 666 Type 304 (18-8); satin finish exposed surfaces unless otherwise indicated.

B. Steel Sheet: ASTM A 1008/A 1008M, Designation CS, manufacturer’s standard thickness.

C. Galvanized-Steel Sheet: ASTM A 653/A 653M, with G60 hot-dip zinc coating, manufacturer’s standard thickness.


E. Fasteners:
   1. Exposed: Screws, bolts, and other devices of same material as accessory unit and tamper-and-theft resistant.
   2. Concealed: Galvanized steel.

F. Chrome Plating: ASTM B 456, Service Condition Number SC 2, moderate service.

G. Mirrors: ASTM C 1503, mirror glazing quality, consisting of clear float glass ASTM C 1036, nominal 6.0 mm thick, triple silver plated with electro copper plated layer and thermosetting, infrared cured paint backing with epoxy protective finish.


2.6 FABRICATION

A. General: Fabricate units with tight seams and joints, and exposed edges rolled. Hang doors and access panels with full-length, continuous hinges. Equip units for concealed anchorage and with corrosion-resistant backing plates.

B. Keys: Provide universal keys for internal access to accessories for servicing and resupplying. Provide minimum of six keys to Owner’s representative.
PART 3 - EXECUTION

3.1 INSTALLATION

A. Assemble fixtures and associated fittings and trim in accordance with manufacturer's instructions.

B. Install supports attached to building structure for equipment requiring supports.

C. Grab Bars: Install grab bars to withstand downward force of not less than 250 lbf (1112 N) per ASTM F 446.

D. Install equipment level, plumb, and firmly in place in accordance with manufacturer's rough-in drawings.

3.2 CLEANING AND PROTECTION

A. Repair or replace defective work, including damaged equipment and components.

B. Clean unit surfaces, and leave in ready-to-use condition.

C. Turn over keys, tools, maintenance instructions, and maintenance stock to Owner.

3.3 TESTING AND ADJUSTING

A. Test each piece of equipment provided with moving parts to assure proper operation, freedom of movement, and alignment. Install new batteries in battery-powered items.

B. Repair or replace malfunctioning equipment, or equipment with parts that bind or are misaligned.

END OF SECTION
SECTION 10 42 50 - SIGNS

PART 1 - General:

A. Submittals: Submit the following:

1. Product Data: Manufacturer’s construction details.

2. Shop Drawings: Show elevations, layout and installation details. Signs to meet ADA Requirements. Letters raised 1/32” with raised braille 1/32” (Grade 2).

PART 2 - Products:

A. Room Function Signs

1. 12 signs to have room name, all raised with braille. Signs to be 2 1/2” tall and as long as required for text to fit (standard length). Restroom signs to be sized independently of other signs to show universal symbol of accessibility.

2. Manufacturers: Subject to compliance with requirements, Best Manufacturing, Advance Corporation, ASI Sign Systems, or approved equal.

3. Graphic Content and Style of Signs: Provide copy that complies with size, style, spacing, content, position, material, finishes and colors of letters, numbers, and other graphic devices. Sign text schedule to be provided at a later date.

B. Dedication Plaque

1. Manufacturers: Subject to compliance with requirements, A.R.K. Ramos, or approved equal.

2. Dedication Plaque: Shall be 18” x 18” cast aluminum with a standard border No. 500 and leatherette background texture. Remaining specifications and content to be determined at a future date by Owner/Architect. Location to be determined by Owner/Architect.

PART 3 - Execution:

A. Installation: Locate signs on walls adjacent to latch side of doors as shown on plans, using mounting methods described. Install level, plumb and at 60”
A.F.F. to centerline, with surfaces free from distortion or other defects in appearance.

B. Wall Mounted Signs: Attach using methods indicated below:
   1. Double-sided foam tape for smooth, non-porous surfaces.
   2. Liquid silicone adhesive for irregular, porous or vinyl-covered surfaces. Use double-sided vinyl tape to hold sign in place until adhesive has fully cured.

C. Cleaning and Protection: At completion of the installation, clean soiled sign surfaces. Protect from damage until Owner’s acceptance.

END OF SECTION 10 42 50
SECTION 22 33 13 – INSTANTANEOUS ELECTRIC DOMESTIC WATER HEATERS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Electric, tankless commercial water heaters and water heater accessories.

1.2 REFERENCES

A. General: Applicable edition of references cited in this Section is current edition published on date of issue of Project specifications, unless otherwise required by building code in force.

B. American National Standards Institute (ANSI) http://webstore.ansi.org:

1. ANSI 372 – Drinking Water System Components – Lead Content

C. American Society of Sanitary Engineering (ASSE): www.asse-plumbing.org

1. ASSE 1003 - Performance Requirements for Water Pressure Reducing Valves for Domestic Water Distribution Systems

D. ASSE 1010 - Performance Requirements for Water Hammer Arresters National Electrical Manufacturers Association (NEMA) www.global.ihs.com:

1. NEMA Standards Publication 250 - Enclosures for Electrical Equipment (1000 Volts Maximum)

E. National Fire Protection Association (NFPA) www.nfpa.org:

1. NFPA 70 - National Electrical Code

F. NSF International

1. NSF 61 - Drinking Water System Components – Health Effects
2. NSF 372 - Drinking Water System Components - Lead Content

G. Underwriters Laboratories (UL) www.ul.com:

1. UL 499 - Standard for Electric Heating Appliances

1.3 ACTION SUBMITTALS

A. Product Data: For each product:

1. Manufacturer's data sheets indicating unit performance and compliance with requirements.
2. Include details of electrical and mechanical operating parts.
3. Show mounting and securing requirements and utility connection requirements.

1.4 INFORMATION SUBMITTALS

A. Buy American Act Certification: Submit documentation certifying that products comply with provisions of the Buy American Act 41 U.S.C 10a – 10d.
B. Source quality-control test reports.

C. Field quality-control test reports.

1.5 CLOSEOUT SUBMITTALS

A. Operation and maintenance data.

1.6 QUALITY ASSURANCE

A. Source Limitations: Obtain electric tankless water heaters through a single source from a single manufacturer.

B. Electrical Components: Listed and labeled per NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction.

C. Lead-Free Construction: Comply with NSF 372 for fixture components in contact with potable water.

D. Standard Warranty: Manufacturer’s standard form in which manufacturer agrees to repair or replace components of electric, domestic-water heaters that fail in materials or workmanship within specified warranty period.

1. Warranty Period: From Date of Substantial Completion
   a. Electrical Components, two years
   b. Heating Elements, four years
   c. Heat Exchanger Free From Leaks, eight years

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Basis-of-Design Product: Subject to compliance with requirements, provide electric tankless commercial water heaters by Keltech, Inc., Delton MI; Phone: (269) 623-6395; Email sales@keltech-inc.com; Web site www.keltech-inc.com.

1. Submit requests for substitution in accordance do Division 01.

2.2 ELECTRIC, TANKLESS COMMERCIAL WATER HEATERS

A. Electric tankless commercial water heater, UL 499, sized for low flow constant temperature requirements, with PID Controller, liquid-cooled triac switches, low flow activation, and overheat protection.


2. Enclosure: 0.063-inch/16-ga.- (1.59-mm-) thick stainless steel NEMA 4X.

3. Heat Exchanger: Copper tubing with brazed brass fittings and large internal passageways for minimal pressure drop. NSF 61 barrier materials for potable water, without storage capacity.
   a. Xylan Fluoropolymeric Coating: FDA approved for food contact or deionized water

4. High Temperature Package: 165 degrees


7. Heating Element: Heavy duty, low-watt density Incoloy 800 sheathed resistive element
8. Temperature Control: Microprocessor with PID logic and dual display of set-point and actual outlet water temperature.
9. Safety Controls:
   a. Surface mounted bi-metal thermostat with manual reset.
11. Capacity:
   a. Temperature Rise at Flow Rate: As scheduled.
   b. As scheduled.
12. Electrical Characteristics:
   a. As scheduled.
13. Facility Controls Integration: 4: 20 mA input stainless steel NEMA 4X.
15. Low Flow Activation: 0.25 GPM (0.9 L/m).

2.3 WATER HEATER ACCESSORIES

A. Provide electric tankless water heater system including the following system accessories:
1. Pressure and Temperature Relief Valves: Pressure and Temperature Relief Valves: [Brass] [Stainless steel, ASME rated and stamped pressure relief valve]. Adjust to pressure setting less than water heater working-pressure rating.
   a. Pressure and Temperature Safety Relief Valve set to 80 psig (552 kPa).
5. Thread Adapters: NPT to BSPP, stainless steel.
6. Y-Strainer: [Lead Free Brass] [Stainless steel].

PART 3 - EXECUTION

3.1 INSTALLATION

A. Electric, Tankless, Domestic-Water Heater Mounting:
1. Install water heaters in accordance with manufacturer's written instructions.
2. Install water heaters level and plumb, according to layout drawings and referenced standards.
3. Maintain manufacturer's recommended clearance and access dimensions.

B. Install water supply piping to each water heater, and from heater to fixture requiring hot water supply connection.
1. Install stop valves on water supply and outlet piping. Provide stop valve on each supply in readily-serviced location. Lock stop valve in OPEN position.
2. Comply with Division 22 Section, General-Duty Valves for Plumbing Piping, for stop valve requirements.
C. If shipped loose, install pressure and temperature safety relief valves on water heater. Run relief valve discharge lines as shown in manufacturer's instructions.

D. Extend relief-valve outlet line, and discharge by positive air gap above closest floor drain.

E. Install relief valve drain piping as indirect waste to spill by positive air gap into open drains or over floor drains. Install hose-end drain valves at low points in water piping.

F. Run relief valve drain piping without creating tripping hazard.

3.2 FIELD QUALITY CONTROL

A. Do not energize water heater until hydrostatic testing of domestic water lines is complete. See Division 22 Section "Domestic Water Piping."

B. Test and adjust installation.
   1. Set field-adjustable temperature set point of temperature-actuated controls. Adjust set point within allowable temperature range.
   2. Replace defective or malfunctioning controls and equipment.

C. Clean unit surfaces, test fixtures, and leave in ready-to-use condition.

END OF SECTION
SECTION 22 42 16 - COMMERCIAL LAVATORIES AND FAUCETS

PART 1 - GENERAL

1.1 SECTION INCLUDES

1. Engineered stone commercial lavatory units.
   a. Lavatory faucets.
   b. Soap dispensers.

1.2 REFERENCES

1. American Society of Sanitary Engineering (ASSE):
   a. ASSE 1070 - Water Temperature Limiting Devices.

2. American Society of Mechanical Engineers (ASME):
   a. ASMEA112.18.1 - Plumbing Fixture Fittings.

3. ASTM International (ASTM):

4. International Association of Plumbing and Mechanical Officials (IAPMO):
   a. Universal Plumbing Code (cUPC both U.S. and Canada).

