

Project Manual

HVAC Modifications –
Phase 2 Elementary Schools
Ravenna City Schools
Ravenna, Ohio

Project No. 221119.00

October 6, 2023



PROJECT TITLE PAGE

HVAC MODIFICATIONS – PHASE 2 ELEMENTARY SCHOOLS
RAVENNA CITY SCHOOL
RAVENNA, OHIO

Architects/Engineers

Direct Questions Concerning This Project To:

Questions for this Project shall be directed to OhioBidQuestions@fhai.com.

Fanning/Howey Associates, Inc.
4930 Bradenton Avenue
Dublin, OH 43017
Phone No. 614/764-4661
FAX No. 614/764-7894

SET NO. _____

END OF PROJECT TITLE PAGE

CERTIFICATIONS PAGE

TITLE AND LOCATION OF THE WORK

HVAC Modifications – Phase 2 Elementary Schools

West Main Elementary School
639 West Main Street
Ravenna, OH 44266

Willyard Elementary School
680 Summit Street
Ravenna, OH 44266

West Park Elementary School
1071 Jones Avenue
Ravenna, OH 44266

NAME AND ADDRESS OF OWNER

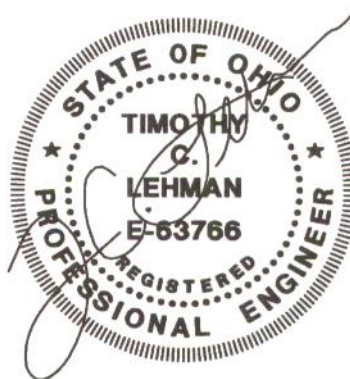
Ravenna City Schools
534 Summit Street
Ravenna, OH 44266

NAME AND ADDRESS OF ARCHITECTS/ENGINEERS

Fanning/Howey Associates, Inc.
4930 Bradenton Avenue
Dublin, OH 43017

I hereby certify that the Project Drawings and the Project Manual were prepared by me or under my direct supervision and that I am a duly registered Architect/Engineer under the Laws of the State of Ohio.

FANNING/HOWEY ASSOCIATES, INC.
ARCHITECTS/ENGINEERS



Date: October 6, 2023

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END OF CERTIFICATION PAGE

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Bids: November 2, 2023

Project Name: HVAC Modifications for Ravenna City Schools – Phase 2 Elementary Schools

Project Number: 221119.00

Fanning/Howey Associates, Inc.
4930 Bradenton Avenue
Dublin, Ohio 43017
Phone No.: 614/764-4661

The Board of Education, Ravenna City School, Ravenna, Ohio, will receive sealed bids for HVAC Modifications.

Bids shall be a on a stipulated sum basis for each school and a combination bid is acceptable.

The Board of Education will receive bids until 11:00 a.m. on November 2, 2023, at the Board Office, Carlin Elementary School, 531 Washington Avenue, Ravenna, OH 44266. Bids received after this time will not be accepted. Bids will be opened and publicly read aloud immediately after specified closing time. All interested parties are invited to attend.

Procurement Documents may be examined electronically at:

CMD (a ConstructConnect Company)
3825 Edwards Road
Suite 800
Cincinnati, OH 45209
www.ConstructConnect.com

Dodge Data & Analytics
3315 Central Ave
Hot Springs, AR 71913
www.construction.com

Copies of the Procurement Documents may be obtained through the printer, DC Reprographics, 1254 Courtland Avenue, Columbus, Ohio 43201; phone no. 614-297-1200. www.dcplanroom.com.

Bid security in the form of certified check, cashier's check, or letter of credit pursuant to the Ohio Revised Code in the amount of 10 percent of the total bid shall accompany each bid; or a Bid Guaranty and Contract Bond in accordance with Chapter 153.571 of the Ohio Revised Code in the amount of 100 percent of the total bid shall accompany each bid.

Each successful bidder is required to furnish a Contract Bond in accordance with the Ohio Revised Code in the amount of 100 percent of the full contract sum, if not provided as part of the bid security.

The estimated cost of the Construction Work is: \$720,000.00.

The project is subject to the Davis Bacon Act and the Contractor and subcontractor will be required to pay federal prevailing wage.

DOMESTIC STEEL USE REQUIREMENTS AS SPECIFIED IN SECTION 153.011 OF THE REVISED CODE APPLY TO THIS PROJECT. COPIES OF SECTION 153.011 CAN BE OBTAINED FROM ANY OF THE OFFICES OF THE DEPARTMENT OF ADMINISTRATIVE SERVICES.

A prebid conference will be held on October 24, 2023, at 4:30 p.m., local time, at the Willyard Elementary School, 680 Summit Street, Ravenna, Ohio of the Ravenna City Schools,. Attendance by bidders is optional, but recommended, in order to clarify or answer questions concerning the Drawings and Project Manual for the Project.

Questions for this Project shall be directed to OhioBidQuestions@fhai.com.

The Owner reserves the right to reject each and every bid, and to waive informalities, irregularities, and errors in the bidding to the extent permitted by law. This includes the right to extend the date and time for receipt of bids.

No bidder may withdraw their bid within 60 days after the actual date of the bid opening thereof.

This notice and request for bids is dated October 6, 2023.

RAVENNA CITY SCHOOLS
RAVENNA, OHIO

END OF DOCUMENT 00 01 13

DOCUMENT 00 21 13 - INSTRUCTIONS TO BIDDERS

Described herein are general and specific instructions provided to assist bidders in the responsible preparations of complete bids. However, it is imperative that each bidder become familiar with all aspects of the Bidding Documents in recognition that only the detailed requirements contained therein shall serve as the basis of compliance with this project.

PART 1 GENERAL

1.01 DEFINITIONS

- A. Bidding Documents include the Bidding Requirements and the proposed Contract Documents. The Bidding Requirements consist of the Advertisement or Notice to Bid, Instructions to Bidders, Supplementary Instructions to Bidders, the bid form, and other sample bidding and contract forms. The proposed Contract Documents consist of the Form of Agreement between the Owner and Contractor, Conditions of the Contract (General, Supplementary and other Conditions), Drawings, Specifications, and all Addenda issued prior to the execution of the Contract.
- B. Definitions set forth in the General Conditions of the Contract for Construction, AIA Document A201, or in other Contract Documents are applicable to the Bidding Documents.
- C. Addenda are written or graphic instructions issued by the Architect/Engineer (A/E) prior to the execution of the Contract which modify or interpret the Bidding Documents by additions, deletions, clarifications, or corrections.
- D. A Bid is a complete and properly executed proposal to do the Work for the sums stipulated therein, submitted in accordance with the Bidding Documents.
- E. The Base Bid is the sum stated in the Bid for which the Bidder offers to perform the Work described in the Bidding Documents as the base, to which Work may be added or from which Work may be deleted for sums stated in Alternate Bids.
- F. An Alternate Bid (or Alternate) is an amount stated in the Bid to be added to or deducted from the amount of the Base Bid if the corresponding change in the Work, as described in the Bidding Documents, is accepted.
- G. A Unit Price is an amount stated in the Bid as a price per unit of measurement for materials, equipment or services or a portion of the Work as described in the Bidding Documents.
- H. A Prime Bidder is a person or entity who submits a Bid and who meets the requirements set forth in the Bidding Documents.
- I. A sub-bidder is a person or entity who submits a bid to a Bidder for materials, equipment or labor for a portion of the Work.

1.02 DOCUMENTS

- A. Architect will not be responsible for choosing correct sheets for Contractor. Contractor shall request which sheets he wants.
- B. Prime Bidders are required to obtain full, complete sets of Bidding Documents.

1.03 BIDDERS EXAMINATION AND REPRESENTATION

- A. Before submitting a bid, each bidder should carefully examine the documents and the construction site and inform himself of the limitations and conditions related to the Work covered by his bid, and shall include in his bid a sum to cover the cost of such items. Each bidder represents and warrants for himself any are relevant, subcontractors he intends to employ on the project, that he has observed all nature of the work, that he has had opportunity to inquire about site conditions including public right-of-ways and areas adjacent to the site which might affect the Work, and that he has prepared his proposal with the requisite understanding of the project and site conditions. Contractors will not be given extra payments for conditions which could have been determined by examining the site and documents.
- B. It is the purpose and intent of the Contract Documents, that a complete job be accomplished. It shall be each bidder's responsibility to include costs necessary to provide labor and materials for that portion of the Work bid upon, including incidentals, whether or not specifically called for in the Specifications and Drawings.
- C. Each bidder by making his bid represents that he has read and understands the bidding documents. Bid is made in compliance with Bidding Documents.
- D. Each bidder by making his bid represents that he has visited the site and familiarized himself with the local conditions under which the Work is to be performed and has correlated the Bidder's personal observations with the requirements of the requirements of the proposed Contract Documents.
- E. Each bidder shall be responsible for being completely familiar with the Work of other bid package(s) which require interface of Work with the bid package(s) the bidder is bidding on. Bid shall be based upon the materials, equipment, and systems required by the Contract Documents without exception.
- F. No allowance shall be subsequently made in behalf of a bidder by reason of error or oversight on his part resulting from his failure to so examine the Construction Documents for the other trades.
- G. Each bidder understands that past acceptance of products does not assure acceptance on this Project. Products not specifically specified require requests for approval prior to bid due date.

1.04 QUALIFICATIONS OF BIDDERS

- A. The Owner will have the right to take such steps as he deems necessary to determine the ability of the bidder to perform the Work, and the apparent low bidders shall furnish the Owner such data for this purpose as the Owner may request. When requested, this shall clearly show the bidder's financial resources, his construction experience, his organization, and equipment available for Work contemplated.
- B. Unless otherwise noted, the apparent low bidders shall complete the AIA Document A305 including all Exhibits A-E, Contractor Qualifications Statement, and thereafter provide it to the Architect within 72 hours after bids are received and any such additional information as the Architect may request regarding the bidder's responsibility. Additionally, upon request from the Architect, other bidders will promptly complete and submit to the Architect AIA Document A305, Contractor Qualifications Statement, and such additional information as the Architect may request regarding the bidder's responsibility.

1.05 INTERPRETATION

- A. Questions for this Project shall be directed to: OhioBidQuestions@fhai.com

- B. If the Bidder finds any perceived ambiguity, conflict, error, omission, or discrepancy on or between any of the Contract Documents, including without limitation the Drawings and Specifications, or between any of the Contract Documents and any applicable provision of law, including without limitation, the Building Code, the Bidder shall submit a written request to the A/E, for an interpretation or clarification.
 - 1. In order to prevent an extension of the bid opening, the Bidder shall make all requests for interpretation or clarification a minimum of 7 days before bid opening.
- C. Prospective bidders in doubt as to the true meaning of a part of the Drawings, Specifications or other Contract Documents shall submit to the Architect not less than 7 days before closing time for bids, a written request for interpretation and clarification. Request made after 7 days may not be answered.
- D. Bidders are instructed to request interpretations and the issuing of addenda if the Contract Documents call for materials, equipment, or methods which adversely affect the cost or quality of the project, or are unavailable.
- E. The Bidder shall not, at any time after the execution of the Contract, be compensated for a claim alleging insufficient data, incomplete, ambiguous, conflicting, or erroneous Contract Documents, any discrepancy on or between Contract Documents, or incorrectly assumed conditions regarding the nature or character of the Work, if no request for interpretation or clarification regarding such matter was made by the Bidder prior to the bid opening.
- F. Interpretations, corrections and changes of the Bidding Documents will be made by Addendum. Interpretations, corrections and changes of the Bidding Documents made in any other manner will not be binding, and Bidders shall not rely upon them.

1.06 SUBSTITUTIONS

- A. The materials, products and equipment described in the Bidding Documents established a standard of required function, dimension, appearance, and quality to be met by any proposed substitution. Each bid will be based on these brands, which may be referred to in the Bid Documents as Standards. The use of another brand (referred to as a substitution or proposed equal in the Bid Documents, when the bidder or the contractor seeks to have a different brand of material or apparatus than that specified and approved by the Owner for use in the Project) may be requested as provided herein.
- B. If a Contractor preparing bids for submission on the Work is in doubt as to the acceptability of a manufacturer's material or equipment, under the requirements as set forth in the Specifications, he should require that representatives of the proposed manufacturer or supplier contact the Architect and request a ruling on the acceptability of the material or equipment in question.
- C. No substitution will be considered prior to receipt of Bids unless written request for approval has been received by the A/E at least ten (10) days prior to the date for receipt of Bids. Such requests shall include the name of the material or equipment for which it is to be substituted and a complete description of the proposed substitution including drawings, performance and test data, and other information necessary for an evaluation. A statement setting forth changes in other materials, equipment or other portions of the Work, including changes in the Work of other contracts that incorporation of the proposed substitution would require, shall be included. The burden of proof of the merit of the proposed substitution is upon the proposer. The A/E's decision of approval or disapproval of a proposed substitution shall be final.
 - 1. Request shall be accompanied by Division 00 Document "Substitution Request Form (During Procurement)".
- D. Requests for product approval shall be submitted on sample form following this Section and sent to the Project Manager and copied to the Bidding Coordinator:
- E. If the A/E approves a proposed substitution prior to receipt of Bids, such approval will be set forth in an Addendum. Bidders shall not rely upon approvals made in any other manner.

- F. No substitutions will be considered after the Contract award unless specifically provided for in the Contract Documents.

1.07 ADDENDA

- A. If the A/E determines that an interpretation or clarification is warranted, the A/E shall issue an Addendum. All addenda become part of the Contract.
- B. A copy of the addenda will be mailed or delivered to each bidder of record, and to each prospective bidder requesting a copy. Bidders who request and are sent documents by the Architect are considered "Bidders of Record." Copies of addenda will be available for inspection wherever Contract Documents are on file for that purpose.
- C. The Owner reserves the right to issue addenda changing, altering, or supplementing the Contract Documents, at any time prior to the time set for receiving bids.
- D. Bidders are responsible for acquiring each issued addenda in time to incorporate them into their proposal.
- E. In the event delivery of addenda to bidders is delayed, for reasons not the fault of the bidders, the Owner may be requested to allow a reasonable extension of time for the opening of bids, to permit inclusion of such addenda.
- F. Each Bidder shall ascertain prior to submitting a Bid that the Bidder has received all Addenda issued, and the Bidder shall acknowledge their receipt in the Bid.
- G. If a bidder fails to indicate receipt of each addendum through the last addendum, issued by the Architect, on its Supplemental Bid Proposal Form, the bid of such bidder will be deemed to be responsive only if:
 - 1. The bid received clearly indicates that the bidder received the addendum, such as where the addendum added another item to be bid upon and the bidder submitted a bid on that item; or
 - 2. The addendum involves only a matter of form or is one which has either no effect or has merely a trivial or negligible effect on price, quantity, quality, or delivery of the item bid upon.

1.08 ALTERNATES (IF REQUESTED)

- A. Requested alternates are listed on the Bid Form and are described in detail under Division 1 - Alternates. NOTE: The terms "alternate" and "alternative" are used interchangeably in this Project Manual and on the Drawings.
 - 1. The price of the Bid for each alternate will be the amount to be added to or deducted from the price of the Base Bid if the Owner selects the alternate.
 - 2. The Owner may accept alternates in any order, regardless of how they are listed, and determine the lowest responsible bidder on the basis of the sum of the base bid plus any selected alternates.
 - 3. If the Bidder does not indicate if the amount state is an add to or a deduct from the base bid amount, the amount shall be deemed to be an addition to the base bid amount.
- B. The cost of each alternate shall include omissions, additions, and adjustments of trades as may be necessary because of each change, substitution, addition, or omission.
- C. Each bidder shall be responsible for bidding alternates which affect the Work of the base bid he is bidding, regardless of whether listed or not listed on the Bid Form. All requested Alternates shall be bid. If no change in the Base Bid is required, enter "No Change". If an applicable alternate(s) is not listed on the Bid Form, the bidder shall submit on his letterhead the cost of said alternate(s). No additional monies will be allowed after signing of contract for failure to bid applicable alternates.

- D. Bidder shall fill in the applicable blank with an increased or decreased bid amount. The Owner reserves the right to accept or reject any or all bids on Alternates, in whole or in part, and in any order.
 - 1. If no change in the bid amount is required, indicate "No Change".
 - 2. A blank entry or an entry of "No Bid", "N/A", or similar entry on any Alternate will cause the bid to be rejected as nonresponsive only if that Alternate is selected.
 - 3. If an Alternate is not selected, an entry as listed in paragraph hereinbefore on that Alternate will not, by itself, render a bid nonresponsive.
 - 4. In a combined bid, a blank entry, or an entry of "No Bid", "N/A", or similar entry on an Alternate will cause the bid to be rejected as nonresponsive only if that Alternate applies to the combined bid and that Alternate is selected.
- E. The Owner retains the right to include or exclude work required by alternates for the sums established exercisable within 60 days from and including the date of signing the Contract.

1.09 UNIT PRICES (Not Applicable)

- A. Refer to Unit Price Sheet included in the Project Manual.
- B. The low bidders shall agree to submit the unit prices requested by the Architect within 10 days of when the bids were received.
- C. Unit prices shall be executed on the form provided by the Architect (see Table of Contents), shall include overhead and profit, shall be negotiated between the bidder and the Architect, and when mutually agreed upon, they shall be attached to and become a part of the awarded Construction Contract (Form of Agreement).
- D. Requested unit prices will not be considered in the award, unless otherwise noted.

1.10 BIDDING PROCEDURES

- A. Each bid shall be submitted on the Bid Form and sealed in an envelope clearly marked as containing a bid, indicating the Project Name, the bid package (scope), and the date of the bid opening on the envelope.
 - 1. Any substantial change, alteration or addition in the wording of the Bid Form may cause a bid to be rejected as not responsible for award of a Contract.
 - 2. Unless the Bidder withdraws the bid, the Bidder will be required to comply with all requirements of the Contract Documents, regardless of whether the Bidder had actual knowledge of requirements and regardless of any statement or omission made by the Bidder which might indicate a contrary intention.
- B. Bids shall be executed upon the Bid Form provided, and relevant blank spaces in the form shall be filled in ink and not in pencil. The signature shall be in longhand and the completed form shall be without interlineation, alteration, or erasure. Each bidder is required to bid every item called for, including alternate and unit costs.
 - 1. The Bidder shall show all bid amounts in both words and figures. In case of a conflict between the words and figures, the amount shown in words shall govern, where such words are not ambiguous. When the Bidder's intention and the meaning of the words are clear, omissions or misspelling of words will not render the words ambiguous.
 - 2. Any alteration or erasure of items filled in on the Bid Form shall be initialed by the Bidder.
- C. A bid is invalid if it has not been deposited at the designated location prior to the time and date for receipt of bids indicated in the Advertisement for Bids, or prior to extension thereof issued to the bidders.
- D. Oral, telephonic, telegraphic, facsimile or other electronically transmitted bids will not be considered.

- E. Bids which are not signed by the individuals making them shall have attached thereto a Power of Attorney evidencing authority to sign the bid in the name of the person for whom it is signed. Bids which are signed for a partnership shall be signed by the partners, or by an attorney-in-fact. If signed by an attorney-in-fact, there shall be attached to the bid a Power of Attorney evidencing authority to sign the bid, executed by the partners.
- F. Bids which are signed for a corporation shall have the authorized officer of the corporation manually written below the corporate name, following the word "By __." If such a bid is manually signed by an official other than the president of the corporation, a certified copy of a resolution by the Board of Directors evidencing the authority of such official to sign the bid shall be attached to it. The bid shall also bear the attesting signature of the secretary of the corporation.
- G. It is the bidder's responsibility to include in his bid costs necessary for a completed and finished job for items of Work bid upon.
- H. Submit bids in duplicate with Bid Security and other requested supplemental material attached; properly and completely executed.
- I. Proposals for Work shall not include the Ohio Sales Tax for materials to be incorporated into this Project. Owner will provide necessary tax exemption forms.

1.11 BID SECURITY

- A. Each Bid shall be accompanied by a bid security in the form and amount required if so stipulated in the Advertisement for Bids. The Bidder pledges to enter into a Contract with the Owner on the terms stated in the Bid and will, if required, furnish bonds covering the faithful performance of the Contract and payment of all obligations arising thereunder. Should the Bidder refuse to enter into such Contract or fail to furnish such bonds if required, the amount of the bid security shall be forfeited to the Owner as liquidated damages, not as a penalty.
- B. The Bid Security of bidders, except the 3 selected best qualified in each category, may be returned within 3 days after the opening of bids, at the Owner's or Architect's option.
- C. Bid Security of the 3 selected qualified bidders may be held by the Owner, following the bid opening, for not more than the maximum number of days stipulated in the Advertisement for Bids, unless the Owner and the bidders agree otherwise; except that in the event a qualified bidder has been awarded the Contract and has failed to execute same and furnish Contract Bond, then the Bid Security of such bidder will be subject to forfeit and the next qualified bidder, if tendered the Contract, will be subject to the same provisions as hereinbefore set forth. Should the award fall to the third qualified bidder because of a default of the previous 2 qualified bidders, the same condition will apply to the third bidder as hereinbefore set forth.
- D. The Bid Security of the 3 selected bidders will be returned within 72 hours after the Form of Agreement has been executed.
- E. In the event that the Owner should decide to reject all bids, the Bid Securities will be returned within 72 hours following that decision.
- F. Bid security is subject to forfeiture if a bid is withdrawn during the time period bids are to be held.

1.12 IDENTIFICATION AND SUBMISSION OF BID PROPOSAL

- A. Enclose bids in opaque, sealed envelope with Bid Security and other requested exhibits. The envelope shall have clearly marked in indelible material on its face, the following:
 - 1. Name of Project
 - 2. Name of Bidder
 - 3. Base Bid(s) _____
(Note: Classification of Work bid upon; such as, Base Bid "A").
 - 4. Date and time of closing of bids

- B. If the Bid is sent by mail, the sealed envelope shall be enclosed in a separate mailing envelope with the notation "SEALED BID ENCLOSED" on the face thereof.
- C. Bids shall be deposited at the designated location prior to the time and date of receipt of Bids. Bid received after the time and date for receipt of Bids will be returned unopened.
- D. The Bidder shall assume full responsibility for timely delivery at the location designated for receipt of Bids.

1.13 MODIFICATION OR WITHDRAWAL OF BID PROPOSAL

- A. A bidder may withdraw his bid prior to the scheduled time for the receipt of bids, without forfeiture of bid security. If a postponement of the time for receiving bids is made, the new time established therein shall be the time within the meaning of this Article.
- B. Bids may be modified prior to bid closing time.
- C. After pronouncement of the closing of bids, no Contractor may recall his bid, except in accordance with Ohio Revised Code.
- D. A Bid may not be modified, withdrawn, or concealed by the Bidder during the stipulated time period following the time and date designated for the receipt of Bids, and each Bidder so agrees in submitting a Bid.

1.14 OPENING OF BIDS

- A. The Advertisement to Bid indicates the time and place fixed for opening bids. If stipulated in the Advertisement, the properly identified Bids received on time will be publicly opened and will be read aloud. An abstract of the Bids may be made available to Bidders. Bids received after advertised time will be returned unopened. Bids will be stamped showing the date and time received.
- B. Bids received prior to the time of opening will be securely kept, unopened. The officer whose duty it is to open them will decide when the specified time has arrived, and no bid received thereafter will be considered.
- C. No responsibility will be attached to an officer for the premature opening of a bid not properly addressed and identified.
- D. The amounts involved in alternates requested will be read or disclosed as part of the requirements of this Article. Voluntary alternates will not be read.
- E. The Owner reserves the right to delay the time for opening of bids when, in his judgment, it is desirable or necessary.

1.15 DISQUALIFICATION

- A. The Owner reserves the right to reject each and every bid, to waive formalities and informalities in bidding, to accept and reject alternates regardless of their order or sequence, unless otherwise called for on the Bid Form. The Owner has the right to reject bids not accompanied by a required bid security or by other data required by the Bidding Documents, or a Bid which is in any way incomplete or irregular is subject to rejection.
- B. The right is reserved to reject a bid where an investigation of the available evidence of information does not satisfy the Owner that the bidder is qualified to properly carry out the terms of the Contract Documents.

- C. Bona fide bids in a definite stated amount, without special clauses governing price of labor and material increases, shall be the only ones that will be considered. No contract shall be entered into carrying what is commonly known as an "Escalator Clause."
- D. Bids which contain qualifications or conditions that are contrary to the text or intent of the Contract Documents, and which are inserted in the bid for the purpose of limiting or otherwise qualifying the responsibility of the bidder, outside of the text or intent of the Contract Documents, will be subject to disqualification.
- E. The Owner also reserves the right to reject the bid of a bidder who has previously failed to perform properly or to complete contracts of a similar nature on time, who is not in a position to perform the contract, or who has habitually, and without just cause neglected the payment of bills or otherwise disregarded his obligations to subcontractors, materialmen, or employees.
- F. The ability of the bidder to obtain or qualify for a Contract Bond shall not be regarded as a sole test of such bidder's competence or responsibility.

1.16 DETERMINATION OF LOWEST RESPONSIBLE BID

- A. Subject to the right of the Owner to reject each and every bid, the Owner will award the Contract for the Work to the bidder submitting the lowest responsible bid. In determining which bid is the lowest responsible bid, the Owner may take into consideration not only the amount of the bid but such of the following criteria as it, in its discretion, deems appropriate and may give such weight thereto as it deems appropriate:
 - 1. The bidder's financial ability to complete the Contract successfully without resort to its Surety;
 - 2. The bidder's prior experience with similar work on comparable or more complex projects;
 - 3. The bidder's prior history for the successful and timely completion of projects;
 - 4. The bidder's equipment and facilities;
 - 5. The adequacy, in numbers and experience, of the bidder's work force to complete the Contract successfully and on time;
 - 6. The bidder's prior experience on other projects of the Owner, including the bidder's demonstrated ability to complete its Work on these projects in accordance with the Contract Documents and on time;
 - 7. The bidder's compliance with federal, state, and local laws, rules, and regulations, including, but not limited to, the prevailing wage law;
 - 8. Depending upon the type of the work, other essential factors.
- B. The failure to submit requested information on a timely basis may result in the determination that the bidder is not responsible.
- C. Affidavit as to Property Taxes
 - 1. Section 5719-042 of the Ohio Revised Code, effective September 21, 1982, requires the successful bidder(s) to furnish the Project Taxing District with a statement under oath that he or his company has or does not have any delinquent personal property taxes due and payable within the county of the Project, 22.2 (ORC) Sec. 5719.042. After the award by a taxing district of any contract let by competitive bid and prior to the time the contract is entered into, the person making a bid shall submit to the district's fiscal officer a statement affirmed under oath that the person with whom the contract is to be made was not charged at the time the bid was submitted with any delinquent personal property taxes on the general tax list of personal property of any county in which the taxing district has territory or that such person was charged with delinquent personal property taxes on any such tax list, in which case the statement shall also set forth the amount of such due and unpaid delinquent taxes and any due and unpaid penalties and interest thereon. If the statement indicates that the taxpayer was charged

with any such taxes, a copy of the statement shall be transmitted by the fiscal officer to the County Treasurer within thirty days of date it is submitted. A copy of the statement shall also be incorporated into the contract, and no payment shall be made with respect to any contract to which this section applies unless such statement has been so incorporated as a part thereof.

1.17 CONTRACT BOND

- A. To satisfy the bond requirements the bidders who become the Contractors must have submitted a combination Bid Guaranty and Contract Bond as prescribed in Sections 153.54, 153.57, and 153.571 of the Ohio Revised Code or the following:
- B. The bidders who become the Contractors, who submitted as a Bid Security, a certified check, cashier's check, or letter of credit, shall be required to provide a Contract Bond, covering the faithful performance of the contract and the payment of obligations arising thereunder in a penal sum equal to 100 percent of the amount of the contract sum. Said bonds shall remain in effect for 12 months after date established as start of one-year guarantee period. Premiums shall be included in the bid and paid for by the Contractor.
 - 1. Bonds shall be submitted on form provided in Division 00 "Bid Forms".
 - 2. The bidder shall deliver the required bonds to the Owner not later than the date of execution of the Contract.
- C. A surety company authorized by the Ohio Department of Insurance to transact business in the State of Ohio must issue the bond. The bond must be issued by a surety capable of demonstrating a record of competent underwriting, efficient management, adequate reserves, and sound investments. These criteria will be met if the surety currently has an A.M. Best Company Policyholders Rating of "A+", "A", or "A-" or better and has or exceeds the Best Financial Size Category of Class VII.
- D. Bonds shall be signed by an authorized agent of an acceptable Surety Bonding Company and by the bidder. (Affix Corporate Seals to each copy.)
- E. Surety Bonding Company bonds shall be supported by credentials showing the Power of Attorney of the agent, and a certificate showing the legal right of the Bonding Company to do business in the State of Ohio, and a financial statement of the Surety.
- F. The Bid Guaranty, as applicable, shall be in the name of or payable to the order of the Owner.
- G. The name and address of the Surety and the name and address of the Surety's Agent should be typed or printed on each bond.

1.18 EXECUTION OF THE CONTRACT

- A. Subsequent to the award, and within 10 days after the prescribed Form of Agreement is presented for his signature, the Awardee shall execute and deliver them to the Owner through the Architect, in such number of counterparts as the Owner may require.
- B. The failure of the Awardee to execute the Contract and to supply the required bonds when the Agreement is presented for signature, or within such extended period as the Owner may grant, based upon reasons determined adequate by the Owner, shall constitute a default; and the Owner may either award the Contract to the next responsible bidder or readvertise for bids. In the event of a default, the Owner shall have the right to declare the amount of the bid security forfeited. It shall be a further condition that the Owner shall not collect more on a defaulted bid than the difference between the defaulted bid amount and the bid of the firm to which the award is made, after giving due weight and consideration to alternates accepted.
- C. A Contractor receiving an award will be required to furnish and execute the following within 14 days after the form of the Contract is presented for signature.
 - 1. Agreement Form
 - 2. Contract Bond

3. Insurance requirements specified in Article 11 of the "Supplementary General Conditions," shall be properly executed on Certificate of Insurance, Acord 25-S or other acceptable form, in duplicate.
4. Enrollment in good standing in the Ohio Bureau of Workers' Compensation (BWC) Drug-Free Workplace Program (DFWP) or an equivalent BWC approved DFWP in accordance with but not limited to Ohio Administrative Code Chapter 4123-17 and Executive Order 2002-13T.
5. Property Tax Affidavit per Section 5719.042 of the O.R.C.
6. Subcontractors and Major Material Suppliers List on form bound herein and specified in Division 01 Section "Submittal Procedures."

1.19 TIME OF COMMENCEMENT AND COMPLETION

- A. The Contractor shall commence Work within 10 days after the effective date of the Contract, or when notified in writing to proceed, and shall complete the Work within the time limitations established in the Form of Agreement, these Instructions To Bidders, and in Division 01 Section "Multiple Contract Summary".

1.20 COMBINED BIDS

- A. Bidders desiring to submit a combined bid for two or more base bid Areas of Work shall so indicate in his combined bid together with the separate base bid areas included on the appropriate page(s) of the Bid Form.
- B. The individual cost amounts of each base bid (including alternates) shall be indicated in the appropriate spaces for each and every base bid included under the combined bid.

1.21 TAX EXEMPT

- A. The Owner is a political subdivision of the State of Ohio. Building materials that the successful bidder purchases for incorporation into the Project will be exempt from state sales and use taxes if the successful bidder provides a properly completed sales tax exemption certificate, executed by the successful bidder and the Owner, to the vendors or suppliers when the materials are acquired. The Owner will execute properly completed certificates on request.

1.22 DAVIS-BACON ACT REQUIREMENTS

- A. The Project is being financed with Qualified School Construction Bonds, which require payment of federal prevailing wage rates for Portage and compliance with other requirements of the Davis-Bacon Act.
- B. Davis-Bacon Wage Decision must be posted by the employing contractor. Wages to anyone performing work on the project must be paid at not less than the rates included in this decision throughout the term of the contract.
- C. The Davis-Bacon poster (WH-1 321) shall be posted at all times by each contractor and its subcontractors at the site of the work by in a prominent and accessible place where it can be easily seen by the workers. A copy of the poster is included in the Project Manual. The poster is available on the I.S. Department of Labors Wage and Hour Division website.
- D. Certain contract clauses are required to be inserted into the contract for construction by 29 CFR 5.5 for any contract in excess of \$2,000. These clauses are included in the AIA Document A101-2007, Standard Form of Agreement between Owner and Contractor where the basis of payment is a stipulated sum, under Section 8.6 and certain references to these requirements will be included in the AIA Document A201-2007, General Conditions of the Contract for Construction. The following clauses will be inserted in AIA Document AI 01-2007 under Section 8.6 in the agreement prepared for each successful bidder as required by 29 CFR 5.5:

1. Minimum wages.
 - a. All laborers and mechanics employed or working upon the site of the work (or under the United States Housing Act of 1937 or under the Housing Act of 1949 in the construction or development of the project), will be paid unconditionally and not less often than once a week, and without subsequent deduction or rebate on any account (except such payroll deductions as are permitted by regulations issued by the Secretary of Labor under the Copeland Act (29 CFR part 3)), the full amount of wages and bona fide fringe benefits (or cash equivalents thereof) due at time of payment computed at rates not less than those contained in the wage determination of the Secretary of Labor which is attached hereto and made a part hereof, regardless of any contractual relationship which may be alleged to exist between the contractor and such laborers and mechanics.
 - b. Contributions made or costs reasonably anticipated for bona fide fringe benefits under section 1 (b)(2) of the Davis-Bacon Act on behalf of laborers or mechanics are considered wages paid to such laborers or mechanics, subject to the provisions of paragraph (a)(i)(iv) of this section; also, regular contributions made or costs incurred for more than a weekly period (but not less often than quarterly) under plans, funds, or programs which cover the particular weekly period, are deemed to be constructively made or incurred during such weekly period. Such laborers and mechanics shall be paid the appropriate wage rate and fringe benefits on the wage determination for the classification of work actually performed, without regard to skill, except as provided in § 5.5(a)(4) [apprentices and trainees]. Laborers or mechanics performing work in more than one classification may be compensated at the rate specified for each classification for the time actually worked therein: Provided that the employer's payroll records accurately set forth the time spent in each classification in which work is performed. The wage determination (including any additional classification and wage rates conformed under paragraph (a)(1)(ii) of this section) and the Davis-Bacon poster (WH-1 321) shall be posted at all times by the contractor and its subcontractors at the site of the work in a prominent and accessible place where it can be easily seen by the workers.
 - c. The contracting officer shall require that any class of laborers or mechanics, including helpers, which is not listed in the wage determination and which is to be employed under the contract shall be classified in conformance with the wage determination. The contracting officer shall approve an additional classification and wage rate and fringe benefits therefore only when the following criteria have been met:
 - 1) The work to be performed by the classification requested is not performed by a classification in the wage determination; and
 - 2) The classification is utilized in the area by the construction industry; and
 - 3) The proposed wage rate, including any bona fide fringe benefits, bears a reasonable relationship to the wage rates contained in the wage determination.
 - d. If the contractor and the laborers and mechanics to be employed in the classification (if known), or their representatives, and the contracting officer agree on the classification and wage rate (including the amount designated for fringe benefits where appropriate), a report of the action taken shall be sent by the contracting officer to the Administrator of the Wage and Hour Division Employment Standards Administration, U.S. Department of Labor, Washington, DC 20210. The Administrator, or an authorized representative, will approve, modify, or disapprove every additional classification action within 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30 day period that additional time is necessary.

- e. In the event the contractor, the laborers or mechanics to be employed in the classification or their representatives, and the contracting officer do not agree on the proposed classification and wage rate (including the amount designated for fringe benefits, where appropriate), the contracting officer shall refer the questions, including the views of all interested parties and the recommendation of the contracting officer to the Administrator for determination. The Administrator or an authorized representative will issue a determination within 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30 day period that additional time is necessary.
- f. The wage rate (including fringe benefits where appropriate) determined pursuant to paragraphs (a)(1)(ii) (B) or (C) of this section shall be paid to all workers performing work in the classification under this contract from the first day on which work is performed in the classification.
 - 1) Whenever the minimum wage rate prescribed in the contract for a class of laborers or mechanics includes a fringe benefit which is not expressed as an hourly rate, the contractor shall either pay the benefit as stated in the wage determination or shall pay another bona fide fringe benefit or an hourly cash equivalent thereof.
 - 2) If the contractor does not make payments to a trustee or other third person the contractor may consider as part of the wages of any laborer or mechanic the amount of any costs reasonably anticipated in providing bona fide fringe benefits under a plan or program, provided, that the Secretary of Labor has found, upon the written request of the contractor, that the applicable standards of the Davis-Bacon Act have been met. The Secretary of Labor may require the contractor to set aside in a separate account assets for the meeting of obligations under the plan or program.
- 2. Withholding the Owner shall upon its own action or upon written request of an authorized representative of the Department of Labor withhold or cause to be withheld from the contractor under this contract or any other Federal contract with the same prime contractor, or any other federally-assisted contract subject to Davis-Bacon prevailing wage requirements which is held by the same prime contractor, so much of the accrued payments or advances as may be considered necessary to pay laborers and mechanics, including apprentices, trainees, and helpers, employed by the contractor or any subcontractor the full amount of wages required by the contract. In the event of failure to pay any laborer or mechanic, including any apprentice, trainee, or helper, employed or working on the site of the work (or under the United States Housing Act of 1937 or under the Housing Act of 1949 in the construction or development of the project), all or part of the wages required by the contract, the (Agency) may, after written notice to the contractor, sponsor, applicant, or owner, take such action as may be necessary to cause the suspension of any further payment, advance or guarantee of funds until such violations have ceased
- 3. Payrolls and basic records.
 - a. Payrolls and basic records relating thereto shall be maintained by the contractor during the course of the work and preserved for a period of three years thereafter for all laborers and mechanics working at the site of the work (or under the United States Housing Act of 1937, or under the Housing Act of 1949, in the construction or development of the project). Such records shall contain the name, address, and social security number of each such worker, his or her correct classification, hourly rates of wages paid (including rates of contributions or costs anticipated for bona fide fringe benefits or cash equivalents thereof of the types described in section 1 (b)(2)(B) of the Davis-Bacon Act), daily and weekly number of hours worked, deductions made and actual wages paid. Whenever the Secretary of Labor has found under 29 CFR 5.5(a)(1)(iv) that the wages of any laborer or mechanic include the amount of any costs reasonably anticipated in providing benefits under a plan or program described in section 1 (b)(2)(B) of the Davis-Bacon Act, the contractor shall maintain records which show that the commitment to provide such benefits is enforceable, that the plan or program is financially responsible, and that the plan or program has been communicated in writing to the laborers or

mechanics affected, and records which show the costs anticipated or the actual cost incurred in providing such benefits. Contractors employing apprentices or trainees under approved programs shall maintain written evidence of the registration of apprenticeship programs and certification of trainee programs, the registration of the apprentices and trainees, and the ratios and wage rates prescribed in the applicable programs.

- b. The contractor shall submit weekly for each week in which any contract work is performed a copy of all payrolls to the (write in name of appropriate federal agency) if the agency is a party to the contract, but if the agency is not such a party, the contractor will submit the payrolls to the applicant, sponsor, or owner, as the case may be, for transmission to the (write in name of agency). The payrolls submitted shall set out accurately and completely all of the information required to be maintained under 29 CFR 5.5(a)(3)(i), except that full social security numbers and home addresses shall not be included on weekly transmittals. Instead the payrolls shall only need to include an individually identifying number for each employee (e.g., the last four digits of the employee's social security number). The required weekly payroll information may be submitted in any form desired. Optional Form WH-347 is available for this purpose from the Wage and Hour Division Web site at <http://www.dol.gov/esa/whd/forms/wh347instr.htm> or its successor site. The prime contractor is responsible for the submission of copies of payrolls by all subcontractors. Contractors and subcontractors shall maintain the full social security number and current address of each covered worker, and shall provide them upon request to the (write in name of appropriate federal agency) if the agency is a party to the contract, but if the agency is not such a party, the contractor will submit them to the applicant, sponsor, or owner, as the case may be, for transmission to the (Write in name of agency), the contractor, or the Wage and Hour Division of the Department of Labor for purposes of an investigation or audit of compliance with prevailing wage requirements. It is not a violation of this section for a prime contractor to require a subcontractor to provide addresses and social security numbers to the prime contractor for its own records, without weekly submission to the sponsoring government agency (or the applicant, sponsor, or owner).
- c. Each payroll submitted shall be accompanied by a "Statement of Compliance," signed by the contractor or subcontractor or his or her agent who pays or supervises the payment of the persons employed under the contract and shall certify the following:
 - 1) That the payroll for the payroll period contains the information required to be provided under § 5.5 (a)(3)(ii) of Regulations, 29 CFR part 5, the appropriate information is being maintained under § 5.5 (a)(3)(i) of Regulations, 29 CFR part 5, and that such information is correct and complete;
 - 2) That each laborer or mechanic (including each helper, apprentice, and trainee) employed on the contract during the payroll period has been paid the full weekly wages earned, without rebate, either directly or indirectly, and that no deductions have been made either directly or indirectly from the full wages earned, other than: permissible deductions as set forth in Regulations, 29 CFR part 3;
 - 3) That each laborer or mechanic has been paid not less than the applicable wage rates and fringe benefits or cash equivalents for the classification of work performed, as specified in the applicable wage determination incorporated into the contract.
- d. The weekly submission of a properly executed certification set forth on the reverse side of Optional Form WH-347 shall satisfy the requirement for submission of the "Statement of Compliance" required by paragraph (a)(3)(ii)(B) of this section.
- e. The falsification of any of the above certifications may subject the contractor or subcontractor to civil or criminal prosecution under section 1001 of title 18 and section 231 of title 31 of the United States Code.

4. The contractor or subcontractor shall make the records required under paragraph (a)(3)(i) of this section available for inspection, copying, or transcription by authorized representatives of the (write the name of the agency) or the Department of Labor, and shall permit such representatives to interview employees during working hours on the job. If the contractor or subcontractor fails to submit the required records or to make them available, the Federal agency may, after written notice to the contractor, sponsor, applicant, or owner, take such action as may be necessary to cause the suspension of any further payment advance or guarantee of funds. Furthermore, failure to submit the required records upon request or to make such records available may be grounds for debarment action pursuant to 29 CFR 5.12.
5. Apprentices and trainees
 - a. Apprentices. Apprentices will be permitted to work at less than the predetermined rate for the work they performed when they are employed pursuant to and individually registered in a bona fide apprenticeship program registered with the U.S. Department of Labor Employment and Training Administration Office of Apprenticeship Training, Employer and Labor Services or with a State Apprenticeship Agency recognized by the Office, or if a person is employed in his or her first 90 days of probationary employment as an apprentice in such an apprenticeship program who is not individually registered in the program but who has been certified by the Office of Apprenticeship Training, Employer and Labor Services or a State Apprenticeship Agency (where appropriate) to be eligible for probationary employment as an apprentice. The allowable ratio of apprentices to journeymen on the job site in any craft classification shall not be greater than the ratio permitted to the contractor as to the entire work force under the registered program. Any worker listed on a payroll at an apprentice wage rate, who is not registered or otherwise employed as stated above, shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any apprentice performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. Where a contractor is performing construction on a project in a locality other than that in which its program is registered, the ratios and wage rates (expressed in percentages of the journeyman's hourly rate) specified in the contractor's or subcontractor's registered program shall be observed. Every apprentice must be paid at not less than the rate specified in the registered program for the apprentice's level of progress, expressed as a percentage of the journeymen hourly rate specified in the applicable wage determination. Apprentices shall be paid fringe benefits in accordance with the provisions of the apprenticeship program. If the apprenticeship program does not specify fringe benefits, apprentices must be paid the full amount of fringe benefits listed on the wage determination for the applicable classification. If the Administrator determines that a different practice prevails for the applicable apprentice classification, fringes shall be paid in accordance with that determination. In the event the Office of Apprenticeship Training, Employer and Labor Services, or a State Apprenticeship Agency recognized by the Office, withdraws approval of an apprenticeship program, the contractor will no longer be permitted to utilize apprentices at less than the applicable predetermined rate for the work performed until an acceptable program is approved.
 - b. Trainees. Except as provided in 29 CFR 5.16, trainees will not be permitted to work at less than the predetermined rate for the work performed unless they are employed pursuant to and individually registered in a program which has received prior approval, evidenced by formal certification by the U.S. Department of Labor, Employment and Training Administration. The ratio of trainees to journeymen on the job site shall not be greater than permitted under the plan approved by the Employment and Training Administration. Every trainee must be paid at not less than the rate specified in the approved program for the trainee's level of progress, expressed as a percentage of the journeyman hourly rate specified in the applicable wage determination. Trainees shall be paid fringe benefits in accordance with the provisions of the

trainee program. If the trainee program does not mention fringe benefits, trainees shall be paid the full amount of fringe benefits listed on the wage determination unless the Administrator of the Wage and Hour Division determines that there is an apprenticeship program associated with the corresponding journeyman wage rate on the wage determination which provides for less than full fringe benefits for apprentices. Any employee listed on the payroll at a trainee rate that is not registered and participating in a training plan approved by the Employment and Training Administration shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any trainee performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. In the event the Employment and Training Administration withdraws approval of a training program, the contractor will no longer be permitted to utilize trainees at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

- c. Equal employment opportunity. The utilization of apprentices, trainees and journeymen under this part shall be in conformity with the equal employment opportunity requirements of Executive Order 1 12466, as amended, and 29 CFR part 30.
6. Compliance with Copeland Act requirements. The contractor shall comply with the requirements of 29 CFR part 3, which are incorporated by reference in this contract.
7. Subcontracts. The contractor or subcontractor shall insert in any subcontracts the clauses contained in 29 CFR 5.5(a)(1) through (10) and such other clauses as the (write in the name of the Federal agency) may by appropriate instructions require, and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for the compliance by any subcontractor or lower tier subcontractor with all the contract clauses in 29 CFR 5.5.
8. Contract termination: debarment. A breach of the contract clauses in 29 CFR 5.5 may be grounds for termination of the contract, and for debarment as a contractor and a subcontractor as provided in 29 CFR 5.12.
9. Compliance with Davis-Bacon and Related Act requirements. All rulings and interpretations of the Davis-Bacon and Related Acts contained in 29 CFR parts 1, 3, and 5 are herein incorporated by reference in this contract.
10. Disputes concerning labor standards. Disputes arising out of the labor standards provisions of this contract shall not be subject to the general disputes clause of this contract. Such disputes shall be resolved in accordance with the procedures of the Department of Labor set forth in 29 CFR parts 5, 6, and 7. Disputes within the meaning of this clause include disputes between the contractor (or any of its subcontractors) and the contracting agency, the U.S. Department of Labor, or the employees or their representatives.
11. Certification of eligibility
 - a. By entering into this contract, the contractor certifies that neither it (nor he or she) nor any person or firm who has an interest in the contractor's firm is a person or firm ineligible to be awarded Government contracts by virtue of section 3(a) of the Davis- Bacon Act or 29 CFR 5.12(a)(1).
 - b. No part of this contract shall be subcontracted to any person or firm ineligible for award of a Government contract by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).
 - c. The penalty for making false statements is prescribed in the U.S. Criminal Code, 18 U.S.C. 1001.

- E. If the contract sum is in excess of \$100,000, each contractor and its subcontractors are subject to the overtime provisions of the Contract Work Hours and Safety Standards Act. The following clauses are required to be inserted in the construction contract by 29 CFR 5.5(b) and will be inserted in AIA Document A101-2007, under Section 8.6, following the clauses set forth in D above for any contract with a contract sum in excess of \$100 000 (as used in these clauses, the terms laborers and mechanics include watchmen and guards):

1. Overtime requirements. No contractor or subcontractor contracting for any part of the contract work which may require or involve the employment of laborers or mechanics shall require or permit any such laborer or mechanic in any workweek in which he or she is employed on such work to work in excess of forty hours in such workweek unless such laborer or mechanic receives compensation at a rate not less than one and one-half times the basic rate of pay for all hours worked in excess of forty hours in such workweek.
 2. Violation; liability for unpaid wages; liquidated damages. In the event of any violation of the clause set forth in paragraph (b)(1) of this section the contractor and any subcontractor responsible therefor shall be liable for the unpaid wages. In addition, such contractor and subcontractor shall be liable to the United States (in the case of work done under contract for the District of Columbia or a territory, to such District or to such territory), for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer or mechanic, including watchmen and guards, employed in violation of the clause set forth in paragraph (b)(1) of this section, in the sum of \$10 for each calendar day on which such individual was required or permitted to work in excess of the standard workweek of forty hours without payment of the overtime wages required by the clause set forth in paragraph (b)(1) of this section. (3) Withholding for unpaid wages and liquidated damages. The (write in the name of the Federal agency or the loan or grant recipient) shall upon its own action or upon written request of an authorized representative of the Department of Labor withhold or cause to be withheld, from any moneys payable on account of work performed by the contractor or subcontractor under any such contract or any other Federal contract with the same prime contractor, or any other federally-assisted contract subject to the Contract Work Hours and Safety Standards Act, which is held by the same prime contractor, such sums as may be determined to be necessary to satisfy any liabilities of such contractor or subcontractor for unpaid wages and liquidated damages as provided in the clause set forth in paragraph (b)(2) of this section.
 3. Subcontracts. The contractor or subcontractor shall insert in any subcontracts the clauses set forth in paragraphs (1) through (4) of this section and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for compliance by any subcontractor or lower tier subcontractor with the clauses set forth in paragraphs (1) through (4) of this section.
- F. To the extent that any of the preceding contract clauses required to be inserted into the contract with the successful bidder conflicts with any of the terms and conditions in the Contract Documents, the clauses required by the Davis-Bacon Act will control. All other terms and conditions in the Contract Documents shall be interpreted in a way that is consistent with the Davis-Bacon Act requirements.

PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION (Not Used)

END OF DOCUMENT 00 21 13

DOCUMENT 00 26 00.00 - PROCUREMENT SUBSTITUTION PROCEDURES

1.1 DEFINITIONS

- A. Procurement Substitution Requests: Requests for changes in products, materials, equipment, and methods of construction from those indicated in the Procurement and Contracting Documents, submitted prior to receipt of bids.
- B. Substitution Requests: Requests for changes in products, materials, equipment, and methods of construction from those indicated in the Contract Documents, submitted following Contract award. See Section 012500 "Substitution Procedures" for conditions under which Substitution requests will be considered following Contract award.

1.2 QUALITY ASSURANCE

- A. Compatibility of Substitutions: Investigate and document compatibility of proposed substitution with related products and materials. Engage a qualified testing agency to perform compatibility tests recommended by manufacturers.

1.3 PROCUREMENT SUBSTITUTIONS

- A. Procurement Substitutions, General: By submitting a bid, the Bidder represents that its bid is based on materials and equipment described in the Procurement and Contracting Documents, including Addenda. Bidders are encouraged to request approval of qualifying substitute materials and equipment when the Specifications Sections list materials and equipment by product or manufacturer name.
- B. Procurement Substitution Requests will be received and considered by Owner when the following conditions are satisfied, as determined by A/E; otherwise requests will be returned without action:
 - 1. Extensive revisions to the Contract Documents are not required.
 - 2. Proposed changes are in keeping with the general intent of the Contract Documents, including the level of quality of the Work represented by the requirements therein.
 - 3. The request is fully documented and properly submitted.