5. International Code Council (ICC):


7. Underwriters Laboratories, Inc. (UL):
   a. UL 723 - Test For Surface Burning Characteristics of Building Materials.
   b. UL 1951 - Electric Plumbing Accessories.

8. US Federal Government:

1.3 ACTION SUBMITTALS
1. Product Data: Manufacturer’s data sheets, installation instructions, and maintenance recommendations.
2. Product Test Reports: Indicating compliance of products with requirements, from a qualified independent testing agency, when requested by Architect.

1.4 INFORMATION SUBMITTALS
1. Sample warranty.
2. Manufacturer's certificates.
3. Indoor environmental quality certificates.

1.5 MAINTENANCE SUBMITTALS
1. Operation and Maintenance data.

1.6 QUALITY ASSURANCE
1. Manufacturer Qualifications: Approved manufacturer listed in this section, with minimum 5 years’ experience in the manufacture of plumbing fixtures. Manufacturers seeking approval must submit the following:
   a. Product data, including test data from qualified independent testing agency indicating compliance with requirements.
   b. Samples of each component of product specified.
   c. List of successful installations of similar products available for evaluation by Architect.
   d. Submit substitution request not less than 15 days prior to bid date.
2. Source Limitations: Obtain each type of plumbing fixture and compatible accessories through one source from a single approved manufacturer.
3. Accessibility Requirements: Comply with requirements of ADA/ABA and with requirements of authorities having jurisdiction.
4. Water Flow and Consumption Requirements: Comply with EPACT.
6. Electrical Components: Listed and labeled per NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction.

1.7 WARRANTY
1. Special Manufacturer’s Warranty: Provide manufacturer's standard form in which manufacturer agrees to repair or replace products that fail in materials or workmanship within the following periods:
   a. Engineered natural quartz material: 10 years.
   b. Faucets: 1 year.
   c. WashBar: 1 year (applies to Verge with WashBar Technology – LVQ-Series only)

PART 2 - PRODUCTS

2.1 MANUFACTURERS
1. Basis-of-Design Product: Subject to compliance with requirements, provide products of Bradley Corporation, Menomonee Falls, WI 53051, (800)272-3539, fax (262)251-5817; Email info@BradleyCorp.com; Website www.bradleycorp.com.
a. Submit comparable products of one of the following for approval by Architect:

b. Submit requests for substitution in accordance with Instructions to Bidders and Division 01 General Requirements.

c. Provide specified product; Owner will not consider substitution requests.

2.2 MATERIALS

1. Lavatory Deck and Bowl Material: Fabricate lavatory units from molded engineered stone material consisting of natural quartz, granite, and other minerals in a matrix of thermoset acrylic modified bio-based polyester resin, certified by approved independent testing agency as complying with CSA B45.5/1A/PMO Z124, with the following minimum properties:

   b. Surface Burning Characteristics: Smoke developed, less than 450; flame spread, less than 25, per ASTM E84.
   c. Flexural Strength: 3267 psi (22.5 MPa), minimum, per ASTM D790.
   d. Compressive Strength: 11,500 psi (79 MPa), minimum, per ASTM C170.
   e. Moisture Absorption: 0.065 percent in 24 hours, per ASTM D570.
   f. Hardness: 6 – 7 Mohs Scale, per ASTM D785.
   g. Thickness: 1/2 inch.

2.3 MULTI-STATION LAVATORY UNITS

1. Lavatory: Wall-mounted rectilinear, level-surface lavatory deck with sleek edges, molded from engineered stone material to create a seamless and integral elongated basin, with stainless steel enclosed pedestal cabinet.

   a. Basis of Design Manufacturer/Model: Bradley, Verge Lavatory System, Model LVRD.
   b. Number of Wash Stations: 3.
   c. Unit Length: 90 inches (2286 mm).
   d. Soap Dispenser: Included.
   f. Color: As selected by Architect from manufacturer's full line.
   g. Rim Mounting Height: 33.5 inch (859 mm, or as indicated.

2.4 SENSOR-OPERATED WashBar

1. Sleek single casting WashBar with integral soap, faucet and single nozzle hand dryer with heated air and adjustable speeds, infrared control, smart technology with adjustable LED lighting and easy to identify icons and external tempering control FCT#____.

   d. Aerator: 0.35 gpm (1.32 L/s) PCA Rubber Tip Aerator Soap Type: Liquid Soap Dispenser
   e. Hand Dryer: DC Motor 120v/60 Hz, 20 Amp.
   f. Sensor Module: Water-conserving, durable sensor unit with adjustable timing turn-off delay and stationary object automatic timed cutoff, with diagnostic signal light.
   g. Sensing Distance: 5 inches (127mm).
   h. Power Supply: 12 volt DC valve.
   i. Thermostatic Mixing Valve: Thermostatic mixing valve, ASSE 1070 listed, with stop/strainer/check valves, and flexible stainless steel connectors.
2.5 SENSOR-OPERATED LAVATORY FAUCETS
1. IR Sensor-Operated Faucet with Infrared Control and External Tempering Control FCT#___:
   Vandal-resistant accessible faucet meeting ASME A112.18.1/CSA B125. ADA/ANSI A117.1 compliant.
   
a. Basis of Design Manufacturer/Model: Bradley IR-DCD.
b. Body: Polished chrome plated commercial solid cast brass spout.
d. Aerator: Flow rate 0.5 gpm (0.032 L/s) at operating range of 20 to 80 psi (138 to 552 kPa).
e. Sensor Module: Water-conserving, vandal-resistant adjustable sensor unit with adjustable timing turn-off delay and stationary object automatic timed cutoff, with battery diagnostic signal light, remote serviceable.
   1) Adjustable Sensing Distance: 3-1/8 to 11-3/4 inch (80 to 300 mm) inch.
g. Thermostatic Mixing Valve: Thermostatic mixing valve, ASSE 1070 listed, with stop/strainer/check valves, and flexible stainless steel connectors.

2.6 SOAP DISPENSERS
1. Soap Dispenser: Deck-mounted 16 oz. (473 mL) stainless steel, with 4 inch (102 mm) spout.
   
a. Basis of Design Manufacturer/Model: Bradley, Model 6324.

PART 3 - EXECUTION

3.1 INSTALLATION
1. Assemble fixtures, accessories, and associated fittings and trim in accordance with manufacturer's instructions.
2. Install fixture supports firmly attached to building structure.
3. Install fixtures level, plumb, and in accordance with manufacturers rough-in instructions.
4. Install water supply piping. Provide stop on each supply in readily-serviceable location. Fasten supply piping to supports or substrate.
5. Install trap and waste piping to each fixture.
6. Install escutcheons at exposed piping penetrations in finished locations and within cabinets.
7. Seal joints between fixtures and walls, floors, and countertops with mildew-resistant silicone sealant meeting requirements in Division 07 Section "Joint Sealants."

3.2 CLEANING AND PROTECTION
1. Repair or replace defective work, including damaged fixtures and components.
2. At time of Substantial Completion:
   
a. Clean unit surfaces, test fixtures, and leave in ready-to-use condition.
b. Install new batteries in battery-operated devices.
c. Fill soap dispensers.
d. Turn over keys, tools, maintenance instructions, and maintenance stock to Owner.
3. Protect units with water-resistant temporary covering. Do not allow temporary use of plumbing fixtures. Remove protection at Substantial Completion and dispose.

3.3 TESTING AND ADJUSTING
2. Test and adjust installation.

END OF SECTION 22 42 16
SECTION 22 42 23 - COMMERCIAL SHOWERS AND SHOWER VALVES

PART 1 - GENERAL

1.1 SECTION INCLUDES
A. Ablution Systems
B. Ablution Valves
C. Individual showers.
D. Group showers.
E. Showervalves.

1.2 REFERENCES
A. American National Standards Institute (ANSI):
B. American Society of Mechanical Engineers (ASME):
   1. ASME A112.18.1/CSA B125.1 - Plumbing Supply Fittings.
C. American Society of Sanitary Engineering (ASSE):
   1. ASSE 1016-2005 - Performance Requirements for Automatic Compensating Valves for Individual Showers and Tub/Shower Combinations.
   2. ASSE 1017-2005 - Performance Requirements for Temperature Actuated Mixing Valves for Hot Water Distribution Systems.
D. American National Standards Institute (ANSI):
   1. ANSI Z124.1.2 – Plastic Bathtubs and Shower Units.
E. International Association of Plumbing and Mechanical Officials (IAPMO):
   1. Uniform Plumbing Code US (UPC) and Canadian Codes and Standards (cUPC).

1.3 ACTION SUBMITTALS
A. Product Data: Manufacturer’s data sheets.
B. LEED Submittals:
   1. Product Data for Credit WE2: Documentation indicating compliance with requirements.

1.4 CLOSEOUT SUBMITTALS
A. Maintenance Data: For shower faucets to include in maintenance parts manuals.

1.5 QUALITY ASSURANCE
A. Source Limitations: Obtain each type of plumbing fixture and compatible accessories through one source from a single approved manufacturer.
PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Basis-of-Design Product: Subject to compliance with requirements, provide ablution, ablution valves, showers and shower valves manufactured by Bradley Corporation, Menomonee Falls, WI 53051, (800)272-3539, fax (262)251-5817, [www.bradleycorp.com](http://www.bradleycorp.com).

1. Submit comparable products of one of the following for approval by Architect:

2.2 COMMERCIAL ABLUTION, GENERAL

A. Commercial Ablution Materials and Fabrication

1. Exposed Parts finish: Type 316 stainless steel or chrome-plated brass.
2. Nominal stainless steel thickness: 0.050 inch (1.3 mm) minimum.
4. Supply Inlets: 1/2-inch NPT, 16-inch (406 mm) long flexible stainless steel hoses unless otherwise indicated.
5. Flow Control: [0.5 gpm (1.9 L/min.)] unless otherwise noted.

2.3 ABLUTION SYSTEM

A. In-Wall Mounted Hand/Foot Washing System ABL#3:

1. Basis-of-Design Product: Bradley Corporation Model No. ABP-1WCA.
2. Standards: ASME A112.18.1/CSA B125.1 and ASSE 1016.
3. Water Spout: Severe Service spout
5. Flow Control: 0.5 gpm (1.9 L/min).

B. Flush Mounted Hand/Foot Washing System ABL#2:

1. Basis-of-Design Product: Bradley Corporation Model No. ABP-1F.
2. Standards: ASME A112.18.1/CSA B125.1 and ASSE 1016.
3. Water Spout: Severe Service spout Hand held control
5. Flow Control: 0.5 gpm (1.9 L/min.).

C. Built In Hand/Foot Washing System ABL#2:

1. Basis-of-Design Product: Bradley Corporation Model No. ABP-1C.
2. Standards: ASME A112.18.1/CSA B125.1 and ASSE 1016.
3. Water Spout: [Severe Service spout]
5. Flow Control: [0.5 gpm (1.9 L/min.)]

D. Panel Hand/Foot Washing System ABL#2:

1. Basis-of-Design Product: Bradley Corporation Model No. ABP-1PA.
2. Standards: ASME A112.18.1/CSA B125.1 and ASSE 1016.
3. Water Spout: [Severe Service spout]
5. Flow Control: [0.5 gpm (1.9 L/min)]
2.4 ABLUTION VALVES

A. Ablution Valves, General:
   1. Valve Bodies: Solid brass castings.
   2. Exposed Parts finish: Type 304 Stainless steel or chrome-plated brass.
   3. Nominal stainless steel thickness: 0.050 inch (1.3 mm) minimum.

B. Single-Handle Compression Valve.
   1. Basis-of-Design Product: Bradley Corporation, Model No. ABP-1C-SV Single Handle Compression Valve
   2. Description: Single-handle user temperature regulated compression valve.
   3. Faucet:
      a. Standards: ASSE 1016 and cUPC.
      c. Finish: Polished chrome plate.
      d. Operation: Solid SS, swept back design handles, twist or rotate control.
      e. Supply Connections: 1/2-inch NPT.
      a. Check Stops: Check-valve type

C. Accessible Electronic Ablution Metering Valve.
   2. Description: ADA/ABA compliant, easy-touch pushbutton solid state electronic control and solenoid ablution valve.
   3. Valve:
      b. Face Plate Material: Chrome plated brass.
      c. Operation: Easy touch push button.
      d. Timing: Factory preset to 60 seconds.
      e. Solenoid
         1) Voltage: 24-volt, 50-60-hertz.
      f. Supply Connections: 1/2-inch NPT.

D. Accessible Push-Button Air Metering Valve.
   1. Basis-of-Design Product: Bradley Corporation, Model No. ABP-1C-AST Air-Metering Shower Control Valve
   2. Description: ADA/ABA compliant, solid state electronic, easy touch push button ablution control
   3. Valve:
      a. Push-Button Material: Chrome plated brass
      b. Actuator Face Plate Material: Chrome plated brass.
      c. Operation: Easy touch push button.
      d. Push-Button Pneumatic Actuator:
      e. Air Metering Valve
         1) Inlet from Tempered Water Valve: 1/2-inch IPS
         2) Outlet to ablution spout: 3/8-inch IPS.
      f. Timing: Adjustable from 5 to 45 seconds.

2.5 COMMERCIAL SHOWERS, GENERAL

A. Commercial Shower Materials and Fabrication
   1. Exposed Parts finish: Type 304 stainless steel or chrome-plated brass.
   2. Nominal stainless steel thickness: 0.050 inch (1.3 mm) minimum.
   4. Supply Inlets, Individual Showers: 1/2-inch NPT, 24-inch (610 mm) long flexible stainless steel hoses unless otherwise indicated.
   5. Supply Inlets, Group Showers: 3/4-inch (19 mm) Type L rigid copper.
B. Flow Control: 1.5 gpm (5.7 L/min.) unless noted otherwise.

2.6 INDIVIDUAL SHOWERS

A. ADA/ABA Compliant Individual Coverall Wall Shower SHR#2:
2. Standards: ASME A112.18.1/CSA B125.1 and ASSE 1016.
3. Shower Head: Hand-held shower head on 60-inch, 1/2-inch NPT flexible SS hose with inline backflow preventer, quick disconnect, and bracket.
4. Shower Valve:
   a. Hot/Tempered and Cold Supplies [Thermostatic mixing valve].
   b. Single Tempered/Cold Supply: [Electronic metering valve].
5. Flow Control: [1.5 gpm(5.7 L/min)]
7. Barrier Free Seat: [Left hand, plastic] [Right hand, plastic].
8. Grab Bar Configuration: [24-inch(610 mm) straight] [Slide bar].

B. Individual Coverall Wall Shower SHR#2:
1. Basis-of-Design Product: Bradley Corporation Model No. WS-1WCA.
2. Standards: ASME A112.18.1/CSA B125.1 and ASSE 1016.
4. Shower Valve:
   a. Hot/Tempered and Cold Supplies: [Thermostatic mixing valve].
   b. Single Tempered/Cold Supply: [Electronic metering valve].
5. Soap Dish: Attached.

C. ADA/ABA Compliant Individual Pivoting Wall Shower SHR#2: Wall mounted shower, with stainless steel pivoting hinges.
2. Standards: ASME A112.18.1/CSA B125.1 and ASSE 1016.
3. Showerhead: Hand-held shower head on 60-inch, 1/2-inch NPT flexible SS hose with inline backflow preventer, quick disconnect, and bracket.
4. Diverter valve: Lever handle for transfer of water between fixed showerhead and hand held spray.
5. Shower Valve:
   a. Hot/Tempered and Cold Supplies: [Pressure balancing valve] [HD pressure balancing valve] [Thermostatic mixing valve].
   b. Single Tempered/Cold Supply: [Electronic metering valve].
7. 24-inch (610 mm) showerhead vertical slide bar.
8. Barrier Free Seat: [Left hand, plastic] [Right hand, plastic].
9. Grab Bar Configuration: [24-inch(610 mm) straight] [Two-wall]

D. Individual Pivoting Wall Shower SHR#3: Wall shower, with adjustable direction showerhead and pivoting wall hinges.
1. Basis-of-Design Product: Bradley Corporation Model No. WS-1X.
2. Standards: ASME A112.18.1/CSA B125.1 and ASSE 1016.
3. Showerhead: Chrome plated brass with ball joint and adjustable spray pattern.
4. Shower Valve:
   a. Hot/Tempered and Cold Supplies [Thermostatic mixing valve]
   b. Single Tempered/Cold Supply: [Electronic metering valve].
5. Soap Dish: Attached.

E. Individual Flush Mounted Wall Shower SHR#1:
1. Basis-of-Design Product: Bradley Corporation Model No. WS-1F.
2. Standards: ASME A112.18.1/CSA B125.1 and ASSE 1016.
4. Flow Control: 2.5 gpm (9.5 L/min)
5. Shower Valve:

PART 3 - EXECUTION

3.1 EXAMINATION
   A. Examine water supply, sanitary piping, and vent piping rough in for coordination with shower installation before beginning installation.
   B. Examine architectural installation for compliance with codes and requirements of the manufacturer.
   C. Correct unsatisfactory conditions before starting with installation.

3.2 INSTALLATION
   A. Assemble and install shower components in accordance with manufacturer's instructions.
   B. Install stops on each water supply piping.
      1. Install stops in locations where they can be easily reached for operation.
   C. Set shower basins in leveling bed of cement grout.
   D. Install wall flanges or escutcheons at piping wall penetrations in exposed, finished locations. Use deep-pattern escutcheons if required to conceal protruding fittings. Comply with escutcheons requirements specified in Division 22 Section "Escutcheons for Plumbing Piping."

3.3 CONNECTIONS
   A. Connect fixtures with water supplies, stops, and risers, and with traps, soil, waste, and vent piping.
   B. Comply with water piping, soil waste and vent piping requirements specified in Division 22.

3.4 ADJUSTING
   A. Operate and adjust showers and controls and adjust water pressure as needed. Replace damaged and malfunctioning showers, fittings, and controls.

3.5 CLEANING AND PROTECTION
   A. Repair any damaged finishes after installation is complete.
   B. Clean shower equipment and basins with manufacturer's recommended cleaning products.
   C. Add protective covering after installation.

END OF SECTION
SECTION 23 33 00 - HVAC Fans

PART 1 GENERAL

1.1 SUMMARY A.

Section Includes
1. The fan is the model scheduled with the capacities indicated. The fan shall be furnished with mounting hardware, a power cord, and a controller.

B. Summary of Work
1. Installation of the fan, miscellaneous or structural work (if required), field electrical wiring, cable, conduit, fuses and disconnect switches, other than those addressed in the installation scope of work, shall be provided by others.

1.3 REFERENCES
A. National Fire Protection Agency {NFPA}
B. Underwriters Laboratory (UL)
C. Canadian Standards Association (CSA)
D. National Electric Code (NEC)
E. International Organization for Standardization {ISO}

1.4 SUBMITTALS
A. Product Data Sheets
B. Revit Files
C. Installation Instructions
D. Schedule

1.5 QUALITY ASSURANCE A.
Certifications
1. The fan assembly, as a system, shall be Intertek/ETL-certified and built pursuant to the guidelines set forth by UL standard 507 and CSA standard 22.2 No. 113.
2. Controllers shall comply with National Electrical Code {NEC} and Underwriters Laboratory (UL) standards and shall be labeled where required by code.

B. Manufacturer Qualifications
1. The fan and all accessories shall be supplied by Big Ass Fans, which has a minimum of 10 years of product experience.
2. The manufacturer shall be ISO 9001-certified.

1.6 DELIVERY, STORAGE, AND HANDLING
A. The product shall be delivered in original, undamaged packaging with identification labels intact. The fan shall be new, free from defects, and factory tested.
B. The fan and its components shall be stored in a safe, dry location.
C. The control components shall be new, free from defects, and factory tested.
1.7 WARRANTY
A. The manufacturer shall replace any products or components defective in material or workmanship for the customer free of charge, including transportation charges, in accordance to the following schedule:

<table>
<thead>
<tr>
<th>Product</th>
<th>Warranty Period</th>
</tr>
</thead>
<tbody>
<tr>
<td>Main Fan Unit</td>
<td>5 years</td>
</tr>
</tbody>
</table>

PART 2 PRODUCT

2.1 APPROVED MANUFACTURERS
A. Delta T LLC, Big Ass Fans, or approved equal.

2.2 DESCRIPTION
A. Complete Unit
   a. Regulatory Requirements: The fan assembly shall be Intertek/ETL-certified and built pursuant to the guidelines set forth by UL standard 507 and CSA standard 22.2. No. 113.
   b. Function: The fan shall be designed for portable use or adaptable mounting in tight industrial spaces requiring localized air movement.
   c. Air Velocity: The fan shall be capable of delivering up to 600 fpm (186 mpm)
   d. Quality: Good workmanship shall be evident in all aspects of construction. Field balancing of the airfoils shall not be necessary.
   e. Sizes: The fan shall be available in three sizes: 20 inches (457 mm), 24 inches (610 mm), and 30 inches (762 mm).
   f. The fan shall require electrical input of 110-120 VAC, 60 Hz, 1 CD.