1.4 SUBMITTALS

- A. Procurement Substitution Request: Submit to A/E. Procurement Substitution Request must be made in writing in compliance with the following requirements:
 - 1. Requests for substitution of materials and equipment will be considered if received no later than 10 days prior to date of bid opening.
 - 2. Submittal Format: Electronically submit each written Procurement Substitution Request, using form bound in Project Manual in accordance with Division 00 Section "Instructions to Bidders".
 - a. Identify the product or the fabrication or installation method to be replaced in each request. Include related Specifications Sections and drawing numbers.
 - b. Provide complete documentation on both the product specified and the proposed substitute, including the following information as appropriate:
 - 1) Point-by-point comparison of specified and proposed substitute product data, fabrication drawings, and installation procedures.
 - 2) Copies of current, independent third-party test data of salient product or system characteristics.
 - 3) Samples where applicable or when requested by A/E.
 - 4) Detailed comparison of significant qualities of the proposed substitute with those of the Work specified. Significant qualities may include attributes such as performance, weight, size, durability, visual effect, sustainable design characteristics, warranties, and specific features and requirements indicated. Indicate deviations, if any, from the Work specified.

- 5) Material test reports from a qualified testing agency indicating and interpreting test results for compliance with requirements indicated.
 - 6) Coordination information, including a list of changes or modifications needed to other parts of the Work and to construction performed by Owner and separate contractors, which will become necessary to accommodate the proposed substitute.
 - c. Provide certification by manufacturer that the substitute proposed is equal to or superior to that required by the Procurement and Contracting Documents, and that its in-place performance will be equal to or superior to the product or equipment specified in the application indicated.
 - d. Bidder, in submitting the Procurement Substitution Request, waives the right to additional payment or an extension of Contract Time because of the failure of the substitute to perform as represented in the Procurement Substitution Request.
- B. A/E's Action:
 - 1. A/E may request additional information or documentation necessary for evaluation of the Procurement Substitution Request. A/E will notify all bidders of acceptance of the proposed substitute by means of an Addendum to the Procurement and Contracting Documents.
- C. A/E's approval of a substitute during bidding does not relieve Contractor of the responsibility to submit required shop drawings and to comply with all other requirements of the Contract Documents.

END OF DOCUMENT 00 26 00

To OhioBidQuestions@fhai.com Date: _____

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

<u>Section</u>	<u>Article/Paragraph (Page)</u>	<u>Specified Item</u>
----------------	---------------------------------	-----------------------

Proposed Substitution: _____ Model: _____

Manufacturer: _____ Phone: _____

Attach complete technical data including laboratory tests if applicable.

Include complete information changes to Drawings and/or Specifications which proposed substitution require for proper installation.

Fill in Blanks Below, use additional sheets if necessary:

A. Does the substitution affect dimensions shown on Drawings?

B. Will the undersigned pay for changes to building design, including engineering and detailing costs caused by substitution, if any?

C. What effect does substitution have on other trades? _____

D. Differences between proposed substitution and specified item?

E. Manufacturer's guarantees of proposed and specified items are:

_____ Same _____ Different (explain on attachment)

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

Submitted By:

Signature _____

Firm

Address _____

Telephone _____

Fax _____

Email _____

For Use by Design Consultant:

Accepted Accepted as Noted

Not Accepted Received too Late

PM _____

Specifier _____

Date _____

Remarks _____

Telephone _____

END OF DOCUMENT 00 26 00.01

DOCUMENT 00 41 16 - BID FORM – STIPULATED SUM
(Single-Prime Contract)

PROJECT IDENTIFICATION: HVAC Modifications – Phase 2 Elementary Schools
Ravenna City Schools
Ravenna, Ohio

BID TO: Ravenna City Schools
531 Washington Avenue
Ravenna, Ohio 44266

BID FROM: Bidder _____
Address _____
Telephone _____
Fax _____
Email address _____

1. The undersigned Bidder agrees, if this Bid is accepted, to enter into an agreement with Owner, in the form included in the Procurement Documents, to perform and furnish the Work as specified or indicated in the Procurement Documents for the Bid Price and within the Bid Times indicated in this Bid and in accordance with the other terms and conditions of the Contract Documents.
2. In submitting this Bid, Bidder represents, as more fully set forth in the Agreement, that:
 - a. This Bid will remain subject to acceptance for sixty (60) days after the day of Bid opening; Alternate Bids will remain subject to acceptance for sixty (60) days after the signing of the Agreement; if requested, a contract is awarded on the basis of this Bid, and if the Bidder does not execute an agreement for any reason, other than as authorized by law, the Bidder and the Bidder's Surety are liable to the Owner as provided in the Ohio Revised Code as applicable to the Owner.
 - b. The Owner has the right to reject this Bid;
 - c. Bidder accepts the provisions of the Instructions to Bidders regarding disposition of Bid Security;
 - d. Bidder will sign and submit the Agreement with the Bonds and other documents required by the Bidding Requirements within 10 days after the date of Owner's Notice to Award;
 - e. Bidder has examined copies of all the Procurement Documents, and agrees to comply with all requirements of the Contract Documents, regardless of whether the Bidder has actual knowledge of the requirements and regardless of any statement or omission made by the Bidder which might indicate a contrary intention.
 - f. Bidder has visited the Project site and has become familiar with the general, local, and site conditions, and has correlated personal observations about the requirements of the Procurement Documents.
 - g. Bidder is familiar with, and will comply with all federal, state and local laws and regulations;
 - h. Bidder has correlated the information known to Bidder, information and observations obtained from visits to the Project site, reports and drawings identified in the Procurement Documents and additional examinations, investigations, explorations, tests, studies, and data with the Procurement Documents.
 - i. Bidder and each person signing on behalf of the Bidder certifies, and in the case of a joint combined bid, each party thereto certifies as to such party's organization, under penalty of perjury, that to the best of the undersigned's knowledge and belief: (a) the base bid, any unit prices; and any alternate bid in this Bid have been arrived at independently without collusion, consultation, communication, or agreement, for the purpose of restricting competition as to any matter relating to such base bid, unit prices, or alternate bid with any other bidder; (b) unless otherwise required by law, the base bid, any unit prices, and any alternate bid in this Bid have not been disclosed by the Bidder and will not be disclosed by the Bidder prior to the bid opening, directly or indirectly, to any other bidder who would have any interest in the base bid, unit prices, or alternate bid; (c) no attempt has been made or will be made by the Bidder to induce any individual, partnership, or corporation to submit or not to submit a bid for the purpose of restricting competition.

- j. Bidder certifies that upon the award of this contract, it will make a good faith effort to ensure that all of its employees, while working on the Project site, will not purchase, transfer, use, or possess illegal drugs or alcohol or abuse prescription drugs in any way.
- k. Bidder agrees to furnish any information requested by Owner to evaluate the responsibility of the Bidder.
- l. Bidder has received the following Addenda receipt of which is hereby acknowledged;

Date	Number
<hr/>	<hr/>
<hr/>	<hr/>
<hr/>	<hr/>
<hr/>	<hr/>
<hr/>	<hr/>

- n. Bidder acknowledges that the Davis-Bacon Act requires the payment of Davis-Bacon wage rates and conformance with other provisions of the Act. Bidder acknowledges that it has reviewed the requirements of 29 CFR 5.5, certifies that it is familiar with the requirements, and agrees that it will conform with the requirements of the Act in the performance of the work under the contract for which it is submitting a bid.

BASE BIDS: I agree to execute the Work under each of the following Base Bid Areas indicated for the following STIPULATED-SUM BID PRICE(S).

BASE BID AREA
(See Division 01 Section "Summary of Work",
for Work included under the Base Bid.)

BASE BID "A" - HVAC Modifications – West Main Elementary School

_____ \$ _____
(sum in words)

I have included in my Base Bid amount the sum(s) specified in Division 01 Section "Allowances" for this Base Bid.

BASE BID "B" - HVAC Modifications – West Park Elementary School

_____ \$ _____
(sum in words)

I have included in my Base Bid amount the sum(s) specified in Division 01 Section "Allowances" for this Base Bid.

BASE BID "C" - HVAC Modifications – Willyard Elementary School

_____ \$ _____
(sum in words)

I have included in my Base Bid amount the sum(s) specified in Division 01 Section "Allowances" for this Base Bid.

COMBINED BIDS: Any bidders desiring to submit a combined bid for two or more Base Bid Areas of Work within the same Base Bid Description Area shall so indicate below, together with each Base Bid Area included in the Combined Bid. Refer to Instructions To Bidders for requirements regarding Combined Bids.

_____	\$ _____
BASE BID AREAS INCLUDED	TOTAL AMOUNT OF COMBINED BID

NOTE: For each Base Bid Area of the combined bid, price for every single Base Bid and all alternatives of those Base Bids must be indicated on the previous Bid Form sheets.

BIDDER: Will you accept an award based on any one or more of the Base Bids included in the above Combined Bid?
Yes _____ No _____

ALTERNATES: I agree to modify the Base Bid by either additive or deductive Alternates, if any, as are accepted by the Owner for the sum or sums of money as indicated below. Every Alternate must be bid or indicated as "\$0.00" by each bidder. Failure to do so may be cause for rejection of bid.

See Division 01 Section "Alternates" for descriptions.

ALT. #1	ADD/DEDUCT/NO CHANGE \$ _____
ALT. #2	ADD/DEDUCT/NO CHANGE \$ _____
ALT. #3	ADD/DEDUCT/NO CHANGE \$ _____
ALT. #4	ADD/DEDUCT/NO CHANGE \$ _____

I have also attached the following required submissions:

Bid Security

Use this form if Bidder is Sole Proprietor:

IN TESTIMONY WHEREOF, the Bidder has hereunto set his hand this _____

day of _____, 20_____.

Bidder _____

Use this form if Bidder is a Partnership:

IN TESTIMONY WHEREOF, the Bidder (a Firm) has hereunto set their hands this _____

day of _____, 20_____.

(Firm Name)_____

By _____

(Individual Names) _____

Use this form if Bidder is a Corporation:

IN TESTIMONY WHEREOF, the Bidder (a Corporation) has caused this proposal to be signed by its President and Secretary, and affixed its corporate seal or notarized this _____ day of _____, 20_____.

Name of Corporation

State of Corporation

President

Secretary

(S E A L)

THIS BID SHALL BE FURNISHED IN DUPLICATE, WITH BOTH COPIES ENCLOSED IN THE SEALED BID ENVELOPE.

END OF DOCUMENT 00 41 16

DOCUMENT 00 43 13 - BID GUARANTY AND CONTRACT BOND

(Section 153.571 Ohio Revised Code)

KNOW ALL PERSONS BY THESE PRESENTS, that we, the undersigned _____

(Name and Address)

as Principal and _____

_____ as Surety,

are hereby held and firmly bound unto the _____ as Oblige

in the penal sum of the dollar amount of the bid submitted by the Principal to the Oblige on _____

_____ to undertake the project known as: _____

The penal sum referred to herein shall be the dollar amount of the principal's bid to the Oblige, incorporating any additive or deductive alternate proposals made by the principal on the date referred to above to the obligee, which are accepted by the Oblige. In no case shall the penal sum exceed the amount of _____ dollars (\$_____).

(If the above line is left blank, the penal sum will be the full amount of the principal's bid, including alternates. Alternatively, if completed, the amount stated must not be less than the full amount of the bid, including alternates, in dollars and cents. A percentage is not acceptable.) For the payment of the penal sum well and truly to be made, we hereby jointly and severally bind ourselves, our heirs, executors, administrators, successors, and assigns.

THE CONDITION OF THE ABOVE OBLIGATION IS SUCH, that the above named principal has submitted a bid on the above referred to project;

NOW, THEREFORE, if the obligee accepts the bid of the principal and the principal fails to enter into a proper contract in accordance with the bid, plans, details, specifications, and bills of material; and in the event the principal pays to the obligee the difference not to exceed ten percent of the penalty hereof between the amount specified in the bid and such larger amount for which the obligee may in good faith contract with the next lowest bidder to perform the work covered by the bid; or in the event the obligee does not award the contract to the next lowest bidder and resubmits the project for bidding, the principal will pay the obligee the difference not to exceed ten percent of the penalty hereof between the amount specified in the bid, or the costs, in connection with the resubmission, of printing new contract documents, required advertising and printing and mailing notices to prospective bidders, whichever is less, then this obligation shall be null and void, otherwise to remain in full force and effect. If the obligee accepts the bid of the principal, and the principal within ten days after awarding the contract, enters into a proper contract in accordance with the bid, plans, details, specifications, and bills of material, which said contract is made a part of this bond the same as though set forth herein; and

IF THE SAID principal shall well and faithfully perform each and every condition of such contract; and indemnify the obligee against all damage suffered by failure to perform such contract according to the provisions thereof and in accordance with the plans, details, specifications, and bills of material therefore; and shall pay all lawful claims of subcontractors, materialmen, and laborers, for labor performed and materials furnished in the carrying forward, performing, or completing benefit of any materialman or laborer having a just claim, as well as

for the obligee herein; then this obligation shall be void; otherwise the same shall remain in full force and effect; it being expressly understood and agreed that the liability of the surety for any and all claims hereunder shall in no event exceed the penal amount of this obligation as herein stated.

THE SAID Surety hereby stipulates and agrees that no modifications, omissions, or additions, in or to the terms of said contract of in or to the plans and specifications therefore shall in any wise affect the obligations of said Surety on its bond, and it does hereby waive notice of any such modifications, omissions or additions to the terms of the contract or to the work or to the specifications.

SIGNED AND SEALED This _____ day of _____, 20_.

PRINCIPAL:

BY: _____

TITLE: _____

SURETY: _____

BY: _____

Attorney-In-Fact

SURETY COMPANY ADDRESS:

Street

City

State

Zip

Telephone

SURETY AGENT'S ADDRESS:

Agency Name

Street

City

State

Zip

Telephone

NOTE: Failure by any party to sign Bid Guaranty and Contract Bond shall result in rejection of bid.

END OF DOCUMENT 00 43 13

AIA Document A305-2020

Contractor's Qualification Statement

(Document enclosed hereinafter)



AIA[®] Document A305™ – 2020

Contractor's Qualification Statement

THE PARTIES SHOULD EXECUTE A SEPARATE CONFIDENTIALITY AGREEMENT IF THEY INTEND FOR ANY OF THE INFORMATION IN THIS A305-2020 TO BE HELD CONFIDENTIAL.

SUBMITTED BY:

(Organization name and address.)

SUBMITTED TO:

(Organization name and address.)

TYPE OF WORK TYPICALLY PERFORMED

(Indicate the type of work your organization typically performs, such as general contracting, construction manager as constructor services, HVAC contracting, electrical contracting, plumbing contracting, or other.)

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

THIS CONTRACTOR'S QUALIFICATION STATEMENT INCLUDES THE FOLLOWING:

(Check all that apply.)

- ☒ Exhibit A – General Information
- ☒ Exhibit B – Financial and Performance Information
- ☒ Exhibit C – Project-Specific Information
- ☒ Exhibit D – Past Project Experience
- ☒ Exhibit E – Past Project Experience (Continued)

CONTRACTOR CERTIFICATION

The undersigned certifies under oath that the information provided in this Contractor's Qualification Statement is true and sufficiently complete so as not to be misleading.

Organization's Authorized Representative
Signature

Date

Printed Name and Title

NOTARY

State of:

County of:

Signed and sworn to before me this day of

Notary Signature

My commission expires:

Certification of Document's Authenticity

AIA® Document D401™ – 2003

I, _____, hereby certify, to the best of my knowledge, information and belief, that I created the attached final document simultaneously with this certification at 11:35:43 ET on 03/19/2021 under Order No. 7101546043 from AIA Contract Documents software and that in preparing the attached final document I made no changes to the original text of AIA® Document A305™ – 2020, Contractor's Qualification Statement, as published by the AIA in its software, other than changes shown in the attached final document by underscoring added text and striking over deleted text.

(Signed)

(Title)

(Dated)



AIA[®] Document A305[™] – 2020 Exhibit A

General Information

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

§ A.1 ORGANIZATION

§ A.1.1 Name and Location

§ A.1.1.1 Identify the full legal name of your organization.

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

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

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

§ A.1.2 Legal Status

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

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

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

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

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

§ A.1.3 Other Information

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

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

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

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

§ A.2 EXPERIENCE

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

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

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

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

§ A.3 CAPABILITIES

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

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

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

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

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

§ A.4 REFERENCES

§ A.4.1 Identify three client references:

(Insert name, organization, and contact information)

§ A.4.2 Identify three architect references:

(Insert name, organization, and contact information)

§ A.4.3 Identify one bank reference:

(Insert name, organization, and contact information)

§ A.4.4 Identify three subcontractor or other trade references:

(Insert name, organization, and contact information)

**AIA®**

Document A305™ – 2020 Exhibit B

Financial and Performance Information

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

§ B.1 FINANCIAL

§ B.1.1 Federal tax identification number:

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

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

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

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

§ B.2 DISPUTES AND DISCIPLINARY ACTIONS

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

(If the answer is yes, provide an explanation.)

§ B.2.2 In the last five years has your organization, its parent, or a subsidiary, affiliate, or other entity having common ownership or management:

(If the answer to any of the questions below is yes, provide an explanation.)

.1 _____ failed to complete work awarded to it?

.2 _____ been terminated for any reason except for an owners' convenience?

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

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

.4 filed any lawsuits or requested arbitration regarding a construction project?

§ B.2.3 In the last five years, has your organization, its parent, or a subsidiary, affiliate, or other entity having common ownership or management; or any of the individuals listed in Exhibit A Section 1.2:

(If the answer to any of the questions below is yes, provide an explanation.)

.1 been convicted of, or indicted for, a business-related crime?

.2 had any business or professional license subjected to disciplinary action?

.3 been penalized or fined by a state or federal environmental agency?



AIA[®] Document A305[™] – 2020 Exhibit C

Project Specific Information

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

PROJECT:

(Name and location or address.)

General - Specifications

CONTRACTOR'S PROJECT OFFICE:

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

TYPE OF WORK SOUGHT

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

CONFLICT OF INTEREST

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

§ C.1 PERFORMANCE OF THE WORK

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

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

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

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

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

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

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

§ C.2 EXPERIENCE RELATED TO THE PROJECT

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

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

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

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

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

§ C.3 SAFETY PROGRAM AND RECORD

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

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

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

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

§ C.4 INSURANCE

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

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

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

§ C.5 SURETY

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

§ C.5.2 Surety company name:

§ C.5.3 Surety agent name and contact information:

§ C.5.4 Total bonding capacity:

§ C.5.5 Available bonding capacity as of the date of this qualification statement:



AIA[®] Document A305™ – 2020 Exhibit D

Contractor's Past Project Experience

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



AIA[®] Document A305™ – 2020 Exhibit E

Contractor's Past Project Experience, Continued

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

DOCUMENT 00 45 21 - TAX COMPLIANCE AFFIDAVIT

**AFFIDAVIT IN COMPLIANCE WITH OHIO REVISED CODE
SECTION 5719.042 RELATING TO DELINQUENT PERSONAL PROPERTY TAXES**

STATE OF OHIO

COUNTY OF _____
(County of Contractor)

I/We _____ after being duly sworn, do
hereby submit this Affidavit to the _____. Neither the undersigned nor the entity which has
submitted the low bid to the _____ for the following projects:

has any delinquent personal property taxes charged against them on the general tax list of personal
property in _____, Ohio at the time this bid was submitted for
(County Work is to be performed)
such Project.

Name

Sworn to and subscribed before me this _____ day of _____, 20_____.

Notary Public

END OF DOCUMENT 00 45 21

AIA Document A101-2017

Standard Form of Agreement between Owner and
Contractor

(Document enclosed hereinafter)



AIA® Document A101® – 2017

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

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

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

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

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

| Ohio

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

| Fanning Howey Associates, Inc.

The Owner and Contractor agree as follows.

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

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

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2	THE WORK OF THIS CONTRACT
3	DATE OF COMMENCEMENT AND SUBSTANTIAL COMPLETION
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9	ENUMERATION OF CONTRACT DOCUMENTS

EXHIBIT A INSURANCE AND BONDS

ARTICLE 1 THE CONTRACT DOCUMENTS

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

ARTICLE 2 THE WORK OF THIS CONTRACT

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

ARTICLE 3 DATE OF COMMENCEMENT AND SUBSTANTIAL COMPLETION

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

(Check one of the following boxes.)

- ☒ The date of this Agreement.
- ☐ A date set forth in a notice to proceed issued by the Owner.
- ☐ Established as follows:
(Insert a date or a means to determine the date of commencement of the Work.)

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

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

§ 3.3 Substantial Completion

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

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

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

☒ By the following date:

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

Portion of Work

Substantial Completion Date

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

ARTICLE 4 CONTRACT SUM

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

§ 4.2 Alternates

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

Item

Price

§ 4.2.2 Subject to the conditions noted below, the following alternates may be accepted by the Owner following execution of this Agreement. Upon acceptance, the Owner shall issue a Modification to this Agreement.
(Insert below each alternate and the conditions that must be met for the Owner to accept the alternate.)

Item

Price

Conditions for Acceptance

§ 4.3 Allowances, if any, included in the Contract Sum:
(Identify each allowance.)

Item

Price

§ 4.4 Unit prices, if any:

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

Item

Units and Limitations

Price per Unit (\$0.00)

§ 4.5 Liquidated damages, if any:

(Insert terms and conditions for liquidated damages, if any.)

If the Contractor does not have its Work on the Project Substantially Complete by the specified Date for Substantial Completion or Finally Complete by the Date for Final Completion, the Contractor shall pay the Owner (and the Owner may set off from sums coming due the Contractor) Liquidated Damages in the per diem amounts as set forth in the following tables, whichever may be applicable. "Contract Amount" of the Work will be determined by totaling the cost of all line items of Work, as set forth in the Schedule of Values.

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LIQUIDATED DAMAGES – DATE FOR SUBSTANTIAL COMPLETION

Original Contract Amount	Dollars Per Day
\$1.00 to \$500,000.00	\$ 250.00
\$500,000.01 to \$2,000,000.00	\$ 500.00
\$2,000,000.01 to \$10,000,000.00	\$ 800.00
\$10,000,000.01 to \$50,000,000.00	\$1,500.00
\$50,000,000.01 and greater	\$2,000.00

LIQUIDATED DAMAGES – DATE FOR FINAL COMPLETION

Original Contract Amount	Dollars Per Day
\$1.00 to \$500,000.00	\$ 200.00
\$500,000.01 to \$2,000,000.00	\$ 250.00
\$2,000,000.01 to \$10,000,000.00	\$ 325.00
\$10,000,000.01 to \$50,000,000.00	\$ 500.00
\$50,000,000.01 and greater	\$ 625.00

The Contractor acknowledges that such amounts of Liquidated Damages represent a reasonable estimate of the actual damages for loss of or interference with the intended use of the Project that the Owner would incur if the Contractor's Work is not Substantially Complete by its Date for Substantial Completion or Finally Complete by the required Date for Final Completion.

§ 4.6 Other:

(Insert provisions for bonus or other incentives, if any, that might result in a change to the Contract Sum.)

ARTICLE 5 PAYMENTS

§ 5.1 Progress Payments

§ 5.1.1 Based upon Applications for Payment submitted to the Architect by the Contractor and Certificates for Payment issued by the Architect, the Owner shall make progress payments on account of the Contract Sum to the Contractor as provided below and elsewhere in the Contract Documents.

§ 5.1.2 The period covered by each Application for Payment shall be one calendar month ending on the last day of the month, or as follows:

§ 5.1.3 Provided that an Application for Payment is received by the Architect not later than the day of a month, the Owner shall make payment of the amount certified to the Contractor not later than the day of the same month. If an Application for Payment is received by the Architect after the application date fixed above, payment of the amount certified shall be made by the Owner not later than () days after the Architect receives the Application for Payment. *(Federal, state or local laws may require payment within a certain period of time.)*

The specific dates for processing of progress payments will be established in the preconstruction meeting.

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

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

§ 5.1.6 In accordance with AIA Document A201™–2017, General Conditions of the Contract for Construction, and subject to other provisions of the Contract Documents, the amount of each progress payment shall be computed as follows:

Init.

§ 5.1.6.1 The amount of each progress payment shall first include:

- .1 That portion of the Contract Sum properly allocable to completed Work;
- .2 That portion of the Contract Sum properly allocable to materials and equipment delivered and suitably stored at the site for subsequent incorporation in the completed construction, or, if approved in advance by the Owner, suitably stored off the site at a location agreed upon in writing; and
- .3 That portion of Construction Change Directives that the Architect determines, in the Architect's professional judgment, to be reasonably justified.

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

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

§ 5.1.7 Retainage

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

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

Refer to AIA Document A201-2017, Article 9.

~~§ 5.1.7.1.1 The following items are not subject to retainage:~~

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

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

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

There shall be no reduction of retainage prior to substantial completion.

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

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

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

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

§ 5.2 Final Payment

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

- .1 the Contractor has fully performed the Contract except for the Contractor's responsibility to correct Work as provided in Article 12 of AIA Document A201–2017, and to satisfy other requirements, if any, which extend beyond final payment; and
- .2 a final Certificate for Payment has been issued by the Architect.

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

If there are any remaining uncompleted items, an amount equal to 200% of the value of each item as determined by the Architect, shall be withheld until said items are completed.

§ 5.3 Interest

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

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

%—per annum

ARTICLE 6 DISPUTE RESOLUTION

§ 6.1 Initial Decision Maker

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

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

§ 6.2 Binding Dispute Resolution

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

(Check the appropriate box.)

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

☒ Litigation in a court of competent jurisdiction

☐ Other *(Specify)*

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

ARTICLE 7 TERMINATION OR SUSPENSION

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

~~§ 7.1.1 If the Contract is terminated for the Owner's convenience in accordance with Article 14 of AIA Document A201–2017, then the Owner shall pay the Contractor a termination fee as follows:
(Insert the amount of, or method for determining, the fee, if any, payable to the Contractor following a termination for the Owner's convenience.)~~

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

ARTICLE 8 MISCELLANEOUS PROVISIONS

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

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

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

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

§ 8.5 Insurance and Bonds

~~§ 8.5.1 The Owner and the Contractor shall purchase and maintain insurance as set forth in AIA Document A101™–2017, Standard Form of Agreement Between Owner and Contractor where the basis of payment is a Stipulated Sum, Exhibit A, Insurance and Bonds, and elsewhere in the Contract Documents.
in AIA Document A201–2017, Article 11.~~

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

~~§ 8.6 Notice in electronic format, pursuant to Article 1 of AIA Document A201–2017, may be given in accordance with AIA Document E203™–2013, Building Information Modeling and Digital Data Exhibit, if completed, or as otherwise set forth below:
(If other than in accordance with AIA Document E203–2013, insert requirements for delivering notice in electronic format such as name, title, and email address of the recipient and whether and how the system will be required to generate a read receipt for the transmission.)~~

§ 8.7 Other provisions:

ARTICLE 9 ENUMERATION OF CONTRACT DOCUMENTS

§ 9.1 This Agreement is comprised of the following documents:

- ~~.1 AIA Document A101™–2017, Standard Form of Agreement Between Owner and Contractor~~
- ~~.2 AIA Document A101™–2017, Exhibit A, Insurance and Bonds~~
- ~~.3 AIA Document A201™–2017, General Conditions of the Contract for Construction~~
- ~~.4 AIA Document E203™–2013, Building Information Modeling and Digital Data Exhibit, dated as indicated below:~~

~~(Insert the date of the E203–2013 incorporated into this Agreement.) as edited and published in the Project Manual.~~

- .5 Drawings

Number	Title	Date
--------	-------	------

- .6 Specifications

Section	Title	Date	Pages
---------	-------	------	-------

- .7 Addenda, if any:

Number	Date	Pages
--------	------	-------

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

- .8 Other Exhibits:
(Check all boxes that apply and include appropriate information identifying the exhibit where required.)

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

☐ The Sustainability Plan:

Title	Date	Pages
-------	------	-------

☐ Supplementary and other Conditions of the Contract:

Document	Title	Date	Pages
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.9 Other documents, if any, listed below:

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

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

OWNER *(Signature)*

(Printed name and title)

CONTRACTOR *(Signature)*

(Printed name and title)

Certification of Document's Authenticity

AIA® Document D401™ – 2003

I, _____, hereby certify, to the best of my knowledge, information and belief, that I created the attached final document simultaneously with this certification at 15:49:29 ET on 03/12/2021 under Order No. 7101546043 from AIA Contract Documents software and that in preparing the attached final document I made no changes to the original text of AIA® Document A101™ – 2017, Standard Form of Agreement Between Owner and Contractor where the basis of payment is a Stipulated Sum, as published by the AIA in its software, other than changes shown in the attached final document by underscoring added text and striking over deleted text.

(Signed)

(Title)

(Dated)

CERTIFICATE OF FUNDS
(Section 5705.41, ORC)

In the matter of: _____ (Contractor)

IT IS HEREBY CERTIFIED that the moneys required to meet the obligations of the Board of Education of the
_____ School District under the foregoing Contract have
been lawfully appropriated for such purposes and are in the treasury of the
_____ School District or are in the process of collection to an appropriate
fund,
free from any previous encumbrance.

_____ **SCHOOL DISTRICT**

By: _____
Treasurer

Dated: _____, _____

DOCUMENT 00 61 00 - CONTRACT BOND
(O.R.C. § 153.57)

KNOW ALL PERSONS BY THESE PRESENTS, that we, the undersigned, _____
_____ ("Contractor") as principal and _____ as
surety, are hereby held and firmly bound unto the Board of Education of the _____
(the "Board"), _____ County, Ohio, as obligee, in the penal sum of _____
_____ Dollars (\$ _____), for the payment of which well and truly to be made, we
hereby jointly and severally bind ourselves, our heirs, executors, administrators, successors, and assigns.

Signed this _____ day of _____, 20____.

THE CONDITION OF THE ABOVE OBLIGATION IS SUCH that whereas, the above-named principal
did on the _____ day of _____, 20____, enter into a contract with the Board for the
_____ ("Project"), which said contract
is made a part of this bond the same as though set forth herein:

Now, if the said Contractor shall well and faithfully do and perform the things agreed by the
Contractor to be done and performed according to the terms of said contract; and shall pay all lawful claims
of subcontractors, material suppliers, and laborers, for labor performed and materials furnished in the
carrying forward, performing, or completing of said contract; we agreeing and assenting that this undertaking
shall be for the benefit of any material supplier or laborer having a just claim, as well as for the obligee
herein; then this obligation shall be void; otherwise the same shall remain in full force and effect; it being
expressly understood and agreed that the liability of the surety for any and all claims hereunder shall in no
event exceed the penal amount of this obligation as herein stated.

The said surety hereby stipulates and agrees that no modifications, omissions, or additions in or to
the terms of the said contract or in or to the plans or specifications therefore shall in any wise affect the
obligations of said surety on its bond, and does hereby waive notice of any such modifications, omissions or
additions to the terms of the contract or to the work or to the specifications.

Signed and sealed this _____ day of _____, 20____.

(PRINCIPAL)

By: _____

Printed Name & Title: _____

(SURETY)

By: _____

Printed Name & Title: _____

Surety's Address: _____

Surety's Agent's Tel. & Fax Numbers: _____

NAME OF SURETY'S AGENT

Surety's Agent's Address: _____

Surety's Agent's Tel. & Fax Numbers: _____

Surety's Agent's Fax Number: _____

AIA Document A201-2017

AIA General Conditions of the Contract for Construction

(Document enclosed hereinafter)



AIA® Document A201® – 2017

General Conditions of the Contract for Construction

for the following PROJECT:

(Name and location or address)

OHIO

THE OWNER:

(Name, legal status and address)

THE ARCHITECT:

(Name, legal status and address)

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

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

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ARTICLE 1 GENERAL PROVISIONS

§ 1.1 Basic Definitions

§ 1.1.1 The Contract Documents

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

§ 1.1.2 The Contract

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

§ 1.1.3 The Work

The term "Work" means the construction and services required by the Contract Documents, whether completed or partially completed, and includes all other labor, materials, equipment, and services provided or to be provided by the Contractor to fulfill the Contractor's obligations. The Work may constitute the whole or a part of the Project. The Contractor acknowledges and agrees that the Contract Documents are sufficient to provide for completion of the Work and include Work, whether or not shown or described, which reasonably may be inferred to be required or useful for the completion of the Work in accordance with applicable laws, codes, and customary standards of the industry.

§ 1.1.4 The Project

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

§ 1.1.5 The Drawings

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

§ 1.1.6 The Specifications

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

§ 1.1.7 Instruments of Service

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

§ 1.1.8 Initial Decision Maker

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

§ 1.1.9 MISCELLANEOUS DEFINITIONS

- .1 The term "product" as used herein includes materials, systems, and equipment.
- .2 The term "supplier" as used herein includes a firm or organization furnishing or delivering products directly to the jobsite, and because of such direct delivery, could be construed under the lien laws of the state in which the Work is being performed as having lien rights against the funds due the Contractor. References to material and/or equipment suppliers in the Contract Documents also refer to "supplier" as defined herein.
- .3 A bidder selected to enter into a Contract with the Owner for Work included under the bid submitted by the bidder is termed a "Lowest Responsible Bidder," until such time as he is awarded a Contract and becomes the Contractor.
- .4 Where "request," "approval," "satisfactory," and similar words appear, it is the request, approval, or satisfaction of the Architect/Engineer that is intended.
- .5 Where "complete" is used, it shall mean "complete with connections, supports, attachments, and incidental items necessary for a finished and properly operating assembly or installation.
- .6 Where "drawing" is used, it shall mean plans and detail drawings, both large and small scale, furnished by the Architect/Engineer for the purpose of showing the Work to be done.
- .7 The term "furnish" – to supply (only) to another party for their use of installation, including cost of delivery and unloading to jobsite.
- .8 The term "install" – to distribute, uncrate, assemble, and fix into the intended final positions. The installer to provide all miscellaneous hardware and supplies required to anchor and support securely, clean up, and dispose of rubbish.
- .9 The term "connect" – to bring service(s) to point of installation and make final connections of the service(s) to the installed equipment, and provide miscellaneous auxiliary appurtenances necessary to make operable for its intended use.
- .10 The term "provide" – to furnish, install, and connect complete.
- .11 Bonds as covered by the Instructions To Bidders shall be considered a part of the Contract Documents.

§ 1.2 Correlation and Intent of the Contract Documents

§ 1.2.1 The intent of the Contract Documents is to include all items necessary for the proper execution and completion of the Work by the Contractor. Contractor whether or not expressly shown or described. The Contract Documents are complementary, and what is required by one shall be as binding as if required by all; performance by the Contractor shall be required only to the extent consistent with the Contract Documents and reasonably inferable from them as being necessary to produce the indicated results. The Contractor acknowledges and agrees, by signing this agreement, that the Contract Documents are sufficient to provide for the completion of the Work and include Work, whether or not shown or described, which reasonably may be inferred to be required or useful for the completion of the Work in accordance with applicable laws, codes, and customary standards of the industry.

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

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

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

§ 1.2.4 If there should be a conflict between two or more of the Contract Documents, the following order of interpretation shall apply:

- .1 The terms and conditions as set forth in the Bidding Requirements, including legal advertisement thereof, shall have full force and effect until such time as the Owner-Contractor Agreement is executed by and between the Owner and the Lowest Responsible Bidder.

- .2 Where there is a conflict between the Bidding Requirements and the Contract requirements, the Contract requirements shall govern.
- .3 Where requirements specifically set forth in the Owner-Contractor Agreement are in conflict with other Contract Documents, the Owner-Contractor Agreement shall govern.
- .4 In the case of conflicts or discrepancies between Drawings and Division 2-49 of the Specifications, or within or among the Contract Drawings and not clarified by Addendum, the Architect will determine which takes precedence in accordance with Sections 3.2.2.1, 4.2.11, 4.2.12, and 4.2.13.

§ 1.2.5 It is the intent of the Contract Documents to accomplish a complete and first-grade installation in which there shall be installed new products of latest and best design and manufacturer, executed by competent and experienced workmen.

- .1 Details of preparation, construction, installation, and finishing encompassed by the Contract Documents, shall conform to the best practices of the respective trades, and that workmanship, construction methods, shall be of first class quality so as to accomplish a neat and first class finished job.
- .2 Where specific recognized standards are mentioned in the Specifications, it shall be interpreted that such requirements shall be complied with.

§ 1.3 Capitalization

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

§ 1.4 Interpretation

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

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

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

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

§ 1.6 Notice

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

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

§ 1.7 Digital Data Use and Transmission

The parties shall agree upon protocols governing the transmission and use of ~~If the parties intend to transmit Instruments of Service or any other information or documentation in digital form. The parties will use AIA Document E203™ 2013, Building Information Modeling and Digital Data Exhibit, to establish the protocols for the development, use, transmission, and exchange of digital data.~~ form, they shall endeavor to establish necessary

protocols governing such transmissions, unless otherwise already provided in the Agreement or the Contract Documents.

§ 1.7.1 Contractor's Use of Instruments of Service In Electronic Form

§ 1.7.1.1 The Architect may, with the concurrence of the Owner, furnish to the Contractor versions of Instruments of Service in electronic form. The Contract Documents executed or identified in accordance with Section 1.5.1 shall prevail in case of an inconsistency with subsequent versions made through manipulatable electronic means involving computers.

§ 1.7.1.2 The Contractor shall not transfer or reuse Instruments of Service in electronic or machine readable form without the prior written consent of the Architect.

§ 1.7.1.3 The Contractor shall execute AIA Document C106-2007 Digital Data Licensing Agreement before receiving Instruments of Service in electronic form from the Architect/Engineer.

§ 1.8 Building Information Models Use and Reliance

~~Any use of, or reliance on, all or a portion of a building information model without agreement to protocols governing the use of, and reliance on, the information contained in the model and without having those protocols set forth in AIA Document E203™ 2013, Building Information Modeling and Digital Data Exhibit, and the requisite AIA Document G202™ 2013, Project Building Information Modeling Protocol Form, shall be at the using or relying party's sole risk and without liability to the other party and its contractors or consultants, the authors of, or contributors to, the building information model, and each of their agents and employees.~~

ARTICLE 2 OWNER

§ 2.1 General

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

§ 2.1.2 The Owner shall prepare a Notice of Commencement for the Project, as required by the Ohio Revised Code, and shall furnish to the Contractor, and anyone else requesting a copy thereof, within fifteen days after receipt of a written request, ~~information necessary and relevant for the Contractor to evaluate, give notice of, or enforce mechanic's lien rights. Such information shall include a correct statement of the record legal title to the property on which the Project is located, usually referred to as the site, and the Owner's interest therein.~~
a copy of the Notice of Commencement for the Project.

§ 2.2 Evidence of the Owner's Financial Arrangements

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

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

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

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

§ 2.3 Information and Services Required of the Owner

§ 2.3.1 Except for permits and fees that are the responsibility of the Contractor under the Contract Documents, including those required under ~~Section 3.7.1~~, Section 3.7.1, the Owner shall secure and pay for necessary approvals, easements, assessments and charges required for construction, ~~use-use,~~ or occupancy of permanent structures or for permanent changes in existing ~~facilities-facilities, including those charges and costs related to zoning changes,~~ environmental impact statements, and similar requirements related to use of the site.

2.3.1.1 The Project is subject to a review and approval process by governmental or other agencies that may affect the permitting process. The Contractor shall allow, in the Construction Schedule, a minimum of sixty days (60) from the date of the Notice to Proceed for the owner to obtain the necessary General Building Permit. After this date potential contract modifications can be discussed..

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

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

§ 2.3.4 The Owner shall ~~furnish surveys describing physical characteristics, legal limitations and utility locations for the site of the Project, and a legal description of the site. The Contractor shall be entitled to rely on the accuracy of information furnished by the Owner but shall exercise proper precautions relating to the safe performance of the Work.~~ not be responsible for furnishing surveys (unless required for the execution of the Work and requested by the Contractor in writing) or other information as to the physical characteristics of, legal limitations of, or utility locations for the Project site, but as necessary for the Work, shall furnish or cause to be furnished to the Contractor a legal description of the Project site, which shall not constitute one of the Contract Documents. The Contractor shall not be entitled to additional compensation resulting from its failure to confirm the location of site utilities or existing structures prior to the opening of its bid.

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

§ 2.3.6 ~~Unless otherwise provided in the Contract Documents, the Owner shall furnish to the Contractor one copy of the Contract Documents for purposes of making reproductions pursuant to Section 1.5.2. The Owner shall furnish the Contract Documents to the Contractor in digital format. If the Contractor requires paper documents, the Contractor shall be responsible for the cost of producing such paper documents.~~

§ 2.4 Owner's Right to Stop the Work

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

§ 2.5 Owner's Right to Carry Out the Work

If the Contractor defaults or neglects to carry out the Work in any respect in accordance with the Contract Documents and fails within a ten-day period after receipt of notice from the Owner to commence and continue correction of such default or neglect with diligence and promptness, the Owner may, to commence to correct such default or neglect within two (2) business days after written notice thereof from the Architect or the Owner (except such period shall be 7 days if the notice is given after final payment), thereafter fails to use its best efforts to correct such default or neglect to the satisfaction of the Owner and Architect, or except where an extension of time is granted in writing by the Owner, fails to correct such default or neglect within 30 days of such notice to the satisfaction of the Architect and the Owner, then the Owner may, upon written notice to the Contractor and without prejudice to other remedies the Owner may have, correct such default or neglect. Such action by the Owner and amounts charged to the Contractor are both subject to prior approval of the Architect and the Architect may, pursuant to Section 9.5.1, withhold or nullify a Certificate for Payment in whole or in part, to the extent reasonably necessary to reimburse the Owner for the reasonable cost of correcting such deficiencies, including Owner's expenses and make good such deficiencies. However, if such default or neglect results in a threat to the safety of persons or property, the Contractor shall immediately commence to correct such default or neglect upon receipt of written or oral notice thereof. If the notice is given before final payment, an appropriate Change Order shall be issued deducting from the payments then or thereafter due the Contractor the costs of correcting such deficiencies, including compensation for the Architect's additional services made necessary by such default, neglect, or failure. If current and future payments neglect or failure and the Owner's administrative and legal expense, including the time of the Owner's personnel in dealing with such default. If payments then or thereafter due the Contractor are not sufficient to cover such amounts, amount, the Contractor shall pay the difference to the Owner. If the Contractor disagrees with the actions of the Owner or the Architect, or the amounts claimed as costs to the Owner, the Contractor may file a Claim pursuant to Article 15.

ARTICLE 3 CONTRACTOR

§ 3.1 General

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

§ 3.1.2 The Contractor shall perform the Work in accordance with the Contract Documents. Documents and shall comply with all rules, regulations, and policies of the Owner and all applicable federal, state, and local codes, statutes, ordinances and regulations in the performance of the Work on the Project. Without limiting the Contractor's obligations to know and follow the Owner's policies, the Contractor acknowledges that the Owner has a policy against citizens other than law enforcement officers carrying weapons or concealed otherwise onto its property.

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

§ 3.2 Review of Contract Documents and Field Conditions by Contractor

§ 3.2.1 Execution of the Contract Agreement by the Contractor is a representation that the Contractor has visited the site, ~~become generally~~ carefully and diligently investigated the entire site and the surrounding area, including location, condition and layout of the site and utility locations, become thoroughly familiar with local conditions under which the Work is to be performed, including the generally occurring climatic condition and carefully correlated personal observations and other information with requirements of the Contract Documents.

§ 3.2.2 Because the Contract Documents are complementary, the Contractor shall, before starting each portion of the Work, carefully study and compare the various Contract Documents relative to that portion of the Work, as well as the information furnished by the Owner pursuant to Section 2.3.4, shall take field measurements of any existing conditions related to that portion of the Work, and shall observe any conditions at the site affecting it. These obligations are for the purpose of facilitating coordination and construction by the Contractor and are not for the purpose of discovering errors, omissions, or inconsistencies in the Contract Documents; however, the Contractor shall promptly report to the Architect any errors, inconsistencies or omissions discovered by or made known to the Contractor as a request for information in such form as the Architect may require. It is recognized that the Contractor's

review is made in the Contractor's capacity as a contractor and not as a licensed design professional, unless otherwise specifically provided in the Contract Documents.

§ 3.2.2.1 Where there is a conflict in or between the Drawings and Specifications, the Contractor shall be deemed to have estimated on the more expensive way of doing the Work and the larger quantity required. Only changes or interpretations covered by Addenda or written from the Architect will be permitted during construction of the Work.

§ 3.2.2.2 The Owner shall be entitled to deduct from the Contract Sum amounts paid to the Architect for the Architect to evaluate and respond to the Contractor's request for information, where such information was available to the Contractor from a careful study and comparison of the Contract Documents, field conditions, other Owner-provided information, Contractor-prepared coordination drawings, or prior Project correspondence or documentation.

§ 3.2.3 ~~The Contractor is not required to ascertain that the Contract Documents are in accordance~~ Additionally, prior to performing each portion of the Work, the Contractor shall have a competent person review the Contract Documents for compliance with applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of public authorities, but the Contractor shall promptly report to the Architect any nonconformity discovered by or made known to the Contractor as a request for information in such form as the Architect may require, and shall immediately report in writing any conflicts with such laws, statutes, ordinances, building codes, and rules and regulations to the Architect and Owner.

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

3.2.5 The Owner is entitled to reimbursement from the contractor for amounts paid to the Architect for evaluating and responding to the contractor's requests for information that are not prepared in accordance with the Contract Documents or where the requested information is available to the Contractor from a careful study and comparison of the Contract Documents, field conditions, other Owner-provided information, Contractor-prepared coordination drawings, or prior project correspondence or documentation.

§ 3.3 Supervision and Construction Procedures

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

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

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

§ 3.3.3.1 If any part of the Contractor's Work is preceded by the Work of another Contractor, Contractor shall inspect such other Contractor's Work before commencing any Work, and report in writing to Architect any defects that render the Contractor's preceding Work unsuitable as related to Contractor's Work. Proceeding with the Work shall constitute an acceptance of the previously performed work.

§ 3.4 Labor and Materials

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

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

§ 3.4.2.1 After the Contract has been executed, the Owner and Architect may consider a requests for the substitution of products in place of those specified. The Owner and Architect may, but are not obligated to, consider only those substitution requests that are in full conformance with the conditions set forth in the General Requirements (Division 1 of the Specifications). By making requests for substitutions, the Contractor:

- .1 Represents that it has personally investigated the proposed substitute product and determined that it is equal or superior in all respects to that specified;
- .2 Represents that it will provide the same warranty for the substitution that it would have provided for the product specified.
- .3 Certifies that the cost data presented is complete and includes all related costs for the substituted product and for Work that must be performed or changed as a result of the substitution, except the Architect's redesign costs, and waives all claims for additional costs related to the substitution which subsequently become apparent;
- .4 Agrees that it shall, if the substitution is approved, coordinate the installation of the accepted substitute, making such changes as may be required for the Work to be complete in all respects; and
- .5 Represents that the request includes a written representation identifying any potential effect the substitution may have on the Project's achievement of a Sustainable Measure or the Sustainable Objective.

3.4.2.2 The Owner shall be entitled to reimbursement from the Contractor for amounts paid to the Architect for reviewing the Contractor's proposed substitutions and making agreed-upon changes in the Drawings and Specifications resulting from such substitutions.

§ 3.4.3 The Contractor shall enforce strict discipline and good order among the Contractor's employees and other persons carrying out the Work. The Contractor shall not permit employment of unfit persons or persons not properly skilled in tasks assigned to them. . If the Owner or Architect/Engineer deems any employee of the Contractor or a Subcontractor unsatisfactory, the Contractor will transfer or require its Subcontractor to transfer such employee from the Project immediately and replace or require the prompt replacement of such employee with a competent employee. The Owner, however, shall be under no obligation to do so.

§ 3.4.4 The Owner shall be entitled to deduct from the Contract Sum amounts paid to the Architect to evaluate the Contractor's proposed substitutions and to make agreed-upon changes in the Drawings and Specifications made necessary by the Owner's acceptance of such substitutions.

§ 3.5 Warranty

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

required by the Architect, the Contractor shall furnish satisfactory evidence as to the kind and quality of materials and equipment. In addition to other warranties, guarantees, or obligations set forth in the Contract Documents or applicable as a matter of law and not in limitation of the terms of the Contract Documents, the Contractor warrants and guarantees that:

- .1 The Owner will have good title to the Work and materials and equipment incorporated into the Work will be new.
- .2 The Work and materials and equipment incorporated into the Work will be free from defects, including defects in the workmanship or materials.
- .3 The Work and equipment incorporated into the Work will be fit for the purpose for which they are intended.
- .4 The Work and materials and equipment incorporated into the Work will be merchantable.
- .5 The Work and materials and equipment incorporated into the Work will conform to the Contract Documents.

§ 3.5.2 Upon notice of the breach of the foregoing warranties or guarantees or other warranties or guarantees under the Contract Documents, the Contractor, in addition to other requirements in the Contract Documents, will commence to correct such breach and damage resulting therefrom within two business days after written notice thereof, thereafter will use its best efforts to correct such breach and damage to the satisfaction of the Owner and, except where an extension of time is granted in writing by the Owner, correct such breach and damage to the satisfaction of the Owner within 30 days of such notice; provided that if such notice is given after final payment hereunder, such 48 hour period shall be extended to 7 days. If the Contractor fails to commence to correct such breach and damage, or correct such breach and damage as provided above, the Owner, upon written notice to the Contractor and without prejudice to its other written notice to the Contractor and without prejudice to his other rights or remedies, may correct the deficiencies. The Contractor upon written notice to the Owner shall pay the Owner, within 10 days after the date of such notice, the Owner's costs and expenses incurred in connection with such correction, including without limitation the Owner's administrative and legal expenses. The foregoing warranties and obligations of the Contractor shall survive the final payment and termination of the Contract.

§ 3.5.3 The Contractor shall, at the time of final completion of the Work and as a condition precedent to final payment to the Contractor, assign to the Owner all manufacturer's warranties related to the materials and labor used in the Work. The Contractor further agrees to perform the Work in such manner as to preserve any and all such manufacturers' warranties and deliver to the A/E the warranties, project manuals, operating procedures, and other materials related to each of the building systems and materials included in the Contractor's Work and as required by the Specifications.

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

§ 3.6 Taxes

The Contractor shall pay sales, consumer, use commercial activity and similar taxes for the Work provided by the Contractor that are legally enacted when bids are received or negotiations concluded, whether or not yet effective or merely scheduled to go into effect. The Contractor acknowledges that the Owner is a political subdivision of the state of Ohio or tax exempt organization and is exempt from state sales, use, and commercial activity taxes. Upon written request, the Owner will provide the Contractor with any applicable certificates of exemption.