B. Motor
   a. The fan motor shall be a 1/3 hp electronically commutated motor with electrical input of 110-120 VAC, 60 Hz, 1 CD.
   b. The motor shall be rated IP 65 for washdown cleaning.
   c. The motor shall be equipped with an 18 ft (5.5 m) cord that plugs into a standard wall outlet.

C. Blades and Cage Assembly
   a. The cage shall be available in three sizes: 25.8 inches (656 mm), 32 inches (813 mm), and 38.2 inches (969 mm).
   b. The blades and cage assembly shall be of washdown construction.
   c. The cage shall be OSHA-compliant and shall consist of two sections that are removable for cleaning and servicing.
   d. The fan shall be equipped with three steel blades available in three size options to correspond with the cage sizing: 20.5 inches (541 mm), 24.5 inches (622 mm), and 30.5 inches (775 mm).
D. Mounting System
   a. The fan shall allow for multiple mounting methods to accommodate a wide variety of airflow needs and building structures.
   b. All mounts shall be made from steel.
   c. Hardware used to mount the fan must be of sufficient strength and quantity to support the weight of the fan and its method of attachment. Consult the install guide for details. For mounting hardware supplied by Big Ass Fans, no hardware substitutions are acceptable.
      i. I-Beam Mount Kit: The I-Beam kit shall be suitable for horizontal and vertical I-beams, and shall be equipped with mounting hardware, conduit, and conduit clamps, motor adapter, and a safety cable kit.
      ii. C-Channel Mount: The C-Channel Mount kit shall be suitable for mounting horizontally or vertically, and shall be equipped with mounting hardware, conduit, motor adapter, and a safety cable kit.
      iii. Swivel Mount: The Swivel Mount kit shall be suitable for mounting to a wall and shall be equipped with a swing arm, L-brackets, and mounting hardware.
      iv. Wall Mount: The Wall Mount kit shall be suitable for mounting the fan to a wall using the provided hardware and customer-supplied mechanical anchors. The kit shall be equipped with a wall mount, swivel bracket, hardware, and a safety cable kit.
      v. Pedestal Mount: The Pedestal Mount kit shall be suitable for portable use, and shall be equipped with a mount and base and hardware, and an optional wheel kit and handle to allow for safe relocation of the fan.

E. Controller
   a. The fan shall be available with either an infinite variable speed controller or a timer control. The control cable shall be attached to the motor cable with a cord retainer to ensure a secure connection.
   b. Timer Control: Includes Hours and Speed pushbuttons to set the airflow and duration of operation.

F. Occupancy Sensor
   a. Use passive detection to run the fan only when a space is occupied.
   b. The sensor to have an effective range of up to 40 ft (12.2 m) within a 90-degree radius.
   c. Sensor position must be adjustable.
   d. Fan to shut off after 5 minutes of space being unoccupied.

PART 3 EXECUTION

3.1 PREPARATION
   A. The fan location shall meet the electrical requirements listed in the product installation guide.
   B. The fan location shall be free from obstacles such as lights, cables, and other building components.

3.2 INSTALLATION
   A. The fan shall be installed and operated according to the installation instructions.
   C. The fan cord shall not be run under carpeting or covered with rugs, runners, or similar coverings. The cord shall not be routed under furniture or appliances.
   D. The fan shall not be located where it will be continuously subjected to wind gusts or in close proximity to the output of HVAC systems or radiant heaters.

END OF SECTION
SECTION 23 34 00 - Circulator Fans - Oscillating

PART 1 GENERAL

1.1 SUMMARY
   A. Section Includes
      1. The fan is the model scheduled with the capacities indicated. The fan shall be furnished with mounting
         hardware, a power cord, and a controller (if applicable).
   B. Summary of Work
      1. Installation of the fan, miscellaneous or structural work (if required), field electrical wiring, cable, conduit,
         circuit breakers, receptacles, and switches, other than those addressed in the installation scope of work, shall
         be provided by others.

1.3 REFERENCES
   A. National Fire Protection Agency (NFPA)
   B. Underwriters Laboratory (UL)
   C. National Electric Code (NEC)
   D. International Organization for Standardization (ISO)

1.4 SUBMITTALS
   A. Product Data Sheets
   B. Installation Instructions
   C. Schedule

1.5 QUALITY ASSURANCE
   A. Certifications
      1. The fan assembly, as a system, shall be Intertek/ETL-certified and built pursuant to the guidelines set forth
         by UL standard 507.
      2. Controllers shall comply with National Electrical Code (NEC) and Underwriters Laboratory (UL) standards
         and shall be labeled where required by code.
   B. Manufacturer Qualifications: Minimum 5 year experience manufacturing similar products.

1.6 DELIVERY, STORAGE, AND HANDLING
   A. The product shall be delivered in original, undamaged packaging with identification labels intact. The fan shall be
      new, free from defects, and factory tested.
   B. The fan and its components shall be stored in a safe, dry location.
   C. The control components shall be new, free from defects, and factory tested.

1.7 WARRANTY
   A. The manufacturer shall replace any products or components defective in material or workmanship for the customer
      free of charge, including transportation charges, for a minimum of 1 years after installation.

PART 2 PRODUCT

2.1 MANUFACTURER
   A. Acceptable Manufacturers: Big Ass Fans, TPI, and Dayton.
   B. Requests for substitutions will be considered in accordance with provisions of Section 01 26 00.

2.2 DESCRIPTION
   A. Complete Unit
      1. Regulatory Requirements: The fan assembly shall be Intertek/ETL-certified and built pursuant to the
         guidelines set forth by UL standard 507.
2. Function: The fan shall be designed for adaptable mounting in industrial spaces requiring localized air movement.
3. Air Velocity: The fan shall be capable of delivering up to a minimum of 613 cfm at a 25 foot distance.
4. Quality: Good workmanship shall be evident in all aspects of construction. Field balancing of the airfoils shall not be necessary.
5. The fan shall be 30 inches in diameter with metal blades balanced at the factory.
6. The fan cage shall be OSHA-compliant, steel wire cage, corrosion coated.
7. The fan shall require electrical input of 110–120 VAC, 60 Hz, 1 Φ, have a SJT 3 conductor cord with a molded.

B. Motor
1. The fan motor shall be totally enclosed, have permanently lubricated ball bearings with electrical input of 110–120 VAC, 60 Hz, 1 Φ.
2. The motor shall be equipped with an SJT, 3 conductor cord that plugs into a standard wall outlet, minimum of 12" long.

C. Oscillator
1. The oscillating mechanism shall be made of metal and have metal gears.
2. The oscillator must be able to be locked in a fixed position.

D. The fan shall be available multiple or variable speeds.

E. Mounting System
1. All mounts shall be made from steel.
2. Hardware used to mount the fan must be of sufficient strength and quantity to support the weight of the fan in its method of attachment.
   a. I-Beam Mount Kit: The I-Beam kit shall be suitable for horizontal and vertical I-beams, and shall be designed so that drilling of the I-Beam is unnecessary. Drawings for the I-Beam mounting kit shall be submitted for approval before installation.
   b. A safety cable shall be installed to keep the fan from falling in case of hardware failure.
   c. Alternate mounting must be approved by Architect/Engineer prior to installation.

PART 3 EXECUTION

3.1 PREPARATION
A. A dedicated 110 V, AC receptacle shall be installed within cord reach of the mounting location and have sufficient ampacity to allow the fan to run continuously.
B. The fan location shall be free from obstacles such as lights, cables, and other building components.

3.2 INSTALLATION
A. The fan shall be installed and operated according to the installation instructions.

END OF SECTION
SECTION 23 81 13 - PACKAGED TERMINAL AIR CONDITIONERS AND HEAT PUMPS

PART 1 GENERAL

1.1 SECTION INCLUDES
A. Terminal air conditioners.
B. Packaged vertical air conditioners.

1.2 SUBMITTALS
A. Submit under provisions of Section 01 33 00 - Submittals.
B. Product Data: Manufacturer's data sheets on each product to be used, including:
   1. Preparation instructions and recommendations.
   2. Storage and handling requirements and recommendations.
   3. Installation methods.
C. Shop Drawings: Overall dimensions and required clearances including detail of architectural enclosing requirements. Detailed schematics of electrical control wiring and power rough-in.

1.3 QUALITY ASSURANCE
A. Manufacturer Qualifications: Minimum 5 year experience manufacturing similar products.
B. Installer Qualifications: Minimum 2 year experience installing similar products.

1.4 PRE-INSTALLATION MEETINGS
A. Convene minimum two weeks prior to starting work of this section.

1.5 DELIVERY, STORAGE, AND HANDLING
A. Deliver and store products in manufacturer's unopened packaging bearing the brand name and manufacturer's identification until ready for installation.
B. Handle materials to avoid damage.

1.6 PROJECT CONDITIONS
A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's recommended limits.

1.7 SEQUENCING
A. Ensure that products of this section are supplied to affected trades in time to prevent interruption of construction progress.

1.8 WARRANTY
A. Manufacturer's Warranty:
   1. For the period of one year from the date of the original purchase: GE will replace any part of the air conditioner which fails due to a defect in materials or workmanship. During this limited one-year warranty, GE will provide, free of charge, all labor and related service costs to replace the defective part.
   2. Five years from the date of the original purchase: Sealed Refrigerating System, if any
part of the Sealed Refrigerating System (the compressor, condenser, evaporator, and all connecting tubing) should fail due to a defect in materials or workmanship. During this limited five-year warranty, GE will provide, free of charge, all labor and related service costs to replace the defective part.

3. Second through fifth year from the date of the original purchase: Fan Motors, Switches, Thermostat, Heater, Heater Protectors, Compressor Overload, Solenoids, Circuit Boards, Auxiliary Controls, Thermistors, Freeze Sentinel, Frost Controls, ICR Pump, Capacitors, Varistors and Indoor Blower Bearing, if any of these parts should fail due to a defect in materials or workmanship. During this additional four-year limited warranty, the customer will be responsible for any labor and related service costs.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturer: GE Zoneline, or equal

2.2 TERMINAL AIR CONDITIONERS - SYSTEM DESCRIPTION

A. The Contractor shall furnish Packaged Terminal Air Conditioners/Package Terminal Heat Pumps of the sizes and capacities shown on the schedule and in the specifications. The units shall be located as shown on the drawings and each shall consist of a chassis, room cabinet, wall case, power cord, sub-base if specified, and outdoor grille.

B. Units shall be listed by UL, AHRI and cUL certified as to capacity and efficiency and shall be GE Zoneline models or equal. Unit Dimensions (W x H): 42-1/8 x 16-1/4 inches (1070 x 413 mm) maximum with room cabinet in place.

C. Unit shall have means of electrical connection listed by Underwriters Laboratories and compatible with the unit's required voltage and amperage in conformance with National Electrical Code and local codes.

1. Units shall be designed to operate on 208, 230 or 265 volts, 60 Hz, single-phase power.

D. Weather Resistance: Complete unit including outside louvers shall be submitted to an independent agency for weather-resistance tests.

1. Air-infiltration test to be conducted in accordance with AHRI 310/380 and in such a facility for leakage air flow measurements described in ANSI/ASHRAE 16 and 58. With indoor static pressure maintained at 0.1 inch (25 mm) H2O below the outdoor static pressure, the allowable air infiltration shall not exceed 19.3 cu ft per min (0.547 cu m per min). Water-infiltration test to be conducted in accordance with ASTM E331-86 with static air pressure differential of 10.0 lbs per sq ft (48.824 kg per sq m) or (1.93 inches (49 mm) H20) equivalent to 63 mph (101.4 kph) wind, 5.0 gal per sq ft (203.73 L per sq m) (8 inches per sq ft per hr (2187 mm per sq m per hr) rain for 15 minutes and there shall be no leakage into the room.

E. Chassis. The air conditioner chassis shall be the standard product of the manufacturer and shall be shipped in protective cartons to prevent damage. Cartons shall be appropriately marked at the factory with wording sufficient to warn handlers against improper stacking, up-ending, rolling or dropping.

F. The chassis shall be the slide-in type, ready to operate after installation.

G. Each shall consist of the following sections and components:

1. Each unit shall have a matching, easily removable, textured finish, wrap-around room cabinet molded of high-temperature styrene to resist corrosion and damage. The
room cabinet shall have slide-out washable filters accessible without requiring removal of room cabinet from chassis.

2. Hermetically sealed refrigerant system with external vibration isolated rotary-type compressor, condenser and evaporator coils and capillary refrigerant control. Airflow system consisting of one permanently lubricated two-speed fan motor for the outdoor fan and a separate permanently lubricated two-speed fan motor for the indoor fan. Outdoor fan shall be multi-blade axial-flow design made of non-corrosive material. Indoor fan shall be of a design to optimize airflow and operating sound. All motors on the exterior side of the weather barrier shall be of an enclosed design to reduce the effects of moisture and corrosion.

3. Line-cord connected units shall require a line-cord power connection kit with integral Leakage Current Detection and Interruption device or Arc Fault Current Interrupter as required by National Electrical Code (NEC) and Underwriters Laboratories. The unit shall have a universal resistance heater with output determined by connection to the power source with the appropriate power connection kit to provide specified heat output.

4. A fan-cycle option to permit continuous fan operation or fan cycle operation, independently selectable for heating and cooling operation.

5. Fan-only operation in either high or low fan speed selectable by room occupant.

6. A positive cooling condensate disposal system which meets the test requirements of applicable AHRI Standard 310 (for Packaged Terminal Air Conditioners) and 380 (for Packaged Terminal Heat Pumps) (80 degrees F dry bulb, 75 degrees F wet bulb, 80 percent relative humidity).

7. Condenser and evaporator coils to be constructed of copper tubing and aluminum plate fins designed to achieve EER and COP rating of the unit.

8. Indoor and outdoor airflows that match the capacity of the coils for efficient heat transfer. Water blow-off shall not occur on the indoor coil.

9. Adjustable indoor discharge air louver design providing a 45 degree off horizontal air pattern with an alternate position to provide a 65 degree off horizontal air pattern.

10. Easily accessible controls for selection of unit operation and thermostat setting.

11. Positive-closing, manually controlled, multi-position fresh-air vent capable of providing selection anywhere from fully open to fully closed. Vent door is to be secured for shipping.

12. Integrated circuit and software to sense and control room temperature.

13. Electronic temperature limiting with independent heating and cooling settings to limit maximum and minimum temperatures without restricting movement of thermostat control knob.

14. Capability to automatically activate the electric resistance heater and fan motor to warm and circulate indoor air to help prevent damage due to freezing temperatures.

15. Capability to automatically activate air conditioner operation when the unit is in the STOP setting when the room temperature warms to 85 degrees F and turns air conditioner operation off when the room temperature cools to 80 degrees F, if selected by owner.

16. Compatible with two-wire Central Desk Control systems.

17. Remote Thermostat compatibility with Class 2 remote thermostat.

18. Connections to interface with a transfer fan to move air into another room.

PART 3 EXECUTION

3.1 EXAMINATION

A. Do not begin installation until substrates have been properly prepared.

B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 PREPARATION
A. Clean surfaces thoroughly prior to installation.

B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.3 INSTALLATION

A. Install in accordance with manufacturer's instructions and approved submittals. Test for proper operation and adjust until satisfactory results are obtained.

3.4 SINGLE PACKAGED VERTICAL UNITS INSTALLATION

A. Minimum Clearances:
   1. Front: Allow 4 inches (102 mm) in front of unit.
   2. Note that plenum may protrude into closet, depending on exterior wall thickness.
   3. Sides: Allow 3 inches (76 mm) on each side of unit.
   4. Platform: Height appropriate with thru wall plenum per installation instructions

3.5 TERMINAL AIR CONDITIONERS INSTALLATION

A. Electrical Connection: 230/208 volt units may be plugged into a receptacle. 265 volt units are provided with a junction box and require direct connection. (NEC Requires 265V Direct Connection.)

3.6 PROTECTION

A. Protect installed products until completion of project.

B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION 23 81 13
SECTION 238126 – MINI-SPLIT SYSTEMS

PART 1 - GENERAL

1.1 System Description
   A. The Heat Pump system shall be based on a Mitsubishi Electric split system with Variable Speed Inverter Compressor technology. The system shall consist of a horizontal discharge, single phase outdoor unit, a matched capacity indoor section that shall be equipped with a wired wall-mounted controller and a lockable cover.
   B.

1.2 Outdoor Unit Capacity

<table>
<thead>
<tr>
<th>Outdoor Units</th>
<th>Cooling (Btu/h)</th>
<th>Heating (Btu/h)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>24,000</td>
<td>26,000</td>
</tr>
</tbody>
</table>

1.3 Quality Assurance
   A. The units shall be tested by a Nationally Recognized Testing Laboratory (NRTL) and shall bear the ETL label.
   B. All wiring shall be in accordance with the National Electrical Code (N.E.C.) and local codes as required.
   C. The units shall be rated in accordance with Air-conditioning, Heating, and Refrigeration Institute’s (AHRI) Standard 210/240 and bear the ARI Certification label.
   D. The units shall be manufactured in a facility registered to ISO 9001 and ISO 14001, which is a set of standards applying to environmental protection set by the International Standard Organization (ISO).
   E. The outdoor unit shall be pre-charged with R-410A refrigerant.
   F. System efficiency shall meet or exceed SEER / HSPF values below:

<table>
<thead>
<tr>
<th>Indoor unit</th>
<th>SEER</th>
<th>HSPF</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>24.2</td>
<td>11.2</td>
</tr>
</tbody>
</table>

1.4 Delivery, Storage and Handling
   A. Unit shall be stored and handled according to the manufacturer’s recommendations.
   B. The controller shall be able to withstand 105°F storage temperatures and 95% relative humidity without adverse effect.

1.5 Submittals
   A. Product data sheets
      a. Preparation instructions and recommendations
      b. Storage and handling requirements and recommendations
      c. Installation methods
   B. Shop drawings
      a. Overall dimensions and required clearances.
      b. Detailed schematics of electrical control wiring.
   C. Manufacturers Instructions
   D. Operating instructions

1.7 Warranty
   A. The manufacturer shall replace any products or components defective material or workmanship for the customer free of charge, including transportation charges, for a minimum of 3 years after the substantial completion date.
PART 2 – PRODUCTS

2.1 Manufacturers
A. Acceptable Manufacturers are Mitsubishi Electric, LG, Daikin.
B. Substitution requests to be made via “Substitution Request Form”.

2.2 Outdoor Unit
A. The outdoor unit shall be compatible with the indoor ceiling cassette model type. The connected indoor unit shall be of the same capacity as the outdoor unit.
B. The outdoor unit shall be equipped with an electronic control board that interfaces with the indoor unit to perform all necessary operation functions.
C. The outdoor unit shall be capable of cooling operation down to ambient temperature of 0°F for heat pump systems without additional low ambient controls (optional wind baffle shall be required).
D. The outdoor unit shall be able to operate with a height difference of at least 22 feet (7 meters) between indoor and outdoor units.
E. System shall operate at up to at least 100 ft (30m) of refrigerant tubing length between indoor and outdoor units without the need for line size changes, traps or additional oil.
F. Outdoor unit shall be pre-charged.
G. The outdoor unit shall be completely factory assembled, piped, and wired. Each unit must be test run at the factory.
H. Outdoor unit sound level shall not exceed 47 dB(A) Cooling and 48dB(A) Heating.
I. The electrical power of the unit shall be 208volts or 230 volts, single phase, 60 hertz. The unit shall be capable of satisfactory operation within voltage limits of 198 volts to 253 volts.
J. Power for the indoor unit shall be supplied from the outdoor unit using three (3) fourteen (14/16) gauge AWG conductors plus ground wire connecting the units.
K. The outdoor unit shall be controlled by the microprocessor located in the indoor unit.
L. The control signal between the indoor unit and the outdoor unit shall be pulse signal 24 volts DC.
M. The unit shall have Pulse Amplitude Modulation circuit to utilize 98% of input power supply.
N. Operating Range:

<table>
<thead>
<tr>
<th>Operating Range</th>
<th>Indoor Air Intake Temperature</th>
<th>Outdoor Air Intake Temperature</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cooling</td>
<td>Maximum D.B. 90°F (32°C)</td>
<td>D.B. 115°F (46°C)</td>
</tr>
<tr>
<td></td>
<td>Minimum D.B. 66°F (19°C)</td>
<td>D.B. 0°F (-18°C)*</td>
</tr>
<tr>
<td>Heating</td>
<td>Maximum D.B. 82°F (28°C)</td>
<td>D.B. 70°F (21.1°C) W.B. 59°F</td>
</tr>
<tr>
<td></td>
<td>Minimum D.B. 50°F (10°C)</td>
<td>(15°C)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>D.B. 12°F/-4°F</td>
</tr>
</tbody>
</table>