§ 3.6.1 The Owner is a political subdivision of the state of Ohio. Building materials that the Contractor purchases for incorporation into the improvements will be exempt from the state sales and use taxes if the Contractor provides a properly completed sales tax exemption certificate executed by the Contractor and the Owner to the vendors or suppliers at the time of the acquisition of the materials. The Owner will execute properly completed certificates on request.

§ 3.6.2 Purchases by the Contractor of expendable items such as form lumber, tools, oils, greases, fuel, or equipment rentals are subject to the applicable Ohio sales or use tax.

§ 3.7 Permits, Fees, Notices and Compliance with Laws

§ 3.7.1 Unless otherwise provided in the Contract Documents, the Contractor shall secure and pay for the building permit as well as for other permits, fees, licenses, and inspections by government agencies necessary for proper

execution and completion of the Work that are customarily secured after execution of the Contract and legally required at the time bids are received or negotiations concluded.

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

§ 3.7.3 ~~If the Contractor performs~~ In addition to its other obligations under the Contract Documents, if the Contractor or any of their Subcontractors or Sub-subcontractors' perform Work knowing it to be contrary to applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders and all other requirements of public authorities, the Contractor shall assume appropriate responsibility for such Work and shall bear the costs attributable to correction.

§ 3.7.4 Concealed or Unknown Conditions

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

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

§ 3.8 Allowances

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

§ 3.8.2 Unless otherwise provided in the Contract Documents,

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

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

§ 3.9 Superintendent and Construction Supervision

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

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

§ 3.9.3 The Contractor shall not employ a proposed superintendent to whom the Owner or Architect has made reasonable and timely objection. The Contractor shall not ~~change the superintendent without the Owner's consent, which shall not unreasonably be withheld or delayed.~~ replace the assigned Superintendent without the consent of the Owner, except with another Superintendent who is satisfactory to the Owner. If the Contractor proposes to change the Superintendent, the Contractor shall submit to the Architect a written request for the change, including the justification for the change, the name and qualifications for the proposed replacement, and the time frame within which the change is proposed to take place. The Contractor shall provide promptly any related additional information the Architect or Owner requests.

§ 3.10 Contractor's Construction and Submittal Schedules

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

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

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

§ 3.10.3.1 Notice of Delays. The Contractor shall give the Owner and the Architect verbal notice of any delay affecting its Work within two (2) business days of the commencement of the delay. In addition, the Contractor shall give the Owner and Architect written notice of the delay within ten (10) business days of the commencement of the delay with specific recommendations about how to minimize the effect of the delay. The written notice of the delay shall conspicuously state at the top of the first page of notice in twelve point type or larger that it is a "NOTICE OF DELAY". A notice of delay shall not constitute the submission of Claim. The Contractor acknowledges and agrees that these notice provisions are material terms of the Contract Documents and give the Owner the opportunity to take action to minimize the cost and/or effect of delays.

§ 3.10.4 If the Architect/Engineer or the Owner determines that the performance of the Work has not progressed so that it is likely that the Contractor will not Substantially Complete its Work by its Date of Substantial Completion, the Owner shall have the right to order the Contractor to take corrective measures necessary to expedite the Work including, without limitation: (i) working additional shifts or overtime; (ii) supplying additional manpower, equipment, and facilities; and (iii) other similar measures (collectively referred to as "corrective measures"). If the Owner orders the Contractor to take such corrective measures, the Contractor shall take and continue such Corrective Measures until the Owner is satisfied that the Contractor is likely to Substantially Complete its Work by its Date for Substantial Completion.

§ 3.10.4.1 The Contractor shall not be entitled to adjustment in the Contract Sum in connection with the Corrective Measures required by the Owner pursuant to this Section, unless the Contractor is able to establish that it is entitled to additional compensation under the terms of the Contract Documents.

§ 3.11 Documents and Samples at the Site

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

§ 3.12 Shop Drawings, Product Data and Samples

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

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

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

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

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

§ 3.12.5.1 If the Shop Drawings or the submittals show variations from the requirements of the Contract Documents, the Contractor shall specify such variations in the Contractor's letter of submittal to the Architect/Engineer accompanying the submittal. Variations must be approved by Change Order.

§ 3.12.5.2 If the Contractor's Shop Drawings or its submittals do not contain sufficient information and the Architect/Engineer must perform more than initial review and one (1) resubmittal with respect to any submittal, the Contractor shall pay the additional costs and expenses incurred by the Owner as a result of such additional reviews by the Architect, and the Owner may withhold from sums due or coming due the Contractor amounts to cover such additional costs and expenses.

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

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

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

deviation. The Contractor shall not be relieved of responsibility for errors or omissions in Shop Drawings, Product Data, Samples, or similar submittals, by the Architect's approval thereof.

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

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

§ 3.12.10.1 If professional design services or certifications by a design professional related to systems, materials, or equipment are specifically required of the Contractor by the Contract Documents, the Owner and the Architect will specify all performance and design criteria that such services must satisfy. The Contractor shall be entitled to rely upon the adequacy and accuracy of the performance and design criteria provided in the Contract Documents. The Contractor shall cause such services or certifications to be provided by an appropriately licensed design professional, whose signature and seal shall appear on all drawings, calculations, specifications, certifications, Shop Drawings, and other submittals prepared by such professional. Shop Drawings, and other submittals related to the Work, designed or certified by such professional, if prepared by others, shall bear such professional's written approval when submitted to the Architect. The Owner and the Architect shall be entitled to rely upon the adequacy and accuracy of the services, certifications, and approvals performed or provided by such design professionals, provided the Owner and Architect have specified to the Contractor the performance and design criteria that such services must satisfy. Pursuant to this Section 3.12.10, the Architect will review and approve or take other appropriate action on submittals only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents.

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

§ 3.12.11 The Architect's review of Contractor's submittals will be limited to examination of an initial submittal and one (1) resubmittal. The Architect's review of additional submittals will be made only with the consent of the Owner after notification by the Architect. The Owner shall be entitled to deduct from the Contract Sum amounts paid to the Architect for evaluation of such additional resubmittals.

§ 3.12.12 Manufacturer's Instructions or Requirements. Without waiving, modifying or relieving the Contractor from its other obligations under the Contract Documents, including its warranties and any performance specifications, the Contractor shall furnish and install its Work in accordance with any applicable manufacturer's instructions and requirements, and if there is a conflict between such instructions or requirements and the Drawings and/or Specifications, the Contractor shall request clarification from the Architect/Engineer prior to commencing the Work.

§ 3.13 Use of Site

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

§ 3.13.1 Restricted Activities. Unless expressly permitted by the Contract Documents or by the Owner in writing, the Contractor shall not interfere with the Owner's ongoing operations, shall not permit any of its employees or its Subcontractors or materialmen's employees to use any existing facilities on the Project Site, including, without limitation, lavatories, toilets, entrances, and parking areas, and shall not permit its employees or its Subcontractors or materialmen's employees to bring any tobacco products, alcoholic beverages, controlled substances, or firearms onto the Project site or any other property owned or controlled by the Owner. Additionally, the Contractor shall not permit its employees or its Subcontractor's or materialmen's employees to use any radios, tape or compact disc players, or sound amplification equipment that is audible outside of the immediate area where the Work is being performed.

§ 3.14 Cutting and Patching

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

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

§ 3.15 Cleaning Up

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

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

§ 3.16 Access to Work

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

§ 3.17 Royalties, Patents and Copyrights

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

§ 3.18 Indemnification

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

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

§ 3.18.3 The Owner may set off an amount equal to sums for which it is entitled to be indemnified from the amounts otherwise due the Contractor under the Contract Documents. It is agreed that cost of the Owner's staff in calculating expenses under this Paragraph will be at the rate of \$40.00 per hour.

§ 3.19 COMPLIANCE WITH DEMOLITION LAWS

§ 3.19.1 The Contractor will, at the Contractor's expense, fully comply with all statutes and regulations regarding notification and disposal of construction and demolition debris, including, without limitation, Ohio Revised Code Chapter 3714 and the regulations enacted thereunder.

§ 3.20 UNDERGROUND UTILITY FACILITIES

§ 3.20.1 The Contractor, at least two (2) working days prior to commencing construction in an area that may involve underground utility facilities, shall give notice to the Architect and the Owner and to the registered underground utility protection services and the Owners of underground utility facilities shown on the Drawings and Specifications.

§ 3.20.2 The Contractor shall notify immediately the occupants of any premises near the Work and the Architect and the Owner as to any emergency that it may create or discover. The Contractor shall notify immediately the operator of the underground facility and the Architect and Owner of any break or leak in the lines of such operator or any dent, gouge, groove, or other damage to such lines or to their rating or cathodic protection, made or discovered in the course of excavation.

§ 3.21 WAIVERS OF CLAIM AND NOTICES OF FURNISHING

§ 3.21.1 With each Application for Payment, the Contractor will obtain from each of its Subcontractors and Material Suppliers, regardless of tier, a waiver of claim for the Project of all lien rights for the amounts for which they have received payments with respect to the Project in the form requested by the Architect.

ARTICLE 4 ARCHITECT

§ 4.1 General

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

§ 4.1.1.1 The term "Architect," "Architect/Engineer," or "Engineer" as used herein means the Architect or his authorized representative.

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

§ 4.2 Administration of the Contract

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

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

§ 4.2.2.1 The Contractor shall reimburse the Owner for compensation paid to the Architect/Engineer for additional site visits made necessary by fault, neglect or request of the Contractor or by defects and deficiencies in the Work.

§ 4.2.3 On the basis of the site visits, the Architect will keep the Owner reasonably informed about the progress and quality of the portion of the Work completed, and promptly report to the Owner (1) known deviations from the Contract Documents, (2) known deviations from the most recent construction schedule submitted by the Contractor, and (3) defects and deficiencies observed in the Work. The Architect will not be responsible for the Contractor's

failure to perform the Work in accordance with the requirements of the Contract Documents. The Architect will not have control over or charge of, and will not be responsible for acts or omissions of, the Contractor, Subcontractors, or their agents or employees, or any other persons or entities performing portions of the Work.

§ 4.2.4 Communications

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

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

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

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

4.2.7.1 In no case will the Architect's review period on any submittal be less than 14 days after receipt of the submittal from the Contractor.

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

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

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

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

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

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

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

4.2.14.1 The Contractor's request for information shall be prepared and submitted in accordance with Division 01 "General Requirements" Sections, on the form included in the Contract Documents. The Architect will return without action requests for information that do not conform to requirements of the Contract Documents.

ARTICLE 5 SUBCONTRACTORS

§ 5.1 Definitions

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

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

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

§ 5.2.1 Unless otherwise stated in the Contract Documents, the Contractor, as soon as practicable after award of the Contract, shall notify the Owner and Architect of the persons or entities proposed for each principal portion of the Work, including those who are to furnish materials or equipment fabricated to a special design. Within 14 days of receipt of the information, the Architect may notify the Contractor whether the Owner or the Architect (1) has reasonable objection to any such proposed person or entity or (2) requires additional time for review. Failure of the Architect to provide notice within the 14-day period shall constitute notice of no reasonable objection. Copies of all bids or other proposals from Subcontractors or Sub-subcontractors shall, upon request of the Owner or Architect/Engineer, be submitted to the Owner and the Architect/Engineer.

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

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

§ 5.2.4 The Contractor shall not substitute a Subcontractor, person, or entity for one previously selected if the Owner or Architect makes reasonable objection to such substitution. The Contractor shall notify the Owner and the Architect of proposed substitution of Subcontractor, person, or entity a minimum of 10 days prior to proposed change. The Owner may require the Contractor to change a Subcontractor or Sub-subcontractor previously approved, and if at such time the Contractor is not in default under this Agreement, the Contract sum shall be increased or decreased by the difference in the cost resulting from the change.

§ 5.3 Subcontractual Relations

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

§ 5.3.1 Notwithstanding the provisions of Subparagraph 5.3, any part of the Work performed for the Contractor by a Subcontractor or its Sub-subcontractor shall be pursuant to a written Subcontract between the Contractor and such Subcontractor (or the Subcontractor and its Sub-subcontractor at any tier). The Architect will assume no responsibility for reviewing, monitoring, or verifying activities or relationships between a Subcontractor or its Sub-subcontractor and the Prime Contractor.

§ 5.4 Contingent Assignment of Subcontracts

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

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

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

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

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

ARTICLE 6 CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS

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

§ 6.1.1 The term "Separate Contractor(s)" shall mean other contractors retained by the Owner under separate agreements. The Owner reserves the right to perform construction or operations related to the Project with the Owner's own forces, and with Separate Contractors retained under Conditions of the Contract substantially similar to those of this Contract, including those provisions of the Conditions of the Contract related to insurance and waiver of subrogation.

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

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

schedules shall then constitute the schedules to be used by the Contractor, Separate Contractors, and the Owner until subsequently revised.

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

§ 6.2 Mutual Responsibility

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

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

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

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

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

§ 6.3 Owner's Right to Clean Up

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

ARTICLE 7 CHANGES IN THE WORK

§ 7.1 General

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

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

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

§ 7.2 Change Orders

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

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

- .3 The extent of the adjustment, if any, in the Contract Time.

§ 7.2.2 Methods used in determining adjustments to the Contract Sum shall be as described in Section 7.3.4.1.

§ 7.3 Construction Change Directives

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

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

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

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

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

§ 7.3.4.1 For each change over \$500.00, the Contractor shall furnish a detailed, written Proposal itemized according to these Pricing Guidelines. Any Subcontractor or Material Supplier pricing shall also be itemized according to these Pricing Guidelines. In order to expedite the review and approval process, all Proposals shall be prepared in the categories and in the order listed below.

- .1 Labor – All field labor shall be priced in compliance with Common Construction Wage Determination for this project, excluding fringe benefits, which are covered under Clause .2 below. The payroll is to be based on straight time only and is to include number of hours and rate of pay for each classification of work. If overtime is approved, list only the straight time portion in this item.
- .1 Costs of labor, including applicable payroll taxes, fringe benefits required by agreement or custom, workers' compensation insurance, and other employee costs approved by the Architect;
- .2 Fringes – All established payroll taxes, assessments and fringe benefits on the labor in item .1. This may include, but is not limited to FICA, Federal and State Unemployment, Health and Welfare, Pension Funds, Workers' Compensation and Apprentice Fund. Each of the fringes is to be a separate line item.
- .3 Equipment Rentals – All charges for certain non-owned heavy or specialized equipment at up to 100 percent of the documented rental cost. No rental charges will be allowed for hand tools, minor equipment, simple scaffolds, etc. Downtime due to repairs, maintenance and weather delays will not be allowed.
- .4 Owned Equipment – All charges for certain owned, heavy or specialized equipment at up to 100 percent of the cost listed by the Associated Equipment Dealers Blue Book. No recovery will be allowed for hand tools, minor equipment, simple scaffolds, etc. The longest period of time that the equipment is to be required for the Work will be the basis for the pricing. Downtime due to repairs, maintenance and weather delays will not be allowed.
- .2 Costs of materials, supplies, and equipment, including cost of transportation, whether incorporated or consumed;
- .5 Trucking – A reasonable delivery charge or per mile trucking charge for delivery of required materials or equipment. Charges for use of a pickup truck will not be allowed.

- .6 Overhead – Includes telephone, telephone charges, facsimile, telegrams, postage, photos, photocopying, hand tools, simple scaffolds (one level high), tool breakage, tool repairs, tool replacement, tool blades, tool bits, home office estimating and expending, home office clerical and accounting support, home office labor, legal services, travel and parking expenses.
- .7 Materials
- .1 All materials purchased by the Contractor and incorporated into the changed Work, showing costs, quantities, or Unit Prices of all items, as appropriate. Reimbursement or material costs shall only be allowed in the amount of the Contractor's actual cost including any and all discounts, rebates or related credits.
- One third (33 percent) of the cost of reusable materials for each use, such as formwork lumber, shoring or temporary enclosures.
- .8 Miscellaneous – The following items are allowable at the cost of the Work, with no overhead or profit.
- .3 Rental costs of machinery and equipment, exclusive of hand tools, whether rented from the Contractor or others; .1 The cost of extending the Bond and the cost of extending liability, property damage, builder's risk or specialty coverage insurance.
- .2 The premium portion only for approved overtime (labor and fringes). The straight time portion is included in items .1 and .2.
- .3 Fees for permits, licenses, inspections, tests, etc.
- .4 Costs of premiums for all bonds and insurance, permit fees, and sales, use, or similar taxes, directly related to the change; and .9 Costs which will not be reimbursed for Change Order Work include the following:
- .1 Employee Profit Sharing Plans – regardless of how defined or described, the Contractor will pay these charges from Contractor profit and will not be reimbursed.
- .2 Voluntary Employee Deductions – examples are United Way and U.S. Savings Bonds, etc.

§ 7.3.4.2 The cost of the Contractors overhead and profit on Change Orders shall be:

- .1 For extra Work completed by the Contractor with his own labor, 15 percent shall be added to items .1, .2, .3, .4, .5 and .7 of Subparagraph 7.3.7.1 as an allowance for overhead and profit.
- .2 For extra Work completed by Subcontractors of the Contractor, 10 percent shall be added to items .1, .2, .3, .4, .5 and .7 of Subparagraph 7.3.7.1 as an allowance for overhead and profit.
- .5 Costs of supervision and field office personnel directly attributable to the change; .3 For work deleted which would have been completed by the Contractor or Subcontractor, 5 percent of items .1, .2, .3, .4, .5 and .7 of Subparagraph 7.3.7.1 shall be credited to the Owner as the allowance for unearned profit.

Example:	Labor	\$500.00
	Material	500.00
	Cost	\$1,000.00
(+)	5% Unearned Profit	50.00
	Credit to Owner	\$1,050.00

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

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

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

§ 7.3.8 The amount of credit to be allowed by the Contractor to the Owner for a deletion or change that results in a net decrease in the Contract Sum shall be actual net cost as confirmed by the Architect. When both additions and credits

covering related Work or substitutions are involved in a change, the allowance for overhead and profit shall be figured on the basis of net increase, if any, with respect to that change.

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

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

§ 7.3.11 The agreement on any Change Order shall constitute a final settlement of all matters relating to the change in the Work that is the subject of the Change Order, including but not limited to, all direct, indirect and cumulative costs associated with such change and any and all adjustments to the Contract Sum and Contract Time.

§ 7.4 Minor Changes in the Work

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

ARTICLE 8 TIME

§ 8.1 Definitions

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

§ 8.1.2 The date of commencement of the Work is the ~~date established in the Agreement~~ effective date established in the Agreement or the date established in the Notice to Proceed.

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

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

§ 8.2 Progress and Completion

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

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

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

§ 8.3 Delays and Extensions of Time

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

Architect determines, justify delay, then the Contract Time shall be extended for such reasonable time as the Architect may determine its progress of the Work by one of the delays for which an extension of time is permitted and gives the Architect written notice specifically describing the delay within two business days of its commencement, the date for the Substantial Completion of the Work will be extended by Change Order for such reasonable time as the Architect may determine. The failure to give such notice will constitute an irrevocable waiver of the Contractor's right to seek an extension for such delay. The only delays for which the Contractor will be entitled to an extension of the time for completion will be delays caused by the Architect or the Owner, physical damage to the Project over which the Contractor has no control, labor disputes beyond the control of the Contractor, and unusually severe weather conditions not reasonably anticipatable. (Temperature, rain, or other precipitation within a range of twenty percent of normal amounts for the time of the year covered by the Agreement shall not be considered unusually severe weather conditions). Extensions of time will only be granted pursuant to the procedures for Change Orders set forth in the General Conditions.

§ 8.3.1.1 The Contractor shall take the number of days of inclement weather as indicated in the U.S. Weather Bureau Reports and the Project Schedule into account when preparing his Bid Proposal. Historical data for all areas may be obtained from:

U.S. Department of Commerce
National Climatic Data Center
Federal Building
Asheville, NC 28801
Phone (704) 271-4800

§ 8.3.1.2 The Contractor shall include in his bid sufficient monies to cover the required manpower, equipment, protection, etc., to complete his Work in accordance with the Project Guideline Schedule, accounting for inclement weather. It is the Contractor's obligation to provide a copy of the "National Climatic Center" report with any weather delay claim filed. This includes the current information as well as the monthly averages available at the time of bidding.

§ 8.3.1.3 The Contractor nor any Subcontractor shall be due any additional compensation for an extension of time granted the Contractor, or granted to another prime Contractor for a weather delay extension. The Contractor may receive additional days only.

8.3.1.4 Whether or not any Hinderance shall be the basis for an increase in the Contract Time, the Contractor shall have no claim against the Owner or the Architect for an increase in the contract sum, nor a claim against the Owner, or the Architect for a payment or allowance of any kind for damage, loss or expense resulting from any Hinderance. As between the Contractor and the Owner, except for acts constituting intentional or grossly unreasonable interference by the Owner, or the Architect with the Contractor's performance of the Work when such acts continue after the Contractor's written notice to the Owner of such interference or disruption, the Contractor shall assume the risk of all Hinderances arising from any and all causes whatsoever, including without limitation, those due to any act or omission of the Owner, or the Architect except only to the extent that an increase to the Contract Time may be due to the Contractor as expressly provided for in this Article. The Contractor shall bear all costs, expenses and liabilities in connection with Hinderances and all costs, expenses and liabilities of any nature whatsoever, whether or not provided for in the Contract Documents, shall conclusively be deemed to have been within the contemplation of the parties. The only remedy available to the Contractor shall be an increase in the Contract Time.

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

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

ARTICLE 9 PAYMENTS AND COMPLETION

§ 9.1 Contract Sum

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

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

§ 9.2 Schedule of Values

Where the Contract is based on a stipulated sum or Guaranteed Maximum Price, the Contractor shall submit a schedule of values to the Architect before the first Application for Payment, allocating the entire Contract Sum to the various portions of the Work. The schedule of values shall be prepared in the form, and supported by the data to substantiate its accuracy, required by the Architect. This schedule, unless objected to by the Architect, shall be used as a basis for reviewing the Contractor's Applications for Payment. Any changes to the schedule of values shall be submitted to the Architect and supported by such data to substantiate its accuracy as the Architect may require, and unless objected to by the Architect, shall be used as a basis for reviewing the Contractor's subsequent Applications for Payment. By submitting the schedule of values, the Contractor represents for the reliance of the Architect and the Owner that the allocation of the values to portions of the Work is a fair and reasonable estimate of such allocation. Once approved, the Contractor will not change the allocations in the Schedule of Values without the Architect's further approval. The Architect may from time to time require the Contractor to adjust such schedule if Architect determines it to be in any way unreasonable or inaccurate. The Contractor then shall adjust the Schedule of Values as required by the Architect/Engineer within ten (10) days.

§ 9.3 Applications for Payment

§ 9.3.1 ~~At least ten days before the date established for each progress payment, the Contractor shall submit to the Architect an itemized Application for Payment prepared in accordance with the schedule of values, if required under Section 9.2, for completed portions of the Work. The application shall be notarized, if required, and supported by all Applications for Payment shall be made at approximately 30 day intervals in accordance with the dates established in the Owner-Contractor Agreement. The Contractor shall submit to the Architect, in triplicate, an itemized Application for Payment, supported by such data substantiating the Contractor's right to payment that the Owner or Architect require, such as copies of requisitions, and releases and waivers of liens from Subcontractors and suppliers, and shall reflect retainage if provided for in the Contract Documents as the Owner or the Architect may require. The form of Application for Payment shall be AIA Document G702 – Application and Certification for Payment, supported by AIA Document G703 – Continuation Sheet. No other forms of Application for Payment will be acceptable. Continuation Sheet (G703) shall be prepared the same as in the Schedule of Values submitted by the Contractor.~~

1 Such applications may include requests for payment on account of changes in the Work which have been properly authorized by Construction Change Directive but not yet included in Change Orders.

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

Contractor shall submit with each monthly Application for Payment 1) an Affidavit that payrolls, bills for materials and equipment, and other indebtedness connected with the Work for which the previous Application was submitted and the Owner or his property might in any way be responsible, have been paid or otherwise satisfied, and 2) release or waivers of liens arising out of the Contract for each Subcontractor, materialmen, supplier, and laborer of the Contractor.

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

§ 9.3.1.3 Documentation. Upon request, the Contractor immediately will supply the Owner and the Architect with such information as may be requested so as to verify the amounts due to the Contractor, including but not limited to original invoices for materials and equipment and documents showing that the Contractor has paid for such materials and equipment, and so as to verify that amounts due laborers, Subcontractors, and material suppliers have been paid to them. The failure to provide such information shall be justification for withholding payment to the Contractor.

§ 9.3.1.4 Escrow Account. The Owner and the Contractor agree that any escrow account required in connection with this Agreement shall be established at a bank or savings and loan association in the State of Ohio used by the Owner,

and that the escrow agent shall be compensated for its services in accordance with the schedule approved by the Owner from income from the escrow account.

§ 9.3.2 Unless otherwise provided in the Contract Documents, payments shall be made on account of materials and equipment delivered and suitably stored at the site for subsequent incorporation in the Work. If approved in advance by the Owner, payment may similarly be made for materials and equipment suitably stored off the site at a location agreed upon in writing. Payment for materials and equipment stored on or off the site shall be conditioned upon compliance by the Contractor with procedures satisfactory to the Owner to establish the Owner's title to such materials and equipment or otherwise protect the Owner's interest, and shall include the costs of applicable insurance, storage, and transportation to the site, for such materials and equipment stored off the site. Payments to Contractor for materials stored off site is discouraged. Where circumstances indicate that the Owner's best interest is served by off-site storage, the Contractor shall make written request to the Architect for approval to include such material costs in his next progress payment. The Contractor's request shall include the following information:

- .1 A list of the fabricated materials consigned to the project (which shall be clearly identified), giving the place of storage, together with copies of invoices and reasons why materials cannot be delivered to the site.
- .2 Certification that items have been tagged for delivery to the project and that they will not be used for another purpose.
- .3 A letter from the Bonding Company indicating agreement to the arrangements and that payment to the Contractor shall not relieve either party or their responsibility to complete the facility.
- .4 Evidence of adequate insurance covering the material in storage, which shall name the Owner as additionally insured.
- .5 Costs incurred by the Architect to inspect material in off-site storage shall be paid by the Contractor.
- .6 Subsequent pay requests shall itemize the materials and their cost which were approved on previous pay requests and remain in off-site storage.
- .7 When a partial payment is allowed on account of material delivered on the site of the work or in the vicinity thereof or under possession and control of the Contractor but not yet incorporated therein, such material shall become the property of the Owner, but if such material is stolen, destroyed, or damaged by casualty before being used, the Contractor will be required to replace it at his own expense.

§ 9.3.3 The Contractor warrants that title to all Work covered by an Application for Payment will pass to the Owner no later than the time of payment. The Contractor further warrants that upon submittal of an Application for Payment all Work for which Certificates for Payment have been previously issued and payments received from the Owner shall, to the best of the Contractor's knowledge, information, and belief, be free and clear of liens, claims, security interests, or encumbrances, in favor of the Contractor, Subcontractors, suppliers, or other persons or entities that provided labor, materials, and equipment relating to the Work.

§ 9.3.4 Partial payments to the Contractor for labor performed under either a unit or lump sum price Contract shall be made at the rate of 92 percent of the estimates prepared by the Contractor and approved by the Architect or Engineer. Labor performed after the job is 50 percent completed shall be paid for at the rate of 100 percent of the estimates submitted by the Contractor and approved by the Architect or Engineer.

- .1 There shall be paid to the Contractor a sum at the rate of 92 percent of the invoice cost, not to exceed the bid price in a unit price contract, of material delivered on the site of the Work, or in the vicinity of the work, or other approved storage site. The balance of such invoiced value shall be paid when such material is incorporated into and becomes a part of such building, construction, addition, improvement, alteration, or installation.
- .2 When the payment is made on account of materials or equipment not yet incorporated into the Project, such materials and equipment will become the property of the Owner; provided that if such materials or equipment are stolen, destroyed, or damaged before being fully incorporated into the Project, the Contractor will be required to replace them at its own expense.

§ 9.3.5 Partial or full payment to the Contractor(s) for material, equipment, or work in place shall not start the warranty period specified in Division 1, Section "Product Requirements."

§ 9.3.6 Contractors application for payment shall reflect an equal percentage amount (within 2-3 percent) for labor and materials for Work completed. The Architect may adjust applications where labor exceeds materials or where materials exceed labor quantities in the Work completed columns.

§ 9.4 Certificates for Payment

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

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

§ 9.5 Decisions to Withhold Certification

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

~~.1 defective Work not remedied;~~

~~.1 The Contractor is in default of the performance of any of its obligations under the Contract Documents, including, but not limited to: Failure to provide sufficient skilled workers; work, including equipment or materials, which is defective or otherwise does not conform to the Contract Documents; failure to conform to the Project Time Schedule; or failure to follow the directions of or instructions from the Architect or Owner.~~

~~.2 third party claims filed or reasonable evidence indicating probable filing of such claims, unless security acceptable to the Owner is provided by the Contractor; The Contractor is in default of the performance of any of its obligations under another Contract which it has with the Owner.~~

~~.3 The filing of the third party claims or reasonable evidence that third party claims have been or will be filed.~~

~~.4 The Work has not proceeded to the extent set forth in the Application for Payment.~~

~~.5 Representations made by the Contractor are untrue.~~

~~.3 .6 The failure of the Contractor to make payments properly to Subcontractors or suppliers for labor, materials or equipment; to its Subcontractors, materialmen, or laborers.~~

~~.7 Damage to the Owner's property or the property of another Contractor or person.~~

~~.4 reasonable evidence .8 The determination by the Architect that there is a substantial possibility that the Work cannot be completed for the unpaid balance of the Contract Sum; Sum~~

~~.5 damage to the Owner or a Separate Contractor;~~

- ~~.6 — reasonable evidence that the Work will not be completed within the Contract Time, and that the unpaid balance would not be adequate to cover actual or liquidated damages for the anticipated delay; or~~ .9 — Liens filed or reasonable evidence indicating the probable filing of such liens.
- ~~.7 — repeated failure to carry out the Work in accordance with the Contract Documents.~~

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

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

§ 9.5.4 If the Architect withholds certification for payment under Section 9.5.1.3, the Owner may, at its sole option, issue joint checks to the Contractor and to any Subcontractor or supplier to whom the Contractor failed to make payment for Work properly performed or material or equipment suitably delivered. If the Owner makes payments by joint check, the Owner shall notify the Architect and the Contractor shall reflect such payment on its next Application for Payment. If the Contractor disputes a determination by the Architect with regard to Certificate of Payment, the Contractor nevertheless shall continue to prosecute the Work.

§ 9.6 Progress Payments

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

§ 9.6.2 The Contractor shall pay each Subcontractor, no later than seven days after receipt of payment from the Owner, the amount to which the Subcontractor is entitled, reflecting percentages actually retained from payments to the Contractor on account of the Subcontractor's portion of the Work. The Contractor shall, by appropriate agreement with each Subcontractor, require each Subcontractor to make payments to Sub-subcontractors in a similar manner. All payments made by the Contractor or any of its Subcontractors and suppliers shall be within the time period required by Ohio law. Neither the Contractor nor any of its Subcontractors or suppliers shall withhold retainage from its Subcontractors and suppliers or their sub-subcontractors and suppliers beyond the retainage withheld by the Owner from the Contractor.

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

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

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

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

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

§ 9.6.8 Provided the Owner has fulfilled its payment obligations under the Contract Documents, the Contractor shall defend and indemnify the Owner from all loss, liability, damage or expense, including reasonable attorney's fees and

litigation expenses, arising out of any lien claim or other claim for payment by any Subcontractor or supplier of any tier. Upon receipt of notice of a lien claim or other claim for payment, the Owner shall notify the Contractor. If approved by the applicable court, when required, the Contractor may substitute a surety bond for the property against which the lien or other claim for payment has been asserted.

§ 9.7 Failure of Payment

If the Architect does not issue a Certificate for Payment, through no fault of the Contractor, within seven days after receipt of the Contractor's Application for Payment, or if the Owner does not pay the Contractor within seven days after the date established in the Contract Documents, the amount certified by the Architect or awarded by binding dispute resolution, Owner does not pay the Contractor the amount certified by the Architect/Engineer within thirty (30) days after receipt of the certified Application for Payment from the Architect/Engineer, then the Contractor may, upon seven additional days' notice to the Owner and Architect, stop the Work until payment of the amount owing has been received. The Contract Time shall be extended appropriately and the Contract Sum shall be increased by the amount of the Contractor's reasonable costs of shutdown, delay and start-up, plus interest as provided for in the Contract Documents.

§ 9.8 Substantial Completion

§ 9.8.1 Substantial Completion is the stage in the progress of the Work when the Work or designated portion thereof is sufficiently complete in accordance with the Contract Documents and when all required occupancy permits, if any, have been issued so that the Owner can occupy or utilize the Work for its intended use.

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

§ 9.8.3 Upon receipt of the Contractor's list, the Architect will make an inspection to determine whether the Work or designated portion thereof is substantially complete. If the Architect's inspection discloses any item, whether or not included on the Contractor's list, which is not sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize the Work or designated portion thereof for its intended use, the Contractor shall, before issuance of the Certificate of Substantial Completion, complete or correct such item upon notification by the Architect. In such case, the Contractor shall then submit a request for another inspection by the Architect to determine Substantial Completion. The time fixed by the Architect for the completion of all items on the list accompanying the Certificate of Substantial Completion shall not be greater than 21 days. The Contractor shall complete items on the list within such 21 day period. If the Contractor fails to do so, the Owner in its discretion may perform the Work by itself or others and the cost thereof shall be charged against the Contractor. If more than one inspection by the Architect for the purpose of evaluating corrected work is required by the subject list of items to be completed or corrected, it will be performed at the Contractor's expense.

.1 At the time the Architect commences the Substantial Completion Inspection, if the Architect discovers excessive additional items requiring completion or correction, the Architect may decline to continue the inspection, instructing the Contractor as to the general classification of deficiencies which must be corrected before the Architect will resume the Substantial Completion Inspection. If the Contractor fails to pursue the Work so as to make it ready for Substantial Completion Inspection in a timely fashion, the Architect shall, after notifying the Contractor, conduct inspections and develop a list of items to be completed or corrected. This list of items shall be furnished to the Contractor who shall proceed to correct such items within 21 days. The Architect will conduct additional inspections as required to determine that the Work is ready for Substantial Completion Inspection. The Architect will invoice the Owner for 1) The cost of inspections between the termination of the initial Substantial Completion Inspection and the commencement of the satisfactory Substantial Completion Inspection, 2) The cost of inspection or review after the 21 day period established for the completion of the list by the Contractor. The Contractor shall reimburse the Owner for such cost, and the Owner may offset the amounts payable to the Architect for such services from the amounts due the Contractor under the Contract Documents.

§ 9.8.4 When the Work or designated portion thereof is substantially complete, the Architect will prepare a Certificate of Substantial Completion that shall establish the date of Substantial Completion; establish responsibilities of the Owner and Contractor for security, maintenance, heat, utilities, damage to the Work and insurance; and fix the time

within which the Contractor shall finish all items on the list accompanying the Certificate. Warranties required by the Contract Documents shall commence on the date of Substantial Completion of the Work or designated portion thereof unless otherwise provided in the Certificate of Substantial Completion.

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

§ 9.9 Partial Occupancy or Use

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

In the event of such partial occupancy or use, the Architect shall assign responsibilities to the Owner and Contractor with respect to payments, retainage, if any, security, maintenance, heat, utilities, damage to the Work, insurance, and the commencement of warranties required by the Contract Documents.

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

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

§ 9.9.4 Any Agreement as to the acceptance of Work not complying with the requirements of the Contract Documents shall be in writing.

§ 9.10 Final Completion and Final Payment

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

9.10.1.1 The Architect will perform no more than one (1) inspection to determine whether the Work or designated portion thereof has attained Final Completion in accordance with the Contract Documents. The Owner is entitled to reimbursement from the Contractor for amounts paid to the Architect for any additional inspections.

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

Subcontractor refuses to furnish a release or waiver required by the Owner, the Contractor may furnish a bond satisfactory to the Owner to indemnify the Owner against such lien, claim, security interest, or encumbrance. If a lien, claim, security interest, or encumbrance remains unsatisfied after payments are made, the Contractor shall refund to the Owner all money that the Owner may be compelled to pay in discharging the lien, claim, security interest, or encumbrance, including all costs and reasonable attorneys' fees. The Contractor shall furnish such evidence as may be necessary to show that any out-of-state subcontractor or supplier has fully met the requirements of payment of taxes as established in any law of the State or local subdivision thereof which may be in effect at the time of final payment. The Owner will require the submission of such proof or evidence before final payment will be approved or made. The following must be submitted to the Architect before approval of final payment.

- .1 Affidavit of payment as required under this Paragraph shall be in the form of AIA Document G706 – Contractor's Affidavit of Payment of Debt and Claims.
- .2 Release of liens as required under this Paragraph shall be in the form of AIA Document G706A – Contractor's Affidavit of Release of Liens.
- .3 Consent of Surety as required under this Paragraph shall be in the form of AIA Document G707 – Consent of Surety Company to Final Payment.
- .4 Submit releases and final waivers of lien from major subcontractor and supplier.
- .5 Submit certification stating that no materials containing asbestos were incorporated into the Work.
- .6 Submit certification that all punch list items have been completed.

§ 9.10.3 If, after Substantial Completion of the Work, final completion thereof is materially delayed through no fault of the Contractor or by issuance of Change Orders affecting final completion, and the Architect so confirms, the Owner shall, upon application by the Contractor and certification by the Architect, and without terminating the Contract, make payment of the balance due for that portion of the Work fully completed, corrected, and accepted. If the remaining balance for Work not fully completed or corrected is less than retainage stipulated in the Contract Documents, and if bonds have been furnished, the written consent of the surety to payment of the balance due for that portion of the Work fully completed and accepted shall be submitted by the Contractor to the Architect prior to certification of such payment. Such payment shall be made under terms and conditions governing final payment, except that it shall not constitute a waiver of Claims. Final payment, constituting the unpaid balance of the contract sum, shall be paid to the Contractor in full, including retainage or escrowed principal and escrowed income by the escrow agent, no less than 61 days following the date of Substantial Completion. If at that time there are remaining uncompleted items, an amount equal to 200 percent of the value of each item as determined by the Architect shall be withheld until said items are completed, and a Final Certificate of Payment issued by the Architect.

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

- .1 liens, Claims, security interests, or encumbrances arising out of the Contract and unsettled;
- .2 failure of the Work to comply with the requirements of the Contract Documents;
- .3 terms of special warranties required by the Contract Documents; or
- .4 audits performed by the Owner, if permitted by the Contract Documents, after final payment.
- .5 Claims for Indemnification;
- .6 Claims about which the Owner has given the Contractor written notice;
- .7 Claims arising after final payment.

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

ARTICLE 10 PROTECTION OF PERSONS AND PROPERTY

§ 10.1 Safety Precautions and Programs

The Contractor shall be responsible for initiating, maintaining, and supervising all safety precautions and programs in connection with the performance of the ~~Contract~~ Contract, including compliance with OSHA and other state and federal regulations applicable to the Work. The Contractor's safety program shall be written and copy maintained at the Project Site for inspection, upon request. Neither Owner nor Architect/Engineer accept any responsibility or liability for the safety of the Contractor's employees or for enforcing the Contractor's safety program. Additionally, Contractor shall comply with the Owner's rules, regulations, and policies including, but not limited to, the Owner's safety, health, and infection control policies and programs.

§ 10.2 Safety of Persons and Property

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

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

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

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

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

§ 10.2.4.1 When use or storage of explosives, or other hazardous materials, substances or equipment, or unusual methods are necessary for execution of the Work, the Contractor shall give the Owner reasonable advance notice.

§ 10.2.4.2 If the Contract Documents require the Contractor to handle materials or substances that under certain circumstances may be designated as hazardous, the Contractor shall handle such materials in an appropriate manner.

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

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

§ 10.2.6.1 The Contractor acknowledges that the safety of the Owner's students, employees, and guests is of the utmost importance. The Contractor will take no action which would jeopardize the safety of the Owner's students, employees, or guests and, without the Owner's written approval, shall take no action which would interfere with the Owner's activities.

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

§ 10.2.8 Injury or Damage to Person or Property

If either party suffers injury or damage to person or property because of an act or omission of the other party, or of others for whose acts such party is legally responsible, notice of the injury or damage, whether or not insured, shall be

given to the other party within a reasonable time not exceeding 21 days after discovery. The notice shall provide sufficient detail to enable the other party to investigate the matter.

§ 10.3 Hazardous Materials and Substances

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

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

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

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

§ 10.3.4.1 The Contractor in addition to products banned as part of the Clean Air Act (NESHAP Rule, Nov. 1990 Revision; 40 CFR 60, Subpart M) shall not use or bring on site materials containing more than 1 percent asbestos by content. No materials marked as "MAY CONTAIN MINERAL FIBERS" shall be used in construction unless written results of microscopic examination by an AIHA or NVLAP certified laboratory documenting the asbestos content at less than 1 percent by weight are provided and approved before installation.

§ 10.3.4.2 If materials containing more than 1 percent asbestos content is brought onto site by Contractor, materials will be removed in accordance with all applicable laws and precautions so as not to make fibers friable. Removal of materials containing more than 1 percent asbestos and replacement of such materials shall be at contractor's expense.

§ 10.3.4.3 Before final payment, the Contractor shall submit to the Owner, on contracting firm's letterhead, a signed, dated copy of the following statement:

§ 10.3.4.4 I hereby certify to the best of my knowledge no asbestos containing material (ACM) above 1 percent content was used as a building material for this project.

§ 10.3.5 The Contractor shall reimburse the Owner for the cost and expense the Owner incurs (1) for remediation of hazardous materials or substances the Contractor brings to the site and negligently handles, or (2) where the

Contractor fails to perform its obligations under Section 10.3.1, except to the extent that the cost and expense are due to the Owner's fault or negligence.

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

§ 10.4 Emergencies

In an emergency affecting safety of persons or property, the Contractor shall act, at the Contractor's discretion, to prevent threatened damage, injury, or loss. Additional compensation or extension of time claimed by the Contractor on account of an emergency shall be determined as provided in Article 15 and Article 7. Nothing in this paragraph shall be construed as relieving the Contractor from the cost and responsibility for emergencies covered hereby, which with normal diligence, planning, and the close supervision of the Work as required under the Contract, could have been foreseen or prevented. The Contractor shall provide the Owner a list of names and telephone numbers of the designated employees for each Subcontractor to be contacted in case of emergency during non-working hours. A copy of the list will also be displayed on the jobsite.

ARTICLE 11 INSURANCE AND BONDS

§ 11.1 Contractor's Insurance and Bonds

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

The Contractor shall purchase from and maintain in a company or companies rated A+, A, or A- by Best Insurance Reports and lawfully authorized to do business in the jurisdiction in which the Project is located such insurance as will protect the Contractor from claims set forth below which may arise out of or result from the Contractor's operations and completed operations under the Contract and for which the Contractor may be legally liable, whether such operations be by the Contractor or by a Subcontractor or by anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable:

- .1 Claims under workers' compensation, disability benefit and other similar employee benefit acts that are applicable to the Work to be performed;
- .2 Claims for damages because of bodily injury, occupational sickness or disease, or death of the Contractor's employees;
- .3 Claims for damages because of bodily injury, sickness or disease, or death of any person other than the Contractor's employees;
- .4 Claims for damages insured by usual personal injury liability coverage;
- .5 Claims for damages, other than to the Work itself, because of injury to or destruction of tangible property, including loss of use resulting therefrom;
- .6 Claims for damages because of bodily injury, death of a person or property damage arising out of ownership, maintenance or use of a motor vehicle;
- .7 Claims for bodily injury or property damage arising out of completed operations; and
- .8 Claims involving contractual liability insurance applicable to the Contractor's obligations under Section 3.18.

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

insurance required by Subparagraph 11.1.1 shall be written for not less than the limits of liability shown on the "Schedule of Insurance Coverages Required" following these modified General Conditions, or required by law, whichever is greater, and with the Owner and/or its assignee and Architect named as "Additional Insureds" on the insurance policy. Coverages, whether written on an occurrence or claims-made basis, shall be maintained without interruption from the date of commencement of the Work until the date of final payment and termination of any coverage required to be maintained after final payment, and, with respect to the Contractor's completed operations

coverage, until the expiration of the period for correction of Work or for such other period for maintenance of completed operations coverage as specified in the Contract Documents.

§ 11.1.2.1 Contractor's Commercial General Liability Insurance shall contain no exclusion that would deny coverage for any claim for either bodily injury or property damage arising out of or otherwise caused, in whole or in part, by any fungus, mildew, mold, or resulting allergens. If such exclusion exists and cannot be removed by endorsement, Contractor shall submit proof of coverage for mold claims under a Pollution Legal Liability or Contractor's Pollution Liability policy.

§ 11.1.3 Upon the request of any person or entity appearing to be a potential beneficiary of bonds covering payment of obligations arising under the Contract, the Contractor shall promptly furnish a copy of the bonds or shall authorize a copy to be furnished. The Contractor shall submit to the Architect a copy of Certificates of Insurance for his review and the Owner's approval prior to commencement of the Work. The form of certificate preferred is AIA A201-2017, Certificate of Insurance. Certificates shall include each and every type of coverage specified. An additional certificate evidencing continuation of liability coverage, including coverage for completed operations, shall be submitted with the final Application for Payment as required by Section 9.10.2 and thereafter upon renewal or replacement of such coverage until the expiration of the time required by Section 11.1.2. Information concerning reduction of coverage on account of revised limits or claims paid under the General Aggregate, or both, shall be furnished by the Contractor with reasonable promptness. The Contractor shall provide written notification to the Owner of the cancellation or expiration of any insurance required by Section 11.1. The Contractor shall provide such written notice within five (5) business days of the date the Contractor is first aware of the cancellation or expiration, or is first aware that the cancellation or expiration is threatened or otherwise may occur, whichever comes first.

§ 11.1.4 Notice of Cancellation or Expiration of Contractor's Required Insurance. Within three (3) business days of the date the Contractor becomes aware of an impending or actual cancellation or expiration of any insurance required by the Contract Documents, the Contractor shall provide notice to the Owner of such impending or actual cancellation or expiration. Upon receipt of notice from the Contractor, the Owner shall, unless the lapse in coverage arises from an act or omission of the Owner, have the right to stop the Work until the lapse in coverage has been cured by the procurement of replacement coverage by the Contractor. The furnishing of notice by the Contractor shall not relieve the Contractor of any contractual obligation to provide any required coverage. The Contractor shall cause the commercial liability coverage required by the Contract Documents to include (1) the Owner, the Architect and the Architect's Consultants as additional insureds for claims caused in whole or in part by the Contractor's negligent acts or omissions during the Contractor's operations; and (2) the Owner as an additional insured for claims caused in whole or in part by the Contractor's negligent acts or omissions during the Contractor's completed operations.

§ 11.2 Owner's Insurance

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

§ 11.2.2 Failure to Purchase Required Property Insurance. If the Owner fails to purchase and maintain the required property insurance, with all of the coverages and in the amounts described in the Agreement or elsewhere in the Contract Documents, the Owner shall inform the Contractor in writing prior to commencement of the Work. Upon receipt of notice from the Owner, the Contractor may delay commencement of the Work and may obtain insurance that will protect the interests of the Contractor, Subcontractors, and Sub-Subcontractors in the Work. When the failure to provide coverage has been cured or resolved, the Contract Sum and Contract Time shall be equitably adjusted. In the event the Owner fails to procure coverage, the Owner waives all rights against the Contractor, Subcontractors, and Sub-subcontractors to the extent the loss to the Owner would have been covered by the insurance to have been procured by the Owner. The cost of the insurance shall be charged to the Owner by a Change Order. If the Owner does not provide written notice, and the Contractor is damaged by the failure or neglect of the Owner to purchase or maintain the required insurance, the Owner shall reimburse the Contractor for all reasonable costs and damages attributable thereto.

§ 11.2.3 Notice of Cancellation or Expiration of Owner's Required Property Insurance. Within three (3) business days of the date the Owner becomes aware of an impending or actual cancellation or expiration of any property insurance required by the Contract Documents, the Owner shall provide notice to the Contractor of such impending or actual cancellation or expiration. Unless the lapse in coverage arises from an act or omission of the Contractor: (1) the

Contractor, upon receipt of notice from the Owner, shall have the right to stop the Work until the lapse in coverage has been cured by the procurement of replacement coverage by either the Owner or the Contractor; (2) the Contract Time and Contract Sum shall be equitably adjusted; and (3) the Owner waives all rights against the Contractor, Subcontractors, and Sub-subcontractors to the extent any loss to the Owner would have been covered by the insurance had it not expired or been cancelled. If the Contractor purchases replacement coverage, the cost of the insurance shall be charged to the Owner by an appropriate Change Order. The furnishing of notice by the Owner shall not relieve the Owner of any contractual obligation to provide required insurance.

§ 11.1.5 Insurance policies shall be written on an occurrence basis.

§ 11.1.6 Products and completed operations coverage shall commence with the certification of the final Certificate for Payment to the Contractor and extend for not less than 2 years beyond that date.

§ 11.1.7 The Contractor shall require all Subcontractors to provide Workers' Compensation, CGL, and Automobile Liability Insurance with the same minimum limits specified herein, unless the Owner agrees to a lesser amount.

§ 11.1.8 All liability policies required in Section 11.1 shall include an additional insured endorsement naming the Owner, the Owner's Board members and employees; the Architect and its employees; and the Owner's Representative and its employees. The CGL additional insured endorsement shall be ISO 20 10 11 85 or its equivalent so that Completed Operations liability extends to the additional insureds.

§ 11.1.9 All liability policies required in Section 11.1 shall be primary and non-contributory to any insurance maintained by the Owner.

§ 11.2 OWNER'S LIABILITY INSURANCE

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

§ 11.3 Waivers of SubrogationPROPERTY INSURANCE

§ 11.3.1 The Owner and Contractor waive all rights against (1) each other and any of their subcontractors, sub-subcontractors, agents, and employees, each of the other; (2) the Architect and Architect's consultants; and (3) Separate Contractors, if any, and any of their subcontractors, sub-subcontractors, agents, and employees, for damages caused by fire, or other causes of loss, to the extent those losses are covered by property insurance required by the Agreement or other property insurance applicable to the Project, except such rights as they have to proceeds of such insurance. The Owner or Contractor, as appropriate, shall require similar written waivers in favor of the individuals and entities identified above from the Architect, Architect's consultants, Separate Contractors, subcontractors, and sub-subcontractors. The policies of insurance purchased and maintained by each person or entity agreeing to waive claims pursuant to this section 11.3.1 shall not prohibit this waiver of subrogation. This waiver of subrogation shall be effective as to a person or entity (1) even though that person or entity would otherwise have a duty of indemnification, contractual or otherwise, (2) even though that person or entity did not pay the insurance premium directly or indirectly, or (3) whether or not the person or entity had an insurable interest in the damaged property. Unless otherwise provided, the Owner shall purchase and maintain, in a company or companies lawfully authorized to do business in the jurisdiction in which the Project is located, property insurance written on a builder's risk "all-risk" or equivalent policy form in the amount of the initial Contract Sum, plus value of subsequent Contract Modifications and cost of materials supplied or installed by others, comprising total value for the entire Project at the site on a replacement cost basis without optional deductibles. Such property insurance shall be maintained, unless otherwise provided in the Contract Documents or otherwise agreed in writing by all persons and entities who are beneficiaries of such insurance, until final payment has been made as provided in Section 9.10 or until no person or entity other than the Owner has an insurable interest in the property required by this Section 11.3 to be covered, whichever is later. This insurance shall include interests of the Owner, the Contractor, Subcontractors and Sub-subcontractors in the Project. The Architect/Engineer, Contractor, and Subcontractors shall be named as additional insured as their interest may appear.