2.3 Indoor Unit
A. The ceiling-cassette indoor unit shall be factory assembled, wired and run tested. Contained within the unit shall be all factory wiring, piping, control circuit board and fan motor. The unit shall have a self-diagnostic function, 3-minute time delay mechanism, an auto restart function, an emergency operation function, a test run switch, and the ability to adjust airflow patterns for different ceiling heights. Indoor unit and refrigerant pipes shall be charged with dehydrated air before shipment from the factory. The unit shall be suitable for use in plenums in accordance with UL1995 ed 4.
B. The cabinet panel shall have provisions fora field installed filtered outside air intake.
   a. Branch ducting shall be allowed from cabinet.
   b. Four-way grille shall be fixed to bottom of cabinet allowing two, three or four-way blow.
   c. The grille vane angles shall be individually adjustable from a wired remote controller to customize the airflow pattern for the conditioned space
C. The electrical power of the unit shall be 208 volts or 230 volts, 1 phase, 60 hertz. The power to the indoor unit shall be supplied from the outdoor unit.
D. A three (3) conductor AWG-14/16 wire with ground shall provide power feed and bi-directional control transmission between the outdoor and indoor units.
2.4 System Control
A. The control system shall be microprocessor controlled with the capability of monitoring return air temperature and indoor coil temperature, receiving and processing commands from a wireless or wired controller, providing emergency operation and controlling the outdoor unit. The control signal between the indoor and outdoor unit shall be below 30 volts DC. Indoor units shall have the ability to control supplemental heat.
B. An appropriately sized cable, minimum 14 gauge AWG wire with ground, shall provide power feed and bi-directional control transmission between the outdoor and indoor units. A 3-Pole Disconnect shall be used to disconnect power at the indoor unit—all three conductors must be interrupted.
C. The system shall be capable of automatic restart when power is restored after power interruption. The system shall have self-diagnostics ability, including total hours of compressor run time. Diagnostics codes for indoor and outdoor units shall be displayed on the wired controller panel.
D. The indoor unit control board shall have auxiliary control contact connectors to provide Lossnay Control and Back-up Heat.
E. The Wireless, wall mounted remote controller kit shall consist of a wireless, wall mounted controller, a wireless receiver and a cable to connect the receiver to the indoor unit. The controller shall consist of Function buttons, and Increase/Decrease Set Temperature buttons. The controller shall have a built-in temperature sensor and a battery holder, using two AA alkaline batteries. Temperature shall be displayed in either Fahrenheit (°F) or Celsius (°C), and temperature changes shall be by increments of 1°F (0.5°C).
F. The wireless receiver shall be specially designed for the brand of the air conditioning units. Linking to the wireless network shall be done from the receiver and from the remote controller. The wireless devices must be adjustable to in case interference with other wireless devices conflicts with operation. Communication shall be automatically restored after power resumes and after batteries are replaced.
G. The Wired Remote Controller shall be capable of controlling up to 16 indoor units (defined as 1 group).
H. The Wired Remote Controller shall only be used in same group with Wireless Remote Controllers or with other Backlit Wired Remote Controllers.

PART 3 – EXECUTION

3.1 Preparation
A. Clean surfaces thoroughly prior to installation.
B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result.

3.2 Installation
A. Install in accordance with manufacturer’s instructions and approved submittals. Test for proper operation and adjust until satisfactory results are obtained.

END OF SECTION 238126
SECTION 23 82 01 - EXHAUST FANS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Bathroom exhaust fan.
B. Inline exhaust fan.

1.2 SUBMITTALS

A. Submit under provisions of Section 01 33 00 - Submittals.
B. Product Data: Manufacturer's data sheets on each product to be used, including:
   1. Preparation instructions and recommendations.
   2. Storage and handling requirements and recommendations.
   3. Installation methods.
C. Shop Drawings: Overall dimensions and required clearances including detail of architectural enclosing requirements. Schematics of electrical control wiring and power rough-in.

1.3 QUALITY ASSURANCE

A. Manufacturer Qualifications: Minimum 5 year experience manufacturing similar products.
B. Installer Qualifications: Minimum 2 year experience installing similar products.

1.4 PRE-INSTALLATION MEETINGS

A. Convene minimum two weeks prior to starting work of this section.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver and store products in manufacturer's unopened packaging bearing the brand name and manufacturer's identification until ready for installation.
B. Handle materials to avoid damage.

1.6 PROJECT CONDITIONS

A. Do not install products under environmental conditions outside manufacturer's recommended limits.

1.7 SEQUENCING

A. Ensure that products of this section are supplied to affected trades in time to prevent interruption of construction progress.
1.8 WARRANTY

A. Manufacturer's Warranty:
   1. Manufacturer will provide a three-year warranty beginning at the time of
      acceptance by the owners representative. During this three-year warranty the
      manufacturer will replace the defective part.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturers: Broan, Panasonic, NuTone.

B. Requests for substitutions will be submitted via the Product Substitution Request
   form in Division 0.

2.2 RECESSED CEILING MOUNT EXHAUST FAN - DESCRIPTION

A. The Contractor shall furnish recessed, ceiling mount, exhaust fans of the sizes and
   capacities shown on the schedule and in the specifications. The units shall be located
   as shown on the drawings.

B. Units shall be listed by UL, HVI and cUL certified as to capacity and efficiency.

C. Unit shall have means of electrical connection listed by Underwriters Laboratories
   and in conformance with National Electrical Code and local codes. Units shall be
   designed to operate on 120 volts, 60 Hz, single-phase power.

D. Housing shall be corrosion resistant galvanized steel with four-point mounting
   capability. It shall be ducted to a roof or wall cap using 4” round ductwork. The
   damper/duct connections shall be provided by the manufacturer.

E. Blower assembly shall be removable, and have a centrifugal blower wheel and a
   permanently lubricated motor designed for continuous operation.

F. Fan shall be acceptable for use in insulated ceilings.

G. Air delivery shall be no less than 50CFM with a sound level of no greater than 0.5
   Sones.

H. Grille shall be included from manufacturer, be white, and be durable poly-
   construction.

2.3 INLINE EXHAUST FANS - DESCRIPTION

A. The Contractor shall furnish inline exhaust fans of the sizes and capacities shown on
   the schedule and in the specifications. The units shall be located as shown on the
   drawings.

B. Units shall be listed by UL and cUL certified as to capacity and efficiency.

C. Unit shall have means of electrical connection listed by Underwriters Laboratories
   and in conformance with National Electrical Code and local codes. Units shall be
   designed to operate on 120 volts, 60 Hz, single-phase power.
D. Housing shall be corrosion resistant galvanized steel with adjustable mounting capable of mounting horizontally or vertically. The backdraft damper to be provided by the manufacturer. Housing shall be free from any sharp edges.

E. Blower assembly shall be removable, and have a centrifugal blower wheel and a permanently lubricated motor designed for continuous operation and thermally protected.

F. Air delivery shall be no less than 900CFM with a sound level of no greater than 7.0 Sones.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install in accordance with manufacturer's instructions and approved submittals. Test for proper operation and adjust until satisfactory results are obtained.

B. Ducting to be fastened together and to duct connector with sheet mental screws to ensure connections do not come apart

3.2 PROTECTION

A. Protect installed products until completion of project.

B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION
SECTION 26 00 00 - ELECTRICAL GENERAL REQUIREMENTS

PART 1 GENERAL

1.1 RELATED DOCUMENTS:

A. The Contractor shall comply with all applicable provisions of the Bidding Requirements, General conditions and Supplementary Conditions which also form a part of this section of these specifications as if bound herein.

B. The Contractor shall comply with all provisions of the drawings and specifications.

1.2 SCOPE OF WORK:

A. Furnish all equipment, services, and facilities required for a complete, proper, and substantial installation of all electrical systems. Include all materials, appliances, and apparatus not specifically mentioned herein or noted, but necessary to make complete working installation of all electrical systems described herein. All systems shall be according to the NEC and Local Codes. Contractor shall use energy saving ideas where applicable.

B. The work includes the Invitation to Bidders, Instruction to Bidders, Proposal Form General Requirements, Supplementary General Requirements, Specifications, Drawings, Alternates, Addenda and Modifications thereof, all of which are a part of this section of the specifications and are applicable to all Contractors, Sub-Contractors and material suppliers.

1.3 USE OF PREMISES:

A. Confine apparatus, storage of materials and operation of workmen to limits indicated by law, ordinance, permits or directions of the Architect, and not encumber premises with materials. Do not load or permit any part of structure to be loaded with weight that will endanger its safety. Enforce instructions of Architect regarding signs, advertisements, fires and smoking.

1.4 RELATED WORK:

A. Coordinate all work and requirements herein with those of Division 23 and related General Construction Sections.

1.5 CODES, RULES AND REGULATIONS:

A. City, Federal and State Building rules, regulations, codes ordinances, and other statutory provisions and regulations that govern are part of specifications plus latest edition of codes as they apply to local conditions: Uniform Building Code (UBC); National Fire Protection Association (NFPA); National Electrical Code (NEC); National Electric Safety Code (NESC); National Bureau of Standards (NBS); and Occupational Safety; Health Act (OSHA) and BOCA.
B. All electrical items and equipment must bear the U.L. Label.

1.6 GUARANTEE/WARRANTY:

A. Refer to General Conditions for Guarantee/Warranty.

1.7 START-UP AND INSPECTION:

A. All systems shall be put into operation at start-up after acceptance by Owner. Personnel qualified to service or repair equipment shall be present during commissioning.

B. Contractor shall operate and maintain systems and equipment until accepted by Owner, including cost of services for operation.

C. All electrical equipment and all electrical equipment furnished by others shall be properly tested, adjusted and aligned by this Contractor.

D. All motors shall be properly aligned and lubricated.

1.8 MATERIAL AND EQUIPMENT:

A. All items of materials and equipment supplied in for this project shall be new, free from defects and of the best quality normally used for the purpose in good commercial practice.

B. All materials and equipment shall be installed in strict accordance with the manufacturer’s recommendations.

C. All equipment shall bear the Underwriter’s label of approval and shall conform to requirements of the National Electrical Manufacturer’s Association, the National Electrical Code and the National Board of Fire Underwriters.

D. Intent of specifications is to allow ample opportunity for Contractor to use his ingenuity and abilities to perform work to his and Owner’s best advantage. Also to permit maximum competition to bidding standards material and equipment equivalent or better than items specified.

E. Protection of equipment is the responsibility of the Contractor from time received until acceptance by Owner. Should equipment be damaged, replace with new equipment or repair, to put in first class condition acceptable by Architect/Engineer.