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

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

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

§11.5 Adjustment and Settlement of Insured Loss

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

§ 11.3.1.1 Property insurance shall be on an "all-risk" or equivalent policy form and shall include, without limitation, insurance against the perils of fire (with extended coverage) and physical loss or damage including, without duplication of coverage, theft, vandalism, malicious mischief, collapse, earthquake, flood, windstorm, falsework, testing and startup, temporary buildings and debris removal including demolition occasioned by enforcement of any applicable legal requirements, and shall cover reasonable compensation for Architect's and Contractor's services and expenses required as a result of such insured loss. The insurance furnished by the Owner is not intended and will not cover tools, equipment, and materials of the Contractor. The Contractor shall bear the entire risk of loss with respect to the tools, equipment, and materials whether rented or leased, belonging to him. The Owner's insurance will cover products, materials, and equipment whether incorporated into the building or to be incorporated. The Contractor shall make their own arrangements for any insurance it may required on such construction equipment and materials. Any policy obtained by the Contractor under this Section 11.3 and related sections shall include a waiver of subrogation in accordance with the requirements of Section 11.3.7.

§ 11.5.2 Prior to settlement of an insured loss, the Owner shall notify the Contractor of the terms of the proposed settlement as well as the proposed allocation of the insurance proceeds. The Contractor shall have 14 days from receipt of notice to object to the proposed settlement or allocation of the proceeds. If the Contractor does not object, the Owner shall settle the loss and the Contractor shall be bound by the settlement and allocation. Upon receipt, the Owner shall deposit the insurance proceeds in a separate account and make the appropriate distributions. Thereafter, if no other agreement is made or the Owner does not terminate the Contract for convenience, the Owner and Contractor shall execute a Change Order for reconstruction of the damaged or destroyed Work in the amount allocated for that purpose. If the Contractor timely objects to either the terms of the proposed settlement or the allocation of the proceeds, the Owner may proceed to settle the insured loss, and any dispute between the Owner and Contractor arising out of the settlement or allocation of the proceeds shall be resolved pursuant to Article 15. Pending resolution of any dispute, the Owner may issue a Construction Change Directive for the reconstruction of the damaged or destroyed Work.

§ 11.3.1.2 If the Owner does not intend to purchase such property insurance required by the Contract and with all of the coverages in the amount described above, the Owner shall so inform the Contractor in writing prior to commencement of the Work. The Contractor may then effect insurance that will protect the interests of the Contractor, Subcontractors and Sub-subcontractors in the Work, and by appropriate Change Order the cost thereof shall be charged to the Owner. If the Contractor is damaged by the failure or neglect of the Owner to purchase or maintain insurance as described above, without so notifying the Contractor in writing, then the Owner shall bear all reasonable costs properly attributable thereto.

§ 11.3.1.3 If the property insurance requires deductibles, the Owner shall pay costs not covered because of such deductibles. Notwithstanding the foregoing, if the cause of any loss payment under such insurance is the fault of the Contractor, then the Contractor shall pay such deductible.

§ 11.3.1.4 This property insurance shall cover portions of the Work stored off the site, and also portions of the Work in transit. The Contractor shall, at the Contractor's own expense, provide insurance coverage for materials stored off the site after written approval of the Owner at the value established in the approval, and also for portions of the Work in transit until such materials are permanently attached to the Work.

§ 11.3.1.5 Partial occupancy or use in accordance with Section 9.9 shall not commence until the insurance company or companies providing property insurance have consented to such partial occupancy or use by endorsement or otherwise. The Owner and the Contractor shall take reasonable steps to obtain consent of the insurance company or companies and shall, without mutual written consent, take no action with respect to partial occupancy or use that would cause cancellation, lapse or reduction of insurance.

§ 11.3.1.6 Damages to Other Property. The maintaining of such insurance as outlined in Section 11.1 shall in no way constitute a waiver of the Contractor's legal liability for damage to any adjoining buildings or existing buildings or their contents or the Work and property of others on the site beyond the limits of insurance thus maintained. The Contractor shall hold the Owner free and harmless from any injury and damage resulting from the negligent or faulty performance of the Contract by the Contractor or its Subcontractors or others under their control or direction.

§ 11.3.2 BOILER AND MACHINERY INSURANCE

The Owner shall purchase and maintain boiler and machinery insurance required by the Contract Documents or by law, which shall specifically cover such insured objects during installation and until final acceptance by the Owner; this insurance shall include interests of the Owner, Contractor, Subcontractors and Sub-subcontractors in the Work, and the Owner and Contractor shall be named insureds.

§ 11.3.3 LOSS OF USE INSURANCE

The Owner, at the Owner's option, may purchase and maintain such insurance as will insure the Owner against loss of use of the Owner's property due to fire or other hazards, however caused. The Owner waives all rights of action against the Contractor for loss of use of the Owner's property, including consequential losses due to fire or other hazards however caused.

§ 11.3.4 If the Contractor requests in writing that insurance for risks other than those described herein or other special causes of loss be included in the property insurance policy, the Owner shall, if possible, include such insurance, and the cost thereof shall be charged to the Contractor by appropriate Change Order.

§ 11.3.5 If during the Project construction period the Owner insures properties, real or personal or both, at or adjacent to the site by property insurance under policies separate from those insuring the Project, or if after final payment property insurance is to be provided on the completed Project through a policy or policies other than those insuring the Project during the construction period, the Owner shall waive all rights in accordance with the terms of Section 11.3.7 for damages caused by fire or other causes of loss covered by this separate property insurance. All separate policies shall provide this waiver of subrogation by endorsement or otherwise.

§ 11.3.6 Before an exposure to loss may occur, the Owner shall file with the Contractor a copy of each policy that includes insurance coverages required by this Section 11.3. Each policy shall contain all generally applicable conditions, definitions, exclusions and endorsements related to this Project. The Owner shall provide written notification to the Contractor of the cancellation or expiration of any insurance required by Sections 11.2 and 11.3. The Owner shall provide such written notice within five (5) business days of the date the Owner is first aware of the cancellation or expiration, or is first aware that the cancellation or expiration is threatened or otherwise may occur, whichever comes first.

§ 11.3.7 WAIVERS OF SUBROGATION

The Owner and Contractor waive all rights against (1) each other and any of their subcontractors, sub-subcontractors, agents and employees, each of the other, and (2) the Architect, Architect's consultants, separate contractors described in Article 6, if any, and any of their subcontractors, sub-subcontractors, agents and employees, for damages caused by fire or other causes of loss to the extent covered by property insurance obtained pursuant to this Section 11.3 or other property insurance applicable to the Work, except such rights as they have to proceeds of such insurance held by the Owner as fiduciary. The Owner or Contractor, as appropriate, shall require of the Architect, Architect's consultants, separate contractors described in Article 6, if any, and the subcontractors, sub-subcontractors, agents and employees of any of them, by appropriate agreements, written where legally required for validity, similar waivers each in favor of other parties enumerated herein. The policies shall provide such waivers of subrogation by endorsement or otherwise. A waiver of subrogation shall be effective as to a person or entity even though that person or entity would otherwise have a duty of indemnification, contractual or otherwise, did not pay the insurance premium directly or indirectly, and whether or not the person or entity had an insurable interest in the property damaged.

§ 11.3.8 A loss insured under the Owner's property insurance shall be adjusted by the Owner as fiduciary and made payable to the Owner as fiduciary for the insureds, as their interests may appear, subject to requirements of any applicable mortgagee clause and of Section 11.3.10. The Contractor shall pay Subcontractors their just shares of insurance proceeds received by the Contractor, and by appropriate agreements, written where legally required for validity, shall require Subcontractors to make payments to their Sub-subcontractors in similar manner.

§ 11.3.9 If required in writing by a party in interest, the Owner as fiduciary shall, upon occurrence of an insured loss, give bond for proper performance of the Owner's duties. The cost of required bonds shall be charged against proceeds received as fiduciary. The Owner shall deposit in a separate account proceeds so received, which the Owner shall distribute in accordance with such agreement as the parties in interest may reach, or as determined in accordance with the method of binding dispute resolution selected in the Agreement between the Owner and Contractor. If after such loss no other special agreement is made and unless the Owner terminates the Contract for convenience, replacement of damaged property shall be performed by the Contractor after notification of a Change in the Work in accordance with Article 7.

§ 11.3.10 The Owner as fiduciary shall have power to adjust and settle a loss with insurers unless one of the parties in interest shall object in writing within five days after occurrence of loss to the Owner's exercise of this power; if such objection is made, the dispute shall be resolved in the manner selected by the Owner and Contractor as the method of binding dispute resolution in the Agreement.

§ 11.4 PERFORMANCE BOND AND PAYMENT BOND

§ 11.4.1 The Contractor shall provide a contract bond to guaranty payment and performance of the Work, required by Ohio law.

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

§ 11.4.3 Material Default or Termination. If the Owner notifies the Contractor's surety that the Contractor is in material default or terminates the Contract, the surety will promptly and in not less than 21 days begin to investigate the claimed material default or termination. If the Owner gives a notice of material default and then terminates the Contract, the surety shall complete its investigation within 21 days of the notice of material default. As part of such investigation, the surety shall complete its investigation within 21 days of the notice of material default. As part of such investigation, the surety shall visit the offices of the Contractor, Architect and Owner to review the available project records. If the surety proposes to take over the Work, the surety shall do so no later than the later of the expiration of such 21 day period of 10 days after the date the Owner terminates the Contract. If the Owner terminates the Work, and surety proposes to provide a replacement contract, the replacement contract shall be fully capable of performing the Work in accordance with the Contract Documents, including meeting all the requirements of the Contract Documents. If the Contractor is terminated for cause, the replacement contractor shall not be the Contractor, unless the Owner agrees to such replacement contractor. The surety will provide the Owner with the results of its investigation, including any written report or documents. This Section 11.5.3 is in addition to the Owner's rights under Section 14.2.2 and is not intended to create any rights of the surety, including but not limited to the right to take over the Contractor's obligations.

ARTICLE 12 UNCOVERING AND CORRECTION OF WORK

§ 12.1 Uncovering of Work

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

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

§ 12.2 Correction of Work

§ 12.2.1 Before Substantial Completion

The Contractor shall promptly correct Work rejected by the Architect or failing to conform to the requirements of the Contract Documents, discovered before Substantial Completion and whether or not fabricated, installed or completed. Costs of correcting such rejected Work, including additional testing and inspections, the cost of uncovering and replacement, and compensation for the Architect's services and expenses made necessary thereby, shall be at the Contractor's expense. Within two business days after written notice from the Architect or the Owner (except such period shall be 7 days when notice is given after final payment) that the work does not conform to the Contract Documents, or immediately upon oral notice, if the nonconformance constitutes a threat to the safety of persons or property, the Contractor, without waiting for the resolution of disputes that may exist, shall commence to correct such nonconformance, shall thereafter use its best efforts to correct such nonconformance to the satisfaction of the Architect and the Owner, and except where an extension of time is granted in writing by the Owner, shall complete necessary corrections so that the nonconformance is eliminated to the satisfaction of the Architect and the Owner within 30 days of such notice. The Contractor shall bear the costs of correcting the nonconformance, including additional testing and inspections and additional service fees of the Architect. The notice provided for in this Subparagraph 12.2.1 may be given at any time. It is the intent that the obligations under this Subparagraph 12.2.1 shall continue to apply after final completion and final payment.

§ 12.2.2 After Substantial Completion

§ 12.2.2.1 In addition to the Contractor's obligations under Section 3.5, if, within one year after the date of Substantial Completion of the Work or designated portion thereof or after the date for commencement of warranties established under Section 9.9.1, or by terms of any applicable special warranty required by the Contract Documents, any of the Work is found to be not in accordance with the requirements of the Contract Documents, the Contractor shall correct it promptly after receipt of notice from the Owner to do so, unless the Owner has previously given the Contractor a written acceptance of such condition. The Owner shall give such notice promptly after discovery of the condition. During the one-year period for correction of Work, if the Owner fails to notify the Contractor and give the Contractor an opportunity to make the correction, the Owner waives the rights to require correction by the Contractor and to make a claim for breach of warranty. If the Contractor fails to correct nonconforming Work ~~within a reasonable time during that period after 30 days~~ after receipt of notice from the Owner or Architect, the Owner may correct it in accordance with Section 2.5.

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

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

12.2.2.4 Upon request by the Owner and prior to the expiration of one year from the date of Substantial Completion, the Architect will conduct, and the Contractor shall attend, a meeting with the Owner to review the facility operations and performance.

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

§ 12.2.4 The Contractor shall bear the cost of correcting destroyed or damaged construction of the Owner or Separate Contractors, whether completed or partially completed, caused by the Contractor's correction or removal of Work that is not in accordance with the requirements of the Contract Documents. If the Contractor fails to correct nonconforming Work as provided in Subparagraph 12.2.1, the Owner may correct it in accordance with Paragraph 2.4. If the Contractor does not proceed with corrections of such nonconforming Work as provided in Subparagraph 12.2.1, the Owner may remove it and store the salvageable materials or equipment at the Contractor's expense.

§ 12.2.5 Nothing contained in this Section 12.2 shall be construed to establish a period of limitation with respect to other obligations the Contractor has under the Contract Documents. Establishment of the one-year period for correction of Work as described in Section 12.2.2 relates only to the specific obligation of the Contractor to correct the Work, and has no relationship to the time within which the obligation to comply with the Contract Documents may be

sought to be enforced, nor to the time within which proceedings may be commenced to establish the Contractor's liability with respect to the Contractor's obligations other than specifically to correct the Work.

§ 12.3 Acceptance of Nonconforming Work

If the Owner prefers to accept Work that is not in accordance with the requirements of the Contract Documents, the Owner may do so instead of requiring its removal and correction, in which case the Contract Sum will be reduced as appropriate and equitable. Such adjustment shall be effected whether or not final payment has been made. The acceptance of nonconforming Work by the Owner shall be by written Change Order signed by the Owner's authorized representative. No person has authority to accept nonconforming Work except pursuant to such written Change Order.

ARTICLE 13 MISCELLANEOUS PROVISIONS

§ 13.1 Governing Law

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

§ 13.2 Successors and Assigns

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

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

§ 13.3 Rights and Remedies

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

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

§ 13.4 Tests and Inspections

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

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

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

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

Certificates of inspection, testing, or approval, as required by Paragraphs 13.5.1 or 13.5.2 shall be secured by the Contractor using an independent agency, subject to the approval of the Architect and Owner. The independent agency shall complete field work, testing, and prepare the test reports, logs, and certificates promptly and deliver the required number of copies directly to the Architect.

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

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

~~§ 13.5 Interest~~

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

§ 13.6 ATTORNEY CLIENT CONFIDENTIAL AND PRIVILEGED COMMUNICATIONS

The Contractor acknowledges and agrees that the Owner's legal counsel may from time to time provide legal services to the Project and that in doing so may communicate with the Architect/Engineer. The Contractor agrees that such communications will be privileged communications and, if there is a claim contemplated or pending, any written communications will be confidential work product.

ARTICLE 14 TERMINATION OR SUSPENSION OF THE CONTRACT

§ 14.1 Termination by the Contractor

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

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

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

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

§ 14.1.4 If the Work is stopped for a period of 60 consecutive days through no act or fault of the Contractor, a Subcontractor, a Sub-subcontractor, or their agents or employees or any other persons or entities performing portions of the Work because the Owner has repeatedly failed to fulfill the Owner's obligations under the Contract Documents

with respect to matters important to the progress of the Work, the Contractor may, upon seven additional days' notice to the Owner and the Architect, terminate the Contract and recover from the Owner as provided in Section 14.1.3.

§ 14.2 Termination by the Owner for Cause

§ 14.2.1 The Owner may terminate the Contract if the Contractor

- .1 ~~repeatedly~~ refuses or fails to supply enough properly skilled workers or proper materials;
- .2 fails to make payment to Subcontractors or suppliers in accordance with the respective agreements between the Contractor and the Subcontractors or ~~suppliers~~; Suppliers;
- .3 ~~repeatedly~~ disregards applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of a public authority; or
- .4 otherwise is guilty of substantial breach of a provision ~~of the Contract Documents of the Contract Documents, including but not limited to failure to maintain the Construction Schedule or failure to correct defective and/or non-conforming Work;~~
- .5 The failure of the Contractor to perform its obligation under the Contract Documents or under the Contract Documents pertaining to other agreement which the Contractor may have with the Owner and to proceed to commence to correct such failure within two business days after written notice thereof from the Owner or the Architect or such lesser time as is provided in the Contract Documents, or thereafter to use its best efforts to correct such failure to the satisfaction of the Owner, or, except where an extension of time is granted in writing by the Owner, to correct such failure within 30 consecutive days after written notice thereof.

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

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

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

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

§ 14.3 Suspension by the Owner for Convenience

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

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

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

§ 14.4 Termination by the Owner for Convenience

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

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

- .1 cease operations as directed by the Owner in the notice;
- .2 take actions necessary, or that the Owner may direct, for the protection and preservation of the Work; and
- .3 except for Work directed to be performed prior to the effective date of termination stated in the notice, terminate all existing subcontracts and purchase orders and enter into no further subcontracts and purchase orders.
- .4 If the Contract is terminated without cause and for the Owner's convenience and there exists an event of the Contractor's default, as defined in Paragraph 14.2 of these Supplementary Conditions, the Contractor will be entitled to receive only such sums as it would be entitled to receive following the occurrence of an event of default under the Owner/Contractor Agreement.
- .5 The termination of the Contract shall be with or without prejudice to rights or remedies which exist at the time of termination.

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

ARTICLE 15 CLAIMS AND DISPUTES

§ 15.1 Claims

§ 15.1.1 Definition

A Claim is a demand or assertion by one of the parties seeking, as a matter of right, payment of money, a change in the Contract Time, or other relief with respect to the terms of the Contract. The term "Claim" also includes other disputes and matters in question between the Owner and Contractor arising out of or relating to the Contract. The responsibility to substantiate Claims shall rest with the party making the Claim. This Section 15.1.1 does not require the Owner to file a Claim in order to impose liquidated damages in accordance with the Contract Documents. The Contractor shall not knowingly (as "knowingly" is defined in the Federal False Claims Act, 31 USC Section 3729 et seq.) present or cause to be presented a false or fraudulent Claim. As a condition precedent to making a Claim, the Claim shall be accompanied by an affidavit sworn to before a notary public or other person authorized to administer oaths in the State of Ohio and executed by an authorized representative of the Contractor, which states that:

The Claim which is submitted herewith complies with Paragraph 15.1 of the General Conditions, which provides that the Contractor shall not knowingly present or cause to be presented a false or fraudulent Claim.

§ 15.1.2 Time Limits on Claims

The Owner and Contractor shall commence all Claims and causes of action against the other and arising out of or related to the Contract, whether in contract, tort, breach of warranty or otherwise, ~~in accordance with the requirements of the binding dispute resolution method selected in the Agreement~~ and within the period specified by applicable law, but in any case not more than 10 years after the date of Substantial Completion of the Work. The Owner and Contractor waive all Claims and causes of action not commenced in accordance with this Section 15.1.2.

§ 15.1.3 Notice of Claims

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

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

§ 15.1.4 Continuing Contract Performance

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

§ 15.1.4.1.1 The Owner reserves the right to pay the Contractor originating the back charge from monies due the Contractor who is responsible for the Work required by same and shall deduct it from the amount due the said responsible Contractor. When and if the necessity arises because of a failure of the separate Contractor to honor and pay the back charges, and when in the Architect's opinion it becomes necessary, each Contractor's surety will be held responsible under the Contract Bond to pay back charges under the following conditions:

- .1 The monies due the Contractor from the Owner is insufficient to cover the cost of said back charges, and the liable Contractor refuses or fails to make prompt payment in connection with the same.
- .2 If the amount still due the Contractor, in the opinion of the Architect, is insufficient to complete the Work required, including such authorized back charges, and the Owner finds it necessary to terminate the Contract and complete the Work as provided in the General Conditions of the Contract.
- .3 In the event that a Contractor shall be adjudged bankrupt under the provisions of (.1) and (.2) of the foregoing.
- .4 In the event a Contractor under direct Contract with the Owner shall refuse or fail to deliver waivers of lien and affidavit of payment in full for labor, material, or equipment suppliers, and Subcontractors doing Work; and it be adjudged, in the opinion of the Architect and the Owner's legal counsel, the monies due the Contractor are insufficient to honor and pay for claims for unpaid bills in the categories described in this Section.

§ 15.1.4.1.2 Contractors under direct Contract with the Owner will be expected to take care of back charges originating with Subcontractors under their employ under the terms and conditions as established in the General Conditions of the Contract, Article 5 and Article 6. Contractors under direct Contract with the Owner, and their Sureties, shall indemnify and save the Owner harmless from claims of this type, including paying for legal expenses necessary to remove or settle any liens or other legal claims against the Owner.

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

§ 15.1.5 Claims for Additional Cost

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

§ 15.1.6 Claims for Additional Time

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

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

§ 15.1.7 Waiver of Claims for Consequential Damages

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

§ 15.1.7.1 The Contractor waives Claims against the Owner for consequential damages arising out of or relating to this Contract. This waiver includes damages incurred by the Contractor for principal office expenses including the

compensation of personnel stationed there, for losses of financing, business and reputation, and for loss of profit except anticipated profit arising directly from the Work.

.1 damages incurred by the Owner for rental expenses, for losses of use, income, profit, financing, business and reputation, and for loss of management or employee productivity or of the services of such persons; and

.2 damages incurred by the Contractor for principal office expenses including the compensation of personnel stationed there, for losses of financing, business and reputation, and for loss of profit, except anticipated profit arising directly from the Work. § 15.1.7.2 This waiver is applicable without limitation, to all consequential damages due to the Owner's termination of the Agreement in accordance with Section 14. Nothing contained in this Section 15.1.7 shall be deemed to preclude an award of liquidated damages, when applicable, in accordance with the requirements of the Contract Documents.

~~This mutual waiver is applicable, without limitation, to all consequential damages due to either party's termination in accordance with Article 14. Nothing contained in this Section 15.1.7 shall be deemed to preclude assessment of liquidated damages, when applicable, in accordance with the requirements of the Contract Documents.~~ § 15.1.8 Settlement Offers. If the Contractor initiates a Claim, the Owner may make "Settlement Offers" to settle the Claim at any time up to the date of the trial. Such settlement offers shall be subject to Rule 408 (Compromise and Offers of Compromise) of the Ohio Rules of Evidence. If at any stage of the litigation, including any appeals, the Contractor's Claim is dismissed or found to be without merit, or if the damages awarded to the Contractor on its Claim do not exceed the Owner's last Section 4.3.11 Settlement Offer, the Contractor shall be liable to the Owner and shall reimburse the Owner for all of the Owner's attorney's fees and expenses, arising out of or related to such Claim.

§ 15.2 Initial Decision

§ 15.2.1 Claims, excluding those where the condition giving rise to the Claim is first discovered after expiration of the period for correction of the Work set forth in Section 12.2.2 or arising under Sections 10.3, 10.4, and 11.5, shall be referred to the Initial Decision Maker for initial decision. The Architect will serve as the Initial Decision Maker, unless otherwise indicated in the Agreement. Except for those Claims excluded by this Section 15.2.1, an initial decision shall be required as a condition precedent to mediation of any Claim. If an initial decision has not been rendered within 30 days after the Claim has been referred to the Initial Decision Maker, the party asserting the Claim may demand mediation and binding dispute resolution without a decision having been rendered. Unless the Initial Decision Maker and all affected parties agree, the Initial Decision Maker will not decide disputes between the Contractor and persons or entities other than the Owner.

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

§ 15.2.2.1 Owner's Request for Documents. The Owner may request such documents and information from the Contractor as the Owner determines necessary to evaluate and comment upon the claim. Upon receipt of request from the Owner, the Contractor shall provide all requested documents and information within ten (10) days. Such documents and information may include but not be limited to the Contractor's Project accounting records, estimate for the Project, daily job logs, and other information from which the Contractor's Project costs may be derived. The Contractor shall provide the requested documents in the formats requested, which include both paper and electronic copies. If requested by the Owner, the electronic copies shall be provided in native computed language. To the extent permitted by law, the Owner shall keep the Project accounting records and estimate for the Project confidential. The Contractor's provision of the requested documents to the Owner in the format requested by the Owner shall be a condition precedent to any further proceeding under the Contract Documents.

§ 15.2.2.2 Failure to provide the requested documents shall be a material breach of the Contract, and Contractor shall indemnify Owner for all of Owner's costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or other dispute resolution costs) arising out of or relating to Contractor's failure to comply with this provision. If the Contractor fails to provide the requested documents, the Contractor shall be precluded from presenting such documents in any subsequent dispute resolution proceedings, if the data was reasonably available at the time of the request.

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

§ 15.2.4 If the Initial Decision Maker requests a party to provide a response to a Claim or to furnish additional supporting data, such party shall respond, within ten days after receipt of the request, and shall either (1) provide a response on the requested supporting data, (2) advise the Initial Decision Maker when the response or supporting data will be furnished, or (3) advise the Initial Decision Maker that no supporting data will be furnished. Upon receipt of the response or supporting data, if any, the Initial Decision Maker will either reject or approve the Claim in whole or in part. If the initial Decision Maker requests supporting data from a party and the party fails to provide it, the party thereafter shall be precluded from presenting such data in any subsequent dispute resolution proceedings, if the data was reasonably available to it at the time of the request.

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

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

~~§ 15.2.6.1 Either party may, If the Contractor does not request mediation of a written decision of the Initial Decision Maker, within 30 days from the date of receipt of an initial decision, demand in writing that the other party file for mediation. If such a demand is made and the party receiving the demand fails to file for mediation within 30 days after receipt thereof, then both parties waive their rights to mediate or pursue binding dispute resolution proceedings with respect to the initial decision, then the Initial Decision Maker's decision becomes final and binding upon the Contractor. If the Initial Decision Maker renders a decision after litigation has been initiated, such decision may be entered as evidence, but shall not supersede the litigation proceedings unless the decision is acceptable to all parties concerned. Litigation shall be considered "initiated" upon either the service of the original complaint on the Owner or, if litigation relating to the Project has already been filed, when a motion for leave to amend the complaint to add the claim has been filed.~~

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

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

§ 15.3 Mediation

~~§ 15.3.1 Claims, disputes, or other matters in controversy-Any claim, dispute or other matter in question arising out of or related to the Contract, except those waived as provided for in Sections 9.10.4, 9.10.5, and 15.1.7, shall be subject to mediation as a condition precedent to binding dispute resolution. this Agreement shall be subject to a meet and confer session as a condition precedent to mediation.~~

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

by members of the Owner and Contractor's senior management, who shall have full authority to bind their respective party with respect to the Claim, dispute, or other matter in question. The meet and confer session shall take place within thirty (30) days after a request by either party, unless the parties mutually agree otherwise.

§ 15.3.3 Either party may, within 30 days from the date that mediation has been concluded without resolution of the dispute or 60 days after mediation has been demanded without resolution of the dispute, demand in writing that the other party file for binding dispute resolution. If such a demand is made and the party receiving the demand fails to file for binding dispute resolution within 60 days after receipt thereof, then both parties waive their rights to binding dispute resolution proceedings with respect to the initial decision. If the parties reach a mutually acceptable resolution, then they shall prepare appropriate documentation memorializing the resolution. If the parties cannot reach a mutually acceptable resolution, they shall proceed to mediation in accordance with Section 15.4.

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

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

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

§ 15.4 Arbitration Litigation – Any Claim subject to, but not resolved by mediation or any Claim that is not subject to mediation, shall be subject to litigation. Venue for such litigation shall be exclusive in the State court of competent jurisdiction in the Court of Common Pleas, Muskingum County, Ohio. The parties expressly waive the right to remove any litigation to federal court.

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

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

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

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

§ 15.4.4 Consolidation or Joinder

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

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

§ 16.1 POLICIES OF EMPLOYMENT

§ 16.1.1 The Contractor and Subcontractors shall not discriminate against employee or applicant for employment because of race, religion, color, sex, or national origin. The Contractor shall take affirmative action to insure that applicants are employed, and that employees are treated during employment without regard to their race, religion, color, sex, or national origin. Such action shall include, but not be limited to, the following: Employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. The Contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices setting forth the policies of non-discrimination.

§ 16.1.2 The Contractor and Subcontractors shall, in solicitations or advertisements for employees placed by them or on their behalf, state that qualified applicants will receive consideration for employment without regard to race, religion, color, sex, or national origin.

END OF DOCUMENT 007300

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

Certification of Document's Authenticity

AIA® Document D401™ – 2003

I, _____, hereby certify, to the best of my knowledge, information and belief, that I created the attached final document simultaneously with this certification at 15:50:53 ET on 03/12/2021 under Order No. 7101546043 from AIA Contract Documents software and that in preparing the attached final document I made no changes to the original text of AIA® Document A201™ – 2017, General Conditions of the Contract for Construction, as published by the AIA in its software, other than changes shown in the attached final document by underscoring added text and striking over deleted text.

(Signed)

(Title)

(Dated)

DOCUMENT 00 73 16.03 - CERTIFICATE OF INSURANCE

PRODUCER

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW.

COMPANIES AFFORDING COVERAGE

COMPANY
LETTER A

INSURED

COMPANY
LETTER B

COMPANY
LETTER C

COMPANY
LETTER D

COMPANY
LETTER E

COVERAGES

THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED, NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

CO LTR	TYPE OF INSURANCE	POLICY NUMBER	POLICY EFFECTIVE DATE (MM/DD/YY)	POLICY EXPIRATION DATE (MM/DD/YY)	LIMITS
GENERAL LIABILITY					GENERAL AGGREGATE \$3,000,000
	COMMERCIAL GENERAL				PRODUCTS-COMP/OP AGG. \$3,000,000
	LIABILITY CLAIMS				PERSONAL & ADV. INJURY \$3,000,000
	MADE ___ OCCUR.				EACH OCCURRENCE \$3,000,000
	OWNER-S &				FIRE DAMAGE (Any one fire) \$1,000,000
	CONTRACTOR-S PROT.				MED. EXPENSE (Any one person) \$10,000
AUTOMOBILE LIABILITY					COMBINED SINGLE LIMIT \$3,000,000
	ANY AUTO				BODILY INJURY (Per person)
	ALL OWNED AUTOS				BODILY INJURY (Per accident)
	SCHEDULED AUTOS				PROPERTY DAMAGE
	HIRED AUTOS				
	NON-OWNED AUTOS				
	GARAGE LIABILITY				
EXCESS LIABILITY					EACH OCCURRENCE \$5,000,000
	UMBRELLA FORM				AGGREGATE \$5,000,000
	OTHER THAN UMBRELLA FORM				
WORKER-S COMPENSATION AND EMPLOYERS= LIABILITY					STATUTORY LIMITS
					EACH ACCIDENT \$1,000,000
					DISEASE - POLICY LIMIT \$1,000,000
					DISEASE - EACH EMPLOYEE \$1,000,000
OTHER					

DESCRIPTION OF OPERATIONS/LOCATIONS/VEHICLES/SPECIAL ITEMS
ADDITIONAL INSURED

CERTIFICATE HOLDER

CANCELLATION

SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, THE ISSUING COMPANY WILL ENDEAVOR TO MAIL ___ DAYS WRITTEN NOTICE TO THE CERTIFICATE HOLDER NAMED TO THE LEFT, BUT FAILURE TO MAIL SUCH NOTICE SHALL IMPOSE NO OBLIGATION OR LIABILITY OF ANY KIND UPON THE COMPANY, ITS AGENTS OR REPRESENTATIVES.

AUTHORIZED REPRESENTATIVE

END OF DOCUMENT 00 73 16

"General Decision Number: OH20230097 09/01/2023

Superseded General Decision Number: OH20220097

State: Ohio

Construction Type: Building

County: Portage County in Ohio.

BUILDING CONSTRUCTION PROJECTS (does not include single family homes or apartments up to and including 4 stories).

Note: Contracts subject to the Davis-Bacon Act are generally required to pay at least the applicable minimum wage rate required under Executive Order 14026 or Executive Order 13658. Please note that these Executive Orders apply to covered contracts entered into by the federal government that are subject to the Davis-Bacon Act itself, but do not apply to contracts subject only to the Davis-Bacon Related Acts, including those set forth at 29 CFR 5.1(a)(2)-(60).

If the contract is entered into on or after January 30, 2022, or the contract is renewed or extended (e.g., an option is exercised) on or after January 30, 2022:	<ul style="list-style-type: none"> . Executive Order 14026 generally applies to the contract. . The contractor must pay all covered workers at least \$16.20 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on the contract in 2023.
If the contract was awarded on or between January 1, 2015 and January 29, 2022, and the contract is not renewed or extended on or after January 30, 2022:	<ul style="list-style-type: none"> . Executive Order 13658 generally applies to the contract. . The contractor must pay all covered workers at least \$12.15 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on that contract in 2023.

The applicable Executive Order minimum wage rate will be adjusted annually. If this contract is covered by one of the Executive Orders and a classification considered necessary for performance of work on the contract does not appear on this wage determination, the contractor must still submit a conformance request.

Additional information on contractor requirements and worker protections under the Executive Orders is available at <http://www.dol.gov/whd/govcontracts>.

Modification Number	Publication Date
0	01/06/2023
1	01/13/2023

2	04/14/2023
3	06/30/2023
4	08/04/2023
5	09/01/2023

ASBE0003-002 08/01/2022

	Rates	Fringes
ASBESTOS WORKER/HEAT & FROST INSULATOR.....	\$ 41.23	25.05

BROH0007-001 06/01/2022

	Rates	Fringes
BRICK POINTER/CAULKER/CLEANER....	\$ 33.56	20.89

BROH0007-003 06/01/2022

	Rates	Fringes
BRICKLAYER.....	\$ 33.56	20.89

BROH0008-007 06/01/2022

	Rates	Fringes
TILE FINISHER.....	\$ 24.16	16.11

BROH0036-002 05/01/2022

	Rates	Fringes
TILE SETTER.....	\$ 30.91	14.94

CARP0285-004 05/01/2019

	Rates	Fringes
CARPENTER (Drywall Hanging, Metal Stud Installation, and Form Work Only).....	\$ 30.78	19.36

* ELEC0038-004 04/24/2023

	Rates	Fringes
ELECTRICIAN (HVAC/Temperature Controls Installation Only).....	\$ 43.13	23.31

FOOTNOTES;

- a. 6 Paid Holidays: New Year's Day; Memorial Day; July 4th;
Labor Day; Thanksgiving Day; & Christmas Day
- b. 1 week's paid vacation for 1 year's service; 2 weeks' paid
vacation for 2 or more years' service

* ELEC0038-005 04/24/2023

	Rates	Fringes
ELECTRICIAN (Low Voltage Wiring Only).....	\$ 28.55	13.76

FOOTNOTES;

- a. 6 Paid Holidays: New Year's Day; Memorial Day; July 4th; Labor Day; Thanksgiving Day; & Christmas Day
- b. 1 week's paid vacation for 1 year's service; 2 weeks' paid vacation for 2 or more years' service

ELEV0045-004 01/01/2023

	Rates	Fringes
ELEVATOR MECHANIC.....	\$ 55.63	37.335+a+b

PAID HOLIDAYS:

- a. New Year's Day, Memorial Day, Independence Day, Labor Day, Veterans' Day, Thanksgiving Day, the Friday after Thanksgiving, and Christmas Day.

- b. Employer contributes 8% of regular hourly rate to vacation pay credit for employee who has worked in business more than 5 years; 6% for less than 5 years' service.

ENGI0018-042 05/01/2018

	Rates	Fringes
POWER EQUIPMENT OPERATOR		
Crane.....	\$ 39.46	15.09
Oiler.....	\$ 28.68	15.09

ENGI0018-045 05/01/2018

	Rates	Fringes
POWER EQUIPMENT OPERATOR		
Backhoe/Excavator/Trackhoe..	\$ 37.38	15.09

ENGI0066-045 06/01/2017

	Rates	Fringes
POWER EQUIPMENT OPERATOR		
Forklift.....	\$ 28.87	19.66
Grader/Blade.....	\$ 32.42	19.66
Mechanic.....	\$ 32.92	19.66

IRON0017-011 05/01/2023

	Rates	Fringes
IRONWORKER		
Ornamental, Reinforcing, & Structural.....	\$ 35.83	28.01

LAB00310-005 05/21/2021

	Rates	Fringes
LABORER		
Mason Tender - Cement/Concrete.....	\$ 28.07	21.52

LAB00894-006 06/01/2018

	Rates	Fringes
LABORER		
Common or General.....	\$ 31.07	10.90
Mason Tender - Brick.....	\$ 31.22	10.90
Pipelaye.....	\$ 31.27	10.90

 PAIN1162-003 05/01/2023

	Rates	Fringes
GLAZIER.....	\$ 29.37	14.39

 PLAS0031-019 05/01/2014

	Rates	Fringes
PLASTERER.....	\$ 29.51	15.67

 PLAS0109-002 05/01/2018

	Rates	Fringes
CEMENT MASON/CONCRETE FINISHER...	\$ 28.86	17.11

 PLUM0120-010 05/02/2022

	Rates	Fringes
PIPEFITTER (Excludes HVAC Pipe Installation).....	\$ 44.07	28.34

 ROOF0044-003 04/30/2023

	Rates	Fringes
ROOFER.....	\$ 37.75	20.68

 SHEE0033-027 06/01/2023

	Rates	Fringes
SHEET METAL WORKER (HVAC Duct Installation Only).....	\$ 34.90	30.49

 SHEE0033-041 06/01/2023

	Rates	Fringes
SHEET METAL WORKER (Excluding HVAC Duct Installation).....	\$ 34.90	30.49

 * UAVG-OH-0032 01/01/2019

	Rates	Fringes
ELECTRICIAN, Excludes Low Voltage Wiring and Installation of HVAC/Temperature Controls.....	\$ 34.86	19.39

 SUOH2012-099 08/29/2014

	Rates	Fringes
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CARPENTER, Excludes Drywall Hanging and Metal Stud Installation, and Form Work.....\$ 27.78	7.91
OPERATOR: Bobcat/Skid Steer/Skid Loader.....\$ 32.30	10.80
OPERATOR: Bulldozer.....\$ 29.23	12.76
OPERATOR: Loader.....\$ 29.66	12.61
OPERATOR: Paver (Asphalt, Aggregate, and Concrete).....\$ 31.48	12.80
OPERATOR: Roller.....\$ 31.48	12.80
PAINTER (Brush and Roller).....\$ 21.55	2.21
PAINTER: Spray.....\$ 22.78	12.40
PIPEFITTER (HVAC Pipe Installation Only).....\$ 35.12	0.00
PLUMBER.....\$ 27.79	14.49
TRUCK DRIVER: Dump (All Types)...\$ 24.32	11.73

WELDERS - Receive rate prescribed for craft performing
operation to which welding is incidental.

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Note: Executive Order (EO) 13706, Establishing Paid Sick Leave for Federal Contractors applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2017. If this contract is covered by the EO, the contractor must provide employees with 1 hour of paid sick leave for every 30 hours they work, up to 56 hours of paid sick leave each year. Employees must be permitted to use paid sick leave for their own illness, injury or other health-related needs, including preventive care; to assist a family member (or person who is like family to the employee) who is ill, injured, or has other health-related needs, including preventive care; or for reasons resulting from, or to assist a family member (or person who is like family to the employee) who is a victim of, domestic violence, sexual assault, or stalking. Additional information on contractor requirements and worker protections under the EO is available at <https://www.dol.gov/agencies/whd/government-contracts>.

Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses (29CFR 5.5 (a) (1) (ii)).

The body of each wage determination lists the classification and wage rates that have been found to be prevailing for the cited type(s) of construction in the area covered by the wage

determination. The classifications are listed in alphabetical order of ""identifiers"" that indicate whether the particular rate is a union rate (current union negotiated rate for local), a survey rate (weighted average rate) or a union average rate (weighted union average rate).

Union Rate Identifiers

A four letter classification abbreviation identifier enclosed in dotted lines beginning with characters other than ""SU"" or ""UAVG"" denotes that the union classification and rate were prevailing for that classification in the survey. Example: PLUM0198-005 07/01/2014. PLUM is an abbreviation identifier of the union which prevailed in the survey for this classification, which in this example would be Plumbers. 0198 indicates the local union number or district council number where applicable, i.e., Plumbers Local 0198. The next number, 005 in the example, is an internal number used in processing the wage determination. 07/01/2014 is the effective date of the most current negotiated rate, which in this example is July 1, 2014.

Union prevailing wage rates are updated to reflect all rate changes in the collective bargaining agreement (CBA) governing this classification and rate.

Survey Rate Identifiers

Classifications listed under the ""SU"" identifier indicate that no one rate prevailed for this classification in the survey and the published rate is derived by computing a weighted average rate based on all the rates reported in the survey for that classification. As this weighted average rate includes all rates reported in the survey, it may include both union and non-union rates. Example: SULA2012-007 5/13/2014. SU indicates the rates are survey rates based on a weighted average calculation of rates and are not majority rates. LA indicates the State of Louisiana. 2012 is the year of survey on which these classifications and rates are based. The next number, 007 in the example, is an internal number used in producing the wage determination. 5/13/2014 indicates the survey completion date for the classifications and rates under that identifier.

Survey wage rates are not updated and remain in effect until a new survey is conducted.

Union Average Rate Identifiers

Classification(s) listed under the UAVG identifier indicate that no single majority rate prevailed for those classifications; however, 100% of the data reported for the classifications was union data. EXAMPLE: UAVG-OH-0010 08/29/2014. UAVG indicates that the rate is a weighted union average rate. OH indicates the state. The next number, 0010 in the example, is an internal number used in producing the wage determination. 08/29/2014 indicates the survey completion date for the classifications and rates under that identifier.

A UAVG rate will be updated once a year, usually in January of each year, to reflect a weighted average of the current negotiated/CBA rate of the union locals from which the rate is based.

WAGE DETERMINATION APPEALS PROCESS

1.) Has there been an initial decision in the matter? This can be:

- * an existing published wage determination
- * a survey underlying a wage determination
- * a Wage and Hour Division letter setting forth a position on a wage determination matter
- * a conformance (additional classification and rate) ruling

On survey related matters, initial contact, including requests for summaries of surveys, should be with the Wage and Hour National Office because National Office has responsibility for the Davis-Bacon survey program. If the response from this initial contact is not satisfactory, then the process described in 2.) and 3.) should be followed.

With regard to any other matter not yet ripe for the formal process described here, initial contact should be with the Branch of Construction Wage Determinations. Write to:

Branch of Construction Wage Determinations
Wage and Hour Division
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

2.) If the answer to the question in 1.) is yes, then an interested party (those affected by the action) can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Write to:

Wage and Hour Administrator
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

The request should be accompanied by a full statement of the interested party's position and by any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

3.) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

4.) All decisions by the Administrative Review Board are final.

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END OF GENERAL DECISIO"

DIVISION

01

GENERAL REQUIREMENTS

SECTION 01 10 00 - SUMMARY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Project information.
 - 2. Work covered by the Contract Documents.
 - 3. Work under other contracts.
 - 4. Use of premises.
 - 5. Owner's right to maintain school operations.
 - 6. Owner's occupancy requirements.
 - 7. Work restrictions.
 - 8. Specification formats and conventions.
 - 9. Permits, fees, and notices.
 - 10. Contractor construction sequence.
- B. Related Sections include the following:
 - 1. Division 01 Section "Temporary Facilities and Controls" for limitations and procedures governing temporary use of Owner's facilities.

1.3 PROJECT INFORMATION

- A. Project Identification: HVAC Modifications, Project No. 221119.00
 - 1. West Main Elementary School, 639 West Main Street, Ravenna, OH 44266
 - 2. Willyard Elementary School, 680 Summit Street, Ravenna, OH 44266
 - 3. West Park Elementary School, 1071 Jones Avenue, Ravenna, OH 44266
- B. Owner: Ravenna City Schools, 534 Summit Street, Ravenna, OH 44266
- C. A/E: Fanning/Howey Associates, Inc., 4930 Bradenton Avenue, Dublin, OH 43017.
 - 1. Project Manager/Engineer: Jonathan Landis

1.4 WORK COVERED BY CONTRACT DOCUMENTS

- A. The Work consists of the following:
 - 1. The Work includes HVAC renovations for West Main Elementary School, Willyard Elementary School, West Park Elementary School, and Carlin Elementary School (Administration Building). All schools are located in the Ravenna City School District, Ravenna, Ohio.
- B. Type of Contract
 - 1. Project(s) will be constructed under a single prime contract(s).

1.5 WORK UNDER OTHER CONTRACTS

- A. The Owner intends to complete the following items of Work outside the provisions of these Contract Documents. The Contractor shall not restrict or interfere with the Owner's right to the Project to accomplish this Work.
 - 1. Existing school maintenance work.

1.6 USE OF PREMISES (ACCESS TO SITE)

- A. General: Contractor shall have full use of premises for construction operations, including use of Project site, during construction period. Contractor's use of premises is limited only by Owner's right to perform work or maintain limited operations.
- B. Use of Site: Limit use of premises to work in areas indicated. Do not disturb portions of Project site beyond areas in which the Work is indicated.
 - 1. Owner Occupancy: Allow for Owner occupancy of Project site and use by the public.
 - 2. Driveways and Entrances: Keep undesignated driveways, parking area, loading areas, and entrances serving premises clear and available to Owner, Owner's employees, and emergency vehicles at all times. Do not use undesignated areas for parking or storage of materials.
 - a. Schedule deliveries to minimize use of driveways and entrances.
 - b. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on-site.
- C. Use of Existing Building: Maintain existing building in a weathertight condition throughout construction period. Repair damage caused by construction operations. Protect building and its occupants during construction period.
- D. Condition of Existing Grounds: Maintain portions of existing grounds, landscaping, and hardscaping affected by construction operations throughout construction period. Repair damage caused by construction operations.

PART 2 - PRODUCTS

2.1 OWNER'S RIGHT TO MAINTAIN SCHOOL OPERATIONS

- A. During the course of this Project, normal and customary school functions and operations must be maintained. The Contract Documents are intended to define a strict separation between the school activities of students and staff from the activities of the construction project.
- B. The A/E and Owner will not tolerate any visible or audible actions initiated or responded to by any employees of Contractors on this Project toward any students, teachers, or staff members at the school system. Violators shall be promptly removed from the Project site.
- C. The Owner intends to instruct students, teachers, and staff to refrain from communications with Contractor's personnel working on this Project. All communication with Owner and staff shall be through the A/E.
 - 1. Despite the Owner's instructions to refrain from doing so, individual students, teachers, staff members, or other unauthorized parties might attempt to initiate changes to the work of this Project by communicating directly with Contractor's or subcontractor's personnel. Do not consider these communications to be instructions either to stop work in progress or to make changes to the work of this Project; instead, refer to Division 01 Section "Contract Modification Procedures" for administrative and procedural requirements for handling and processing modifications to the Contract.
- D. Contractors shall expend their best effort toward protection of the health, safety, and welfare of occupants on the Owner's property during the course of Work on this Project.
- E. Contractors and subcontractors shall be subject to such rules and regulations for the conduct of the Work as the Owner may establish. Employees shall be properly and completely clothed while working. Bare torsos, legs, and feet will not be allowed. Possession or consumption of alcoholic beverages or drugs, tobacco, or other noxious behavior on the Project site is strictly prohibited. Violators shall be promptly removed from the Project site. Smoking is not permitted on school property or within school buildings.

2.2 OWNER'S OCCUPANCY REQUIREMENTS

- A. Partial Owner Occupancy: Owner will occupy the premises during entire construction period, with the exception of areas under construction. Cooperate with Owner during construction operations to minimize conflicts and facilitate Owner usage. Perform the Work so as not to interfere with Owner's operations. Maintain existing exits, unless otherwise indicated.
 - 1. Maintain access to existing walkways, corridors, and other adjacent occupied or used facilities. Do not close or obstruct walkways, corridors, or other occupied or used facilities without written permission from Owner and authorities having jurisdiction.
 - 2. Provide not less than 72 hours' notice to Owner of activities that will affect Owner's operations.
- B. Owner Limited Occupancy of Completed Areas of Construction: Owner reserves the right to occupy and to place and install equipment in completed areas of building, before Substantial Completion, provided such occupancy does not interfere with completion of the Work. Such placement of equipment and partial occupancy shall not constitute acceptance of the total Work.
 - 1. A/E will prepare a Certificate of Substantial Completion for each specific portion of the Work to be occupied before Owner occupancy.
 - 2. Obtain a Certificate of Occupancy from authorities having jurisdiction before Owner occupancy.
 - 3. Before partial Owner occupancy, mechanical and electrical systems shall be fully operational, and required tests and inspections shall be successfully completed. On occupancy, Owner will operate and maintain mechanical and electrical systems serving occupied portions of building.
 - 4. On occupancy, Owner will assume responsibility for maintenance and custodial service for occupied portions of building.

2.3 WORK RESTRICTIONS

- A. Work Restrictions, General: Comply with restrictions on construction operations.
 - 1. Comply with limitations on use of public streets and other requirements of authorities having jurisdiction.
- B. Definitions
 - 1. Ambient Noise Level: The total noise associated with a given environment, being usually a composite of normal or existing sounds from all sources near and far, excluding the noise source at issue.
 - 2. Daytime: The hours from 7 a.m. to 9 p.m. on weekdays and 9 a.m. to 9 p.m. on weekends and holidays.
 - 3. Nighttime: All non-daytime hours.
 - 4. Property Line: The real or imaginary line along the ground surface and its vertical extension, which separates real property owned or controlled by one person from contiguous real property owned or controlled by another person or from any public right-of-way or from any public space.
 - 5. Receiving Noise Area: Any real property where people live or work and where noise is heard, excluding the project or source area.
- C. On-Site Work Hours: Work shall be generally performed inside the existing building during normal business working hours of 7:30 a.m. to 4:30 p.m., Monday through Friday, except otherwise indicated.
 - 1. Work outside normal work hours maybe performed with 48 hour notice to A/E and Owner. All work must be performed in presence of Contractors Superintendent/Foreman.
- D. Noise Control: Perform renovation operations to minimize noise. Coordinate operations that may result in high levels of noise of other disruptions to Owner occupancy with Owner.
 - 1. Notify Owner not less than two days in advance of proposed disruptive operations.
- E. Repetitive and/or intermittent, high-level noise: Permitted only during daytime.
 - 1. Do not exceed the following dB limitations:

Sound Level in dB

70

80

Time Duration of Impact Noise

More than 12 minutes in any hour

More than 3 minutes in any hour

2. Provide equipment, sound-deadening devices, and take noise abatement measures that are necessary for compliance.
3. Maximum permissible construction equipment noise levels at 50 feet (dB):

<u>EARTHMOVING</u>	<u>dB</u>	<u>MATERIALS HANDLING</u>	<u>dB</u>
Front Loaders	75	Concrete Mixers	75
Backhoes	75	Concrete Pumps	75
Dozers	75	Cranes	75
Tractors	75	Derricks Impact	75
Scrapers	80	Pile Drivers	95
Graders	75	Jack Hammers	75
Trucks	75	Rock Drills	80
Pavers, Stationary	80	Pneumatic Tools	80
Pumps	75	Saws	75
Generators	75	Vibrators	75
Compressors	75		

F. Ambient Noise:

1. Maximum noise levels (dB) for receiving noise area at property line shall be as follows:
 - a. Residential receiving area

Daytime:	65 dB
Nighttime:	60 dB
 - b. Commercial/Industrial receiving area

Daytime:	67 dB
Nighttime:	65 dB
2. In the event the existing local ambient noise level exceeds the maximum allowable receiving noise level (dB), the receiving noise level maximum for construction operations shall be adjusted as follows:
 - a. Residential receiving area: Maximum 3 additional dB above the local ambient as measured at property line.
 - b. Commercial/Industrial receiving area: Maximum 5 additional dB above the local ambient as measured at the property line.

G. Existing Utility Interruptions: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:

1. Notify **Owner** not less than 72 hours in advance of proposed utility interruptions.
2. Do not proceed with utility interruptions without Owner written permission.

H. Controlled Substances: Use of tobacco products and other controlled substances on the Project site is not permitted.

I. Employee Identification: Provide identification tags for Contractor personnel working on the Project site. Require personnel to utilize identification tags at all times.

J. Employee Screening: Comply with Owner's requirements regarding drug and background screening of Contractor personnel working on the Project site.

1. Maintain list of approved screened personnel with Owner's Representative.
2. A background inquiry for the construction work force is a requirement of the construction contract. No one will be permitted to work on school construction projects adjacent to active school facilities without the completion of a satisfactory background inquiry.
 - a. Documentation shall be submitted within 10 days of Notice to Proceed. Construction work at the Project site cannot start without properly screened personnel.
3. Data Collection:
 - a. Applicants shall provide; name, address, SSN, employment reference and consent to background check.

- b. Information along with a photograph of applicant shall be provided Owner along with results of each criminal background search.
 - c. Provide a complete listing of all screened individuals sorted by serial number with person's name, phone number and employer and employer phone number.
- 4. Criminal Background Search
 - a. A criminal history search will begin with a comprehensive Social Security Number (SSN) verification to identify the use of multiple SSN and/or aliases (AKA's) as well as current and previous locations of residence. This information will be used for a criminal history search where applicant has worked and resided within the last three years. Searches will be 100 percent, realtime court searches in any U.S. county, Puerto Rico, the US Virgin Islands, Guam, and Canada. All felony convictions, misdemeanor convictions, and related activity on record will be reported to Owner.
 - b. Provide background checks against both state-level (BCI) and federal-level (FBI) fingerprint databases (available from National WebCheck at deputy registrar locations of the Ohio Bureau of Motor Vehicles).
- 5. Project Site Compliance Monitoring:
 - a. After successful completion of the criminal history search, the screening firm shall provide the applicant with a form of identification to be displayed on the applicant's hard hat or employee identification tags. Identification shall be displayed at all times.
 - 1) Identification shall not directly identify the applicant's personal information.
 - b. Random checks will be performed to verify through brief random sampling that:
 - 1) There are no construction personnel working without a background check and proper identification.
 - 2) Contractor is maintaining a sign-in sheet for personnel visiting Project and providing a background-compliant full time escort.
- 6. Tracking and Reporting: Deliver background inquiry reports to the Owner in hard copy and PDF format.
- 7. Contractor shall include cost of initial screening and reporting in their bid.

2.4 SPECIFICATION AND DRAWING CONVENTIONS

- A. Specification Format: The Specifications are organized into Divisions and Sections using the 50-division format and CSI/CSC's "MasterFormat" numbering system.
 - 1. Section Identification: The Specifications use Section numbers and titles to help cross-referencing in the Contract Documents. Sections in the Project Manual are in numeric sequence; however, the sequence is incomplete because all available Section numbers are not used. Consult the table of contents at the beginning of the Project Manual to determine numbers and names of Sections in the Contract Documents.
 - 2. Division 01: Sections in Division 01 govern the execution of the Work of all Sections in the Specifications.
- B. Specification Content: The Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:
 - 1. Abbreviated Language: Language used in the Specifications and other Contract Documents is abbreviated. Words and meanings shall be interpreted as appropriate. Words implied, but not stated, shall be inferred as the sense requires. Singular words shall be interpreted as plural, and plural words shall be interpreted as singular where applicable as the context of the Contract Documents indicates.
 - 2. Imperative mood and streamlined language are generally used in the Specifications. Requirements expressed in the imperative mood are to be performed by Contractor. Occasionally, the indicative or subjunctive mood may be used in the Section Text for clarity to describe responsibilities that must be fulfilled indirectly by Contractor or by others when so noted.
 - a. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.

- C. Drawing Coordination: Requirements for materials and products identified on Drawings are described in detail in the Specifications. One or more of the following are used on Drawings to identify materials and products:
 - 1. Terminology: Materials and products are identified by the typical generic terms used in the individual Specifications Sections.
 - 2. Abbreviations: Materials and products are identified by abbreviation published as part of the U.S. National CAD Standard, unless otherwise noted on Drawings.
 - 3. Keynoting: Materials and products are identified by reference keynotes referencing Specification Section numbers found in this Project Manual.

2.5 PERMITS, FEES, AND NOTICES

- A. Contractor shall secure and pay for permits, inspections, governmental fees, tap-in fees, and licenses necessary for the proper execution and completion of Work, which are applicable at the time the bids are received, unless otherwise noted.
 - 1. A/E shall assist the Owner in applying for "Certificate of Plan Approval" (General Building Permit) typically required by law for projects similar to the one for which the A/E's services are engaged. Owner will pay associated fees.
- B. Inspections of installed work shall be performed by the governing authority as arranged for by the Contractor. Work shall not be covered until approved.
- C. Contractor shall give notices and comply with laws, ordinances, rules, regulations, and orders of public authorities bearing on the performance of his Work. If a Contractor observes that the Contract Documents are at variances therewith, he shall promptly notify the A/E in writing, and necessary changes shall be adjusted by appropriate notification. If a Contractor performs Work knowing it to be contrary to such laws, ordinances, rules, and regulations, and without such notice to the A/E, he shall assume full responsibility therefore and shall bear the costs attributable thereto.

2.6 CONTRACTORS CONSTRUCTION SEQUENCE

- A. The sequence of construction is based upon receiving bids November 2, 2023; Notice to Proceed November 18, 2023; and Substantial Completion of Work by March 1, 2024.

2.7 MISCELLANEOUS PROVISIONS

- A. Contractor shall enforce strict discipline and good order among his employees or other persons carrying out Work of his Contract and shall not permit employment of unfit person or persons or anyone not skilled in the task assigned to them.
- B. When verification of existing dimensions is required, the Contractor requiring said verification for the construction or fabrication of his material shall be the Contractor responsible for the procurement of the field information.
- C. Do not scale documents.
- D. Contractor shall be responsible for developing and conducting a security program, specifically oriented for the protection of – and for the preventing of damage, injury, or loss to –the Contractor's respective portion of the Project site and other property at the site or adjacent thereto. This security program shall be acceptable to the Owner, and shall remain in effect through Substantial Completion of the Project.
- E. Hazardous Materials: The Contractor in addition to products banned as part of the Clean Air Act (NESHAP Rule, Nov. 1990 Revision; 40 CFR 60, Subpart M) shall not use or bring on-site materials containing more than 1 percent asbestos by polarized-light microscopy (PLM) analysis. No materials marked as "MAY CONTAIN MINERAL FIBERS" shall be used in construction unless written results of microscopic examination by an AIHA or NVLAP-certified laboratory documenting the asbestos content at less than 1 percent are provided and approved before installation.

1. If material containing more than 1 percent asbestos is brought onto Project site by Contractor, materials shall be removed in accordance with all applicable laws and precautions so as not to make fibers friable. Removal of materials containing more than 1 percent asbestos and replacement of such materials shall be at Contractor's expense.
2. Before final payment, the Contractor shall submit to the Owner, on contracting firm's letterhead, a signed, dated copy of the following statement:
 - a. I hereby certify to the best of my knowledge that no asbestos-containing material (ACM) above 1 percent content was used as a building material for this Project.

F. Smoking Ban

1. Smoking is prohibited in any "public place" or "place of employment" as of December 7, 2006. For definitions of a "public place" and "place of employment," refer to ORC 3794.01 Definitions.
2. All "public places" and "places of employment" must, by December 7, 2006, post conspicuous signs at each entrance. The signs shall be clearly legible and shall contain a toll-free number for reporting violations. Refer to ORC 3794.06 (A) Posting of Signs.

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 10 00

SECTION 01 21 00 - ALLOWANCES

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes administrative and procedural requirements governing allowances.
 - 1. Certain items are specified in Contract Documents by allowances. Allowances have been established in lieu of additional requirements and to defer selection of actual materials and equipment to a later date when additional information is available for evaluation. If necessary, additional requirements will be issued by Change Order.
- B. Types of allowances include following:
 - 1. Contingency allowances.

1.2 SELECTION AND PURCHASE

- A. At earliest practical date after award of Contract, advise A/E of date when final selection and purchase of each product or system described by an allowance must be completed to avoid delaying Work.
- B. At A/E's request, obtain proposals for each allowance for use in making final selections. Include recommendations that are relevant to performing Work.
- C. Purchase products and systems selected by A/E from designated supplier.

1.3 SUBMITTALS

- A. Submit proposals for purchase of products or systems included in allowances, in form specified for Change Orders.
- B. Informational/Quality Assurance/Control Submittals
 - 1. Submit invoices or delivery slips to show actual quantities of materials delivered to site for use in fulfillment of each allowance.
 - 2. Submit time sheets and other documentation to show labor time and cost for installation of allowance items that include installation as part of allowance.
 - 3. Coordinate and process submittals for allowance items in same manner as for other portions of Work.

1.4 COORDINATION

- A. Coordinate allowance items with other portions of Work. Furnish templates as required to coordinate installation.

1.5 CONTINGENCY ALLOWANCES

- A. Use contingency allowance only as directed by A/E for Owner's purposes and only by Change Order that indicate amounts to be charged to allowance.
- B. Contractor's overhead, profit, and related costs for products and equipment ordered by Owner under contingency allowance are included in allowance and are not part of Contract Sum. These costs include delivery, installation, taxes, insurance, equipment rental, and similar costs.
 - 1. Coordinate percentage of markups with General Conditions, "Changes in Work".
- C. Change Order authorizing use of funds from contingency allowance will include Contractor's related costs and reasonable overhead and profit margins.

- D. At Project closeout, credit unused amounts remaining in contingency allowance to Owner by Change Order.

1.6 UNUSED MATERIALS

- A. Return unused materials purchased under an allowance to manufacturer or supplier for credit to Owner, after installation has been completed and accepted.
 - 1. If requested by A/E, prepare unused material for storage by Owner when it is not economically practical to return material for credit. If directed by A/E, deliver unused material to Owner's storage space. Otherwise, disposal of unused material is Contractor's responsibility.
 - 2. Unused amounts of monies included under allowances shall be credited to Owner by deduct Change Order prior to approval of Final Application for Payment.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 SCHEDULE OF ALLOWANCES

- A. Contingency Allowances: Include following amounts in bid for inclusion in Contract Sum:
 - 1. Allowance No. 1: Base Bid – HVAC Modifications at West Main ES \$25,000.00
 - 2. Allowance No. 2: Base Bid – HVAC Modifications at Willyard ES \$25,000.00
 - 3. Allowance No. 3: Base Bid – HVAC Modifications at West Park ES \$25,000.00
- B. Note: Allowance for Combined Bid shall be the total of all three \$75,000.00

END OF SECTION 01 21 00

SECTION 01 23 00 - ALTERNATES

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes administrative and procedural requirements for alternates.

1.2 DEFINITIONS

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

1.3 PROCEDURES

- A. Coordination: Modify or adjust affected adjacent work as necessary to completely integrate work of alternate into Project.
 - 1. Include as part of each alternate, miscellaneous devices, accessory objects, and similar items incidental to or required for a complete installation whether or not indicated as part of alternate.
- B. Notification: Immediately following award of Contract, notify each party involved, in writing, of status of each alternate. Indicate if alternates have been accepted, rejected, or deferred for later consideration. Include a complete description of negotiated modifications to alternates.
- C. Execute accepted alternates under same conditions as other work of Contract.
- D. Schedule: A Schedule of Alternates is included at end of this Section. Specification Sections referenced in schedule contain requirements for materials necessary to achieve work described under each alternate.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 SCHEDULE OF ALTERNATES

- A. Alternate No. 1 – HVAC Equipment Outlets – West Main Elementary School
- B. Alternate No. 2 - HVAC Equipment Outlets – West Park Elementary School
- C. Alternate No. 3 - HVAC Equipment Outlets – Willyard Elementary School
- D. Alternate No. 4 - HVAC Equipment Outlets – West Main, West Park and Willyard Elementary Schools

END OF SECTION 01 23 00

SECTION 01 26 00 - CONTRACT MODIFICATION PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section specifies administrative and procedural requirements for handling and processing Contract modifications.
- B. Related Sections include following:
 - 1. Division 01 Section "Substitution Procedures" for administrative procedures for handling requests for substitutions made after award.

1.2 MINOR CHANGES IN WORK

- A. A/E will issue supplemental instructions clarifying contract documents, not involving adjustment to Contract Sum or Contract Time, on Architect's Supplemental Instructions (AIA Document G710-2017).

1.3 PROPOSAL REQUESTS

- A. Owner-Initiated Proposal Requests: A/E will issue a detailed description of proposed changes in Work that may require adjustment to Contract Sum or Contract Time. If necessary, description will include supplemental or revised Drawings and Specifications.
 - 1. Proposal Requests issued by A/E are for information only. Do not consider them instructions either to stop work in progress or to execute proposed change.
 - 2. Within time specified in Proposal Request or 20 days, when not otherwise specified, after receipt of Proposal Request, submit a quotation estimating cost adjustments to Contract Sum and Contract Time necessary to execute change.
 - a. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
 - b. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
 - c. Include costs of labor and supervision directly attributable to change.
 - d. Include an updated Contractor's Construction Schedule that indicates effect of change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship.
- B. Contractor-Initiated Proposals: If latent or unforeseen conditions require modifications to Contract, Contractor may propose changes by submitting a request for a change to A/E.
 - 1. Include a statement outlining reasons for change and effect of change on Work. Provide a complete description of proposed change. Indicate effect of proposed change on Contract Sum and Contract Time.
 - 2. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
 - 3. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
 - 4. Include costs of labor and supervision directly attributable to change.
 - 5. Include an updated Contractor's Construction Schedule that indicates effect of change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship.
 - 6. Comply with requirements in Division 01 Section "Substitution Procedures" if proposed change requires substitution of one product or system for product or system specified.

- C. Proposal Request Form: Use forms provided by hereinafter. Sample copies are included at end of this Section.
 - 1. Proposal Worksheet Detail: Use forms provided hereinafter.
 - 2. Proposal Worksheet Summary: Use forms provided hereinafter.

1.4 CHANGE ORDER PROCEDURES

- A. On Owner's approval of a Proposal Request, A/E will issue a Change Order for signatures of A/E, Owner, and Contractor on form included hereinbefore.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 26 00

Change Order Request No. _____
 Proposal Request No. _____
 Date: _____
 To (Architect): _____

SHADED AREAS FOR A/E USE

ADDITIONS					UNIT PRICES				SUBTOTALS			
	Ref. No.	Item Description	Quantity		Materials		Labor		Materials		Labor	
									\$ -		\$ -	
									\$ -		\$ -	
									\$ -		\$ -	
									\$ -		\$ -	
									\$ -		\$ -	
		SUBTOTAL							\$ -		\$ -	

DEDUCTIONS					UNIT PRICES				SUBTOTALS			
	Ref. No.	Item Description	Quantity		Materials		Labor		Materials		Labor	
									\$ -		\$ -	
									\$ -		\$ -	
									\$ -		\$ -	
									\$ -		\$ -	
									\$ -		\$ -	
		SUBTOTAL							\$ -		\$ -	

TOTAL MATERIAL AND LABOR				\$	-	\$	-
TOTAL CHANGE REQUESTED				\$	-		

Subcontractor's Net:	\$	-	
Subcontractor's OH&P:	\$	-	
Subcontractor's Bond:	\$	-	
Subcontractor's Total:	\$	-	
Contractor's OH&P:	\$	-	
Contractor's Bond:	\$	-	
Insurance:	\$	-	
Tax:	\$	-	
Worksheet Total:	\$	-	

PROPOSAL WORKSHEET SUMMARY

Project Description: _____	Proposal Request No. _____
To: _____	Change Order Request No. _____
Re: _____	Date: _____
From: _____	A/E Project No. _____

COMPLETE AND ATTACH PROPOSAL WORKSHEET DETAIL FOR EACH ELEMENT OF WORK. ENTER WORKSHEET INFORMATION BELOW.

ADDITIONS

	Ref. No.	Item Description	Materials		Labor		Subtotal	
		SUBTOTAL						

DEDUCTIONS

	Ref. No.	Item Description	Materials		Labor		Subtotal	
		SUBTOTAL						

Subcontractor's Net:		
Subcontractor's OH&P:		
Subcontractor's Bond:		
Subcontractor's Total:		
Contractor's OH&P:		
Contractor's Bond:		
Insurance:		
Tax:		
Worksheet Total:		



AIA[®] Document G709[™] – 2018

Proposal Request

PROJECT: *(name and address)*

General - Specifications

CONTRACT INFORMATION:

Contract For: General Construction

Date:

Architect's Project Number:

Proposal Request Number: 002

Proposal Request Date:

OWNER: *(name and address)***ARCHITECT:** *(name and address)***CONTRACTOR:** *(name and address)*

The Owner requests an itemized proposal for changes to the Contract Sum and Contract Time for proposed modifications to the Contract Documents described herein. The Contractor shall submit this proposal within Zero (0) days or notify the Architect in writing of the anticipated date of submission.

(Insert a detailed description of the proposed modifications to the Contract Documents and, if applicable, attach or reference specific exhibits.)

THIS IS NOT A CHANGE ORDER, A CONSTRUCTION CHANGE DIRECTIVE, OR A DIRECTION TO PROCEED WITH THE WORK DESCRIBED IN THE PROPOSED MODIFICATIONS.

REQUESTED BY THE ARCHITECT:

PRINTED NAME AND TITLE

**AIA**[®]**Document G701™ – 2017****Change Order****PROJECT:** *(Name and address)*

General - Celina

CONTRACT INFORMATION:

Contract For: General Construction

Date:

CHANGE ORDER INFORMATION:

Change Order Number: 001

Date:

OWNER: *(Name and address)***ARCHITECT:** *(Name and address)***CONTRACTOR:** *(Name and address)***THE CONTRACT IS CHANGED AS FOLLOWS:***(Insert a detailed description of the change and, if applicable, attach or reference specific exhibits. Also include agreed upon adjustments attributable to executed Construction Change Directives.)*

The original Contract Sum was	\$	0.00
The net change by previously authorized Change Orders	\$	0.00
The Contract Sum prior to this Change Order was	\$	0.00
The Contract Sum will be increased by this Change Order in the amount of	\$	0.00
The new Contract Sum including this Change Order will be	\$	0.00

The Contract Time will be increased by Zero (0) days.

The new date of Substantial Completion will be

NOTE: This Change Order does not include adjustments to the Contract Sum or Guaranteed Maximum Price, or the Contract Time, that have been authorized by Construction Change Directive until the cost and time have been agreed upon by both the Owner and Contractor, in which case a Change Order is executed to supersede the Construction Change Directive.

NOT VALID UNTIL SIGNED BY THE ARCHITECT, CONTRACTOR AND OWNER.**ARCHITECT** *(Firm name)***CONTRACTOR** *(Firm name)***OWNER** *(Firm name)***SIGNATURE****SIGNATURE****SIGNATURE****PRINTED NAME AND TITLE****PRINTED NAME AND TITLE****PRINTED NAME AND TITLE****DATE****DATE****DATE**



AIA[®] Document G714[™] – 2017

Construction Change Directive

PROJECT: *(name and address)*

General - Specifications

CONTRACT INFORMATION:

Contract For: General Construction

Date:

CCD INFORMATION:

Directive Number: 001

Date:

OWNER: *(name and address)*
ARCHITECT: *(name and address)*
CONTRACTOR: *(name and address)*

The Contractor is hereby directed to make the following change(s) in this Contract:

(Insert a detailed description of the change and, if applicable, attach or reference specific exhibits.)

PROPOSED ADJUSTMENTS

1. The proposed basis of adjustment to the Contract Sum or Guaranteed Maximum Price is:

☒ Lump Sum decrease of \$0.00

☐ Unit Price of \$ per

☐ Cost, as defined below, plus the following fee:
(Insert a definition of, or method for determining, cost)

☐ As follows:

2. The Contract Time is proposed to remain unchanged. The proposed adjustment, if any, is (0 days).

NOTE: The Owner, Architect and Contractor should execute a Change Order to supersede this Construction Change Directive to the extent they agree upon adjustments to the Contract Sum, Contract Time, or Guaranteed Maximum price for the change(s) described herein.

When signed by the Owner and Architect and received by the Contractor, this document becomes effective IMMEDIATELY as a Construction Change Directive (CCD), and the Contractor shall proceed with the change(s) described above.

Contractor signature indicates agreement with the proposed adjustments in Contract Sum and Contract Time set forth in this CCD.

ARCHITECT *(Firm name)*

OWNER *(Firm name)*

CONTRACTOR *(Firm name)*

SIGNATURE

SIGNATURE

SIGNATURE

PRINTED NAME AND TITLE

PRINTED NAME AND TITLE

PRINTED NAME AND TITLE

DATE

DATE

DATE



AIA[®] Document G710[™] – 2017

Architect's Supplemental Instructions

PROJECT: *(name and address)*

General - Specifications

CONTRACT INFORMATION:

Contract For: General Construction

Date:

ASI INFORMATION:

ASI Number: 005

Date:

OWNER: *(name and address)*

ARCHITECT: *(name and address)*

CONTRACTOR: *(name and address)*

The Contractor shall carry out the Work in accordance with the following supplemental instructions without change in Contract Sum or Contract Time. Proceeding with the Work in accordance with these instructions indicates your acknowledgment that there will be no change in the Contract Sum or Contract Time.

(Insert a detailed description of the Architect's supplemental instructions and, if applicable, attach or reference specific exhibits.)

Attachments:

ISSUED BY THE ARCHITECT:

ARCHITECT *(Firm name)*

SIGNATURE

PRINTED NAME AND TITLE

DATE



AIA[®] Document G901[™] – 2022

Conditional Waiver and Release on Progress Payment

Waiver and Release Number: _____
Payment Application Number: _____

IDENTIFYING INFORMATION

Contractor: _____
Customer: _____
Property Owner: _____
Work: _____
Project: _____
Property: _____

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

CONDITIONAL WAIVER AND RELEASE

This Conditional Waiver and Release on Progress Payment is effective only on the Contractor's receipt of payment as described below. A person should not rely on this document unless satisfied that Contractor has received payment.

Except as listed in the Exceptions section below, Contractor conditionally waives and releases any (i) liens and encumbrances, (ii) right to assert a lien or encumbrance, (iii) common law or statutory payment bond right, (iv) stop payment notices, (v) claim for payment, and (vi) rights under any similar ordinance, rule, or statute related to claim or payment that Contractor has or may have with respect to the (1) Work, (2) Project or Property and improvements thereon, (3) labor, services, materials, fixtures, apparatus, equipment, or machinery furnished for the Project or Property, and (4) monies, funds, or other considerations due or to become due arising out of the Work.

THIS DOCUMENT HAS IMPORTANT LEGAL CONSEQUENCES, AND ITS USE IS GOVERNED BY STATE LAW. STATUTORY AND LEGAL REQUIREMENTS APPLICABLE TO THIS DOCUMENT AND ITS USE MAY CHANGE WITHOUT NOTICE. BEFORE EACH USE, USERS SHOULD CONSULT WITH AN ATTORNEY WITH RESPECT TO ITS COMPLETION OR USE.

Contractor represents that all debts owed to any third party relating to the goods or services covered by this Conditional Waiver and Release on Progress Payment have been paid or will be timely paid.

This Conditional Waiver and Release on Progress Payment is effective only on Contractor's receipt of payment in accordance with the following payment terms:

Describe method by which payment will be made to the Contractor: _____

Maker of payment: _____

Amount of payment: _____

Identify party to whom full or partial payment will be made, if other than Contractor: _____

EXCEPTIONS

This Conditional Waiver and Release on Progress Payment covers a progress payment for Work furnished for the Project or the Property and the improvements thereon through _____ ("Effective Date"). This Conditional Waiver and Release on Progress Payment does not cover (i) Work furnished after the Effective Date, (ii) unpaid retention, (iii) extras for which Contractor has not received payment, (iv) pending modifications and changes, (v) disputed claims in the total amount of \$ _____, and other exceptions described below, if any:

Other exceptions: _____

(Signature of Contractor's authorized representative)

Supporting documents attached hereto, if any: _____

(Date)

Subscribed and sworn to before me on this date: _____

Notary Public: _____

My Commission Expires: _____

SECTION 01 29 00 - APPLICATIONS FOR PAYMENT

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section specifies administrative and procedural requirements governing contractor's Applications for Payment.
 - 1. Coordinate Applications for Payment with Schedule of Values, Project Schedule, Submittal Schedule, and List of Subcontracts.
 - 2. Contractors shall use AIA documents, unless otherwise noted and approved in writing by Owner.
 - a. Purchase: www.aiacontracts.org/purchase.
 - b. Tech Support: 800-942-7736.

1.2 APPLICATIONS FOR PAYMENT

- A. Applications for Payment shall be made in accordance with General Conditions. Payments to Contractor will not be made until final approval by Owner.
 - 1. Contractors shall present a proposed Application for Payment to A/E at site 10 days prior to date for submission of Application of Payment. After review by A/E a corrected copy will be returned to Contractor within 5 working days.
- B. Each Application for Payment shall be consistent with previous applications and payments as certified by A/E and paid for by Owner.
 - 1. Initial Application for Payment, Application for Payment at time of Substantial Completion, and final Application for Payment involve additional requirements.
- C. Application for Payment Forms: Use AIA Document G702 and AIA Document G703 as form for Applications for Payment.
- D. Payment-Application Times: The date for each progress-payment is indicated in the Owner/Contractor Agreement. Period of construction work covered by each Application for Payment is period indicated in Agreement.
- E. Application Preparation: Complete every entry on form. Include notarization and execution by a person authorized to sign legal documents on behalf of Contractor. A/E will return incomplete applications without action.
 - 1. Entries shall match data on Schedule of Values and Project Schedule.
 - 2. Include amounts of Change Orders and Construction Change Directives issued prior to last day of construction period covered by application and include only those fully executed by all parties.
- F. Transmittal: Submit signed and notarized Application for Payment to A/E by a method ensuring receipt within 24 hours. One copy shall be complete, including waivers of lien and similar attachments, when required.
 - 1. Transmit each copy with a transmittal form listing attachments and recording appropriate information related to application, in a manner acceptable to A/E.
- G. Stored Materials: Include in Application for Payment amounts applied for materials or equipment purchased or fabricated and stored, but not yet installed. Differentiate between items stored on-site and items stored off-site.
 - 1. Provide supporting documentation that verifies amount requested, such as paid invoices. Match amount requested with amounts indicated on documentation; do not include overhead and profit on stored materials.
 - 2. Provide summary documentation for stored materials indicating following:
 - a. Value of materials previously stored and remaining stored as of date of previous Application for Payment.

- b. Value of previously stored materials put in place after date of previous "Application for Payment" and on or before date of current "Application for Payment".
 - c. Value of materials stored since date of previous "Application for Payment" and remaining stored as of date of current "Application for Payment".
- 3. Payment for Stored Materials
 - a. When Applications for Payment include products stored off project site or stored on project site but not incorporated in Project, for which no previous payment has been requested, a complete description of such product shall be attached to application. Suitable storage which is off project site shall be a bonded warehouse with stored products properly tagged and identifiable for project. Contract Administrator's written approval shall be obtained before use of an off-site storage area.
 - b. If size, quantity, and/or type of material or product is such that a bonded warehouse is deemed unsuitable, then, Contractor may elect to prepay a Subcontractor or Supplier for certain material and products which are to remain on and be stored on subcontractor's or supplier's premises until needed by Project. In such event, Contractors shall enter into a security agreement with subcontractor or supplier under which Contractor shall be granted a security interest in and to all such material and products fabricated and/or to be supplied by subcontractor or supplier for this project and stored on subcontractor's or supplier's premises. This security agreement shall be a part of financing statement which shall be presented to a filing officer for filing pursuant to Uniform Commercial Code. All expenses incurred in this agreement shall not accrue to Owner, A/E, nor project. A copy of each and every agreement shall be filed with A/E with first Application for Payment which requests payment for such material or products.
 - c. All payment requests for off-site stored materials shall be accomplished by attached "Payment Request for Stored Materials" form.
- 4. Stored Equipment: Each item shall be identified as to manufacturer, model number, and serial number, if applicable, or other identifiers. Each listing shall be accompanied by invoices, shipping tickets, consent of surety, and any other applicable supporting information.
- 5. Stored Manufactured Building Materials: Each item shall be identified as to type, manufacturer's number of designation, and shall also list number of cartons and contents therein. Each listing shall also be accompanied by supporting documents including all invoices, shipping tickets, and consent of surety.
- 6. Stored Fabricated Materials:
 - a. A listing specifying number of pieces, items, etc., and marks as may be applicable to particular type of items. Photographs shall accompany request as supporting information.
 - b. Payment requests for stored materials not complying with above mentioned requirements will not be approved. Contractors are to notify A/E in ample time to conduct verification procedures. Contractors may not apply cost of materials stored offsite towards a reduction in retention amount.
- 7. Stored Materials Offsite Insurance Requirements:
 - a. In situations where Contractor is requesting payment for purchased materials that are being stored offsite for a specific project, evidence of property insurance shall be furnished as indicated below:
 - 1) For Builder's Risk Policy that is in force for projects.
 - a) Verify that "off premises" coverage exists and that amount of insurance is adequate to cover cumulative value of stored materials.
 - b) Verify that "in transit" coverage exists and that amount of insurance is adequate to cover cumulative value of materials while in transit.
 - c) Conform that policy includes Contractor's interest.
 - d) Make sure that Contractor has been notified of its responsibility for applicable policy deductibles.

- 2) If "off premises" and "in transit" coverage are not included under Builder's Risk Policy, Contractor shall provide evidence of property insurance.
 - a) Evidence of insurance is to be provided.
 - b) The top portion of form shall indicate
 - .1 Producer (insurance agent)
 - .2 Company (insurance company)
 - .3 Insured (contractor)
 - .4 Policy number
 - .5 Effective date
 - .6 Expiration date
 - c) The following additional information shall be included:
 - .1 Description of stored property.
 - .2 Store location of insured property.
 - .3 Type of policy (fire policy, installation floater, specific risk policy) and perils insured (all-risk).
 - .4 Amount of insurance which shall equal or exceed cumulative value of stored materials.
 - .5 Deductible
 - .6 Cancellation notice of 30 days.
 - .7 Additional insured shall include interest of Owner.
- H. Waivers of Mechanics Lien: With each Application for Payment, submit waivers of mechanics lien related to Work covered by payment.
 1. Submit partial waivers on each item for amount requested, in previous application, before deduction for retainage, on each item.
 2. When an application shows completion of an item, submit final or full waivers.
- I. Initial Application for Payment: Administrative actions and submittals that must precede or coincide with submittal of first Application for Payment include following:
 1. List of subcontractors.
 2. List of principal suppliers and fabricators.
 3. Schedule of Values.
 4. Project Schedule.
 5. Certificates of insurance and insurance policies.
- J. Retainage: In general, there will be no reduction of retainage granted to this Project.
 1. Retainage shall only be reduced/returned when value of remaining uncompleted items, is less than an amount equal to 200 percent of the value of each item, as determined by the A/E.
 - a. Note: Value shall be determined in part by values indicated in schedule of values, including value of close out documents, i.e. Operation and Maintenance Manuals.
- K. Application for Payment at Substantial Completion: Following issuance of Certificate of Substantial Completion, submit an Application for Payment.
 1. Administrative actions and submittals that shall precede or coincide with this application include:
 - a. Occupancy permits and similar approvals. Occupancy permit shall be submitted by party responsible for acquiring general building permit.
 - b. Warranties (guarantees) and maintenance agreements.
 - c. Test/adjust/balance records.
 - d. Maintenance instructions.
 - e. Final cleaning.
 - f. List of incomplete Work, recognized as exceptions to A/E's Certificate of Substantial Completion.
- L. Final Payment Application: Administrative actions and submittals that must precede or coincide with submittal of final Application for Payment include following:
 1. Completion of Project closeout requirements.
 2. Completion of items specified for completion after Substantial Completion.
 3. Ensure that unsettled claims will be settled.

4. Ensure that incomplete Work is not accepted and will be completed without undue delay.
5. Transmittal of required Project construction records to Owner.

1.3 SCHEDULE OF VALUES

- A. Contractor shall coordinate preparation of its Schedule of Values for its part of Work with Project Schedule.
 1. Within 15 days of award of Contract, Contractor shall submit to A/E a Schedule of Values, for approval.
- B. Format and Content: Use Project Manual table of contents as a guide to establish format for Schedule of Values. Schedule of Values shall include at a minimum a line item for labor and material costs for each specification section assigned to Contractor. Each work item shall receive its prorated share of profit and overhead, including a line item for closeout. Schedule of Values shall consist of a complete breakdown of Contractor's contract sum showing various items of work, divided so as to facilitate approval of payments to Contractor for Work completed. This schedule when reviewed by A/E and Owner shall be used as basis of approving payments along with establishing percentages of Work complete.
 1. In addition to sections assigned to Contractor as defined above, Contractor shall include following line items on their Schedule of Values (in event of combined contracts, each individual bid package shall be broken out as follows):
 - a. Contract Bonds, item shall be included as a material cost.
 - b. Mobilization, including permits, item shall be included as a labor cost.
 - c. Demobilization, item shall be included as a labor cost.
 - d. Insurance: Item shall be included as a material cost.
 - e. Submittals (excluding Closeout Submittals) in amount of 2 percent of Contract; however, not less than \$1,000 or more than \$20,000, item shall be included as a labor cost.
 - f. Project Meetings in amount of \$250 times anticipated number of meetings Contractor will be required to attend during course of Project, item shall be included as a labor cost.
 - g. Daily and final cleanup (in amount of 1 percent of total contract amount). Daily cleanup shall be 80 percent of total with remainder held for final cleanup, item shall be included as a labor cost.
 - h. Punch lists in amount of 2 percent of Contract; however, not less than \$1,000 minimum and \$50,000 maximum, item shall be included as a labor cost.
 - i. Closeout submittals in an amount equal to 3 percent of Contract amount; however, not less than \$500 or more than \$75,000, item shall be included as a material cost.
 - j. HVAC testing/adjusting/balancing, item shall be included as a labor cost.
 2. Provide a breakdown of Contract Sum in sufficient detail to facilitate continued evaluation of Applications for Payment and progress reports. Coordinate with Project Manual table of contents. Break principal subcontract amounts down into several line items. Schedule of Values shall be coordinated with Construction Schedules such that percentages of Work completed closely relates to values for Work shown on request for payments. At beginning of Project, Contractor shall prepare a schedule of monthly progress payments showing amount Contractor may require for Work proposed to be completed. Purpose of this schedule is to allow Owner to determine what amounts of funds will be required to have available each month during progress of construction for progress payments.
 - a. Whenever material allocation exceeds 55 percent of Contract price, Contractor shall provide, upon request, sufficient information to support such higher percentage.
 3. Round amounts to nearest whole dollar. Total shall equal Contract Sum.
 4. Provide a separate line item in Schedule of Values for each part of Work where Applications for Payment may include materials or equipment, purchased or fabricated and stored, but not yet installed.
 - a. Differentiate between items stored on-site and items stored off-site. Include requirements for insurance and bonded warehousing, if required.

- 5. Provide separate line items on Schedule of Values for initial cost of materials, for each subsequent stage of completion, and for total installed value of that part of Work.
- C. Schedule of Values shall be typed or printed on AIA Documents G702-1992 and G703-1992.
- D. Each Schedule of Values shall have Contractor's name, Bid Category name and number, project name and number and shall be dated and signed.
- E. Should Schedule of Values be "rejected, resubmit", resubmittal is due within 5 days of receipt of rejected schedule.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

PAYMENT REQUEST FOR STORED MATERIALS

To: _____ Project: _____

From: _____ Contract No. _____

(Name of Contractor)

Payment Application No. _____

Period: From: _____ to _____

In accordance with provisions of "Payment to Contractor" section of contract General Conditions, request is made for payment as "stored materials" for following materials.

Item No.	Qty.	Material Description	Value	Type of Substantiating Evidence of Purchase Attached	Where Stored (*)

AFFIDAVIT:

Materials listed above have been purchased exclusively for use on above referenced project. Material is separated from other like materials and is physically identified as our property for use only on Contract No.:_____. Owner or Owner's authorized representative may enter upon premises for purpose of inspection, checking or auditing, or for any other purpose as it considers necessary. It is expressly understood and agreed that this information and affidavit is furnished to Owner for purpose of obtaining payment of above materials before they are delivered to, or incorporated into, project described above. A revised form showing current status of value of materials for which payment is being requested will be submitted each estimate period.

Signed: _____ Date: _____
(Name of Contractor)

State of _____ County of: _____

Subscribed and sworn to before me this _____ day of _____

Notary Public _____ Commission Expires _____

When stored at a location other than on jobsite or at a fabricator's yard, a bonded warehouse receipt for material and a certificate of insurance showing coverage of materials stored issued in name of Owner, shall accompany request for payment. In case storage location (other than jobsite or fabricator's yard) is Contractor's property, area containing material within fence area is property of Owner. Responsibility for protecting material remains that of Contractor.

Submit this form with each required copy of AIA Document G702. Attach evidence of purchase (and warehousing receipts when required), along with proof of insurance of bonded warehouse to original.

END OF SECTION 01 29 00

SECTION 01 31 00 - PROJECT MANAGEMENT AND COORDINATION

1.1 SUMMARY

- A. Section includes administrative provisions for coordinating construction operations on Project including, but not limited to, following:
 - 1. Requests for Interpretation (RFIs).
 - 2. Project meetings/meetings.
 - a. Pre-construction meeting.
 - b. Pre-installation meeting.
 - 3. Pre-closeout meeting.
- B. Related Sections:
 - 1. Division 01 Section "Construction Progress Documentation" for preparing and submitting Contractor's construction schedule.
 - 2. Division 01 Section "Closeout Procedures" for coordinating closeout of Contract.

1.2 DEFINITIONS

- A. Request for Interpretation (RFI): A request from a prime contractor seeking an interpretation or a clarification of some requirement of Contract Documents. Contractor shall clearly and concisely set forth issue for which it seeks clarification or interpretation and why a response is needed. Contractor shall, in written request, set forth its interpretation or understanding of contract's requirements along with reasons why it has reached such an understanding. Responses will not change any requirements of Contract Documents.

1.3 INFORMATIONAL SUBMITTALS

- A. Subcontract List: Prepare a written summary identifying individuals or firms proposed for each portion of Work, including those who are to furnish products or equipment fabricated to a special design. Include following information in tabular form:
 - 1. Name, address, and telephone number of entity performing subcontract or supplying products.
 - 2. Number and title of related Specification Section(s) covered by subcontract.
 - 3. Drawing number and detail references, as appropriate, covered by subcontract.
- B. Key Personnel Names: Within 15 days of starting construction operations, submit a list of key personnel assignments, including superintendent and other personnel in attendance at Project site. Identify individuals and their duties and responsibilities; list addresses and telephone numbers, including home, office, and cellular telephone numbers and e-mail addresses. Provide names, addresses, and telephone numbers of individuals assigned as alternates in 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.

1.4 REQUESTS FOR INTERPRETATION (RFIs)

- A. General: Immediately on discovery of need for interpretation of Contract Documents, and if not possible to request interpretation at project meetings, Contractor shall prepare and submit an RFI in form specified.
 - 1. A/E will return RFIs submitted to A/E by other entities controlled by Contractor with no response.
 - 2. Coordinate and submit RFIs in a prompt manner so as to avoid delays in Contractor's work or work of subcontractors.
- B. Content of RFI: Include a detailed, legible description of item needing information or interpretation and following:
 - 1. Project name.
 - 2. Project number.

3. Date.
4. Name of Contractor.
5. Name of A/E.
6. RFI number, numbered sequentially.
7. RFI subject.
8. Specification Section number and title and related paragraphs, as appropriate.
9. Drawing number and detail references, as appropriate.
10. Field dimensions and conditions, as appropriate.
11. Contractor's suggested resolution. If Contractor's solution(s) impacts Contract Time or Contract Sum, Contractor shall state impact in RFI.
12. Contractor's signature.
13. Attachments: Include sketches, descriptions, measurements, photos, Product Data, Shop Drawings, coordination drawings, and other information necessary to fully describe items needing interpretation.
 - a. Include dimensions, thicknesses, structural grid references, and details of affected materials, assemblies, and attachments on attached sketches.

C. RFI Forms: Form bound in Project Manual.

D. A/E's Action: A/E will review each RFI, determine action required, and respond. If it is determined that document is not an RFI, it will be returned to Contractor, unreviewed as to content, for resubmittal on proper form and in proper manner. If RFI is determined unnecessary or frivolous, by nature of information clearly indicated in documents, RFI will also be returned with no response. Numerous frivolous RFI that lead to additional compensation to design team shall result in change orders to submitting contractor's contract. Allow seven working days for A/E's response for each RFI. RFIs received by A/E after 1:00 p.m. will be considered as received following working day. If a longer time is determined necessary, A/E will, within five working days of receipt of request, notify contractor of anticipated response time.

1. The following RFIs will be returned without action:
 - a. Requests for approval of submittals.
 - b. Requests for approval of substitutions.
 - c. Request for approval of Contractor's means and methods.
 - d. Requests for coordination information already indicated in Contract Documents.
 - e. Requests for adjustments in Contract Time or Contract Sum.
 - f. Requests for interpretation of A/E's actions on submittals.
 - g. Incomplete RFIs or inaccurately prepared RFIs.
2. A/E's action may include a request for additional information, in which case A/E's time for response will date from time of receipt of additional information.
3. A/E's action on RFIs that may result in a change to Contract Time or Contract Sum may be eligible for Contractor to submit Change Proposal according to Division 01 Section "Contract Modification Procedures."
 - a. If Contractor believes RFI response warrants change in Contract Time or Contract Sum, notify A/E in writing within 10 days of receipt of RFI response.

1.5 PROJECT MEETINGS

A. General: A/E will schedule and conduct meetings and meetings at Project site, unless otherwise indicated.

1. Attendees: Inform participants and others involved, and individuals whose presence is required, of date and time of each meeting. Notify Owner and A/E of scheduled meeting dates and times.
2. Agenda: Prepare meeting agenda. Distribute agenda to all invited attendees.
3. Minutes: A/E will record significant discussions and agreements achieved. Distribute meeting minutes to everyone concerned, including Owner, within three days of meeting.

B. Preconstruction Meeting: A/E will schedule and conduct a preconstruction meeting before starting construction, at a time convenient to Owner and A/E, but no later than 15 days after execution of Agreement.

1. Conduct meeting to review responsibilities and personnel assignments.

2. Attendees: Authorized representatives of Owner, A/E, and their consultants; Contractor and its superintendent; major subcontractors; suppliers; and other concerned parties shall attend meeting. Participants at meeting shall be familiar with Project and authorized to conclude matters relating to Work.
 3. Agenda: Discuss items of significance that could affect progress, including following:
 - a. Critical work sequencing and long-lead items.
 - b. Designation of key personnel and their duties.
 - c. Lines of communications.
 - d. Procedures for processing field decisions and Change Orders.
 - e. Procedures for RFIs.
 - f. Procedures for testing and inspecting.
 - g. Procedures for processing Applications for Payment.
 - h. Distribution of Contract Documents.
 - i. Submittal procedures.
 - j. Preparation of record documents.
 - k. Use of premises and existing building.
 - l. Work restrictions.
 - m. Working hours.
 - n. Owner's occupancy requirements.
 - o. Responsibility for temporary facilities and controls.
 - p. Procedures for disruptions and shutdowns.
 - q. Parking availability.
 - r. Office, work, and storage areas.
 - s. Equipment deliveries and priorities.
 - t. First aid.
 - u. Security.
 - v. Progress cleaning.
 4. Minutes: Entity responsible for conducting meeting will record and distribute meeting minutes.
- C. Pre-installation Meetings: A/E will conduct a pre-installation meeting 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 installation and its coordination or integration with other materials and installations that have preceded or will follow, shall attend meeting. Advise A/E of potential meeting dates. A/E will schedule meeting.
 2. Agenda: Review progress of other construction activities and preparations for particular activity under consideration, including requirements for following:
 - a. Contract Documents.
 - b. Options.
 - c. Related RFIs.
 - d. Related Change Orders.
 - 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. A/E will record significant meeting discussions, agreements, and disagreements, including required corrective measures and actions.
 - 4. A/E will distribute minutes of meeting to each party present and to other parties requiring information.
 - 5. Do not proceed with installation if meeting cannot be successfully concluded and all required parties are present. Initiate whatever actions are necessary to resolve impediments to performance of Work and reconvene meeting at earliest feasible date.
- D. Project Closeout Meeting: A/E will schedule and conduct a Project closeout meeting, at a time convenient to Owner and A/E, when work or designated portion thereof is 70 percent substantially complete, by billing, but no later than 90 days prior to scheduled date of Substantial Completion.
- 1. Conduct meeting to review requirements and responsibilities related to Project closeout.
 - 2. Attendees: Authorized representatives of Owner, Contractor and its superintendent; major subcontractors; suppliers; and other concerned parties shall attend meeting. Participants at meeting shall be familiar with Project and authorized to conclude matters relating to Work.
 - 3. Agenda: Discuss items of significance that could affect or delay Project closeout, including following:
 - a. Preparation of record documents.
 - b. Procedures required prior to inspection for Substantial Completion and for final inspection for acceptance.
 - c. Submittal of written warranties.
 - d. Requirements for preparing operations and maintenance data.
 - e. Requirements for delivery of material samples, attic stocks, and spare parts.
 - f. Requirements for demonstration and training.
 - g. Preparation of Contractor's punch list.
 - h. Procedures for processing Applications for Payment at Substantial Completion and for final payment.
 - i. Submittal procedures.
 - j. Responsibility for removing temporary facilities and controls.
 - 4. Minutes: A/E will record and distribute meeting minutes.
- E. Progress Meetings: A/E will conduct progress meetings at weekly intervals.
- 1. Attendees: In addition to representatives of Owner and A/E, each contractor, subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at meeting shall be familiar with Project and authorized to conclude matters relating to Work.
 - a. Contractor is required to attend progress meetings, unless previously excused by A/E. Contractor failing to be represented at project meetings, when specifically requested, will be taken into consideration when A/E is considering payment applications for approval. Contractor may be charged \$250.00 for each unexcused absence, from meetings in which they are requested to attend. A deduct Change Order for these changes will be issued prior to contract closeout. This in no way relieves Contractors for coordination due to lack of attendance. Punitive damage claims shall be in addition to fees charged.
 - 2. Agenda: Review and correct or approve minutes of previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.
 - a. Contractor's Construction Schedule: Review progress since last meeting. Determine whether each activity is on time, ahead of schedule, or behind schedule, in relation to Contractor's construction schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within Contract Time.
 - 1) Review schedule for next period.

- b. Review present and future needs of each entity present, including following:
 - 1) Interface requirements.
 - 2) Sequence of operations.
 - 3) Status of submittals.
 - 4) Deliveries.
 - 5) Off-site fabrication.
 - 6) Access.
 - 7) Site utilization.
 - 8) Temporary facilities and controls.
 - 9) Progress cleaning.
 - 10) Quality and work standards.
 - 11) Status of correction of deficient items.
 - 12) Field observations.
 - 13) Status of RFIs.
 - 14) Status of proposal requests.
 - 15) Pending changes.
 - 16) Status of Change Orders.
 - 17) Pending claims and disputes.
 - 18) Documentation of information for payment requests.
 - 19) Review Closeout Submittals Log
- 3. Minutes: A/E will record and distribute meeting minutes to each party present and to parties requiring information.
 - a. Schedule Updating: Revise Contractor's construction schedule after each progress meeting where revisions to schedule have been made or recognized. Issue revised schedule concurrently with report of each meeting.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 31 00

REQUEST FOR INTERPRETATION



Project: HVAC Modifications
Ravenna City Schools

Fanning Howey
RFI No.

Contractor
RFI No.)

Date

Project No.: 221119.00

Response
Requested
by date

To:

Reference
Specification Section
(if applicable)

From:

Drawing No.
(if applicable)

Request for Interpretation (RFI): A request from Construction Manager or contractor seeking an interpretation or a clarification of some requirement of Contract Documents. Clearly and concisely set forth issue for which it seeks clarification or interpretation and why a response is needed. On this form, set forth its interpretation or understanding of contract's requirements along with reasons why it has reached such an understanding. Responses will not change any requirements of Contract Documents.

Information Requested:

Proposed Solution(s):

Response:

Signature: _____

Date: _____

Proposal Request Issued:

☐ Yes

☐ No

Note: This is not an authorization to proceed if contract time or amount is affected.

SUBCONTRACTORS AND
MAJOR MATERIAL SUPPLIERS LIST



Project: HVAC Modifications
Ravenna City Schools
To (A/E):

From (Contractor):
Date:
A/E Project Number: 221119.00
Contract For:

List Subcontractors and Major Material Suppliers proposed for use on this Project as required by the Construction Documents. Attach supplemental sheets if necessary.

Section Number	Section Title	Firm	Address	Phone Number (Fax Number)	Contact
-------------------	------------------	------	---------	------------------------------	---------

Attachments

Signed by: Date:
Copies: Owner Consultants _____ File

SECTION 01 32 00 - CONSTRUCTION PROGRESS DOCUMENTATION

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes administrative and procedural requirements for documenting progress of construction during performance of Work, including following:
 - 1. Startup Construction Schedule.
 - 2. Contractor's Construction Schedule.
 - 3. Construction schedule updating reports.
 - 4. Daily construction reports.
 - 5. Material location reports.
 - 6. Site condition reports.
 - 7. Use of site plan.
- B. Related Sections include following:
 - 1. Division 01 Section "Payment Procedures" for submitting Schedule of Values.
 - 2. Division 01 Section "Project Management and Coordination" for submitting and distributing meeting and conference minutes.
 - 3. Division 01 Section "Submittal Procedures" for submitting schedules and reports.