1.9 RUBBISH AND PROTECT WORK:

A. Clear away, periodically, dirt and rubbish resulting from operations. Cover and protect work and materials from damage by elements, or from other cause during progress of building. Deliver clean and in perfect condition.
PART 2 – PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.0 OPENINGS AND CHASES:

A. Contractor will leave such openings and chases for pipes, cabinets, access doors and equipment, as necessary or directed by Architect to facilitate working of Contractor and will refinish around same, provided however, Contractor is on job in due time to properly advise as to locations and sizes of such openings and chases. Contractor is responsible for locating and setting his own pipe sleeves, and to be well aware of job progress to avoid unnecessary delay for setting.

3.1 MUTILATION:

A. Damage to work caused by Contractor by reason of neglect, accident or other causes whatsoever, shall be repaired and made good, in manner as specified for new work.

3.2 CUTTING AND PATCHING:

A. Building materials cut and patched only where required for installation of work. No structural members cut without approval of Architect. Patching and sealing done in neat and workmanlike manner including openings around ducts or pipes in floors or walls and meet with Architect’s approval. Drilling of holes through concrete accurately and carefully done by using “Concrete Core” drill. Use of star drill or air hammer for this work will not be permitted. Work in or through existing finished walls requires Contractor to restore such to existing condition.

3.3 SCAFFOLDING AND STAGING:

A. Scaffolding, staging and cribbing required for safe completion of work. Removed from premises when its use is no longer required.

3.4 ELECTRICAL CONNECTION OF MECHANICAL EQUIPMENT:

A. Contractor shall be responsible for determining all requirements for the electrical connection of mechanical equipment provided for this project and shall furnish and install all power and control wiring in conduit, completely connect and make ready for operation all electric motors, controls, etc. All accessories, devices and modifications required to connect and make operative mechanical equipment actually furnished for this project shall be provided without additional cost to the Owner.

3.5 ELECTRICAL REQUIREMENTS:

A. Electrical work to include items primarily electrical by function, items that are integral part of electrical equipment such as wiring, power connections, feeder installation, interlocking, switches, starters, disconnects, fuses, conduit, boxes, motor controllers, auxiliary contact, holding coils, selector switches, pushbutton stations, maintained contacts, remote H.O.A. switches, time delay relay switches, etc. Wiring of
interlocking, sequence of operation and proper function of system will be furnished by others and be prepared by licensed electrical engineer, so stamped, and of point to point with numbered and color coded to terminal strips for major equipment, air handling systems, controls, pumps, and interlocking.

3.6 IDENTIFICATION OF SWITCHES AND APPARATUS:

A. All cabinets, safety switches and other apparatus used for operation and control of circuits, appliances and equipment under this contract shall be properly identified by means of neatly stenciled labels or decals.

3.7 COORDINATION:

A. Contractor shall coordinate his work under this division of the specifications with the work of other trades wherein it may be interrelated. This shall be done in order that there will be no interference in installation nor delay in completion of any part or parts of each respective trade, thereby permitting all construction work to proceed in its natural sequence without unnecessary delay.

END OF SECTION 26 00 00
**SECTION 26 05 19 - CONDUCTORS AND CABLES**

**PART 1 - GENERAL**

1.1 **SUMMARY**
   
   A. This Section includes the following:
      
      1. Building wires and cables rated 600 V and less.
      2. Connectors, splices, and terminations rated 600 V and less.

1.2 **ACTION SUBMITTALS**
   
   A. Product Data: For each type of product indicated.

1.3 **INFORMATIONAL SUBMITTALS**
   
   A. Field quality-control test reports.

1.4 **QUALITY ASSURANCE**
   
   A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

   B. Comply with NFPA 70.

**PART 2 - PRODUCTS**

2.1 **CONDUCTORS AND CABLES**
   
   A. Copper Conductors: Comply with NEMA WC 70.

   B. Conductor Insulation: Comply with NEMA WC 70 for Types THHN-THWN, XHHW, and SO.

   C. Multiconductor Cable: Comply with NEMA WC 70 for metal-clad cable, Type MC nonmetallic-sheathed cable, Type SO with ground wire.

2.2 **CONNECTORS AND SPLICES**
   
   A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
1. AFC Cable Systems, Inc.
3. O-Z/Gedney; EGS Electrical Group LLC.
4. 3M; Electrical Products Division.
5. Tyco Electronics Corp.

B. Description: Factory-fabricated connectors and splices of size, ampacity rating, material, type, and class for application and service indicated.

PART 3 - EXECUTION

3.1 CONDUCTOR MATERIAL APPLICATIONS
A. Feeders: Copper. Solid for No. 10 AWG and smaller; stranded for No. 8 AWG and larger.
B. Branch Circuits: Copper. Solid for No. 10 AWG and smaller; stranded for No. 8 AWG and larger.

3.2 CONDUCTOR INSULATION AND MULTICONDUCTOR CABLE APPLICATIONS AND WIRING METHODS
A. Service Entrance: Type THHN-THWN, single conductors in raceway
B. Exposed Feeders: Type THHN-THWN, single conductors in raceway.
C. Feeders Concealed in Ceilings, Walls, Partitions, and Crawlspace: Type THHN-THWN, single conductors in raceway, Metal-clad cable, Type MC.
D. Feeders Concealed in Concrete, below Slabs-on-Grade, and Underground: Underground feeder cable, Type UF.
E. Exposed Branch Circuits, Including in Crawlspace: Type THHN-THWN, single conductors in raceway.
F. Branch Circuits Concealed in Ceilings, Walls, and Partitions: Type THHN-THWN, single conductors in raceway, Metal-clad cable, Type MC.
G. Cord Drops and Portable Appliance Connections: Type SO, hard service cord with stainless-steel, wire-mesh, strain relief device at terminations to suit application.
H. Class 1 Control Circuits: Type THHN-THWN, in raceway.

3.3 INSTALLATION OF CONDUCTORS AND CABLES
A. Conceal cables in finished walls, ceilings, and floors, unless otherwise indicated.
B. Use manufacturer-approved pulling compound or lubricant where necessary; compound used must not deteriorate conductor or insulation. Do not exceed manufacturer's recommended maximum pulling tensions and sidewall pressure values.

C. Use pulling means, including fish tape, cable, rope, and basket-weave wire/cable grips, that will not damage cables or raceway.

D. Install exposed cables parallel and perpendicular to surfaces of exposed structural members, and follow surface contours where possible.

E. Cables shall be listed for the purposes used, and supported every 4.5 feet horizontally and within 12 inches of entry into enclosures, boxes, cabinets, and fittings.

F. Identify and color-code conductors and cables according to NEC 200.6 and 250.119.

G. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.

H. Make splices and taps that are compatible with conductor material and that possess equivalent or better mechanical strength and insulation ratings than unspliced conductors.

I. Wiring at devices: Install conductor at each device, with at least 6 inches of slack.
SECTION 26 05 33 - RACEWAYS AND BOXES

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes raceways, fittings, boxes, enclosures, and cabinets for electrical wiring.

1.2 SUBMITTALS

A. Product Data: For surface raceways, wireways and fittings, floor boxes, hinged-cover enclosures, and cabinets.

1.3 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

B. Comply with NFPA 70.

PART 2 - PRODUCTS

2.1 METAL CONDUIT AND TUBING

A. Rigid Steel Conduit: ANSI C80.1.

B. EMT: ANSI C80.3.

C. FMC: Zinc-coated steel.

D. LFMC: Flexible steel conduit with PVC jacket.

E. Fittings for Conduit (Including all Types and Flexible and Liquidtight), EMT, and Cable: NEMA FB 1; listed for type and size raceway with which used, and for application and environment in which installed.

2. Fittings for EMT: Steel or die-cast, set-screw or compression type.

2.2 NONMETALLIC CONDUIT AND TUBING

B. RNC: NEMA TC 2, Type EPC-40-PVC, unless otherwise indicated.
C. LFNC: UL 1660.
D. Fittings for ENT and RNC: NEMA TC 3; match to conduit or tubing type and material.
E. Fittings for LFNC: UL 514B.

2.3 BOXES, ENCLOSURES, AND CABINETS
A. Sheet Metal Outlet and Device Boxes: NEMA OS 1.
B. Cast-Metal Outlet and Device Boxes: NEMA FB 1, ferrous alloy, Type FD, with gasketed cover.
C. Nonmetallic Outlet and Device Boxes: NEMA OS 2.
D. Nonmetallic Floor Boxes: Nonadjustable, round.
E. Small Sheet Metal Pull and Junction Boxes: NEMA OS 1.
F. Cast-Metal Access, Pull, and Junction Boxes: NEMA FB 1, galvanized, cast iron with gasketed cover.
G. Hinged-Cover Enclosures: NEMA 250, Type 1, with continuous-hinge cover with flush latch, unless otherwise indicated.
   1. Metal Enclosures: Steel, finished inside and out with manufacturer's standard enamel.
   2. Nonmetallic Enclosures: Plastic
H. Cabinets:
   1. NEMA 250, Type 1, galvanized-steel box with removable interior panel and removable front, finished inside and out with manufacturer's standard enamel.
   2. Hinged door in front cover with flush latch and concealed hinge.
   3. Key latch to match panelboards.
   4. Metal barriers to separate wiring of different systems and voltage.

PART 3 - EXECUTION

3.1 RACEWAY APPLICATION
A. Outdoors and pavilion areas: Apply raceway products as specified below, unless otherwise indicated:
   1. Exposed Conduit below 6 feet: Rigid steel conduit or Intermediate steel conduit.
   2. Exposed Conduit Above 6 feet: Intermediate steel conduit or (EMT) Electrical metallic tubing.
   3. Concealed Conduit, Aboveground: EMT, RNC, Type EPC-40-PVC.
5. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): LFMC.
6. Boxes and Enclosures, Aboveground: NEMA 250, Type 3R.

B. Comply with the following indoor applications, unless otherwise indicated:

1. Exposed, Not Subject to Physical Damage: EMT or RNC.
2. Exposed, Not Subject to Severe Physical Damage: EMT.
3. Exposed and Subject to Severe Physical Damage: Rigid steel conduit.
4. Concealed in Ceilings and Interior Walls and Partitions: EMT or RNC, Type EPC-40-PVC.
5. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): FMC, except use LFMC in damp or wet locations.
6. Damp or Wet Locations: IMC.
7. Raceways for Optical Fiber or Communications Cable: EMT or Type EPC-40-PVC.
8. Boxes and Enclosures: NEMA 250, Type 1, except use NEMA 250, Type 4, nonmetallic in damp or wet locations.

C. Minimum Raceway Size: 1/2-inch trade size.

D. Raceway Fittings: Compatible with raceways and suitable for use and location.

1. Rigid and Intermediate Steel Conduit: Use threaded rigid steel conduit fittings, unless otherwise indicated.

3.2 INSTALLATION

A. Comply with NECA 1 for installation requirements applicable to products specified in Part 2 except where requirements on Drawings or in this Article are stricter.