1.2 SUBMITTALS

- A. Format for Submittals: Submit required submittals in following format:
 - 1. PDF electronic file.
- B. Startup Construction Schedule
- C. Contractor's Construction Schedule: Submit copies of schedule, large enough to show entire schedule for entire construction period.
- D. Construction Schedule Updating Reports: Submit with Applications for Payment.
- E. Daily Construction Reports: Submit at weekly intervals.
- F. Material Location Reports: Submit at weekly intervals.
- G. Field Condition Reports: Submit at time of discovery of differing conditions.
- H. Unusual Reports: Submit at time of unusual event.

1.3 STARTUP CONSTRUCTION SCHEDULE

- A. Gantt-Chart Schedule: Submit startup horizontal Gantt-type construction schedule within seven days of date established for the Notice to Proceed.
- B. Preparation: Indicate each significant construction activity separately. Identify first workday of each week with continuous vertical line. Outline significant construction activities for first 30 days of construction. Include skeleton diagram for the remainder of the work and a cash requirement prediction based on indicated activities.

1.4 CONTRACTOR'S CONSTRUCTION SCHEDULE (GANTT CHART)

- A. Gantt-Chart Schedule: Submit a comprehensive, fully developed, horizontal Gantt-chart-type, Contractor's Construction Schedule within 30 days of date established for Notice to Proceed. Base schedule on Division 01 Section "Summary" article "Contractor's Construction Sequence".

- B. Preparation: Indicate each significant construction activity separately. Identify first workday of each week with a continuous vertical line.
 - 1. For construction activities that require 3 months or longer to complete, indicate an estimated completion percentage in 10 percent increments within time bar.
- C. Contractor's Construction Schedule Updated: At monthly intervals, update schedule to reflect actual construction progress and activities.
 - 1. Revise schedule immediately after each meeting.

1.5 REPORTS

- A. Daily Construction Reports: Prepare a daily construction report recording following information concerning events at Project site:
 - 1. List of subcontractors at Project site.
 - 2. Approximate count of personnel at Project site.
 - 3. Equipment at Project site.
 - 4. Material deliveries.
 - 5. High and low temperatures and general weather conditions.
 - 6. Accidents.
 - 7. Meetings and significant decisions.
 - 8. Unusual events (refer to special reports).
 - 9. Stoppages, delays, shortages, and losses.
 - 10. Emergency procedures.
 - 11. Orders and requests of authorities having jurisdiction.
 - 12. Change Orders received and implemented.
 - 13. Construction Change Directives received and implemented.
 - 14. Services connected and disconnected.
 - 15. Equipment or system tests and startups.
 - 16. Partial Completions and occupancies.
 - 17. Substantial Completions authorized.
- B. Material Location Reports: At monthly intervals, prepare and submit a comprehensive list of materials delivered to and stored at Project site. List shall be cumulative, showing materials previously reported plus items recently delivered. Include with list a statement of progress on and delivery dates for materials or items of equipment fabricated or stored away from Project site. Indicate the following categories for stored materials:
 - 1. Material stored prior to previous report and remaining in storage.
 - 2. Material stored prior to previous report and since removed from storage and installed.
 - 3. Materials stored following previous report and remaining in storage.
- C. Site Condition Reports: Immediately on discovery of a difference between field conditions and Contract Documents, prepare and submit a detailed report. Submit with a request for interpretation. Include a detailed description of differing conditions, together with recommendations for changing Contract Documents.

1.6 PROJECT USE OF SITE PLAN

- A. Contractor shall confine operations at site to areas within areas indicated and as approved on use of site plan, and as permitted by law, ordinances, and permits. Site shall not be unreasonably encumbered with materials, products, or construction equipment.
- B. Contractor in reviewing his use of site shall include access to proposed building for construction purposes, storage of materials and products, parking, where possible, for employees, temporary facilities including offices, storage, and workshop sheds or portable trailers, and unloading space.
 - 1. Indicate staff and student access routes; zoning of building areas; temporary exists to eliminate dead-end corridors during construction.

- a. Indicate how mechanical systems air handling units are zoned and ductwork routed, so construction can be isolated without affecting air distribution in occupied areas.
 - b. Indicate routing of existing electrical feeders and switchgear to ensure occupied spaces have continuous power sourcing.
 - c. Indicate where temporary partitions will be used to protect students.
 - d. Designate staging areas protected from students and public.
- C. Where a temporary fence is indicated to be provided, Contractor shall show any additional area needed in Contractor's use of site beyond that which may be indicated on Drawings. Where additional fencing is required, such fencing shall be included at no additional cost to Owner.
 - 1. Construction fencing to separate areas from students, staff and visitors.
- D. Owner will indicate which portions of existing parking lot and nonpaved areas can be used for construction activities. Damage to existing parking lot or unpaved areas shall be paid for by Contractor responsible for damage.

PART 2 - PRODUCTS – NOT USED

PART 3 - EXECUTION

3.1 CONTRACTOR'S CONSTRUCTION SCHEDULE

- A. Contractor's Construction Schedule Updating: At monthly intervals, update schedule to reflect actual construction progress and activities. Issue schedule one week before each regularly scheduled progress meeting.
 - 1. Revise schedule immediately after each meeting or other activity where revisions have been recognized or made. Issue updated schedule concurrently with report of each such meeting.
 - 2. Include a report with updated schedule that indicates every change, including, but not limited to, changes in logic, durations, actual starts and finishes, and activity durations.
 - 3. As Work progresses, indicate Actual Completion percentage for each activity.
- B. Distribution: Distribute copies of approved schedule to A/E, Owner, separate contractors, testing and inspecting agencies, and other parties identified by Contractor with a need-to-know schedule responsibility.
 - 1. Post copies in Project meeting rooms and temporary field offices.
 - 2. When revisions are made, distribute updated schedules to same parties and post in same locations. Delete parties from distribution when they have completed their assigned portion of Work and are no longer involved in performance of construction activities.

END OF SECTION 01 32 00

SECTION 01 33 00 - SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes requirements for submittal schedule and administrative and procedural requirements for submitting Shop Drawings, Product Data, Samples, and other submittals.
- B. Section Includes:
 - 1. Submittal schedule requirements.
 - 2. Administrative and procedural requirements for submittals.
- C. Related Sections:
 - 1. Division 01 Section "Payment Procedures" for submitting Applications for Payment and schedule of values.
 - 2. Division 01 Section "Project Management and Coordination" for submitting and distributing meeting and conference minutes.
 - 3. Division 01 Section "Construction Progress Documentation" for submitting schedules and reports, including Contractor's construction schedule.
 - 4. Division 01 Section "Closeout Procedures" for closeout submittals.

1.2 DEFINITIONS

- A. Action Submittals: Written and graphic information and physical samples that require A/E's responsive action. Action submittals are those Submittals indicated in individual specification sections as "Action Submittals".
- B. Informational Submittals: Written and graphic information and physical samples that do not require A/E's responsive action. Submittals may be rejected for not complying with requirements. Information Submittals are those submittals indicated in individual Specification Sections as "Quality Assurance/Control Submittals" or "Informational Submittals".
- C. Closeout Submittals: Written and graphic information and physical extra stock items required at or near completion of a project. Requirements for these submittals are included in the General Conditions of the contract and Division 01 Section "Closeout Procedures".
- D. File Transfer Protocol (FTP): Communications protocol that enables transfer of files to and from another computer over a network and that serves as basis for standard Internet protocols. An FTP site is a portion of a network located outside of network firewalls within which internal and external users are able to access files.
- E. Portable Document Format (PDF): An open standard file format licensed by Adobe Systems used for representing documents in a device-independent and display resolution-independent fixed-layout document format.

1.3 SUBMITTAL ADMINISTRATIVE REQUIREMENTS

- A. A/E's Digital Data Files: Electronic copies of CAD Drawings of Contract Drawings may be provided by A/E for Contractor's use in preparing submittals.
 - 1. A/E may furnish Contractor one set of digital data drawing files of Contract Drawings for use in preparing Shop Drawings and Project Record Drawings.
 - a. A/E makes no representations as to accuracy or completeness of digital data drawing files as they relate to Contract Drawings and Project Record Drawings.
 - b. Contractor shall execute a data licensing agreement in form of AIA Document C106, Digital Data Licensing Agreement.
- B. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.

1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
 2. Submit all submittal items required for each Specification Section concurrently unless partial submittals for portions of Work are indicated on approved submittal schedule.
 3. Submit action submittals and informational submittals required by same Specification Section as separate packages under separate transmittals.
 4. Coordinate transmittal of different types of submittals for related parts of Work so processing will not be delayed because of need to review submittals concurrently for coordination.
 - a. Where submission of samples, shop drawings, or other items are required from suppliers or subcontractors, it shall be responsibility of Contractor for whom subcontractor is executing Work to see that submittal items required are complete and properly submitted, and corrected and resubmitted on time and in order required so as not to delay progress of Work. Submittals shall be made through Contractor. Submittals shall include sufficient detail to determine that contractor clearly understands requirements of Contract Documents.
 - b. Contractors on this Project shall provide submittals in accordance with requirements of this Section. Where a submittal is required by a Contractor but assistance needed from others, Contractors shall participate and cooperate to expedite each submittal. Coordinate preparation and processing of submittals with performance of construction activities.
 - 1) Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
 - c. A/E reserves right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.
- C. Processing Time: Allow time for submittal review, including time for resubmittals, as follows. Time for review shall commence on A/E's receipt of submittal. No extension of Contract Time will be authorized because of failure to transmit submittals enough in advance of Work to permit processing, including resubmittals.
1. Initial Review: Allow 14 days for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required. A/E will advise Contractor when a submittal being processed must be delayed for coordination.
 2. Resubmittal Review: Allow 14 days for review of each resubmittal.
 3. Submittals Not Required: A/E will send a transmittal indicating submittals were "not required for review". All copies of submittals may be disposed of by A/E.
- D. Electronic Submittals: Identify and incorporate information in each electronic submittal file as follows:
1. Assemble complete submittal package into a single bookmarked file with links enabling navigation to each item.
 2. Each submittal shall be transmittal separately and shall cover only as specification section.
 3. Name file with submittal number or other unique identifier, including revision identifier.
 - a. File name shall use project identifier and Specification Section number followed by a decimal point and then a sequential number (e.g., LNHS-061000.01). Resubmittals shall include an alphabetic suffix after another decimal point (e.g., LNHS-061000.01.A).
 4. Provide means for insertion to permanently record Contractor's review and approval markings and action taken by A/E.
 5. Transmittal Form for Electronic Submittals: Use electronic form acceptable to A/E containing following information.
 - a. Project name.
 - b. Date.
 - c. Name and address of A/E.
 - d. Name of Contractor.
 - e. Name of firm or entity that prepared submittal.
 - f. Name of subcontractor, manufacturer and supplier.
 - g. Category and type of submittal
 - h. Submittal purpose and description.
 - i. Number and title of appropriate Specification Section.

- j. Specification paragraph number or drawing designation and generic name for each of multiple items.
 - k. Drawing number and detail references, as appropriate.
 - l. Location(s) where product is to be installed, as appropriate.
 - m. Related physical samples submitted directly.
 - n. Indication of full or partial submittal
 - o. Transmittal number
 - p. Submittal and transmittal distribution record.
 - q. Remarks.
 - r. Other necessary identification.
- 6. Include following information as keywords in electronic file metadata:
 - a. Project name.
 - b. Number and title of appropriate Specification Section.
 - c. Manufacturer name.
 - d. Product name.
- E. Options: Identify options requiring selection by A/E.
- F. Deviations and Additional Information: On an attached separate sheet, prepared on Contractor's Letterhead, record relevant information, requests for data, revisions other than those requested by A/E on previous submittals, and deviations from requirements in Contract Documents, including minor variations and limitations. Include same identification information as related submittals.
- G. Resubmittals: Make resubmittals in same form and number of copies as initial submittal.
 - 1. Note date and content of previous submittal.
 - 2. Note date and content of revision in label or title block and clearly indicate extent of revision.
 - 3. Resubmit submittals until they are marked with approval notation from A/E's action stamp.
- H. Distribution: Furnish copies of final submittals to manufacturers, subcontractors, suppliers, fabricators, installers, authorities having jurisdiction, and others as necessary for performance of construction activities. Show distribution on transmittal forms.
- I. Use for Construction: Use only final submittals that are marked "No Exceptions Taken" or "Note Markings" from A/E's action stamp.

PART 2 - PRODUCTS

2.1 SUBMITTAL PROCEDURES, GENERAL

- A. General Submittal Procedure Requirements: Prepare and submit submittals required by individual Specification Sections. Types of submittals are indicated in individual Specification Sections. Submit electronic submittals in one of following formats as agreed upon in Preconstruction Conference.
 - 1. Submit electronic submittals via email as PDF electronic files.
 - a. A/E will return annotated file. Annotate and retain one copy of file as an electronic Project record document file.
 - 2. Closeout Submittals and Maintenance Material Submittals: Comply with requirements specified in Division 01 Section "Closeout Procedures."
 - 3. Certificates and Certifications Submittals: Provide a statement that includes signature of entity responsible for preparing certification. Certificates and certifications shall be signed by an officer or other individual authorized to sign documents on behalf of that entity.
 - a. Provide a digital signature with digital certificate on electronically-submitted certificates and certifications where indicated.
 - b. Provide a notarized statement on original paper copy certificates and certifications where indicated.

- B. Electronic submittals will only be accepted in an unchangeable electronic format such as pdf. File formats such as MS Word, MS Excel, AutoCAD dwg or dxf, are considered unacceptable as original file submitted could be accidentally altered from originator's intended document. These file types will be rejected by A/E.
- C. Fanning Howey File Transfer Site (Newforma Info Exchange): This shall be the primary means of electronic submittals for the Project. The Info Exchange Project website does not have file size restrictions. External team members will be added to the Project Team and are granted access to the Fanning Howey Newforma Info Exchange project website. Invitations will be emailed to external team members for setting-up login information. Once access is gained, external team members will be able to upload submittals and check status of pending submittals.
 - 1. Info Exchange Submittals are sent to A/E via.04submittal@fanninghowey.com
 - a. E-mails sent directly to Fanning Howey staff will be rejected.
 - 2. Transmittal is required as stated hereinbefore.
 - 3. A Newforma Info Exchange submittal should only include a single submittal and PDF file per Specification Section.

2.2 ACTION SUBMITTALS

- A. General: Prepare and submit Action Submittals required by individual specification sections.
- B. Product Data: Collect information 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 applicable information. Contractor must annotate information. Highlighting choices or striking out products or options not required is acceptable. Product data unmarked by Contractor may be returned unreviewed by A/E. Include following information, as applicable:
 - a. Manufacturer's product specifications
 - b. Manufacturer's installation instructions
 - c. Standard color charts
 - d. Manufacturer's catalog cuts
 - e. Compliance with specified trade association standards.
 - f. Compliance with recognized testing agency standards.
 - g. Application of testing agency labels and seals.
 - h. Notation of dimensions verified by field measurement.
 - i. Notation of coordination requirements.
 - j. Availability and delivery time information.
 - 2. For equipment, include following in addition to above, as applicable.
 - a. Wiring diagrams showing factory-installed wiring.
 - b. Printed performance curves.
 - c. Operational range diagrams.
 - d. Clearances required to other construction, if not indicated on accompanying shop drawings.
 - 3. Do not submit Product Data until compliance with requirements of Contract Documents has been confirmed. Submit before or concurrent with Samples and Shop Drawings.
 - a. Preliminary Submittal: Submit a preliminary single copy of Product Data where selection of options is required.
 - 4. Distribution: Furnish copies of final submittal to installers, subcontractors, suppliers, manufacturers, fabricators, and others required for performance of construction activities. Show distribution on transmittal forms.
 - a. Do not proceed with installation until a copy of Product Data is in Installer's possession.
 - b. Do not permit use of unsubmitted copies of Product Data in connection with construction.

5. In compliance with OSHA Hazard Communication Standard (1910.1200, 08-24-1987) Contractors shall post at site MSDS (Material Safety Data Sheets) for ALL products classified as hazardous that their firm has knowledge that they will be furnishing, using, or storing on jobsite during duration of this Project in accordance with OSHA standards. At completion of project, Contractor shall turn their "MSDS" information directly over to Owner with a receipt for Owner to sign. A copy of signed receipt only shall be submitted to A/E.
 - a. Material Safety Data Sheets (MSDS) shall not be submitted to A/E for review. Material Safety Data Sheets submitted to A/E will be removed or crossed out with no action taken.
 6. Submit product data in following format:
 - a. PDF electronic file.
- C. Shop Drawings: Prepare project specific information, drawn accurately to scale. Do not base shop drawings on reproductions of Contract Documents or standard printed data, unless submittal based on A/E's digital data drawing files is otherwise permitted.
1. Contractor shall perform no portion of Work requiring submittal and review of shop drawings, product data, samples or similar submittals until A/E has approved respective submittal. Such Work shall be in accordance with approved submittals.
 2. Submit newly prepared information drawn accurately to scale. Highlight, encircle, or otherwise indicate deviations from Contract Documents. Do not reproduce Contract Documents or copy standard information as basis of Shop Drawings. Standard information prepared without specific reference to Project is not a Shop Drawing.
 3. Shop drawings are drawings, diagrams, illustrations, schedules, performance charts, brochures, and other data that are prepared by Contractor or subcontractor, manufacturer, supplier, or distributor to illustrate some portion of Work. Do not base shop drawings on reproduction of Contract Documents.
 - a. Advertising brochures will not be accepted as shop drawings.
 - b. Erection and setting drawings as referred to in these Specifications will be considered as shop drawings and shall be submitted along with detailed shop drawings.
 - c. Where schedules are required to indicate locations, they shall be submitted as part of shop drawings package for that item.
 - d. Shop drawings and schedules shall repeat identification shown on Contract Drawings.
 - e. Contractor shall check all shop drawings, samples and other submittals and submit them to A/E utilizing a Transmittal Form, giving his approval and/or comments and suggestions. Failure to use a Transmittal Form will result in submittals being returned "without action".
 - f. Preparation: Fully illustrate requirements in the Contract Documents. Include the following information as applicable:
 - 1) Identification of products and materials included by sheet and detail number
 - 2) Compliance with specified standards
 - 3) Notation of coordination requirements
 - 4) Notation of dimensions established by field measurements
 - 5) Fabrication and installation drawings
 - 6) Roughing-in and setting diagrams
 - 7) Wiring diagrams showing field installed wiring, including power, signal, and control wiring
 - 8) Shop work manufacturing instructions
 - 9) Templates and patterns
 - 10) Schedules
 - 11) Design calculations
 - 12) Seal and signature of professional engineer, if specified.
 - 13) Relationship and attachment to adjoining construction clearly indicated.
 4. Preparation of Submittals: Provide permanent marking on each submittal to identify project, date, Contractor, Subcontractor, submittal name, and similar information to distinguish it from other submittals. Show Contractor's executed review and approval marking and provide space for A/E's "action" marking. Package each submittal appropriately for transmittal and handling.

5. By approving and submitting shop drawings, Contractor thereby represents that they have determined and verified field measurements, field construction criteria, materials, catalog numbers, and similar data, and that they have checked and coordinated each shop drawing with requirements of Work and of Contract Documents prior to submitting to A/E.
 6. Contractor shall make corrections required by A/E and shall resubmit shop drawings until appropriately marked. Contractor shall direct specific attention in writing or on resubmitted shop drawings to revisions other than corrections requested by A/E on previous submissions.
 7. A/E will review shop drawings only for conformance with design concept of Project and with information given in Contract Documents. A/E's review of a separate item shall not indicate review of an assembly in which item functions.
 8. A/E's review of shop drawings shall not relieve Contractor of responsibility for any deviation from requirements of Contract Documents unless Contractor has informed A/E in writing of such deviation at time of submission and A/E has given written approval to specific deviation, nor shall A/E's action relieve Contractor from responsibility for errors or omissions in shop drawings.
 - a. A/E's review of such submittals is not conducted for purpose of determining accuracy and completeness of other details such as dimensions and qualities, or for substantiating instructions or performance of equipment or systems, all of which remain responsibility of Contractor as required by Contract Documents. A/E's review shall not constitute approval of safety precautions or, unless orwise specifically stated by A/E, of any construction means, methods, techniques, sequences, or procedures. A/E's approval of a specific item shall not indicate approval of an assembly of which it is a component.
 9. Notations and remarks added to shop drawings by A/E are to ensure compliance to Drawings and Specifications and do not imply a requested or approved change to contract cost.
 10. Should deviations, discrepancies, or conflicts between shop and contract drawings and Specifications be discovered, either prior to or after review, Contract Documents shall control and be followed.
 11. Submit shop drawings in following format:
 - a. PDF electronic file.
 12. Where resubmittal is required, submit same number of copies as initial submittal.
 13. Shop drawings not requested by A/E shall be returned without action.
- D. Samples for Initial Selection: Prepare physical units of materials or products, including following:
1. Contractor shall submit to A/E samples to illustrate materials or workmanship, colors, and textures, and establish standards by which Work will be judged.
 - a. Transmit samples that contain multiple, related components such as accessories together in one submittal package.
 2. Provide corresponding electronic submittal of sample transmittal, digital image file illustrating sample characteristics, and identification information for record.
 3. Identification: Attach label on unexposed side of samples that includes following:
 - a. Generic description of sample.
 - b. Product name and name of manufacturer.
 - c. Sample source.
 - d. Number and title of applicable specification section.
 4. Samples for Initial Selection: Submit manufacturer's color published charts consisting of units or sections of units showing full range of colors, textures, and patterns available. Reproductions, facsimiles, or copies will be rejected.
 - a. Number of Samples for Initial Selection: Submit two full sets of available choices where color, pattern, texture, or similar characteristics are required to be selected from manufacturer's product line, unless otherwise noted.

2.3 INFORMATIONAL/QUALITY ASSURANCE/CONTROL SUBMITTALS

- A. General: Prepare and submit informational submittals required by other Specification Sections.

- B. Samples for Verification: Submit full size units or Samples of size indicted, prepared from same material to be used for Work, cured and finished in manner specified, and physically identical with material or product proposed fur use, and that show full range of color and texture variations expected. Sample include, but are not limited to, following: partial sections of manufactured or fabricated components, small cuts or containers of materials, complete units of repetitively used materials; swatches showing color, texture, and pattern; color range sets, and components used for independent testing and inspection.
1. Number of Samples for Verification: Submit 3 sets of samples. A/E will retain sample sets, unless otherwise noted.
 - a. Contractor shall receive written notification.
 2. Provide corresponding electronic submittal of sample transmittal, digital image file illustrating sample characteristics, and identification information for record.
 3. Disposition: Maintain sets of approved samples at project site, available for quality control comparisons throughout course of construction activity. Sample sets may be used to determine final acceptance of construction associated with each set.
 - a. Samples that may be incorporated into Work are indicated in individual Specification Sections. Such samples must be in an undamaged condition at time of use.
 - b. Samples not incorporated into Work, or otherwise designated as Owner's property, are property of Contractor.
 4. Identification: Permanently attach label on unexposed side of Samples that include following:
 - a. Product name and submittal number.
 - b. Generic description of sample.
 - c. Product name and name of manufacturer.
 - d. Sample source.
 - e. Number and title of applicable Specification Section.
 - f. Specification paragraph number and generic name of each item.
 5. Materials shall not be ordered until final review is received in writing from A/E. Materials shall be furnished, equal in every respect to reviewed samples. Where color or shade cannot be guaranteed, manufacturer shall indicate maximum deviation. Work shall be in accordance with final reviewed samples.
- C. Qualification Data: Prepare written information that demonstrates capabilities and experience of firm or person. Include lists of completed projects with project names and addresses, names and addresses of A/E's and Owners, and other information specified.
- D. Design Data: Prepare written and graphic information, including, but not limited to, performance and design criteria, list of applicable codes and regulations, and calculations. Include list of assumption and other performance and design criteria and a summary of loads. Include load diagrams if applicable. Provide name and version of software, if any, used for calculations. Include page numbers.
- E. Certificates:
1. Certificates and Certification Submittals: Submit a statement that includes signature of entity responsible for preparing certification. Certificates and certifications shall be signed by an officer or other individual authorized to sign documents on behalf of that entity. Provide a notarized signature where indicated.
 2. Product Certificates: Prepare written statements on manufacturer's letterhead certifying that product complies with requirements.
 3. Installer Certificates: Prepare written statements on manufacturer's letterhead certifying that Installer complies with requirements in Contract Documents and, where required, is authorized for this specific project.
 4. Manufacturer Certificates: Prepare written statements on manufacturer's letterhead certifying that manufacturer complies with requirements. Include evidence of manufacturing experience where required.
 5. Material Certificates: Prepare written statements on manufacturer's letterhead certifying that material complies with requirements.

- F. Test and Research Reports
1. Material Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements.
 2. Preconstruction Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of tests performed before installation of product, for compliance with performance requirements.
 3. Compatibility Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of compatibility tests performed before installation of product. Include written recommendations for primers and substrate preparation needed for adhesion.
 4. Field Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of field tests performed either during installation of product or after product is installed in its final location, for compliance with requirements.
 5. Product Test Reports: Prepare written reports indicating current product produced by manufacturer complies with requirements. Base reports on evaluation of tests performed by manufacturer and witnessed by a qualified testing agency, or on comprehensive tests performed by a qualified testing agency.
 - a. Test reports shall be no older than 15 months, unless otherwise noted or approved by A/E.
- G. Manufacturer's Instructions: Prepare written or published information that documents manufacturer's recommendations, guidelines, and procedures for installing or operating a product or equipment. Include name of product and name, address, and telephone number of manufacturer. Include following, as applicable:
1. Preparation of substrates
 2. Required substrate tolerances
 3. Sequence of installation or erection
 4. Required installation tolerances
 5. Required adjustments
 6. Recommendations for cleaning and protection
- H. Manufacturer's Field Reports: Prepare written information documenting factory authorized service representative's tests and inspections. Include following, as applicable:
1. Name, address, and telephone number of factory authorized service representative making report.
 2. Statement on condition of substrates and their acceptability for installation of product.
 3. Statement that products at project site comply with requirements.
 4. Summary of installation procedures being followed, whether they comply with requirements and, if not, what corrective action was taken.
 5. Results of operational and other tests and a statement of whether observed performance complies with requirements.
 6. Statement whether conditions, products, and installation will affect warranty.
 7. Other required items indicated in individual Specification Sections.
- I. Material Safety Data Sheets (MSDSs) or Safety Data Sheets (SDS): Submit information directly to Owner; do not submit to A/E.
1. This information relates directly to construction safety, which is sole responsibility of Contractor.
 2. MSDS or SDS shall not be submitted to A/E for review.
 3. MSDS or SDS submitted to A/E will be either removed or crossed out of submittal with no action taken.
- J. Contractor's Construction Schedule: Comply with requirements specified in Division 01 Section "Construction Progress Documentation."
- K. Application for Payment: Comply with requirements specified in Division 01 Section "Payment Procedures."

- L. Schedule of Values: Comply with requirements specified in Division 01 Section "Payment Procedures."
- M. Subcontractors and Major Material Suppliers List: Prepare a written summary identifying individuals or firms proposed for each portion of Work, including those who are to furnish products or equipment fabricated to a special design. Include following information in tabular form:
 - 1. Name, address, and telephone number of entity performing subcontract or supplying products.
 - 2. Number and title of related Specification Section(s) covered by subcontract.
 - 3. Drawing number and detail references, as appropriate, covered by subcontract.
 - 4. Submit subcontract list in following format:
 - a. PDF electronic file.

2.4 CLOSEOUT SUBMITTALS

- A. General: Closeout Submittals are to be submitted with O and M Manuals only. Do not submit with other ACTION and INFORMATIONAL Submittals.
 - 1. Maintenance Data: Prepare written and graphic instructions and procedures for operation and normal maintenance of products and equipment. Comply with requirements in Division 01 Section "Closeout Procedures".

PART 3 - EXECUTION

3.1 CONTRACTOR'S REVIEW

- A. Action and Informational/Quality Assurance/Control Submittals: Review each submittal and check for coordination with other Work of Contract and for compliance with Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to A/E.
- B. Project Closeout and Maintenance/Material Submittals: Refer to requirements in Division 01 Section "Closeout Procedures."
- C. Approval Stamp: Stamp each submittal with a uniform, approval stamp. Include Project name and location, submittal number, Specification Section title and number, name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with Contract Documents.

3.2 A/E'S ACTION

- A. General: A/E will not review submittals that do not bear Contractor's approval stamp and will return them without action.
- B. Action Submittals: A/E will review each submittal, make marks to indicate corrections or modifications required, and return it. A/E will stamp each submittal with an action stamp and will mark stamp appropriately to indicate action.
 - 1. Shop drawings will be marked as follows: Contractor shall take following action for each respective marking:
 - a. "NO EXCEPTIONS TAKEN" – Contractor shall make and distribute copies.
 - b. "NOTE MARKINGS" – Final Release; Contractor may proceed with fabrication, taking into account necessary corrections on submittal or attached and with Contract Documents.
 - c. "NOTE MARKINGS/RESUBMIT" - Contractor may proceed with fabrication, taking into account necessary corrections. Corrected shop drawings shall be resubmitted before fabrication of this work is complete to obtain a different action marking. Do not allow drawings marked "Resubmit" to be used in connection with installation of Work.

- d. "REJECTED" - Contractor will be required to resubmit shop drawings in their entirety. No fabrication or installation shall be started until shop drawings so marked have been completely revised, resubmitted, and marked by A/E according to preceding Paragraphs a., b., or c.
- C. Informational/Quality Assurance/Control Submittals: A/E will review each submittal and will not return it, or will return it if it does not comply with requirements. A/E will forward each submittal to appropriate party.
- D. Partial submittals prepared for a portion of Work will be reviewed when use of partial submittals has received prior approval from A/E.
- E. Incomplete submittals are not acceptable, will be considered nonresponsive, and will be returned without review.
- F. Submittals not required by Contract Documents may not be reviewed and may be discarded.

END OF SECTION 01 33 00



AIA[®] Document C106[™] – 2013

Digital Data Licensing Agreement

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

BETWEEN the Party transmitting Digital Data (“Transmitting Party”):
(Name, address and contact information, including electronic addresses)

and the Party receiving the Digital Data (“Receiving Party”):
(Name, address and contact information, including electronic addresses)

for the following Project:
(Name and location or address)

The Transmitting Party and Receiving Party agree as follows.

The Receiving Party agrees not to reuse this Digital Data, in whole or in part, for any purpose other than for the Project. The Receiving Party agrees not to transfer this Digital Data to others without the prior written consent of the Transmitting Party. The Receiving Party further agrees to indemnify and hold the Transmitting Party harmless from any damage, liability or cost (including reasonable attorney fees and the cost of defense) to the extent caused by unauthorized changes to the Digital Data by anyone other than the Transmitting Party or by use of the Digital Data for any other project.

The Receiving Party is aware that differences may exist between the Digital Data delivered and the printed Instruments of Service. In the event of a conflict between the signed or sealed Instruments of Service prepared by the Transmitting Party and the Digital Data, the signed or sealed hard copy Instruments of Service shall govern. The Receiving Party has the responsibility to verify the accuracy of the Digital Data as it pertains to the needs of the Receiving Party on the Project.

TABLE OF ARTICLES

1 GENERAL PROVISIONS

2 TRANSMISSION OF DIGITAL DATA

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

Init.

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3 LICENSE CONDITIONS

4 LICENSING FEE OR OTHER COMPENSATION

5 DIGITAL DATA

ARTICLE 1 GENERAL PROVISIONS

§ 1.1 The purpose of this Agreement is to grant a license from the Transmitting Party to the Receiving Party for the Receiving Party's use of Digital Data on the Project, and to set forth the license terms.

§ 1.2 This Agreement is the entire and integrated agreement between the parties. Except as specifically set forth herein, this Agreement does not create any other contractual relationship between the parties.

§ 1.3 For purposes of this Agreement, the term Digital Data is defined to include only those items identified in Article 5 below.

§ 1.3.1 Confidential Digital Data is defined as Digital Data containing confidential or business proprietary information that the Transmitting Party designates and clearly marks as "confidential."

ARTICLE 2 TRANSMISSION OF DIGITAL DATA

§ 2.1 The Transmitting Party grants to the Receiving Party a nonexclusive limited license to use the Digital Data identified in Article 5 solely and exclusively to perform services for, or construction of, the Project in accordance with the terms and conditions set forth in this Agreement.

§ 2.2 The transmission of Digital Data constitutes a warranty by the Transmitting Party to the Receiving Party that the Transmitting Party is the copyright owner of the Digital Data, or otherwise has permission to transmit the Digital Data to the Receiving Party for its use on the Project in accordance with the terms and conditions of this Agreement.

§ 2.3 If the Transmitting Party transmits Confidential Digital Data, the transmission of such Confidential Digital Data constitutes a warranty to the Receiving Party that the Transmitting Party is authorized to transmit the Confidential Digital Data. If the Receiving Party receives Confidential Digital Data, the Receiving Party shall keep the Confidential Digital Data strictly confidential and shall not disclose it to any other person or entity except as set forth in Section 2.3.1.

§ 2.3.1 The Receiving Party may disclose the Confidential Digital Data as required by law or court order, including a subpoena or other form of compulsory legal process issued by a court or governmental entity. The Receiving Party may also disclose the Confidential Digital Data to its employees, consultants or contractors in order to perform services or work solely and exclusively for the Project, provided those employees, consultants and contractors are subject to the restrictions on the disclosure and use of Confidential Digital Data as set forth in this Agreement.

§ 2.4 The Transmitting Party retains its rights in the Digital Data. By transmitting the Digital Data, the Transmitting Party does not grant to the Receiving Party an assignment of those rights; nor does the Transmitting Party convey to the Receiving Party any right in the software used to generate the Digital Data.

§ 2.5 To the fullest extent permitted by law, the Receiving Party shall indemnify and defend the Transmitting Party from and against all claims arising from or related to the Receiving Party's modification to, or unlicensed use of, the Digital Data.

ARTICLE 3 LICENSE CONDITIONS

The parties agree to the following conditions on the limited license granted in Section 2.1:

(State below rights or restrictions applicable to the Receiving Party's use of the Digital Data, requirements for data format, transmission method or other conditions on data to be transmitted.)

ARTICLE 4 ~~LICENSING FEE OR OTHER COMPENSATION~~

The Receiving Party agrees to pay the Transmitting Party the following fee or other compensation for the Receiving Party's use of the Digital Data:

(State the fee, in dollars, or other method by which the Receiving Party will compensate the Transmitting Party for the Receiving Party's use of the Digital Data.)

ARTICLE 5 DIGITAL DATA

The Parties agree that the following items constitute the Digital Data subject to the license granted in Section 2.1:
(Identify below, in detail, the information created or stored in digital form the parties intend to be subject to this Agreement.)

This Agreement is entered into as of the day and year first written above and will terminate upon Substantial Completion of the Project, as that term is defined in AIA Document A201™–2007, General Conditions of the Contract for Construction, unless otherwise agreed by the parties and set forth below.

(Indicate when this Agreement will terminate, if other than the date of Substantial Completion.)

TRANSMITTING PARTY *(Signature)*

(Printed name and title)

RECEIVING PARTY *(Signature)*

(Printed name and title)

Certification of Document's Authenticity

AIA® Document D401™ – 2003

I, , hereby certify, to the best of my knowledge, information and belief, that I created the attached final document simultaneously with this certification 12:35:32 ET on 11/29/2018 under Order No. 9809616082 from AIA Contract Documents software and that in preparing the attached final document I made no changes to the original text of AIA® Document C106™ - 2013, Digital Data Licensing Agreement, as published by the AIA in its software, other than changes shown in the attached final document by underscoring added text and striking over deleted text.

(Signed)

(Title)

(Dated)

SECTION 01 42 00 - REFERENCES

PART 1 - GENERAL

1.1 DEFINITIONS

- A. General: Basic Contract definitions are included in Conditions of Contract.
- B. "Approved": When used to convey A/E's action on Contractor's submittals, applications, and requests, "approved" is limited to A/E's duties and responsibilities as stated in Conditions of Contract.
- C. "Directed": A command or instruction by A/E. Other terms including "requested," "authorized," "selected," "approved," "required," and "permitted" have same meaning as "directed."
- D. "Indicated": Requirements expressed by graphic representations or in written form on Drawings, in Specifications, and in other Contract Documents. Other terms including "shown," "noted," "scheduled," and "specified" have same meaning as "indicated."
- E. "Regulations": Laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, and rules, conventions, and agreements within construction industry that control performance of Work.
- F. "Furnish": Supply and deliver to Project site, ready for unloading, unpacking, assembly, installation, and similar operations.
- G. "Install": Operations at Project site including unloading, temporarily storing, unpacking, assembling, erecting, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations.
- H. "Provide": Furnish and install, complete and ready for intended use.
- I. "Project Site": Space available for performing construction activities. Extent of Project site is shown on Drawings and may or may not be identical with description of land on which Project is to be built.

1.2 INDUSTRY STANDARDS

- A. Applicability of Standards: Unless Contract Documents include more stringent requirements, applicable construction industry standards have same force and effect as if bound or copied directly into Contract Documents to extent referenced. Such standards are made a part of Contract Documents by reference.
- B. Publication Dates: Comply with standards in effect as of date of Contract Documents, unless otherwise indicated.
- C. Copies of Standards: Each entity engaged in construction on Project should be familiar with industry standards applicable to its construction activity. Copies of applicable standards are not bound with Contract Documents.
 - 1. Where copies of standards are needed to perform a required construction activity, obtain copies directly from publication source.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 42 00

SECTION 01 50 00 - TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.1 SUMMARY

- A. Provide temporary facilities as specified and as indicated on Drawings, in accordance with Contract Documents.
 - 1. Installing and maintain such temporary facilities shall remove from premises temporary work erected at completion of Project, or when requested to do so by A/E. Temporary structures and facilities become property of party furnishing them. Leave premises clean and in acceptable conditions as approved by A/E.

1.2 DEFINITIONS

- A. Permanent Enclosure: As determined by A/E, permanent or temporary roofing is complete, insulated and watertight; exterior walls are insulated and weathertight; and all openings are closed with permanent construction or substantial temporary closures.

1.3 USE CHARGES

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

1.4 INFORMATIONAL/QUALITY ASSURANCE/CONTROL SUBMITTALS

- A. Site Utilization Plan: Show temporary facilities, utility hookups, staging areas, and parking areas for construction personnel vehicle circulation, including construction site entrance.
- B. Fire-Safety Program: Show compliance with requirements of NFPA 241 and authorities having jurisdiction. Indicate Contractor personnel responsible for management of fire-prevention program.

1.5 QUALITY ASSURANCE

- A. Regulations: Comply with industry standards and applicable laws and regulations of authorities having jurisdiction
- B. Standards: Comply with NFPA 241 "Standard for Safeguarding Construction, Alterations, and Demolition Operations", ANSI A10 Series Standards for "Safety Requirements for Construction and Demolition," and NECA Electrical Design Library "Temporary Electrical Facilities".
 - 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.

- D. Accessible Temporary Egress: Comply with applicable provisions in U.S. Architectural and Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines and ICC/ANSI A117.1.

1.6 PROJECT CONDITIONS

- A. 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 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.
- B. Temporary Utilities: Prepare a schedule indicating dates for implementation and termination of each temporary utility. At earliest feasible time, when acceptable to Owner, change over from use of temporary service to use of permanent service.
 - 1. Temporary Use of Permanent Facilities: Installer of each permanent service shall assume responsibility for operation, maintenance, and protection of that permanent service during its use as a construction facility before Owner's acceptance, regardless of previously assigned responsibilities.
- C. Conditions of Use: Following conditions apply to use of temporary services and facilities by all parties engaged in Work:
 - 1. Keep temporary services and facilities clean and neat.
 - 2. Relocate temporary services and facilities as required by progress of work.

PART 2 - PRODUCTS

2.1 MATERIALS

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

2.2 EQUIPMENT

- A. General: Provide new equipment. If acceptable to A/E, Contractor may use undamaged, previously used equipment in serviceable condition. Provide equipment suitable for use intended.
- B. Heating Equipment: Provide vented, self-contained, liquid propane or natural gas or fuel oil heaters with individual space thermostatic control.
 - 1. Burners may be fueled with natural gas, liquid propane, or fuel oil, and they should enable contractor to practically maintain a safe and healthy working environment, with acceptable levels of carbon monoxide. Use of gasoline burning space heaters, open flame heaters, or salamander type heating units is strictly prohibited.
 - 2. Heating Units: Listed and labeled for type of fuel being consumed, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use for type of fuel being consumed.
 - 3. Permanent HVAC System: If Owner authorizes use of permanent HVAC system for temporary use during construction, provide filter with MERV of 8 at each return air grille in system and remove at end of construction.
- C. 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 exposures.
 - 1. Comply with NFPA 10 and NFPA 241 for classification, extinguishing agent, and size required by location and class of fire exposure.
- D. Air Filtration Units: HEPA primary and secondary filter-equipped portable units with four-stage filtration. Provide single switch for emergency shutoff. Configure to run continuously.

2.3 TEMPORARY FACILITIES

- A. Field Offices, General: Prefabricated or mobile units with serviceable finishes, temperature control, and foundations adequate for normal loading.
- B. Storage and Fabrication Sheds: Provide sheds sized, furnished, and equipped to accommodate materials and equipment for construction operations.
 - 1. Store combustible materials apart from building.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Locate facilities where they will serve project adequately and result in minimum interference with performance of Work. Relocate and modify facilities as required.
- B. Provide each facility ready for use when needed to avoid delay. Do not remove until facilities are no longer needed or are replaced by authorized use of completed permanent facilities.

3.2 TEMPORARY UTILITY INSTALLATION

- A. General: Install temporary service or connect to existing services.
 - 1. Arrange with utility company, Owner, and existing users for time where service can be interrupted, if necessary, to make connections for temporary services.
- B. Water Service and Distribution
 - 1. Owner will make provisions for use of existing water facilities at Project site and shall designate location where service will be provided. Contractor shall provide own means of conveying water from designated location, as approved by Owner.
 - a. Owner will pay cost of water used on Project.
- C. Temporary Electric Power
 - 1. Owner will make provisions for use of existing service at Project site and shall designate location where service will be provided. Contractor shall provide own means of extending electrical service from designated location, as approved by Owner. Maintain equipment in condition acceptable to Owner.
 - a. Owner will pay for cost of electrical energy used on Project.
- D. Heating and Cooling, General: Provide temporary heating and cooling required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of low temperatures or high humidity. Select equipment from that specified that will not have a harmful effect on completed installations or elements being installed.
 - 1. Maintain a minimum temperature of 50 degrees F in permanently enclosed portions of building for normal construction activities, and 65 degrees F for finishing activities and areas where finished work has been installed. Maintain a maximum temperature of 90 degrees.
 - 2. Maintain a relative humidity between 30 and 50 percent in permanently enclosed portions of building for normal construction activities.
 - 3. Maintain a healthy working environment with carbon monoxide levels within OSHA guidelines.
- E. Heating System - Existing Building
 - 1. Existing building heating system shall remain "in-service" as much as possible. Owner shall pay for services, maintenance, and fuel for existing facility during construction.
 - 2. In event existing building heating system is specified to be modified, added to, or replaced in part or total, then Contractor shall provide temporary mean suitable to Owner to maintain workable conditions.
 - 3. Isolation of Work Areas in Occupied Facilities: Prevent dust, fumes, and odors from entering occupied areas.

- a. Prior to commencing work, isolate the HVAC system in area where work is to be performed in accordance with approved coordination drawings.
 - 1) Disconnect supply and return ductwork in work area from HVAC systems servicing occupied areas.
 - 2) Maintain negative air pressure within work area using HEPA-equipped air filtration units, starting with commencement of temporary partition construction, and continuing until removal of temporary partitions is complete.
 - b. Perform daily construction cleanup and final cleanup using approved, HEPA-filter-equipped vacuum equipment.
 - 4. Electrical wiring required for temporary heating shall be provided by Contractor from temporary wiring service and Contractor will do permanent wiring to permanent equipment mounted in its permanent location even when used for temporary heating.
- F. Ventilation and Humidity Control - After Building Enclosure
 - 1. Provide and pay for ventilation and humidity control of enclosed space for workmen in accordance with applicable laws. Provide ventilation, air conditioning, and humidity control of enclosed space as required to facilitate drying of plaster, poured decks and floors, or other materials requiring ventilation in accordance with manufacturer's directions and as required to attain proper moisture levels within building including materials, surfaces and ambient air for installation and application of interior materials and equipment. Provide temporary ventilation and humidity control to protect installed construction from adverse effects of high humidity. Select equipment that will not have a harmful effect on completed installations or elements being installed. Coordinate ventilation requirements to produce ambient condition required and minimize energy consumption.
 - 2. If permanent ventilation and air conditioning system is used, assume full responsibility for maintenance of permanent equipment and shall keep system clean, furnish and change filters as needed, and turn complete new heating-ventilation system over to Owner in a clean condition when project is completed. Permanent equipment shall not be used for temporary ventilation unless maintained and operated as follows:
 - a. Return air ducts shall not be used.
 - b. Supply air to each unit shall be filtered.
 - c. Filters shall be constantly checked and changed when necessary.
 - d. Operation of permanent equipment for ventilation shall not negate Owner's one year warranty specified to commence on date of Substantial Completion.
- G. Temporary Telephones: Use of Wifi cell phone system is acceptable, if can be maintained.
- H. Electronic Communication Service: Contractor shall provide temporary electronic communication service, including electronic mail, in common use facilities. Provide secure Wifi wireless connection to internet with provisions for access by A/E
 - 1. Provide a T-1 line, cable or DSL in primary field office.
- I. Temporary Toilet Facilities
 - 1. Provide, at beginning of Work, and shall maintain an approved chemical type toilet as required by law and in quantity needed for proper servicing of Project. Temporary toilets shall be for use by trades on job. Place in an approved location.
 - a. Provide toilet tissue and similar disposable materials for each facility.

3.3 SUPPORT FACILITIES INSTALLATION

- A. General: Comply with following:
 - 1. Provide construction for temporary offices, shops, and sheds located within construction area or within 30 feet of building lines that is noncombustible according to ASTM E 136. Comply with NFPA 241.
- B. Field Offices and Storage Sheds
 - 1. Not required. Approval of Contractor and Owner is required if subcontractor wishes to provide a construction office for his own use.

2. Mobile offices or storage facilities may be supplied by subcontractors, if approved by A/E. Remove from and clean premises when directed by A/E.
 3. No signs will be allowed to be erected on site or on building unless approved by Owner.
- C. Temporary Roads and Paving
1. Existing drives and parking areas as indicated on Drawings and as directed by Owner, shall be used as access drives, staging, and parking areas for construction.
 - a. Contractor shall be held responsible for damage to existing surfaces resulting from operations relative to Work being performed under this Contract; and shall repair damaged areas to their original condition, as approved by A/E, at no additional cost to Owner.
- D. Traffic Controls: Comply with requirements of authorities having jurisdiction.
1. Protect existing site improvements to remain including curbs, pavement, and utilities.
 2. Maintain access for fire fighting equipment and access to fire hydrants.
- E. Parking: Use designated areas of Owner's existing parking areas for construction personnel.
- F. Dewatering Facilities and Drain: Comply with requirements of authorities having jurisdiction. Maintain Project site, excavations, and construction free of water.
1. Dispose of rainwater in a lawful manner that will not result in flooding Project or adjoining properties or endanger permanent work or temporary facilities.
- G. Project Signs: Unauthorized signs are not permitted.
1. Temporary Signs: Provide signs as required to inform public and individuals seeking entrance to Project.
 - a. Provide temporary, directional signs for construction personnel and visitors.
- H. Waste Disposal Services
1. Contractor shall provide (for life of Project) and pay for dumpster type rubbish container adequately sized for waste, debris, and rubbish generated.
 - a. Contractor shall dispose of container contents weekly or at more frequent intervals if required by inadequate container capacity.
 - b. Shall erect suitable, closed, relatively dust free chutes for use by all trades during demolition and remodeling. No material or debris will be permitted to drop free.
 2. 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 7 days during normal weather or 3 days when temperature is expected to rise above 80 degrees F. Handle hazardous, dangerous, or unsanitary waste materials separately from other waste by containerizing properly. Dispose of material lawfully.
- I. Existing Elevator Use: Use of Owner's existing elevators will be permitted, provided elevators are cleaned and maintained in a condition acceptable to Owner. At Substantial Completion, restore elevators to condition existing before use.
- J. Existing Stair Usage: Use of Owner's existing stairs will be permitted, provided stairs are cleaned and maintained in a condition acceptable to Owner. At Substantial Completion, restore stairs to condition existing before initial use.
1. Provide protective coverings, barriers, devices, signs, or other procedures to protect stairs and to maintain means of egress. If stairs become damaged, restore damage areas so no evidence remains of correction work.
- K. Temporary First Aid Facilities
1. Contractor and subcontractor shall provide first aid facilities as required by federal, state, county, and municipal safety regulations.

3.4 SECURITY AND PROTECTION FACILITIES

- A. Temporary Enclosures
 - 1. Provide temporary enclosures for protection of construction, in progress and completed, from exposure, foul weather, other construction operations, and similar activities. Provide temporary weathertight enclosure for building exterior.
 - 2. Maintain required exitways for protection of life and property.
- B. Temporary Fire Protection: Install and maintain temporary fire-protection facilities of types needed to protect against reasonably predictable and controllable fire losses. Comply with NFPA 241; manage fire-prevention program.
 - 1. Prohibit smoking in construction areas. Comply with additional limits on smoking specified in other sections.
 - 2. Supervise welding operations, combustion-type temporary heating units, and similar sources of fire ignition according to requirements of authorities having jurisdiction.
 - 3. Develop and supervise an overall fire-prevention and -protection program for personnel at Project site. Review needs with local fire department and establish procedures to be followed. Instruct personnel in methods and procedures. Post warnings and information.
- C. Safety and Health Regulations for Construction
 - 1. These Construction Documents and construction hereby contemplated shall be governed by applicable provisions of Federal, State and local regulations for construction safety in State in which project is located.
 - a. Contractor shall be responsible for safety and health of persons and property affected by Contractor's performance of Work including work performed by his subcontractors. This requirement shall apply continuously during entire contract period and shall not be limited to normal working hours.
 - b. Contractor shall designate a qualified safety and health representative to be responsible for administration of Contractor's Safety and Health program.
 - 2. Contractor shall be responsible for compliance with above aforesaid safety and health regulations for construction as applicable to Contractor's Contract and Contractor's construction means and methods. Contractor shall be liable for violations as may be cited or charged against Contractor by authorities governing safety and health regulations for construction.
 - a. A/E and Owner shall not be responsible for construction means and methods and shall not be responsible for construction safety.
 - 3. Barricades
 - a. Contractor shall provide and pay for temporary construction barricades as required for safety and security for his specified portion of Work.
 - 1) Erect barricades as required by applicable laws at slab edges, slab openings, and other building hazards.
 - 4. Where appropriate and needed, provide lighting, including flashing red or amber lights.
- D. Environmental Protection
 - 1. In order to prevent and to provide for abatement and control of environmental pollution arising from construction activities of Contractor and his subcontractors in performance of this Contract, they shall comply with applicable federal, state, and local laws, and regulations concerning environmental pollution control and abatement as well as specific requirements stated elsewhere in Contract Documents.
 - 2. No Contractor shall pollute water resources with fuels, oils, bitumen, calcium chloride, acids or harmful materials. It is responsibility of each Contractor to investigate and comply with applicable federal, state, county, and municipal laws concerning pollution of rivers and streams.
 - 3. Contractor will be required to minimize dispersed dust at required excavations, embankments, stockpiles, haul roads, permanent access roads, plant sites, waste areas, borrow areas, and other work areas on or off site to minimize dispersed dust.