B. Keep raceways at least 6 inches away from parallel runs of flues and steam or hot-water pipes. Install horizontal raceway runs above water and steam piping.

C. Complete raceway installation before starting conductor installation.

D. Support raceways according to the following:
### HORIZONTAL RUNS

<table>
<thead>
<tr>
<th>CONDUIT SIZE</th>
<th>NUMBER OF CONDUIT IN RUN</th>
<th>LOCATION</th>
<th>SPACING IN FEET</th>
</tr>
</thead>
<tbody>
<tr>
<td>½” &amp; ¾”</td>
<td>1 or 2</td>
<td>On Flat Ceiling or Wall</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>1 or 2</td>
<td>Where difficult to support, except at intervals fixed by building construction</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>3 or More</td>
<td>Any Location</td>
<td>7</td>
</tr>
<tr>
<td>1” &amp; Larger</td>
<td>1 or 2</td>
<td>On Flat Ceiling or Wall</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>1 or 2</td>
<td>Where difficult to support, except at intervals fixed by building construction</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>3 or More</td>
<td>Any Location</td>
<td>10</td>
</tr>
</tbody>
</table>

**VERTICAL RUNS**

- ½” & ¾”
  - Support every 7 feet or less
- 1” & 1-1/2”
  - Support every 8 feet or less
- 1-1/2” & Larger
  - Support every 10 feet or less

**E.** Conceal conduit and EMT within finished walls, ceilings, and floors, unless otherwise indicated.

**F.** Install pull wires in empty raceways. Use polypropylene or monofilament plastic line with not less than 200-lb tensile strength. Leave at least 12 inches of slack at each end of pull wire.

**G.** Install raceway sealing fittings at suitable, approved, and accessible locations and fill them with listed sealing compound. For concealed raceways, install each fitting in a flush steel box with a blank cover plate having a finish similar to that of adjacent plates or surfaces. Install raceway sealing fittings at the following points:

1. Where conduits pass from warm to cold locations, such as boundaries of refrigerated spaces.
2. Where otherwise required by NFPA 70.

**H.** Flexible Conduit Connections: Use maximum of 72 inches of flexible conduit for recessed and semirecessed lighting fixtures, equipment subject to vibration, noise transmission, or movement, and for transformers and motors.

1. Use LFMC in damp or wet locations subject to severe physical damage.
2. Use LFMC or LFNC in damp or wet locations not subject to severe physical damage.

**I.** Recessed Boxes in Masonry Walls: Saw-cut opening for box in center of cell of masonry block, and install box flush with surface of wall.
J. Use an 16 gauge, metal, cable protection plate where nonmetallic conduit or cable is used in wood framing. The plate shall extend no less than 1.5 inches beyond the sidewall of the conduit or cable.

3.3 FIRESTOPPING

A. All penetrations through floor sleeves and through smoke and/or fire-rated walls shall be fitted with 3-M Brand Fire Barrier Penetration Sealing System #7904, CP-25 caulk or 303 putty, and shall be installed in accordance with the manufacturer’s instructions. The penetration sealing system must be capable of passing a three (3) hour test per ASTM E-814 (UL 1479). The penetration sealing system must consist of wall wrap, partitions and end caps composed of a material capable of expanding when exposed to temperatures of 250 – 350 degrees F. See Architectural Drawings for smoke and/or fire rated walls.

3.4 PULL, JUNCTION AND SUPPORT BOXES

A. All boxes required under this Section shall be substantially and well made galvanized code gauge steel boxes with bolted or screwed covers, except where otherwise indicated. Boxes exposed to weather or used in wet locations shall be equipped with gaskets and conduit hubs and shall meet weatherproof requirements. All cover plates shall be identified with marking pen to indicate the Panel and Circuit Numbers in which the conductors are terminated. Pull, junction and support boxes shall be sized in accordance with Article 370 of the latest National Electrical Code.

END OF SECTION 26 05 33
SECTION 262416 - PANELBOARDS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes distribution panelboards and branch-circuit panelboards.

1.2 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

B. Comply with NEMA PB 1.

C. Comply with NFPA 70.

PART 2 - PRODUCTS

2.1 GENERAL REQUIREMENTS FOR PANELBOARDS

A. Fabricate and test panelboards according to IEEE 344.

B. Enclosures: Surface-mounted cabinets.
   1. Rated for environmental conditions at installed location.
      a. Indoor Dry and Clean Locations: NEMA 250, Type 1.
      b. Pavilion Area: NEMA 20, Type 3.
   2. Front: Secured to box with concealed trim clamps. For surface-mounted fronts, match box dimensions; for flush-mounted fronts, overlap box.
   3. Hinged Front Cover: Entire front trim hinged to box and with standard door within hinged trim cover.
   4. Enclosures in public areas shall have covers with locks, all keyed the same.

C. Incoming Mains Location:
   1. Top.
   2. MDP to be bottom fed.

D. Phase, Neutral, and Ground Buses: Hard-drawn copper, 98 percent conductivity.

E. Conductor Connectors: Suitable for use with conductor material and sizes.
   2. Main and Neutral Lugs: Mechanical type.
   3. Ground Lugs and Bus Configured Terminators: Mechanical type.
   4. Feed-Through Lugs: Mechanical type, suitable for use with conductor material. Locate at opposite end of bus from incoming lugs or main device.
   5. Subfeed (Double) Lugs: Mechanical type suitable for use with conductor material. Locate at same end of bus as incoming lugs or main device.

F. Future Devices: Mounting brackets, bus connections, filler plates, and necessary appurtenances required for future installation of devices.
G. Panelboard Short-Circuit Current Rating: Rated for series-connected system with integral or remote upstream overcurrent protective devices and labeled by an NRTL. Include size and type of allowable upstream and branch devices, and listed and labeled for series-connected short-circuit rating by an NRTL.


2.2 BRANCH-CIRCUIT PANELBOARDS

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. Eaton Electrical Inc.; Cutler-Hammer Business Unit.
   4. Square D, a brand of Schneider Electric.

C. Panelboards: NEMA PB 1, lighting and appliance branch-circuit type.

D. Mains: Main Lug Only.

E. Branch Overcurrent Protective Devices: Bolt-in circuit breakers, replaceable without disturbing adjacent units.

F. Contactors in Main Bus: NEMA ICS 2, Class A, mechanically held, general-purpose controller, with same short-circuit interrupting rating as panelboard.
   1. External Control-Power Source: 120-V branch circuit.

G. Doors: Concealed hinges; secured with flush latch with tumbler lock; keyed alike.

H. Column-Type Panelboards: Narrow gutter extension, with cover, to overhead junction box equipped with ground and neutral terminal buses.

2.3 DISCONNECTING AND OVERCURRENT PROTECTIVE DEVICES

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 comparable product by one of the following:
   1. Eaton Electrical Inc.; Cutler-Hammer Business Unit.
   4. Square D; a brand of Schneider Electric.

C. Molded-Case Circuit Breaker (MCCB): Comply with UL 489, with series-connected rating to meet available fault currents.


3. Electronic trip circuit breakers with rms sensing; field-replaceable rating plug or field-replaceable electronic trip; and the following field-adjustable settings:
   a. Instantaneous trip.
   b. Long- and short-time pickup levels.
   c. Long- and short-time time adjustments.
   d. Ground-fault pickup level, time delay, and I2t response.

4. Current-Limiting Circuit Breakers: Frame sizes 400 A and smaller; let-through ratings less than NEMA FU 1, RK-5.

5. GFCI Circuit Breakers: Single- and two-pole configurations with Class A ground-fault protection (6-mA trip).


8. Molded-Case Circuit-Breaker (MCCB) Features and Accessories:
   a. Standard frame sizes, trip ratings, and number of poles.
   b. Lugs: Mechanical style, suitable for number, size, trip ratings, and conductor materials.
   c. Application Listing: Appropriate for application; Type SWD for switching fluorescent lighting loads; Type HID for feeding fluorescent and high-intensity discharge (HID) lighting circuits.
   d. Ground-Fault Protection: Remote-mounted relay and trip unit with adjustable pickup and time-delay settings, push-to-test feature, and ground-fault indicator.

D. Fused Switch: NEMA KS 1, Type HD; clips to accommodate specified fuses; lockable handle.

1. Fuses, and Spare-Fuse Cabinet: Comply with requirements specified in Division 16 Section "Fuses."

2.4 ACCESSORY COMPONENTS AND FEATURES

A. Portable Test Set: For testing functions of solid-state trip devices without removing from panelboard. Include relay and meter test plugs suitable for testing panelboard meters and switchboard class relays.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Receive, inspect, handle, store and install panelboards and accessories according to NEMA PB 1.1.

B. Comply with mounting and anchoring requirements specified in Division 16 Section "Vibration and Seismic Controls for Electrical Systems."

C. Mount top of trim 90 inches (2286 mm) above finished floor unless otherwise indicated.
D. Mount panelboard cabinet plumb and rigid without distortion of box. Mount recessed panelboards with fronts uniformly flush with wall finish and mating with back box.

E. Install overcurrent protective devices and controllers not already factory installed.
   1. Set field-adjustable, circuit-breaker trip ranges.

F. Install filler plates in unused spaces.

G. Arrange conductors in gutters into groups and bundle and wrap with wire ties.

H. Comply with NECA 1.

3.2 IDENTIFICATION

A. Create a directory to indicate installed circuit loads and incorporating Owner's final room designations. Obtain approval before installing. Use a computer or typewriter to create directory; handwritten directories are not acceptable.

B. Panelboard Nameplates: Label each panelboard with a nameplate identifying name of panelboard per drawings. Nameplate to be engraved plastic with white face and black letters with factory adhesive backing. Lettering shall be not less than 1/4" in height.

C. Disconnect Nameplates: Each disconnect shall be clearly labeled with the circuit that it is services from and the device that it services (Ex. 1LP7-13, 15/CU-1).

3.3 FIELD QUALITY CONTROL

A. Perform tests and inspections.

B. Acceptance Testing Preparation:
   1. Test insulation resistance for each panelboard bus, component, connecting supply, feeder, and control circuit.
   2. Test continuity of each circuit.

C. Tests and Inspections:
   1. Perform each visual and mechanical inspection and electrical test stated in NETA Acceptance Testing Specification. Certify compliance with test parameters.
   2. Correct malfunctioning units on-site, where possible, and retest to demonstrate compliance; otherwise, replace with new units and retest.

D. Panelboards will be considered defective if they do not pass tests and inspections.

E. Prepare test and inspection reports, including a certified report that identifies panelboards included and that describes scanning results. Include notation of deficiencies detected, remedial action taken, and observations after remedial action.

END OF SECTION 26 24 16