- E. Security Enclosure and Lockup
 - 1. Install substantial temporary doors or enclosure of partially completed areas of construction. Provide locking entrances to prevent unauthorized entrance, vandalism, theft, and similar violations of security. Cost to be included in Contractor's Base bid.
 - a. Storage: Where materials and equipment must be stored, and are of value or attractive for theft, provide a secure lockup.
- F. Barricades, Warning Signs, and Lights: Comply with requirements of authorities having jurisdiction for erecting structurally adequate barricades, including warning signs and lighting.
- G. Utility Protection
 - 1. Existing utility lines and structures indicated or known, and utility lines constructed for this Project shall be protected from damage during construction operations.

3.5 OPERATION, TERMINATION, AND REMOVAL

- A. Supervision: Enforce strict discipline in use of temporary facilities. To minimize waste and abuse, limit availability of temporary facilities to essential and intended uses.
- B. Maintenance: Maintain facilities in good operating condition until removal. Protect from damage caused 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. Prevent water filled piping from freezing. Maintain markers for underground lines. Protect from damage during excavation operations.
- C. Temporary Facility Changeover: Except for using permanent fire protection as soon as available, do not change over from using temporary security and protection facilities to permanent facilities until Substantial Completion.
- D. Termination and Removal: Remove each temporary facility when need for its service has ended, when it has been replaced by authorized use of a permanent facility, or no later than Substantial Completion. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with temporary facility. Repair damaged work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.
 - 1. Materials and facilities that constitute temporary facilities are property of Contractor.
 - 2. At Substantial Completion, clean and renovate permanent facilities used during construction period. Comply with final cleaning requirements in Division 01 Section "Closeout Procedures".

END OF SECTION 01 50 00

SECTION 01 60 00 - PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes administrative and procedural requirements for selection of products for use in Project; product delivery, storage, and handling; manufacturers' standard warranties on products; special warranties; product substitutions; and comparable products.
 - 1. It is intent of Specifications and Drawings to accomplish a complete and first-grade installation executed by competent and experienced workmen.
 - 2. Equipment, specialties, and similar items shall be checked for compliance and approved prior to installation. Contractors are cautioned that work or equipment installed without approval is subject to condemnation, removal, and subsequent replacement with an approved item without extra remuneration.
- B. Related Sections include following:
 - 1. Division 01 Section "Allowances" for products selected under an allowance.
 - 2. Division 01 Section "References" for applicable industry standards for products specified.
 - 3. Division 01 Section "Closeout Procedures" for submitting warranties for Contract closeout.
 - 4. Divisions 02 through 49 Sections for specific requirements for warranties on products and installations specified to be warranted.

1.2 DEFINITIONS

- A. Products: Items purchased for incorporating into Work, whether purchased for Project or taken from previously purchased stock. Term "product" includes terms "material," "equipment," "system," and terms of similar intent.
 - 1. Named Products: Items identified by manufacturer's product name, including make or model number or other designation shown or listed in manufacturer's published product literature that is current as of date of Contract Documents.
 - 2. New Products: Items that have not previously been incorporated into another project or facility, except that products consisting of recycled-content materials are allowed, unless explicitly stated otherwise. Products salvaged or recycled from other projects are not considered new products.
 - 3. Comparable Product: Product that is to have indicated qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics that equal or exceed those of specified product.
- B. Substitutions: Changes in products, materials, equipment, and methods of construction from those required by Contract Documents and proposed by Contractor.
- C. Basis-of-Design Product Specification: Where a specific manufacturer's product is named and accompanied by words "basis of design," including make or model number or other designation, to establish significant qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics for purposes of evaluating comparable products of other named manufacturers.

1.3 SUBMITTALS

- A. Substitution Requests: Submit three copies of each request for consideration. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.
 - 1. Substitution Request Form: Use facsimile of form provided at end of Section.
 - 2. Documentation: Show compliance with requirements for substitutions and following, as applicable:
 - a. Statement indicating why specified material or product cannot be provided.

- b. Coordination information, including a list of changes or modifications needed to other parts of Work and to construction performed by Owner and separate contractors, that will be necessary to accommodate proposed substitution.
 - c. Detailed comparison of significant qualities of proposed substitution with those of Work specified. Significant qualities may include attributes such as performance, weight, size, durability, visual effect, and specific features and requirements indicated.
 - d. Product Data, including drawings and descriptions of products and fabrication and installation procedures.
 - e. Samples, where applicable or requested.
 - f. List of similar installations for completed projects with project names and addresses and names and addresses of A/E's and owners.
 - g. Material test reports from a qualified testing agency indicating and interpreting test results for compliance with requirements indicated.
 - h. Research/evaluation reports evidencing compliance with building code in effect for Project, from a model code organization acceptable to authorities having jurisdiction.
 - i. Detailed comparison of Contractor's Construction Schedule using proposed substitution with products specified for Work, including effect on overall Contract Time. If specified product or method of construction cannot be provided within Contract Time, include letter from manufacturer, on manufacturer's letterhead, stating lack of availability or delays in delivery.
 - j. Cost information, including a proposal of change, if any, in Contract Sum.
 - k. Contractor's certification that proposed substitution complies with requirements in Contract Documents and is appropriate for applications indicated.
 - l. Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of failure of proposed substitution to produce indicated results.
3. A/E's Action: If necessary, A/E will request additional information or documentation for evaluation within 7 days of receipt of a request for substitution. A/E will notify Contractor of acceptance or rejection of proposed substitution within 15 days of receipt of request, or 7 days of receipt of additional information or documentation, whichever is later.
- a. Form of Acceptance: Change Order.
 - b. Use product specified if A/E cannot make a decision on use of a proposed substitution within time allocated.

- B. Basis-of-Design Product Specification Submittal: Comply with requirements in Division 01 Section "Submittal Procedures." Show compliance with requirements.

1.4 QUALITY ASSURANCE

- A. Compatibility of Options: If Contractor is given option of selecting between two or more products for use on Project, product selected shall be compatible with products previously selected, even if previously selected products were also options.

1.5 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, and handle products using means and methods that will prevent damage, deterioration, and loss, including theft. Comply with manufacturer's written instructions.
- B. Delivery and Handling:
- 1. Schedule delivery to minimize long-term storage at Project site and to prevent overcrowding of construction spaces.
 - 2. Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.
 - 3. Deliver products to Project site in an undamaged condition in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.

4. Inspect products on delivery to ensure compliance with Contract Documents and to ensure that products are undamaged and properly protected.
- C. Storage:
1. Store products to allow for inspection and measurement of quantity or counting of units.
 2. Store materials in a manner that will not endanger Project structure.
 3. Store products that are subject to damage by elements, under cover in a weathertight enclosure above ground, with ventilation adequate to prevent condensation.
 4. Store cementitious products and materials on elevated platforms.
 5. Store foam plastic from exposure to sunlight, except to extent necessary for period of installation and concealment.
 6. Comply with product manufacturer's written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage.
 7. Protect stored products from damage and liquids from freezing.
- D. Contractor shall be responsible for materials he orders for delivery to jobsite. Responsibility includes, but is not limited to, receiving, unloading, storing, protecting, and setting in place; ready for final connections.
1. Owner will not be responsible for deliveries related to construction or operation of Contractor. Owner cannot sign delivery forms for Contractor.
- E. Contractors shall insure that products are delivered to Project in accordance with Construction Schedule of Project. In determining date of delivery, sufficient time shall be allowed for shop drawings and sample approvals, including possibility of having to resubmit improperly prepared submittals or products other than those specified and necessary fabrication or procurement time along with delivery method and distance involved.

1.6 WARRANTIES

- A. Specific warranties or bonds called for in Contract Documents, in addition to that falling under general warranty as set forth in General Conditions, shall be furnished in accordance with requirements of Specifications.
1. Owner's Recourse: Expressed warranties made to Owner are in addition to implied warranties and shall not limit duties, obligations, rights, and remedies otherwise available under law. Expressed warranty periods shall not be interpreted as limitations on time in which Owner can enforce such other duties, obligations, rights, or remedies.
 - a. Rejection of Warranties: Owner reserves right to reject warranties and to limit selection to products with warranties not in conflict with requirements of Contract Documents.
- B. Contractor shall and does hereby agree to warrant for a period of one year, or for longer periods, where so provided in Specifications, as evidenced by date of Substantial Completion issued by A/E, products installed under Contract to be of good quality in every respect and to remain so for periods described herein.
- C. Should defects develop in previously mentioned Work within specified periods, due to faults in products or their workmanship, Contractor hereby agrees to make repairs and do necessary Work to correct defective Work to A/E's satisfaction, in accordance with General and Supplementary Conditions. Such repairs and corrective Work, including costs of making good other Work damaged by or otherwise affected by making repairs or corrective Work, shall be done without cost to Owner and at entire cost and expense of Contractor within 30 days after written notice to Contractor by Owner.
1. Related Damages and Losses: When correcting failed or damaged warranted construction, remove and replace construction that has been damaged as a result of such failure or must be removed and replaced to provide access for correction of warranted construction.
 2. Reinstatement of Warranty: When Work covered by a warranty has failed and been corrected by replacement or rebuilding, reinstate warranty by written endorsement. Reinstated warranty shall be equal to original warranty with an equitable adjustment for depreciation.

- D. Nothing herein intends or implies that warranty shall apply to Work that has been abused, neglected, or improperly maintained by Owner or his successor in interest.
- E. Where service on products is required under this Article, it shall be promptly provided when notified by Owner and no additional charge shall be made, unless it can be established that defect or malfunctioning was caused by abuse or accidental damage not to be expected under conditions of ordinary wear and tear.
- F. In event movement in adjoining structure or components causes malfunctioning, Contractor responsible for original installation of adjoining structure or components shall provide such repair, replacement, or correction necessary to provide for proper functioning to bring equipment back into same operating condition as approved at completion of building.
- G. Manufacturer and supplier expressly warrants that each item of equipment furnished by him and installed in this Project is suitable for application shown and specified in Contract Documents and includes features, accessories, and performing characteristics listed in manufacturer's catalog in force on date bids are requested for Work. This warranty is intended as an assurance by manufacturer that his equipment is not being misapplied and is fit and sufficient for service intended. This warranty is in addition to and not in limitation of other warranties or remedies required by law or by Contract Documents. It shall be responsibility of Contractor for particular equipment to obtain this warranty in writing.
- H. In case Contractor fails to do Work so ordered, Owner may have Work done and charge cost thereof against monies retained as provided for in Agreement and, if said retained monies shall be insufficient to pay such cost or if no money is available, Contractor and his Sureties shall agree to pay to Owner cost of such Work.
- I. Warranties specified in other Sections shall be in addition to, and run concurrent with, other warranties required by Contract Documents. Manufacturer's disclaimers and limitations on product warranties do not relieve Contractor of obligations under requirements of Contract Documents.
 - 1. Manufacturer's Warranty: Preprinted written warranty published by individual manufacturer for a particular product and specifically endorsed by manufacturer to Owner.
 - 2. Special Warranty: Written warranty required by or incorporated into the Contract Documents, either to extend time limit provided by manufacturer's warranty or to provide more rights for Owner.
- J. Special Warranties: Prepare a written document that contains appropriate terms and identification, ready for execution. Submit a draft for approval before final execution.
 - 1. Manufacturer's Standard Form: Modified to include Project-specific information and properly executed.
 - 2. Specified Form: When specified forms are included with Specifications, prepare a written document using appropriate form properly executed.
 - 3. Refer to Divisions 02 through 49 Sections for specific content requirements and particular requirements for submitting special warranties.
- K. Submittal Time: Comply with requirements in Division 01 Section "Closeout Procedures."

PART 2 - PRODUCTS

2.1 PRODUCT SELECTION PROCEDURES

- A. General Product Requirements: Provide products that comply with Contract Documents, that are undamaged and, unless otherwise indicated, that are new at time of installation.
 - 1. Provide products complete with accessories, trim, finish, fasteners, and other items needed for a complete installation and indicated use and effect.
 - 2. Standard Products: If available, and unless custom products or nonstandard options are specified, provide standard products of types that have been produced and used successfully in similar situations on other projects.

3. Owner reserves right to limit selection to products with warranties not in conflict with requirements of Contract Documents.
4. Where products are accompanied by term "as selected," A/E will make selection.
5. Where products are accompanied by term "match sample," sample to be matched is A/E's.
6. Descriptive, performance, and reference standard requirements in Specifications establish "salient characteristics" of products.

B. Product Selection Procedures:

1. Product: Where Specifications name a single product and manufacturer, provide named product that complies with requirements.
2. Manufacturer/Source: Where Specifications name a single manufacturer or source, provide a product by named manufacturer or source that complies with requirements.
3. Products: Where Specifications include a list of names of both products and manufacturers, provide one of products listed that complies with requirements.
 - a. Restricted List: Where specifications include a list of names of both manufacturers and products, provide one of products listed that complies with requirements. Substitutions for Contractor's convenience will not be considered after award, unless otherwise noted.
4. Manufacturers: Where Specifications include a list of manufacturers' names, provide a product by one of manufacturers listed that complies with requirements.
 - a. Restricted List: Where specifications include a list of manufacturer's names, provide a product by one of manufacturers listed that complies with requirements. Substitutions for Contractor's convenience will not be considered, unless otherwise indicated.
5. Product Options: Where Specifications indicate that sizes, profiles, and dimensional requirements on Drawings are based on a specific product or system, provide specified product or system. Comply with provisions in Part 2 "Product Substitutions" Article for consideration of an unnamed product or system.
6. Basis-of-Design Product: Where Specifications name a product and include a list of manufacturers, provide specified product or a comparable product by one of other named manufacturers. Drawings and Specifications indicate sizes, profiles, dimensions, and other characteristics that are based on product named.
7. Visual Matching Specification: Where Specifications require matching an established Sample, select a product that complies with requirements and matches A/E's sample. A/E's decision will be final on whether a proposed product matches.
 - a. If no product available within specified category matches and complies with other specified requirements, comply with provisions in Part 2 "Product Substitutions" Article for proposal of product.
8. Visual Selection Specification: Where Specifications include phrase "as selected from manufacturer's colors, patterns, textures" or a similar phrase, select a product that complies with other specified requirements.
 - a. Standard Range: Where Specifications include phrase "standard range of colors, patterns, and textures" or similar phrase, A/E will select color, pattern, density, or texture from manufacturer's product line that does not include premium items.
 - b. Full Range: Where Specifications include phrase "full range of colors, patterns, textures" or similar phrase, A/E will select color, pattern, density, or texture from manufacturer's product line that includes both standard and premium items.

2.2 PRODUCT SUBSTITUTIONS

- A. Timing: A/E will consider requests for substitution if received within 60 days after Notice to Proceed. Requests received after that time may be considered or rejected at discretion of A/E.
- B. Conditions: A/E will consider Contractor's request for substitution when following conditions are satisfied. If following conditions are not satisfied, A/E will return requests without action, except to record noncompliance with these requirements:

1. Requested substitution offers Owner a substantial advantage in cost, time, energy conservation, or other considerations, after deducting additional responsibilities Owner must assume. Owner's additional responsibilities may include compensation to A/E for redesign and evaluation services, increased cost of other construction by Owner, and similar considerations.
2. Requested substitution does not require extensive revisions to Contract Documents.
3. Requested substitution is consistent with Contract Documents and will produce indicated results.
4. Substitution request is fully documented and properly submitted.
5. Requested substitution will not adversely affect Contractor's Construction Schedule.
6. Requested substitution has received necessary approvals of authorities having jurisdiction.
7. Requested substitution is compatible with other portions of Work.
8. Requested substitution has been coordinated with other portions of Work.
9. Requested substitution provides specified warranty.
10. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.

2.3 PROTECTION

- A. Contractor shall protect building elements and products subject to damage. Should workmen or other persons employed or commissioned by a Contractor be responsible for damage, entire cost of repairing said damage shall be assumed by that individual Contractor. Should damage be done by a person or persons not employed or commissioned by a Contractor, respective Contractors shall make repairs and charge cost to guilty person or persons. Affected Contractors shall be responsible for collecting such charges. If person or persons responsible for damage cannot be discovered, respective Contractor shall make full and satisfactory repairs, and cost of Work shall be prorated against Contractor.
- B. Contractor shall protect their products prior to installation and final acceptance. Storage shall be dry, clean, and safe. Materials or equipment damaged, deteriorated, rusted, or defaced due to improper storage shall be repaired, refinished, or replaced, as required by A/E. Products lost through theft or mishandling shall be replaced by Contractor without cost to Owner.

2.4 ACCEPTANCE OF EQUIPMENT OR SYSTEMS

- A. Owner will not accept start of warranty period on systems or equipment until Substantial Completion is issued to respective Contractor(s) for Owner's occupancy of building, in part or whole. Contractor shall make such provisions as required to extend manufacturer's warranty from time of initial operation of systems or equipment until Substantial Completion is given in writing.

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 60 00

**SUBSTITUTION
REQUEST**
(After the Bidding Phase)



Project: HVAC Modifications
Ravenna City Schools
To: _____
Re: _____
From: _____
Date: _____
A/E Project Number: 221119.00
Contract For: _____

Specification Title: _____ Description: _____
Section: _____ Page: _____ Article/Paragraph: _____

Proposed Substitution: _____
Manufacturer: _____ Address: _____ Phone: _____
Trade Name: _____ Model No.: _____
Installer: _____ Address: _____ Phone: _____

History: ☐ New product ☐ 2-5 years old ☐ 5-10 yrs old ☐ More than 10 years old

Differences between proposed substitution and specified product: _____

☐ Point-by-point comparative data attached

Reason for not providing specified item: _____

Similar Installation:

Project: _____ Architect: _____
Address: _____ Owner: _____
Date Installed: _____

Proposed substitution affects other parts of Work: ☐ No ☐ Yes; explain _____

Savings to Owner for accepting substitution: _____ (\$ _____).

Proposed substitution changes Contract Time: ☐ No ☐ Yes [Add] [Deduct] _____ days.

Supporting Data Attached: ☐ Drawings ☐ Product Data ☐ Samples ☐ Tests ☐ Reports ☐ _____

**SUBSTITUTION
REQUEST**
(Continued)



The Undersigned certifies:

- Proposed substitution has been fully investigated and determined to be equal or superior in all respects to specified product.
- Same warranty will be furnished for proposed substitution as for specified product.
- Same maintenance service and source of replacement parts, as applicable, is available.
- Proposed substitution will have no adverse effect on other trades and will not affect or delay progress schedule.
- Cost data as stated above is complete. Claims for additional costs related to accepted substitution which may subsequently become apparent are to be waived.
- Proposed substitution does not affect dimensions and functional clearances.
- Payment will be made for changes to building design, including A/E design, detailing, and construction costs caused by the substitution.
- Coordination, installation, and changes in the Work as necessary for accepted substitution will be complete in all respects.

Submitted by: _____

Signed by: _____

Firm: _____

Address: _____

Telephone: _____

Attachments: _____

A/E's REVIEW AND ACTION

- ☐ Substitution approved - Make submittals in accordance with Specification Section 01330.
- ☐ Substitution approved as noted - Make submittals in accordance with Specification Section 01330.
- ☐ Substitution rejected - Use specified materials.
- ☐ Substitution Request received too late - Use specified materials.

Signed by: _____
(Project Manager)

Date: _____

Additional Comments: ☐ Contractor ☐ Subcontractor ☐ Supplier ☐ Manufacturer ☐ A/E ☐ _____

SECTION 01 73 00 - EXECUTION

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes general procedural requirements governing execution of Work including, but not limited to, following:
 - 1. General installation of products.
 - 2. Starting and adjusting.
 - 3. Protection of installed construction.
- B. Related Sections include following:
 - 1. Division 01 Section "Project Management and Coordination" for procedures for coordinating field engineering with other construction activities.
 - 2. Division 01 Section "Submittal Procedures" for submitting surveys.
 - 3. Division 01 Section "Cutting and Patching" for procedural requirements for cutting and patching necessary for installation or performance of other components of Work.
 - 4. Division 01 Section "Progress Cleaning" for progress cleaning.
 - 5. Division 01 Section "Closeout Procedures" for recording of Owner-accepted deviations from indicated lines and levels, and final cleaning.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Existing Conditions: Existence and location of site improvements, utilities, and other construction indicated as existing are not guaranteed. Before beginning work, investigate and verify existence and location of mechanical and electrical systems and other construction affecting Work.
 - 1. Before construction, verify location and points of connection of utility services.
- B. Existing Utilities: Existence and location of underground and other utilities and construction indicated as existing are not guaranteed. Before beginning sitework, investigate and verify existence and location of underground utilities and other construction affecting Work.
- C. Acceptance of Conditions: Examine substrates, areas, and conditions, with Installer or Applicator present where indicated, for compliance with requirements for installation tolerances and other conditions affecting performance. Record observations.
 - 1. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
 - 2. Examine roughing-in for mechanical and electrical systems to verify actual locations of connections before equipment and fixture installation.
 - 3. Examine walls, floors, and roofs for suitable conditions where products and systems are to be installed.
- D. Written Report: Where a written report listing conditions detrimental to performance of Work is required by other Sections, include following:
 - 1. Description of Work.
 - 2. List of detrimental conditions, including substrates.
 - 3. List of unacceptable installation tolerances.
 - 4. Recommended corrections.
- E. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with Work indicates acceptance of surfaces and conditions.

3.2 PREPARATION

- A. Existing Utility Information: Furnish information to Owner that is necessary to adjust, move, or relocate existing utility structures, utility poles, lines, services, or other utility appurtenances located in or affected by construction. Coordinate with authorities having jurisdiction.
- B. Field Measurements: Take field measurements as required to fit Work properly. Recheck measurements before installing each product. Where portions of Work are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication. Coordinate fabrication schedule with construction progress to avoid delaying Work.
- C. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.
- D. Review of Contract Documents and Field Conditions: Immediately on discovery of need for clarification of Contract Documents, submit a Request for Interpretation to A/E. Include a detailed description of problem encountered, together with recommendations for changing Contract Documents.
- E. Protect existing roof areas where construction traffic is anticipated.

3.3 INSTALLATION, GENERAL

- A. Locate Work and components of Work accurately, in correct alignment and elevation, as indicated.
 - 1. Make vertical work plumb and make horizontal work level.
 - 2. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.
 - 3. Conceal pipes, ducts, and wiring in finished areas, unless otherwise indicated.
 - 4. Maintain minimum headroom clearance of 8 feet occupied spaces and 90 inches in unoccupied spaces, unless otherwise indicated on Drawings.
- B. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.
- C. Install products at time and under conditions that will ensure best possible results. Maintain conditions required for product performance until Substantial Completion.
- D. Conduct construction operations so no part of Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy of type expected for Project.
- E. Sequence Work and allow adequate clearances to accommodate movement of construction items on site and placement in permanent locations.
- F. Tools and Equipment: Do not use tools or equipment that produce harmful noise levels.
- G. Templates: Obtain and distribute to parties involved templates for work specified to be factory prepared and field installed. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing products to comply with indicated requirements.
- H. Anchors and Fasteners: Provide anchors and fasteners as required to anchor each component securely in place, accurately located and aligned with other portions of Work.
 - 1. Mounting Heights: Where mounting heights are not indicated, mount components at heights directed by A/E.
 - 2. Allow for building movement, including thermal expansion and contraction.

3. Coordinate installation of anchorages. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.
4. Electrical wiring and associated metallic conduit shall not be embedded within roof assemblies or placed directly below roof decks. Electrical wiring or metallic conduit located near roof assemblies shall be positioned and supported at least 10 inches away from bottom side of metal roof deck or other substrate to which a roof system has been or will be applied.
5. Suspension wires, straps, chains, and metal framing such as those used to support following shall not be attached to or through steel roof decks.
 - a. Bulkheads.
 - b. Suspended ceilings.
 - c. Fire-suppression systems.
 - d. Ductwork.
 - e. Lighting.
 - f. Similar items.
- I. Joints: Make joints of uniform width. Where joint locations in exposed work are not indicated, arrange joints for best visual effect. Fit exposed connections together to form hairline joints.
- J. Hazardous Materials: Use products, cleaners, and installation materials that are not considered hazardous.

3.4 STARTING AND ADJUSTING

- A. Start equipment and operating components to confirm proper operation. Remove malfunctioning units, replace with new units, and retest.
- B. Adjust operating components for proper operation without binding. Adjust equipment for proper operation.
- C. Test each piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
- D. Manufacturer's Field Service: Inspect field-assembled components and equipment installation. Comply with qualification requirements in Division 01 Section "Quality Requirements."

3.5 PROTECTION OF INSTALLED CONSTRUCTION

- A. Provide final protection and maintain conditions that ensure installed Work is without damage or deterioration at time of Substantial Completion.
- B. Protection of Existing Items: Provide protection and ensure that existing items to remain undisturbed by construction are maintained in condition that existed at commencement of the work.
- C. Comply with manufacturer's written instructions for temperature and relative humidity.
- D. Protect 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.
 1. Protect new roof areas where continued construction traffic is anticipated.
 - a. Loosely lay 1-inch minimum thick, molded expanded polystyrene (MEPS) insulation over roofing membrane in areas indicated. Loosely lay 15/32-inch plywood or OSB panels over MEPS. Extend MEPS past edges of plywood or OSB panels a minimum of 1 inch.

- 1) Protection sheet or mat: provide a sacrificial layer of matching membrane sheet extending minimum 6 inches beyond insulation in all directions or a woven or nonwoven polypropylene, polyolefin, or polyester fabric, water permeable and resistant to UV degradation, type and weight as recommended by roofing system manufacturer for application.
- b. Limit traffic and material storage to areas of roofing that have been protected.

END OF SECTION 01 73 00

SECTION 01 73 29 - CUTTING AND PATCHING

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes procedural requirements for cutting and patching.
- B. Related Sections include the following:
 - 1. Division 02 Section "Selective Structure Demolition" for demolition of selected portions of the building.
 - 2. Divisions 02 through 33 Sections for specific requirements and limitations applicable to cutting and patching individual parts of the Work.
 - a. Division 04 Section "Unit Masonry" for restoration of existing masonry.
 - b. Division 05 Section "Metal Fabrications" for loose lintels.
 - 3. Division 07 Section "Penetration Firestopping" for patching fire-rated construction.

1.2 DEFINITIONS

- A. Cutting: Removal of in-place construction necessary to permit installation or performance of other Work.
- B. Patching: Fitting and repair work required to restore surfaces to original conditions after installation of other Work.
- C. Cutting and patching performed during the manufacture of products or during the initial fabrication, erection, or installation processes is not considered to be "cutting and patching" under this definition. Drilling of holes to install fasteners and similar operations are also not considered to be "cutting and patching".

1.3 SUBMITTALS

- A. Cutting and Patching Plan: Submit a plan describing procedures at least 10 days before the time cutting and patching will be performed, requesting approval to proceed. Include the following information:
 - 1. Extent: Describe cutting and patching, show how they will be performed, on structural elements.
 - a. Structural Elements: Where cutting and patching involve adding reinforcement to structural elements, submit details and engineering calculations showing integration of reinforcement with original structure.
 - 2. Changes to In-Place Construction: Describe anticipated results. Include changes to structural elements and operating components as well as changes in building's appearance and other significant visual elements.
 - 3. Products: List products to be used and firms or entities that will perform the Work.
 - 4. Dates: Indicate when cutting and patching will be performed.
 - 5. A/E's Approval: Obtain approval of cutting and patching proposal before cutting and patching. Approval does not waive right to later require removal and replacement of unsatisfactory work.

1.4 QUALITY ASSURANCE

- A. Structural Elements: Do not cut and patch structural elements in a manner that could change their load-carrying capacity or load-deflection ratio.
 - 1. Structural Elements: When cutting and patching structural elements, notify A/E of locations and details of cutting and await directions from the A/E before proceeding. Shore, brace, and support structural element during cutting and patching. Do not cut and patch structural elements in a manner that could change their load-carrying capacity or increase deflection.
 - a. Bearing and retaining walls (masonry).

- b. Lintels.
 - c. Miscellaneous structural metals.
 - d. Equipment supports.
- B. Operational Elements: Do not cut and patch operating elements and related components in a manner that results in reducing their capacity to perform as intended or that results in increased maintenance or decreased operational life or safety. Operating elements include the following:
 - 1. Fire-suppression systems.
 - 2. Fire detection and alarm systems.
 - 3. Fire separation assemblies.
- C. Miscellaneous Elements: Do not cut and patch miscellaneous elements or related components in a manner that could change their load-carrying capacity, that results in reducing their capacity to perform as intended, or that results in increased maintenance or decreased operational life or safety.
- D. Visual Requirements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch construction exposed on the exterior or in occupied spaces in a manner that would, in A/E's opinion, reduce the building's aesthetic qualities. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner.
- E. Manufacturer's Installation Instructions: Obtain and maintain on-site manufacturer's written recommendations and instructions for installation of products and equipment.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. General: Comply with requirements specified in other Sections.
- B. In-Place Materials: Use materials identical to in-place materials. For exposed surfaces, use materials that visually match in-place adjacent surfaces to the fullest extent possible.
 - 1. If identical materials are unavailable or cannot be used, use materials that, when installed, will match the visual and functional performance of in-place materials.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine surfaces to be cut and patched and conditions under which cutting and patching are to be performed.
 - 1. Compatibility: Before patching, verify compatibility with and suitability of substrates, including compatibility with in-place finishes or primers.
 - 2. Proceed with installation only after unsafe or unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Existing Warranties: Remove, replace, patch and repair materials and surfaces cut or damaged during installation or cutting and patching operations, by methods and with materials so as not to void warranties.
- B. Temporary Support: Provide temporary support of Work to be cut.
- C. Protection: Protect in-place construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations.

- D. Adjacent Occupied Areas: Where interference with use of adjoining areas or interruption of free passage to adjoining areas is unavoidable, coordinate cutting and patching according to requirements in Division 01 Section "Summary."
- E. Existing Utility Services and Mechanical/Electrical Systems: Where existing services/systems are required to be removed, relocated, or abandoned, bypass such services/systems before cutting to minimize interruption to occupied areas.

3.3 CUTTING AND PATCHING

- A. General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.
 - 1. Cut in-place construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.
 - 2. Do not use cutting torches.
 - 3. Contractor shall be responsible for cutting, fitting, and patching that may be required to complete his Work.
 - 4. Contractor shall not do cutting that may impair the strength of the building or its components. No holes except for small screws or bolts may be drilled in the beams or other structural members for the purpose of supporting, routing, or attaching Work without obtaining prior approval from the A/E.
 - a. Provide temporary support of work to be cut.
 - 5. Refer to other Sections of these Specifications for specific cutting and patching requirements and limitations applicable to individual units of Work.
 - 6. Unless otherwise specified, requirements of this Section apply to Mechanical and Electrical Work.
 - a. Existing Utility Services and Mechanical/Electrical Systems: Where existing services/systems are required to be removed, relocated, or abandoned, bypass such services/systems before cutting to prevent interruption to occupied areas.
- B. Cutting: Cut in-place construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction. If possible, review proposed procedures with original Installer; comply with original Installer's written recommendations.
 - 1. In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots as small as possible, neatly to size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
 - 2. Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces.
 - 3. Concrete or Masonry: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.
 - a. After coring, Contractor shall pack and grout openings around sleeves or work penetrating the floor or deck.
 - b. CMU Removal: Remove units that are damaged or require removal to accommodate new work. Carefully remove entire units joint to joint, without damaging surrounding masonry in a manner that permits replacement with full size units.
 - 1) Support and protect remaining masonry that surrounds removal area. Maintain reinforcement and adjoining construction in an undamaged condition.
 - 2) Clean surrounding removal areas by removing mortar, dust, and loose particles in preparation for replacement.
 - 4. Mechanical and Electrical Services: Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after cutting.
 - 5. Do not proceed with patching until after construction operations requiring cutting in immediate area are complete.

- C. Patching: Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other Work. Patch with durable seams that are as invisible as possible. Provide materials and comply with installation requirements specified in other Sections.
1. Inspection: Where feasible, test and inspect patched areas after completion to demonstrate integrity of installation.
 2. Exposed Finishes: Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will eliminate evidence of patching and refinishing.
 - a. Clean piping, conduit, and similar features before applying paint or other finishing materials.
 - b. Restore damaged pipe covering to its original condition.
 3. Walls: Where walls or partitions that are removed extend one finished area into another, patch and repair floor and wall surfaces in the new space. Provide an even surface of uniform finish, color, texture, and appearance. Remove in-place floor and wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.
 - a. Where patching occurs in a painted surface, apply primer and intermediate paint coats over the patch and apply final paint coat over entire unbroken surface containing the patch. Provide additional coats until patch blends with adjacent surfaces.
 - b. Patch CMU: Replace damaged or removed units into bonding and coursing pattern of existing. Lay replacement units with completely filled bed, head, and collar joints. Butter ends with sufficient mortar to fill head joints and shove into place.
 4. Ceilings: Patch, repair, or rehang in-place ceilings as necessary to provide an even-plane surface of uniform appearance.
 5. Exterior Building Enclosure: Patch components in a manner that restores enclosure to a weathertight condition.
- D. Cleaning: Clean areas and spaces where cutting and patching are performed. Completely remove paint, mortar, oils, putty, and similar materials.

END OF SECTION 01 73 29

SECTION 01 74 00 - PROGRESS CLEANING

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes general procedural requirements governing execution of Work including, but not limited to, following:
 - 1. Progress cleaning.

1.2 PURPOSE – DAILY/PROGRESS CLEANING

- A. Define and emphasize responsibility of Contractor to remove his rubbish and debris from construction site to guard against fire and safety hazards as well as to provide a more efficient construction operation. If this cleaning is not performed to satisfaction of Owner and A/E, it will be performed for Contractor at his expense, cost of which will be deducted by Change Order prior to final payment.

1.3 PURPOSE - ROUTINE CLEANING

- A. Each Friday afternoon, and more often if necessary, Contractor shall perform an overall clean up of entire site, including a broom cleaning of appropriate surfaces. Remove rubbish and debris from building site to rubbish collection location promptly upon its accumulation and in no event later than Contractor's regular Friday general clean up.

1.4 RUBBISH CONTAINMENT

- A. Refer to Division 01 Section "Temporary Facilities and Controls" for requirements.

1.5 SAFETY REQUIREMENTS

- A. Hazards Control
 - 1. Store volatile wastes in covered metal containers, and remove from premises daily.
 - 2. Prevent accumulation of wastes that create hazardous conditions.
 - 3. Provide adequate ventilation during use of volatile or noxious substances.
- B. Conduct cleaning and disposal operations to comply with local ordinances and anti-pollution laws.
 - 1. Do not burn or bury rubbish and waste materials on project site.
 - 2. Do not dispose of volatile wastes such as mineral spirits, oil, or paint thinner in storm or sanitary drains.
 - 3. Do not dispose of wastes into streams or waterways.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Cleaning Agents: Use only cleaning materials recommended by manufacturer of surface to be cleaned.
 - 1. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finish surface.

PART 3 - EXECUTION

3.1 DAILY/PROGRESS CLEANING

- A. General: Clean Project site and work areas daily, including common areas. Coordinate progress cleaning for joint-use areas where more than one installer has worked. Enforce requirements strictly. Dispose of materials lawfully.

1. Comply with requirements in NFPA 241 for removal of combustible waste materials and debris.
 2. Do not hold materials more than 7 days during normal weather or 3 days if temperature is expected to rise above 80 deg F.
 3. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.
 - a. Use containers intended for holding waste materials of type to be stored.
- B. Site: Maintain Project site free of waste materials and debris.
- C. Work Areas: Clean areas where work is in progress to level of cleanliness necessary for proper execution of Work.
 1. Remove liquid spills promptly.
 2. Where dust would impair proper execution of Work, broom-clean or vacuum entire work area, as appropriate.
- D. Installed Work: Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.
- E. Concealed Spaces: Remove debris from concealed spaces before enclosing space.
- F. Exposed Surfaces in Finished Areas: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.
- G. Waste Disposal: Burying or burning waste materials on-site will not be permitted. Washing waste materials down sewers or into waterways will not be permitted.
- H. Schedule cleaning operations so that dust and other contaminants resulting from cleaning process will not fall on wet, newly painted or finished surfaces.

3.2 ROUTINE CLEANING

- A. Employ experienced workmen for cleaning.
- B. Remove dirt, mud, and other foreign materials from sight exposed interior and exterior surfaces.
- C. Weekly, or at more frequent intervals, if work activities justify same, perform following cleaning. This includes all dirt, dust, and debris not identifiable as part of a Contract. Broom clean floor and paved surfaces; rake clean other surfaces of ground.
- D. Maintain cleaning throughout duration of Project.
- E. Compliances: Comply with governing regulations and safety standards for cleaning operations. Remove waste materials from site and dispose of lawfully.

END OF SECTION 01 74 00

SECTION 01 77 00 - CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes administrative and procedural requirements for contract closeout, including, but not limited to, the following:
 - 1. Substantial Completion procedures.
 - 2. Final Completion procedures.
 - 3. Warranties.
 - a. Correction of work period.
 - 4. Final cleaning.
 - 5. Corrections/Punch List/List of Incomplete items
 - 6. Repair of work.
- B. Related Sections include the following:
 - 1. Division 01 Section "Payment Procedures" for requirements for Applications for Payment for Substantial and Final Completion.
 - 2. Division 01 Section "Submittal Procedures" for submission of closeout document procedures.
 - 3. Division 01 Section "Progress Cleaning" for progress cleaning of Project site.
 - 4. Division 01 Section "Operation and Maintenance Data" for operation and maintenance manual requirements.
 - 5. Division 01 Section "Project Record Documents" for submitting Record Drawings.
 - 6. Division 01 Section "Demonstration and Training" for requirements for instructing Owner's personnel.

1.2 DEFINITIONS

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

1.3 SUBMITTALS

- A. Action Submittals
 - 1. Product Data: For each type of cleaning agent.
 - 2. Contractor's List of Incomplete Items: Initial submittal of Substantial Completion.
 - 3. Certified List of Incomplete Items: Final submittal at Final Completion.
- B. Closeout Submittals
 - 1. Certificates of Release: From authorities having jurisdiction.
 - 2. Certificate of Insurance: For continued coverage.

1.4 SUBSTANTIAL COMPLETION PROCEDURES

- A. Contractor's List of Incomplete Items: Prepare and submit a list of items to be completed and corrected (Contractor's Corrections/Punch List), indicating the value of each item on the list and reasons why the Work is incomplete.
- B. Submittals Prior to Substantial Completion: Complete the following a minimum of 10 days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.
 - 1. Certificates of Release: Obtain and submit releases from authorities having jurisdiction permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar release.

2. Submit closeout submittals specified in other Division 01 Sections, including project record documents, operation and maintenance manuals, final completion construction photographic documentation, damage, and similar final record information.
 3. Submit closeout submittals specified in individual Sections, including specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
 4. Submit maintenance material submittals specified in individual Sections, including tools, spare parts, extra materials, and similar items, and deliver to location designated by Owner.
 - a. Schedule of Maintenance Material Items: Prepare and submit schedule of maintenance material submittal items, including name and quantity of each item and name and number of related Specification Section. Obtain Owner's signature for receipt of submittals.
 5. Submit test/adjust/balance records.
 6. Submit changeover information related to Owner's occupancy, use, operation, and maintenance.
 7. Certification
 - a. Submit certification stating that no materials containing more than 1 percent asbestos were incorporated into the work.
 - b. Plumbing Contractor shall submit certification stating that no flux or solder used for drinking water piping contains more than 0.2 percent lead, and lead content shall not exceed a weighted average of not more than 0.25 percent in the wetted surface material in accordance with requirements of EPS's "Safe Drinking Water Act" (SDWA).
- C. Procedures Prior to Substantial Completion: Complete the following a minimum of 10 days prior to requesting for determining date of Substantial Completion. List items below that are incomplete at time of request.
1. Advise Owner of pending insurance changeover requirements.
 2. Make final changeover of permanent locks and deliver keys to Owner. Advise Owner's personnel of changeover in security provisions.
 3. Complete startup and testing of systems and equipment.
 4. Perform preventive maintenance on equipment used prior to Substantial Completion.
 5. Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems. Submit demonstration and training video recordings specified in Division 01 Section "Demonstration and Training".
 6. Advise Owner of changeover in heat and other utilities.
 7. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
 8. Complete final cleaning requirements, including touchup painting.
 9. Touch up and otherwise repair and restore marred exposed finishes to eliminate visual defects.
- D. Inspection: Submit a written request for inspection for Substantial Completion a minimum of 14 days prior to the date of the work will be substantially complete. On receipt of request, A/E will either proceed with inspection or notify Contractor of unfulfilled requirements. A/E will prepare the Certificate of Substantial Completion after inspection or will notify Contractor of items, either on Contractor's list or additional items identified by A/E, that must be completed or corrected before certificate will be issued.
1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.
 - a. If more than one reinspection is necessary, Contractor shall be charged \$500.00 for each reinspection when work is found not to be substantially complete.
 2. Results of completed inspection will form the basis of requirements for Final Completion.

1.5 FINAL COMPLETION PROCEDURES

- A. Submittals Prior to Final Completion: Before requesting final inspection for determining date of Final Completion, complete the following:

1. Submit a final Application for Payment according to Division 01 Section "Payment Procedures."
 2. Submit certified copy of A/E's Substantial Completion inspection list of items to be completed or corrected (Corrections/Punch List), endorsed and dated by A/E. The certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.
 3. Submit evidence of final, continuing insurance coverage complying with insurance requirements.
- B. Inspection: Submit a written request for final inspection for acceptance a minimum of 10 days prior to date the Work will be completed and ready for final inspection and tests. On receipt of request, A/E will either proceed with inspection or notify Contractor of unfulfilled requirements. A/E will prepare a final Certificate for Payment after inspection or will notify Contractor of construction that must be completed or corrected before certificate will be issued.
1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.
 - a. For all additional reinspections, the Contractor shall be charged \$500.00 per occurrence.

1.6 LIST OF INCOMPLETE ITEMS (CORRECTIONS/PUNCH LIST)

- A. Prior to the A/E's preparation of a Corrections/Punch List, each Prime Contractor, shall prepare an initial Corrections/Punch List on the job for use by his employees and subcontractors and for use by other Contractors and for use by the A/E to facilitate completion of the Work.
- B. Organization of List Include name and identification of each space and area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by Contractor that are outside the limits of construction.
1. Organize list of spaces in sequential order, starting with exterior areas first and proceeding from lowest floor to highest floor.
 2. Organize items applying to each space by major element, including categories for ceiling, individual walls, floors, equipment, and building systems.
 3. Include the following information at the top of each page:
 - a. Project name.
 - b. Date.
 - c. Name of A/E.
 - d. Name of Contractor.
 - e. Page number.
 4. Submit list of incomplete items in the following format:
 - a. PDF electronic file. A/E will return annotated file.
- C. Upon receipt of the initial Corrections/Punch List, the A/E, will inspect the Work to determine if the work is substantially complete. Following the inspection, the A/E will issue a supplement to the Contractor's list of a Final Corrections/Punch List.
- D. At the time the A/E commences the Substantial Completion Inspection, if the A/E discovers excessive additional items requiring completion or correction, the A/E may decline to continue the inspection, instructing the Contractor as to the general classification of deficiencies which must be corrected before the A/E will resume the Substantial Completion Inspection. If the Contractor fails to pursue the Work so as to make it ready for Substantial Completion Inspection in a timely fashion, the A/E shall, after notifying the Contractor, conduct inspections and develop a list of items to be completed or corrected. This list of items shall be furnished to the Contractor who shall proceed to correct such items within 21 days. The A/E will conduct additional inspections as required to determine that the Work is ready for Substantial Completion Inspection. The A/E will invoice the Owner for \$500.00 per reinspection.

- E. The time fixed by the A/E for the completion of all items on the Final Corrections/Punch List shall not be greater than 21 days. The Contractor shall complete items on the list within such 21 day period. The Contractor shall begin completion and correction and correction activities within 7 days of receipt of the lists and complete all activities within the 21 day period specified. If the Contractor fails to do so, the Owner in its discretion may perform the Work by itself or others and the cost thereof shall be charged against the Contractor. If more than one inspection by the A/E for the purpose of evaluating corrected work is required by the subject list of items to be completed or corrected, it will be performed at the cost of \$500.00 per inspection and deducted from the Contractor's Contract.
 - 1. The A/E will reinspect the work, upon request by the Contractor or within 21 days. If items required for Substantial Completion have been completed a certificate for Substantial Completion will be issued.
- F. Deferred Items: With the approval of Owner, A/E, upon reinspection, items of Work that cannot be completed within 21 days or because of seasonal conditions, such as bituminous paving or landscaping, or if the Owner has a schedule conflict, payment will be released to the Contractor less twice the cost of completing the remaining work as determined by the A/E and Construction Manager.

1.7 SUBMITTAL OF PROJECT WARRANTIES

- A. Submittal Time: Submit written warranties on request of A/E for designated portions of the Work where commencement of warranties other than date of Substantial Completion is indicated, or when delay in submittal of warranties might limit Owner's rights under warranty.
- B. Organize warranty documents into an orderly sequence based on the table of contents of the Project Manual.
 - 1. Warranty Electronic File: Scan warranties and bonds and assemble complete warranty and bond submittal package into a single indexed electronic PDF file with links enabling navigation to each item. Provide bookmarked table of contents at beginning of document.
- C. Provide additional copies of each warranty to include in operation and maintenance manuals.

1.8 CORRECTION OF WORK PERIOD (WARRANTY)

- A. One month prior to the expiration of the one year correction of work period (warranty), the A/E will schedule a walk through to see if additional Work by the Contractor(s) is needed to make good on the warranties. An itemized list will be furnished to the Contractor for corrective or replacement work.
 - 1. The walk through will be attended by the A/E and Owner.
- B. This Work shall be completed immediately by the Contractor(s) after receiving notification.

PART 2 - PRODUCTS

2.1 MATERIALS

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

PART 3 - EXECUTION

3.1 FINAL CLEANING

- A. General: Provide final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.

- B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to condition expected in an average commercial building cleaning and maintenance program. Comply with manufacturer's written instructions.
 - 1. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for entire Project or for a portion of Project:
 - a. Clean Project site, yard, and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances.
 - b. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.
 - c. Rake grounds that are neither planted nor paved to a smooth, even-textured surface.
 - d. Remove tools, construction equipment, machinery, and surplus material from Project site.
 - e. 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.
 - f. Remove debris and surface dust from limited access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.
 - g. Remove labels that are not permanent.
 - h. Clean ducts, blowers, and coils if units were operated without filters during construction.
 - i. Leave Project clean and ready for occupancy.
- C. Comply with safety standards for cleaning. Do not burn waste materials. Do not bury debris or excess materials on Owner's property. Do not discharge volatile, harmful, or dangerous materials into drainage systems. Remove waste materials from Project site and dispose of lawfully.
- D. Construction Waste Disposal: Comply with waste disposal requirements in Division 01 Section "Temporary Facilities and Controls".

3.2 REPAIR OF THE WORK

- A. Complete repair and restoration operations before requesting inspection for determination of Substantial Completion.
- B. Repair or remove and replace defective construction. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment. Where damaged or worn items cannot be repaired or restored, provide replacements. Remove and replace operating components that cannot be repaired. Restore damaged construction and permanent facilities used during construction to specified condition.
 - 1. Remove and replace chipped, scratched, and broken glass, reflective surfaces, and other damaged transparent materials.
 - 2. Touch up and otherwise repair and restore marred or exposed finishes and surfaces. Replace finishes and surfaces that already show evidence of repair or restoration.
 - a. Do not paint over "UL" and other required labels and identification, including mechanical and electrical nameplates. Remove paint applied to required labels and identification.
 - 3. Replace parts subject to operating conditions during construction that may impede operation or reduce longevity.

END OF SECTION 01 77 00

AFFIDAVIT OF COMPLIANCE WITH FEDERAL PREVAILING WAGE

I, _____
(Name of person signing affidavit) (Title)

do hereby certify that the wages paid to all employees of _____
(Company Name)

for all hours worked on the

(Project name and location)

Project, during the period from _____ to _____
(Project Dates)

are in compliance with Federal Wage rates and Federal Labor Standards Provisions as the same pertain to said construction project and are a part of the bid documents. I further certify that no rebates or deductions have been or will be made, directly or indirectly, from any wages paid in connection with this project, other than those provided by law.

(Signature of Officer or Agent)

Sworn to and subscribed in my presence this _____ day of _____, 20____.

(Notary Public)

The above affidavit must be executed and sworn to by the officer or agent of the contractor or subcontractor who supervises the payment of employees. This affidavit must be submitted to the Owner (public authority) before the surety is released or final payment due under the terms of the contract is made.

*Prime contractor and all subcontractors complete at the end of the project.

SECTION 01 78 23 - OPERATION AND MAINTENANCE DATA

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes administrative and procedural requirements for preparing operation and maintenance manuals, including the following:
 - 1. Operation and maintenance documentation directory manuals.
 - 2. Emergency manuals.
 - 3. Systems and equipment operation manuals.
 - 4. Systems and equipment maintenance manuals.
 - 5. Product maintenance manuals.
- B. Related Requirements:
 - 1. Division 01 Section "Submittal Procedures" for submitting copies of submittals for operation and maintenance manuals.
 - 2. Division 01 Section "Closeout Procedures" for administrative and procedural requirements including warranties.
 - 3. Division 01 Section "Project Record Documents" for preparing Record Drawings for operation and maintenance manuals.
 - 4. Divisions 02 through 33 Sections for specific operation and maintenance manual requirements for the Work of those Sections.

1.2 DEFINITIONS

- A. System: An organized collection of parts, equipment, or subsystems united by regular interaction.
- B. Subsystem: A portion of a system with characteristics similar to a system.

1.3 CLOSEOUT SUBMITTALS

- A. Submit operation and maintenance manuals indicated. Provide content for each manual as specified in individual Specification Sections. Submit manual content formatted and organized as required by this Section.
 - 1. A/E will comment on whether content of operation and maintenance submittals is acceptable.
 - 2. Where applicable, clarify and update reviewed manual content to correspond to revisions and field conditions.
- B. Format: Submit operation and maintenance manuals in the following format:
 - 1. Submit on digital media acceptable to A/E. Enable reviewer comments on draft submittals.
- C. Initial Manual Submittal: Submit draft copy of table of contents at least 30 days before commencing demonstration and training. A/E will comment on whether general scope and content of manual are acceptable.
- D. Final Manual Submittal: Submit each manual in final form at least 15 days before commencing demonstration and training.
- E. Comply with Section 01 77 00 "Closeout Procedures" for schedule for submitting operation and maintenance documentation.

1.4 FORMAT OF OPERATION AND MAINTENANCE MANUALS

- A. Manuals, Electronic Files: Submit manuals in the form of a multiple file composite electronic PDF file for each manual type required.
 - 1. Electronic Files: Use electronic files prepared by manufacturer where available. Where scanning of paper documents is required, configure scanned file for minimum readable file size.
 - 2. File Names and Bookmarks: Bookmark individual documents based on file names. Name document files to correspond to system, subsystem, and equipment names used in manual directory and table of contents. Group documents for each system and subsystem into individual composite bookmarked files, then create composite manual, so that resulting bookmarks reflect the system, subsystem, and equipment names in a readily navigated file tree. Configure electronic manual to display bookmark panel on opening file.

1.5 REQUIREMENTS FOR EMERGENCY, OPERATION, AND MAINTENANCE MANUALS

- A. Organization of Manuals: Unless otherwise indicated, organize each manual into a separate section for each system and subsystem, and a separate section for each piece of equipment not part of a system. Each manual shall contain the following materials, in the order listed:
 - 1. Title page.
 - 2. Table of contents.
 - 3. Manual contents.
- B. Title Page: Include the following information:
 - 1. Subject matter included in manual.
 - 2. Name and address of Project.
 - 3. Name and address of Owner.
 - 4. Date of submittal.
 - 5. Name and contact information for Contractor.
 - 6. Name and contact information for Architect.
 - 7. Names and contact information for major consultants to the Architect that designed the systems contained in the manuals.
 - 8. Cross-reference to related systems in other operation and maintenance manuals.
- C. Table of Contents: List each product included, identified by product name, indexed to the content of the volume, and cross-referenced to Specification Section number in Project Manual.
- D. Manual Contents: Organize into sets of manageable size. Arrange contents alphabetically by system, subsystem, and equipment.
- E. Identification: In the documentation directory and in each operation and maintenance manual, identify each system, subsystem, and piece of equipment with same designation used in the Contract Documents. If no designation exists, assign a designation according to ASHRAE Guideline 4, "Preparation of Operating and Maintenance Documentation for Building Systems."

1.6 OPERATION AND MAINTENANCE DOCUMENTATION DIRECTORY MANUAL

- A. Operation and Maintenance Documentation Directory: Prepare a separate manual that provides an organized reference to emergency, operation, and maintenance manuals. List items and their location to facilitate ready access to desired information. Include the following:
 - 1. List of Systems and Subsystems: List systems alphabetically. Include references to operation and maintenance manuals that contain information about each system.
 - 2. List of Equipment: List equipment for each system, organized alphabetically by system. For pieces of equipment not part of system, list alphabetically in separate list.
 - 3. Tables of Contents: Include a table of contents for each emergency, operation, and maintenance manual.

1.7 EMERGENCY MANUALS

- A. Emergency Manual: Assemble a complete set of emergency information indicating procedures for use by emergency personnel and by Owner's operating personnel for types of emergencies indicated.
- B. Content: Organize manual into a separate section for each of the following:
 - 1. Type of emergency.
 - 2. Emergency instructions.
 - 3. Emergency procedures.
- C. Type of Emergency: Where applicable for each type of emergency indicated below, include instructions and procedures for each system, subsystem, piece of equipment, and component:
 - 1. Fire.
 - 2. Flood.
 - 3. Gas leak.
 - 4. Water leak.
 - 5. Power failure.
 - 6. Water outage.
 - 7. System, subsystem, or equipment failure.
 - 8. Chemical release or spill.
- D. Emergency Instructions: Describe and explain warnings, trouble indications, error messages, and similar codes and signals. Include responsibilities of Owner's operating personnel for notification of Installer, supplier, and manufacturer to maintain warranties.
- E. Emergency Procedures: Include the following, as applicable:
 - 1. Instructions on stopping.
 - 2. Shutdown instructions for each type of emergency.
 - 3. Operating instructions for conditions outside normal operating limits.
 - 4. Required sequences for electric or electronic systems.
 - 5. Special operating instructions and procedures.

1.8 SYSTEMS AND EQUIPMENT OPERATION MANUALS

- A. Systems and Equipment Operation Manual: Assemble a complete set of data indicating operation of each system, subsystem, and piece of equipment not part of a system. Include information required for daily operation and management, operating standards, and routine and special operating procedures.
 - 1. Engage a factory-authorized service representative to assemble and prepare information for each system, subsystem, and piece of equipment not part of a system.
 - 2. Prepare a separate manual for each system and subsystem, in the form of an instructional manual for use by Owner's operating personnel.
- B. Content: In addition to requirements in this Section, include operation data required in individual Specification Sections and the following information:
 - 1. System, subsystem, and equipment descriptions. Use designations for systems and equipment indicated on Contract Documents.
 - 2. Performance and design criteria if Contractor has delegated design responsibility.
 - 3. Operating standards.
 - 4. Operating procedures.
 - 5. Operating logs.
 - 6. Wiring diagrams.
 - 7. Control diagrams.
 - 8. Piped system diagrams.
 - 9. Precautions against improper use.
 - 10. License requirements including inspection and renewal dates.

- C. Descriptions: Include the following:
1. Product name and model number. Use designations for products indicated on Contract Documents.
 2. Manufacturer's name.
 3. Equipment identification with serial number of each component.
 4. Equipment function.
 5. Operating characteristics.
 6. Limiting conditions.
 7. Performance curves.
 8. Engineering data and tests.
 9. Complete nomenclature and number of replacement parts.
- D. Operating Procedures: Include the following, as applicable:
1. Startup procedures.
 2. Equipment or system break-in procedures.
 3. Routine and normal operating instructions.
 4. Regulation and control procedures.
 5. Instructions on stopping.
 6. Normal shutdown instructions.
 7. Seasonal and weekend operating instructions.
 8. Required sequences for electric or electronic systems.
 9. Special operating instructions and procedures.
- E. Systems and Equipment Controls: Describe the sequence of operation, and diagram controls as installed.
- F. Piped Systems: Diagram piping as installed, and identify color coding where required for identification.

1.9 SYSTEMS AND EQUIPMENT MAINTENANCE MANUALS

- A. Systems and Equipment Maintenance Manuals: Assemble a complete set of data indicating maintenance of each system, subsystem, and piece of equipment not part of a system. Include manufacturers' maintenance documentation, preventive maintenance procedures and frequency, repair procedures, wiring and systems diagrams, lists of spare parts, and warranty information.
1. Engage a factory-authorized service representative to assemble and prepare information for each system, subsystem, and piece of equipment not part of a system.
 2. Prepare a separate manual for each system and subsystem, in the form of an instructional manual for use by Owner's operating personnel.
- B. Content: For each system, subsystem, and piece of equipment not part of a system, include source information, manufacturers' maintenance documentation, maintenance procedures, maintenance and service schedules, spare parts list and source information, maintenance service contracts, and warranties and bonds as described below.
- C. Source Information: List each system, subsystem, and piece of equipment included in manual, identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual and drawing or schedule designation or identifier where applicable.
- D. Manufacturers' Maintenance Documentation: Include the following information for each component part or piece of equipment:
1. Standard maintenance instructions and bulletins; include only sheets pertinent to product or component installed. Mark each sheet to identify each product or component incorporated into the Work. If data include more than one item in a tabular format, identify each item using appropriate references from the Contract Documents. Identify data applicable to the Work and delete references to information not applicable.

- a. Prepare supplementary text if manufacturers' standard printed data are not available and where the information is necessary for proper operation and maintenance of equipment or systems.
 2. Drawings, diagrams, and instructions required for maintenance, including disassembly and component removal, replacement, and assembly.
 3. Identification and nomenclature of parts and components.
 4. List of items recommended to be stocked as spare parts.
- E. Maintenance Procedures: Include the following information and items that detail essential maintenance procedures:
1. Test and inspection instructions.
 2. Troubleshooting guide.
 3. Precautions against improper maintenance.
 4. Disassembly; component removal, repair, and replacement; and reassembly instructions.
 5. Aligning, adjusting, and checking instructions.
 6. Demonstration and training video recording, if available.
- F. Maintenance and Service Schedules: Include service and lubrication requirements, list of required lubricants for equipment, and separate schedules for preventive and routine maintenance and service with standard time allotment.
1. Scheduled Maintenance and Service: Tabulate actions for daily, weekly, monthly, quarterly, semiannual, and annual frequencies.
 2. Maintenance and Service Record: Include manufacturers' forms for recording maintenance.
- G. Spare Parts List and Source Information: Include lists of replacement and repair parts, with parts identified and cross-referenced to manufacturers' maintenance documentation and local sources of maintenance materials and related services.
- H. Maintenance Service Contracts: Include copies of maintenance agreements with name and telephone number of service agent.
- I. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.
1. Include procedures to follow and required notifications for warranty claims.
- J. Drawings: Prepare drawings supplementing manufacturers' printed data to illustrate the relationship of component parts of equipment and systems and to illustrate control sequence and flow diagrams. Coordinate these drawings with information contained in record Drawings to ensure correct illustration of completed installation.
1. Do not use original project record documents as part of maintenance manuals.
- 1.10 PRODUCT MAINTENANCE MANUALS
- A. Product Maintenance Manual: Assemble a complete set of maintenance data indicating care and maintenance of each product, material, and finish incorporated into the Work.
- B. Content: Organize manual into a separate section for each product, material, and finish. Include source information, product information, maintenance procedures, repair materials and sources, and warranties and bonds, as described below.
- C. Source Information: List each product included, identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual and drawing or schedule designation or identifier where applicable.
- D. Product Information: Include the following, as applicable:
1. Product name and model number.
 2. Manufacturer's name.

3. Color, pattern, and texture.
 4. Material and chemical composition.
 5. Reordering information for specially manufactured products.
- E. Maintenance Procedures: Include manufacturer's written recommendations and the following:
1. Inspection procedures.
 2. Types of cleaning agents to be used and methods of cleaning.
 3. List of cleaning agents and methods of cleaning detrimental to product.
 4. Schedule for routine cleaning and maintenance.
 5. Repair instructions.
- F. Repair Materials and Sources: Include lists of materials and local sources of materials and related services.
- G. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.
1. Include procedures to follow and required notifications for warranty claims.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 78 23

SECTION 01 78 39 - PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes administrative and procedural requirements for project record documents, including following:
 - 1. Record Drawings.
 - 2. Record Product Data.
 - 3. Miscellaneous record submittals.
- B. Related Sections:
 - 1. Division 01 Section "Closeout Procedures" for general closeout procedures.
 - 2. Division 01 Section "Operation and Maintenance Data" for operation and maintenance manual requirements.
 - 3. Divisions 02 through 49 Sections for specific requirements for project record documents of Work in those Sections.

1.2 CLOSEOUT SUBMITTALS

- A. Record Drawings: Comply with following:
 - 1. Number of Copies: Submit PDF electronic files of scanned record prints and one set of file prints.
 - 2. Print each drawing file, whether or not changes and additional information were recorded.
- B. Record Product Data: Submit annotated PDF electronic files and directories of each submittal.
 - 1. Where record Product Data are required as part of operation and maintenance manuals, submit duplicate marked-up Product Data as a component of manual.
- C. Miscellaneous Record Submittals: See other Specification Sections for miscellaneous record-keeping requirements and submittals in connection with various construction activities. Submit annotated PDF electronic files and directories of each submittal.

PART 2 - PRODUCTS

2.1 RECORD DRAWINGS

- A. Record Prints: Maintain one set of marked-up paper copies of Contract Drawings and Shop Drawings.
 - 1. Preparation: Mark record prints to show actual installation where installation varies from that shown originally. Require individual or entity who obtained record data, whether individual or entity is Installer, subcontractor, or similar entity, to provide information for preparation of corresponding marked-up record prints.
 - a. Give particular attention to information on concealed elements that would be difficult to identify or measure and record later.
 - b. Accurately record information in an acceptable drawing technique.
 - c. Record data as soon as possible after obtaining it.
 - d. Record and check markup before enclosing concealed installations.
 - e. Cross-reference record prints to corresponding archive photographic documentation.
 - 2. Content: Types of items requiring marking include, but are not limited to, following:
 - a. Dimensional changes to Drawings.
 - b. Revisions to details shown on Drawings.
 - c. Revisions to routing of piping and conduits.
 - d. Revisions to electrical circuitry.
 - e. Actual equipment locations.
 - f. Duct size and routing.
 - g. Locations of concealed internal utilities.
 - h. Changes made by Change Order or Construction Change Directive.

- i. Changes made following A/E's written orders.
 - j. Details not on original Contract Drawings.
 - k. Field records for variable and concealed conditions.
 - l. Record information on Work that is shown only schematically.
- 3. Mark Contract Drawings and Shop Drawings completely and accurately. Utilize personnel proficient at recording graphic information in production of marked-up record prints.
- 4. Mark record sets with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of Work at same location.
- 5. Mark important additional information that was either shown schematically or omitted from original Drawings.
- 6. Note Construction Change Directive numbers, alternate numbers, Change Order numbers, and similar identification, where applicable.

2.2 RECORD PRODUCT DATA

- A. Preparation: Mark Product Data to indicate actual product installation where installation varies substantially from that indicated in Product Data submittal.
 - 1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
 - 2. Include significant changes in product delivered to Project site and changes in manufacturer's written instructions for installation.
- B. Format: Submit record Product Data as scanned PDF electronic file(s) of marked up paper copy of Product Data.
 - 1. Include record Product Data directory organized by specification section number and title, electronically linked to each item of record Product Data.

2.3 MISCELLANEOUS RECORD SUBMITTALS

- A. Assemble miscellaneous records required by other Specification Sections for miscellaneous record keeping and submittal in connection with actual performance of Work. Bind or file miscellaneous records and identify each, ready for continued use and reference.
- B. Format: Submit miscellaneous record submittals as scanned PDF electronic file(s) of marked-up miscellaneous record submittals.
 - 1. Include miscellaneous record submittals directory organized by Specification Section number and title, electronically linked to each item of miscellaneous record submittals.
- C. Refer to other Specification Sections for miscellaneous record-keeping requirements and submittals in connection with various construction activities. Immediately before Substantial Completion, complete miscellaneous records and place in good order, properly identified and bound or filed, ready for use and reference. Miscellaneous records include, but are not limited to, following:
 - 1. Ambient and substrate condition tests.
 - 2. Certifications received in lieu of labels on bulk products.
 - 3. Batch mixing and bulk delivery records.
 - 4. Testing and qualification of trades persons.
 - 5. Documented qualification of installation firms.
 - 6. Inspections and certifications by governing authorities.
 - 7. Fire-resistance and flame-spread test results.
 - 8. Final Inspection and correction procedures.

PART 3 - EXECUTION

3.1 RECORDING AND MAINTENANCE

- A. Recording: Maintain one copy of each submittal during construction period for project record document purposes. Post changes and modifications to project record documents as they occur; do not wait until end of Project.

- B. Maintenance of Record Documents and Samples: Store record documents and Samples in field office apart from Contract Documents used for construction. Do not use project record documents for construction purposes. Maintain record documents in good order and in a clean, dry, legible condition, protected from deterioration and loss. Provide access to project record documents for A/E's reference during normal working hours.

END OF SECTION 01 78 39

SECTION 01 79 00 - DEMONSTRATION AND TRAINING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes administrative and procedural requirements for instructing Owner's personnel, including the following:
 - 1. Instruction of operation of systems, subsystems, and equipment.
 - 2. Training in operation and maintenance of systems, subsystems, and equipment.
 - 3. Demonstration and training video recordings.
 - a. Full cooperation during the Owner's audio-and video-recording of demonstration and training for products in those Sections.
- B. Related Sections:
 - 1. Divisions 02 through 49 Sections for specific requirements for demonstration and training for products in those Sections.

1.2 INFORMATIONAL SUBMITTALS

- A. Instruction Program: Submit 2 copies of outline of instructional program for demonstration and training, including a list of training modules and a schedule of proposed dates, times, length of instruction time, and instructors' names for each training module. Include learning objective and outline for each training module.
- B. Qualification Data: For instructor and/or facilitator.
- C. Attendance Record: For each training module, submit list of participants and length of instruction time.
- D. Evaluations: For each participant and for each training module, submit results and documentation of performance-based test.

1.3 CLOSEOUT SUBMITTALS

- A. Demonstration and Training Video Recordings: Submit two copies within seven days of end of each training module.
 - 1. Identification: On each copy, provide an applied label with the following information:
 - a. Name of Project.
 - b. Name and address of videographer.
 - c. Name of A/E.
 - d. Name of Contractor.
 - e. Date of video recording.
 - 2. Transcript: Prepared in PDF electronic format. Include a cover sheet with same label information as the corresponding video recording and a table of contents with links to corresponding training components. Include name of Project and date of video recording on each page.
 - 3. At completion of training, submit complete training manual(s) for Owner's use in PDF electronic file format in form acceptable to A/E and Owner.

1.4 QUALITY ASSURANCE

- A. Facilitator Qualifications: A firm or individual experienced in training or educating maintenance personnel in a training program similar in content and extent to that indicated for this Project, and whose work has resulted in training or education with a record of successful learning performance.

- B. Instructor Qualifications: A factory-authorized service representative, complying with requirements in Division 01 Section "Quality Requirements," experienced in operation and maintenance procedures and training.
- C. Pre-instruction Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination." Review methods and procedures related to demonstration and training including, but not limited to, the following:
 - 1. Inspect and discuss locations and other facilities required for instruction.
 - 2. Review and finalize instruction schedule and verify availability of educational materials, instructors' personnel, audiovisual equipment, and facilities needed to avoid delays.
 - 3. Review required content of instruction.
 - 4. For instruction that must occur outside, review weather and forecasted weather conditions and procedures to follow if conditions are unfavorable.

1.5 COORDINATION

- A. Coordinate instruction schedule with Owner's operations. Adjust schedule as required to minimize disrupting Owner's operations.
- B. Coordinate instructors, including providing notification of dates, times, length of instruction time, and course content.
- C. Coordinate content of training modules with content of approved emergency, operation, and maintenance manuals. Do not submit instruction program until operation and maintenance data has been reviewed and approved by A/E.

PART 2 - PRODUCTS

2.1 INSTRUCTION PROGRAM

- A. Program Structure: Develop an instruction program that includes individual training modules for each system and for equipment not part of a system, as required by individual Specification Sections.
- B. Training Modules: Develop a learning objective and teaching outline for each module. Include a description of specific skills and knowledge that participant is expected to master. For each module, include instruction for the following as applicable to the system, equipment, or component:
 - 1. Basis of System Design, Operational Requirements, and Criteria: Include the following:
 - a. System, subsystem, and equipment descriptions.
 - b. Performance and design criteria if Contractor is delegated design responsibility.
 - c. Operating standards.
 - d. Regulatory requirements.
 - e. Equipment function.
 - f. Operating characteristics.
 - g. Limiting conditions.
 - h. Performance curves.
 - 2. Documentation: Review the following items in detail:
 - a. Emergency manuals.
 - b. Operations manuals.
 - c. Systems and equipment.
 - d. Maintenance manuals.
 - e. Product maintenance manuals.
 - f. Project record documents.
 - g. Identification systems.
 - h. Warranties and bonds.
 - i. Maintenance service agreements and similar continuing commitments.
 - 3. Emergencies: Include the following, as applicable:
 - a. Instructions on meaning of warnings, trouble indications, and error messages.
 - b. Instructions on stopping.

- c. Shutdown instructions for each type of emergency.
 - d. Operating instructions for conditions outside of normal operating limits.
 - e. Sequences for electric or electronic systems.
 - f. Special operating instructions and procedures.
- 4. Operations: Include the following, as applicable:
 - a. Startup procedures.
 - b. Equipment or system break-in procedures.
 - c. Routine and normal operating instructions.
 - d. Regulation and control procedures.
 - e. Control sequences.
 - f. Safety procedures.
 - g. Instructions on stopping.
 - h. Normal shutdown instructions.
 - i. Operating procedures for emergencies.
 - j. Operating procedures for system, subsystem, or equipment failure.
 - k. Seasonal and weekend operating instructions.
 - l. Required sequences for electric or electronic systems.
 - m. Special operating instructions and procedures.
- 5. Adjustments: Include the following:
 - a. Alignments.
 - b. Checking adjustments.
 - c. Noise and vibration adjustments.
 - d. Economy and efficiency adjustments.
- 6. Troubleshooting: Include the following:
 - a. Diagnostic instructions.
 - b. Test and inspection procedures.
- 7. Maintenance: Include the following:
 - a. Inspection procedures.
 - b. Types of cleaning agents to be used and methods of cleaning.
 - c. List of cleaning agents and methods of cleaning detrimental to product.
 - d. Procedures for routine cleaning
 - e. Procedures for preventive maintenance.
 - f. Procedures for routine maintenance.
 - g. Instruction on use of special tools.
- 8. Repairs: Include the following:
 - a. Diagnosis instructions.
 - b. Repair instructions.
 - c. Disassembly; component removal, repair, and replacement; and reassembly instructions.
 - d. Instructions for identifying parts and components.
 - e. Review of spare parts needed for operation and maintenance.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Assemble educational materials necessary for instruction, including documentation and training module. Assemble training modules into a training manual organized in coordination with requirements in Division 01 Section "Operations and Maintenance Data."
- B. Set up instructional equipment at instruction location.

3.2 INSTRUCTION

- A. Facilitator: Engage a qualified facilitator to prepare instruction program and training modules, to coordinate instructors, and to coordinate between Contractor and Owner for number of participants, instruction times, and location.
- B. Engage qualified instructors to instruct Owner's personnel to adjust, operate, and maintain systems, subsystems, and equipment not part of a system.

1. Owner will furnish Contractor with names and positions of participants.
 - C. Scheduling: Provide instruction at mutually agreed on times. For equipment that requires seasonal operation, provide similar instruction at start of each season.
 1. Schedule training with Owner, through A/E, with at least fourteen days' advance notice.
 - D. Training Location and Reference Material: Conduct training on-site in the completed and fully operational facility using the actual equipment in-place. Conduct training using final operation and maintenance data submittals.
 - E. Evaluation: At conclusion of each training module, assess and document each participant's mastery of module by use of a demonstration performance-based test.
 - F. Cleanup: Collect used and leftover educational materials and give to Owner. Remove instructional equipment. Restore systems and equipment to condition existing before initial training use.
- 3.3 DEMONSTRATION AND TRAINING VIDEO RECORDINGS
- A. General: Owner may engage a photographer or sound technician to audio-or video-record demonstration and training sessions.
 - B. Subcontractor and trainer shall cooperate fully with the Owner's efforts to audio-or video-record demonstration and training sessions.

END OF SECTION 01 79 00

DIVISION

02

EXISTING CONDITIONS

SECTION 02 41 19 - SELECTIVE DEMOLITION

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the following:
 - 1. Demolition and removal of selected portions of building or structure as required to accommodate new work.
- B. Related Sections include the following:
 - 1. Division 01 Section "Summary" for use of premises and Owner-occupancy requirements.
 - 2. Division 01 Section "Temporary Facilities and Controls" for temporary construction and environmental-protection measures for selective demolition operations.
 - 3. Division 01 Section "Cutting and Patching" for cutting and patching procedures.

1.2 DEFINITIONS

- A. Remove: Detach items from existing construction and legally dispose of them off-site, unless indicated to be removed and salvaged or removed and reinstalled.
- B. Remove and Salvage: Detach items from existing construction and deliver them to Owner ready for reuse.
- C. Remove and Reinstall: Detach items from existing construction, prepare them for reuse, and reinstall them where indicated.
- D. Existing to Remain: Existing items of construction that are not to be removed and that are not otherwise indicated to be removed, removed and salvaged, or removed and reinstalled. When permitted by the A/E, items may be removed to a suitable, protected storage location during selective demolition and then cleaned and reinstalled in their original locations.
- E. Dismantle: To remove by disassembling or detaching an item from a surface, using gentle methods and equipment to prevent damage to the item and surfaces; disposing of items unless indicated to be salvaged or reinstalled.
- F. Asbestos-Containing Materials (ACM): Materials containing greater than 1 percent asbestos; however since OSHA regulates the removal of materials containing less than or equal to 1 percent asbestos even those containing less than 1 percent can be considered ACM.

1.3 MATERIALS OWNERSHIP

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

1.4 PREINSTALLATION MEETINGS

- A. Pre-demolition Meeting: Conduct meeting at Project site to comply with requirements in Division 01 Section "Project Management and Coordination."
 - 1. Inspect and discuss condition of construction to be selectively demolished.
 - 2. Review structural load limitations of existing structure.
 - a. Discuss requirements for cutting openings in existing masonry to accommodate new work.
 - 1) Discuss methods for cutting opening including support of masonry to remain.
 - 3. Review and finalize selective demolition schedule and verify availability of materials, demolition personnel, equipment, and facilities needed to make progress and avoid delays.
 - 4. Review requirements of work performed by other trades that rely on substrates exposed by selective demolition operations.
 - 5. Review areas where existing construction is to remain and requires protection.

1.5 INFORMATIONAL/QUALITY ASSURANCE/CONTROL SUBMITTALS

- A. Schedule of Selective Demolition Activities: Indicate the following:
1. Detailed sequence of selective demolition and removal work, with starting and ending dates for each activity. Ensure Owner's on-site operations are uninterrupted.
 2. Interruption of utility services. Indicate how long utility services will be interrupted.
 3. Coordination of Owner's continuing occupancy of portions of existing building and of Owner's partial occupancy of completed Work.
 4. Means of protection for items to remain and items in path of waste removal from building.

1.6 CLOSEOUT SUBMITTALS

- A. General: Closeout Submittals are to be submitted with O and M Manuals only. Do not submit with other ACTION and INFORMATIONAL Submittals.
1. Identify and accurately locate capped utilities and other subsurface structural, electrical, or mechanical conditions.
 2. Warranties: Documentation indicating that existing warranties are still in effect after completion of selective demolition.
 3. Inventory: After selective demolition is complete, submit a list of items that have been removed and salvaged.

1.7 QUALITY ASSURANCE

- A. Regulatory Requirements: Comply with governing National Emission Standards for Hazardous Air Pollutants (NESHAP) and EPA notification regulations before beginning demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.
1. Contractors shall assume that painted and coated surfaces that may be disturbed during renovation work contain lead. Contractors shall follow OSHA regulations defined in 29 CFR 1926.62 (Lead Exposure in Construction; Interim Final Rule). At a minimum, if paint or other coating is stripped from its substrate, stripped material shall be disposed of in an EPA approved landfill, unless such paint or other coating is sampled and found not to be an EPA regulated lead-based paint (paint or coating containing lead in an amount less than one milligram per square centimeter or less than 5 percent by weight) or waste is sampled and found to contain less than 5 milligrams of lead per liter using TCLP analysis.
 - a. In schools not defined as a child-occupied facility, contractors shall assume that painted and coated surfaces that may be disturbed during work contain lead and cadmium. Contractors shall follow applicable OSHA and EPA regulations.
 - 1) OSHA requirements include, but are not limited to: Air monitoring; engineering controls and respirator usage (based on results of air monitoring); designation of a competent person; certain housekeeping activities; hand washing facilities; hazard communication and safety training; and clean lunchroom facilities.
 - 2) EPA requirements include, but are not limited to sampling and/or disposal of lead waste.
 - b. In schools which are child-occupied facility (e.g., kindergarten classrooms, daycare facilities, etc.,) contractor shall assume that painted and coated surfaces that may be disturbed during work contain lead and cadmium. Contractors shall follow applicable OSHA and EPA regulations, including EPA's Renovation, Repair and Painting Program Final Rule (RRP).
 - 1) RRP requirements include, but are not limited to: Use of certified firms, certified renovators, and trained workers; installation of job postings and demarcation signage; isolation of work areas; installation of polyethylene film over all flooring and objects; use of personal protective equipment, and prohibition of certain work activities.
 - 2) RRP also requires that, at a minimum, prior to opening a renovated area within a building to the public, that the work area pass a visual inspection and project cleaning verification process; this process includes the wiping of floors, countertops and sills with a cleaning cloth at least three times or until the cloth passes a visual cleaning standard.
 2. Mercury
 - a. Elemental mercury may be found in schools as follows:

- 1) HVAC and other mechanical components may utilize mercury switches and thermostats; EPA regulations require proper recycling and disposal of such devices.
3. Polychlorinated Biphenyls (PCB's)
 - a. Many schools in the United States have light ballasts containing PCBs. PCBs are contained within the ballast capacitors and potting materials.
 - b. Caulk may contain PCBs in buildings built from 1950 through the 1970's.
 - c. PCBs may have been used as an insulator and fire retardant in electrical transformers.
 - d. PCBs are regulated by the EPA under their Toxic Substances Control Act (TSCA). Materials containing PCBs must be disposed of properly.
4. If waste consolidation and recycling methods will be utilized, if any portion of a building or its demolished components will be intentionally burned, or if any ACM will be subject to sanding, grinding, or abrading, then there is likelihood that Category I nonfriable ACM will be regulated. Therefore, if any of these methods will be used during your demolition process, ACM subject to these work practices should be removed prior to start of work. Additionally, if ACM will be salvaged or removed prior to start of demolition by Contractor (e.g., floor tile, carpet, and windows) or Owner (e.g., auction), then applicable OSHA, EPA, and Health Department regulations should be followed.

1.8 FIELD CONDITIONS

- A. Owner will occupy portions of building immediately adjacent to selective demolition area. Conduct selective demolition so Owner's operations will not be disrupted.
 1. Comply with requirements specified in Division 01 Section "Summary."
- B. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.
 1. Owner will remove items indicated before selective demolition.
- C. Notify A/E of discrepancies between existing conditions and Drawings before proceeding with selective demolition.
- D. Hazardous Materials: It is not expected that hazardous materials will be encountered in the Work.
 1. If materials suspected of containing hazardous materials are encountered, do not disturb; immediately notify A/E and Owner. Owner will remove hazardous materials under a separate contract, unless otherwise noted.
- E. Existing Warranties: It is not expected that work will require removal, patching, or repair to materials and surfaces so as to void existing warranties. No work is to be done on the roof that may affect roof membrane. Notify Owner if any work effecting warranties must be performed.
- F. Storage or sale of removed items or materials on-site is not permitted.
- G. Utility Service: Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.
 1. Maintain fire-protection facilities in service during selective demolition operations.

1.9 COORDINATION

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

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Regulatory Requirements: Comply with governing EPA notification regulations before beginning selective demolition. Comply with hauling and disposal regulations at authorities having jurisdiction.

- B. Standards: Comply with ANSI/ASSP A10.6 and NFPA 241.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Review Project Record Documents of existing construction or other existing condition and hazardous material information provided by Owner. Owner does not guarantee that existing conditions are same as indicated in Project Record Documents.
- B. Survey existing conditions and correlate with requirements indicated to determine extent of selective demolition required.
- C. Inventory and record the condition of items to be removed and reinstalled and items to be removed and salvaged.
- D. When unanticipated mechanical, electrical, or structural elements that conflict with intended function or design are encountered, investigate and measure the nature and extent of conflict. Promptly submit a written report to A/E.

3.2 UTILITY SERVICES AND MECHANICAL/ELECTRICAL SYSTEMS

- A. Existing Services/Systems: Maintain services/systems indicated to remain and protect them against damage during selective demolition operations.
 - 1. Comply with requirements for existing services/systems interruptions specified in Division 01 Section "Summary."
- B. Existing Services/Systems to Be Removed, Relocated, or Abandoned: Locate, identify, disconnect, and seal or cap off indicated utility services and mechanical/electrical systems serving areas to be selectively demolished.
 - 1. If services/systems are required to be removed, relocated, or abandoned, provide temporary services/systems that bypass area of selective demolition and that maintain continuity of services/systems to other parts of building.
 - 2. Disconnect, demolish, and remove fire-suppression systems, plumbing, and HVAC systems, equipment, and components indicated to be removed.
 - a. Piping to Be Removed: Remove portion of piping indicated to be removed and cap or plug remaining piping with same or compatible piping material.
 - b. Piping to Be Abandoned in Place: Drain piping and cap or plug piping with same or compatible piping material.
 - c. Equipment to Be Removed: Disconnect and cap services and remove equipment.
 - d. Equipment to Be Removed and Reinstalled: Disconnect and cap services and remove, clean, and store equipment; when appropriate, reinstall, reconnect, and make equipment operational.
 - e. Equipment to Be Removed and Salvaged: Disconnect and cap services and remove equipment and deliver to Owner.
 - f. Ducts to Be Removed: Remove portion of ducts indicated to be removed and plug remaining ducts with same or compatible ductwork material.
 - g. Ducts to Be Abandoned in Place: Cap or plug ducts with same or compatible ductwork material.

3.3 PROTECTION

- A. Site Access and Temporary Controls: Conduct selective demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.
 - 1. Comply with requirements for access and protection specified in Division 01 Section "Temporary Facilities and Controls."
- B. Temporary Facilities: Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.

1. Provide protection to ensure safe passage of people around selective demolition area and to and from occupied portions of building.
 2. Provide temporary weather protection, during interval between selective demolition of existing construction on exterior surfaces and new construction, to prevent water leakage and damage to structure and interior areas.
 3. Protect walls, ceilings, floors, and other existing finish work that are to remain or that are exposed during selective demolition operations.
 4. Cover and protect furniture, furnishings, and equipment that have not been removed.
 5. Comply with requirements for temporary enclosures, dust control, heating, and cooling specified in Division 01 Section "Temporary Facilities and Controls."
- C. Temporary Shoring: Provide and maintain shoring, bracing, and structural supports as required to preserve stability and prevent movement, settlement, or collapse of construction and finishes to remain, and to prevent unexpected or uncontrolled movement or collapse of construction being demolished.
1. Strengthen or add new supports when required during progress of selective demolition.
 2. Cease operations of public safety or remaining structures are endangered. Perform temporary corrective measures until operations can be continued properly.
 3. Provide supporting lintels wherever openings of more than 8 inches for brick size units and 16 inches for CMU.
- D. Security: Provide adequate protection against accidental trespassing. Secure project after work hours.

3.4 SELECTIVE DEMOLITION, GENERAL

- A. General: Demolish and remove existing construction only to the extent required by new construction. Use methods required to complete the Work within limitations of governing regulations and as follows:
1. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. Use hand tools or small power tools designed for sawing or grinding, not hammering and chopping, to minimize disturbance of adjacent surfaces. Temporarily cover openings to remain.
 2. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
 3. Do not use cutting torches.
 4. Remove decayed, vermin-infested, or otherwise dangerous or unsuitable materials and promptly dispose of off-site.
 5. Remove structural framing members and lower to ground by method suitable to avoid free fall and to prevent ground impact or dust generation.
 6. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
 7. Dispose of demolished items and materials promptly.
- B. Removed and Salvaged Items:
1. Clean salvaged items.
 2. Pack or crate items after cleaning. Identify contents of containers.
 3. Store items in a secure area until delivery to Owner.
 4. Transport items to Owner's storage area off-site, unless otherwise noted.
 5. Protect items from damage during transport and storage.
- C. Removed and Reinstalled Items:
1. Clean and repair items to functional condition adequate for intended reuse. Paint equipment to match new equipment.
 2. Pack or crate items after cleaning and repairing. Identify contents of containers.
 3. Protect items from damage during transport and storage.
 4. Reinstall items in locations indicated. Comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make item functional for use indicated.

- D. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during selective demolition. When permitted by A/E, items may be removed to a suitable, protected storage location during selective demolition and cleaned and reinstalled in their original locations after selective demolition operations are complete.

3.5 SELECTIVE DEMOLITION PROCEDURES FOR SPECIFIC MATERIALS

- A. Concrete adjacent to Construction Indicated to Remain: Demolish in sections. Cut concrete full depth at junctures with construction to remain and at regular intervals, using power-driven saw, then remove concrete between saw cuts.
- B. Masonry: Demolish in small sections. Cut masonry at junctures with construction to remain, using power-driven saw, then remove masonry between saw cuts.
 - 1. Remove full size CMU without cutting, if possible, at areas to be patched. If cutting is required to provide a continuous pattern or to fit adjoining construction, cut units with motor-driven saws; provide clean, sharp, unchipped edges. Allow units to dry before patching. Install units with cut surfaces and, where possible, cut edges concealed.
 - 2. Refer to Division 04 Section "Unit Masonry" for salvaging masonry materials.
 - 3. Remove in an undamaged condition as many whole bricks as possible.
 - a. Remove mortar, loose particles, and soil from brick by cleaning with hand chisels, brushes, and water.
 - b. Remove sealants by cutting close to brick with utility knife and cleaning with solvents.
 - c. Store brick for reuse. Store off ground, on skids, and protected from weather.
- C. Thermostats with Mercury Switches: Remove mercury switch thermostats intact, if applicable. Containerize and transport thermostats to a wholesaler participating in a thermostat recycling program within 10 days.
- D. Explosives: Use of explosives or cutting torches is not permitted.

3.6 DISPOSAL OF DEMOLISHED MATERIALS

- A. General: Except for items or materials indicated to be recycled, reused, salvaged, reinstalled, or otherwise indicated to remain Owner's property, remove demolished materials from Project site and legally dispose of them in an EPA-approved landfill.
 - 1. Do not allow demolished materials to accumulate on-site.
 - 2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
- B. Burning: Do not burn demolished materials.
- C. Disposal: Transport demolished materials off Owner's property and legally dispose of them.

3.7 CLEANING/PATCHING

- A. Clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition operations. Return adjacent areas to condition existing before selective demolition operations began.
- B. Repair demolition performed in excess of that required. Return structures, substrates, 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.
 - 1. Refer to Division 01 Section "Cutting and Patching".

END OF SECTION 02 41 19

03

DIVISION

CONCRETE

SECTION 03 06 30.01 - CONCRETE SCHEDULE

SUBMIT THIS SCHEDULE TO CONCRETE SUPPLIER PRIOR TO BIDDING		
ITEM OR STRUCTURE	FINISH**	COMPRESSIVE STRENGTH AND OTHER REQUIREMENTS
Concrete slabs and concrete not otherwise indicated	SF-1.0 SF-2.0 if exposed	3500 P.S.I. at 28 days Slump Limit: 4 inches plus or minus 1 inch before adding water-reducing or plasticizing admixtures, with maximum slump less than 6 inches. Max W/C Ratio = 0.45 Use mid-range water reducer
Interior formed concrete exposed to view	SF-2.0, UON Ab-Fn, where noted	3500 P.S.I. at 28 days Max W/C Ratio = 0.45
Exposed interior floor slabs, unless otherwise noted	Tr-Fn1	4000 P.S.I. at 28 days Max W/C Ratio – 0.45 Use mid-range water reducer Slump Limit: 4 inches, plus or minus 1 inch, before adding water-reducing or plasticizing admixtures, with maximum slump less than 6 inches. Do not use high range water reducers. Air Content: Do not allow air content of troweled finished floors to exceed 3 percent.
Exterior formed concrete exposed to view; exterior concrete not otherwise indicated	NsBrm-Fn (Horizontal) Ab-Fn (Vertical)	4500 P.S.I. at 28 days Max W/C Ratio = 0.45 Use mid-range water reducer Air Content: 5.0 percent, plus or minus 1.5 percent at point of delivery for concrete containing 3/4 inch nominal maximum aggregate size.

**Refer to Section 03 30 53 – Miscellaneous Cast-In-Place Concrete for definitions of finishes.

END OF SECTION 03 06 30.01

SECTION 03 30 53 - MISCELLANEOUS CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section specifies cast-in-place concrete, including reinforcement, concrete materials, mixture design, placement procedures, and finishes.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Design Mixtures: For each concrete mixture.

1.3 QUALITY ASSURANCE

- A. Ready-Mix-Concrete Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C 94 requirements for production facilities and equipment.

PART 2 - PRODUCTS

2.1 CONCRETE, GENERAL

- A. Comply with ACI 301, "Specification for Structural Concrete," including the following sections, unless modified by requirements in the Contract Documents:
 - 1. "General Requirements."
 - 2. "Formwork and Formwork Accessories."
 - 3. "Reinforcement and Reinforcement Supports."
 - 4. "Concrete Mixtures."
 - 5. "Handling, Placing, and Constructing."
- B. Comply with ACI 117, "Specifications for Tolerances for Concrete Construction and Materials."

2.2 FORMWORK

- A. Furnish formwork and formwork accessories according to ACI 301.

2.3 STEEL REINFORCEMENT

- A. Reinforcing Bars: ASTM A 615, Grade 60, deformed.
- B. Plain-Steel Welded Wire Reinforcement: ASTM A 1064, fabricated from as-drawn steel wire into flat sheets.
- C. Reinforcement Accessories
 - 1. Joint Dowel Bars: ASTM A 615, Grade 60, plain-steel bars, cut bars true to length with ends square and free of burrs.
 - 2. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded wire reinforcement in place. Manufacturer bar supports from steel wire, plastic, or precast concrete according to CRSI's "Manual of Standard Practice" of greater compressive strength than concrete.

2.4 CONCRETE MATERIALS

- A. Cementitious Material: Use the following cementitious materials, of the same type, brand, and source throughout Project:

1. Portland Cement: ASTM C 150, Type I or III. Supplement cement as necessary to meet project conditions.
 - a. Fly Ash: ASTM C 618, Class C or F.
 - b. Ground Granulated Blast-Furnace Slag: ASTM C 989, Grade 100 or 120.
- B. Normal-Weight Aggregate: ASTM C 33, Class 3S, course aggregate or better, uniformly graded, 1-1/2-inch nominal maximum aggregate size.
- C. Water: ASTM C 94; potable.

2.5 ADMIXTURES

- A. Air-Entraining Admixture: ASTM C 260.
- B. Chemical Admixtures: Provide admixtures certified by manufacturer to be compatible with other admixtures and that will not contribute water-soluble chloride ions exceeding those permitted in hardened concrete. Do not use calcium chloride or admixtures containing calcium chloride. Admixtures shall conform to limit consistent with ACI 318 and ACI 301.
 1. Water-Reducing Admixture: ASTM C 494, Type A.
 2. Retarding Admixture: ASTM C 494, Type B.
 3. Water-Reducing and Retarding Admixture: ASTM C 494, Type D.
 4. High-Range, Water-Reducing Admixture: ASTM C 494, Type F.
 5. High-Range, Water-Reducing and Retarding Admixture: ASTM C 494, Type G.
 6. Plasticizing and Retarding Admixture: ASTM C 1017, Type II.

2.6 CURING MATERIALS

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

2.7 CONCRETE MIXTURES

- A. Comply with ACI 301 requirements for concrete mixtures.
- B. Normal-Weight Concrete: Prepare design mixes, proportioned according to ACI 301, as follows:
 1. Minimum Compressive Strength: As indicated on Concrete Schedule.
 2. Maximum Water-Cementitious Materials Ratio: As indicated on Concrete Schedule.
 3. Slump Limit: 4 inches or 8 inches for concrete with verified slump of 2 to 4 inches before adding high-range water-reducing admixture or plasticizing admixture, plus or minus 1 inch.
 4. Air Content: Maintain within range permitted by ACI 301. Do not allow air content of floor slabs to receive troweled finishes to exceed 3 percent.

2.8 PATCHING AND REPAIR MATERIALS

- A. Epoxy Crack Injection Adhesive (Repair): ASTM C881, Type I, Grade 1, solvent free.
 1. Products:
 - a. Sikadur 35 Hi-Mod LV; Sika Corp.
 - b. Sure-Inject J56; Dayton Superior Corp.
 - c. EUCO #452 LV; Euclid Chemical Co.
 - d. MasterInject 1500; Construction Systems.
 - e. Pro-Poxy 100; Unitex
- B. Job-Mixed Patching Mortar: 1 part portland cement complying with ASTM C 150, Type I, II, or III and 2-1/2 parts fine aggregate complying with ASTM C 144, except 100 percent passing a No. 16 (1.18-mm) sieve.

- C. Cementitious Patching Mortar: Packaged, dry mix complying with ASTM C 928.
1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Cementitious Patching Mortar:
 - 1) Hicap; Kaufman Products, Inc.
 - 2) MasterEmaco S466 CI, MasterEmaco S 477 CI, or MasterEmaco S 488 CI; Construction System.
 - 3) Sikarepair 223 or Sikarepair SHB; Sika Corporation.
 - 4) Deep Pour Mortar; Sonneborn; Div. of ChemRex.
 - 5) Sto Full-Depth Repair Mortar; Sto Corp., Concrete Restoration Division.
 - 6) MasterEmaco S 440 MC; Construction System.
 - b. Cementitious Patching Mortar, Rapid Setting:
 - 1) Pro Patching Cement; CGM, Incorporated.
 - 2) Day-Chem Perma-Patch, Re-Crete 5 Minute, or Re-Crete 20 Minute; Dayton Superior Corporation.
 - 3) Euco-Speed; Euclid Chemical Company (The).
 - 4) FX-928 Rapid Hardening Mortar; Fox Industries, Inc.
 - 5) Duracrete; Kaufman Products, Inc.
 - 6) Sealtight Meadow-Patch 5, Sealtight Meadow-Patch 20, or Sealtight Futura-15; Meadows, W. R. Inc.
 - 7) Sikaset Roadway Patch; Sika Corporation.
 - 8) Road Patch; Sonneborn, Div. of ChemRex.
 - 9) Sto Rapid Repair Mortar. Sto Corp., Concrete Restoration Division.
 - 10) Speed Crete 2028; Tamms Industries, Inc.
 - 11) MasterEmaco T 1060 or MasterEmaco T 1061; Construction System.
 - 12) Patch Set 928; Unitex.
 - 13) US Spec Transpatch; US MIX Products Company.
 - 14) Wabo Renew 100; Watson Bowman Acme Corp., Admixtures, Inc.

2.9 CONCRETE MIXING

- A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete according to ASTM C 94, and furnish batch ticket information.
1. When air temperature is above 90 deg F, reduce mixing and delivery time to 60 minutes.
- B. Project-Site Mixing: Measure, batch, and mix concrete materials and concrete according to ASTM C 94. Mix concrete materials in appropriate drum-type batch machine mixer.
1. For mixer capacity of 1 cu. yd. or smaller, continue mixing at least 1-1/2 minutes, but not more than 5 minutes after ingredients are in mixer, before any part of batch is released.
 2. For mixer capacity larger than 1 cu. yd., increase mixing time by 15 seconds for each additional 1 cu. yd.
 3. Provide batch ticket for each batch discharged and used in the Work, indicating Project identification name and number, date, mix type, mix time, quantity, and amount of water added. Record approximate location of final deposit in structure.

PART 3 - EXECUTION

3.1 FORMWORK

- A. Design, construct, erect, brace, and maintain formwork according to ACI 301.

3.2 EMBEDDED ITEMS

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

3.3 STEEL REINFORCEMENT

- A. Comply with CRSI's "Manual of Standard Practice" for fabricating, placing, and supporting reinforcement.

1. Do not cut or puncture vapor retarder. Repair damage and reseal vapor retarder before placing concrete.

3.4 CONCRETE PLACEMENT

- A. Comply with ACI 301 for measuring, batching, mixing, transporting, and placing concrete.
- B. Before test sampling and placing concrete, water may be added at Project site, subject to limitations of ACI 301.
- C. Equipment Bases and Foundations:
 1. Coordinate sizes and locations of concrete bases with actual equipment provided.
 2. Construct concrete bases 4 inches high, unless otherwise indicated; and extend base not less than 6 inches in each direction beyond the maximum dimensions of supported equipment unless otherwise indicated.
 3. Minimum Compressive Strength: 4000 psi at 28 days, unless otherwise noted.
 4. Install dowel rods to connect concrete base to concrete floor. Unless otherwise indicated, install dowel rods on 18-inch centers around the full perimeter of concrete base.
 5. For supported equipment, install epoxy-coated anchor bolts that extend through concrete base, and anchor into structural concrete substrate.
 6. Prior to pouring concrete, place and secure anchorage devices. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
 7. Cast anchor-bolt insert into bases. Install anchor bolts to elevations required for proper attachment to supported equipment.

3.5 FINISHING FORMED SURFACES

- A. General: Refer to Concrete Schedule for location.
- B. Rough-Formed Finish (SF-1.0): As-cast concrete texture imparted by form-facing material with tie holes and defective areas repaired and patched. Remove fins and other projections exceeding 1/2 inch.
- C. Smooth-Formed Finish (SF-2.0): As-cast concrete texture imparted by form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams. Repair and patch tie holes and defective areas. Remove fins and other projections exceeding 1/8 inch.
- D. Rubbed Finish: Apply the following rubbed finish, defined in ACI 301, to smooth-formed finished as-cast concrete where indicated:
 1. Smooth-rubbed finish (Ab-Fn).
- E. Related Unformed Surfaces: At tops of walls, horizontal offsets, and similar unformed surfaces adjacent to formed surfaces, strike off smooth and finish with a texture matching adjacent formed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces, unless otherwise indicated.

3.6 FINISHING UNFORMED SURFACES

- A. General: Comply with ACI 302.1R for screeding, restraighening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.
- B. Screed surfaces with a straightedge and strike off. Begin initial floating using bull floats or darbies to form a uniform and open-textured surface plane before excess moisture or bleedwater appears on surface.
 1. Do not further disturb surfaces before starting finishing operations.
- C. Float Finish: Apply float finish to surfaces indicated, to surfaces to receive trowel finish.

- D. Trowel Finish: Apply a hard trowel finish to surfaces indicated and to floor and slab surfaces exposed to view.
- E. Nonslip Broom Finish: Apply a nonslip broom finish to surfaces indicated and to exterior concrete platforms, steps, and ramps. Immediately after float finishing, slightly roughen trafficked surface by brooming with fiber-bristle broom perpendicular to main traffic route.

3.7 CONCRETE PROTECTING AND CURING

- A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 306.1 for cold-weather protection and with ACI 301 for hot-weather protection during curing.
- B. Begin curing after finishing concrete but not before free water has disappeared from concrete surface.
- C. Curing Methods: Cure formed and unformed concrete for at least seven days by one or a combination of the following method:
 - 1. Curing and Sealing Compound: Apply uniformly to floors and slabs indicated in a continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Repeat process 24 hours later and apply a second coat. Maintain continuity of coating and repair damage during curing period.

3.8 CONCRETE SURFACE REPAIRS

- A. General: Comply with manufacturer's written instructions and recommendations for application of products, including surface preparation.
- B. Patching Mortar: Unless otherwise recommended by manufacturer apply as follows:
 - 1. Wet substrate thoroughly and then remove standing water. Scrub a slurry of neat patching mortar into substrate, filling pores and voids.
 - 2. Place patching mortar by troweling toward edges of patch to force intimate contact with edge surfaces. For large patches, fill edges first and then work toward center, always troweling toward edges of patch.
 - 3. Wet-cure cementitious patching materials for not less than seven days by water-fog spray or water-saturated absorptive cover.

3.9 CONCRETE WASTE DISPOSAL

- A. Salvageable Materials: Unless otherwise indicated, excess concrete materials are Contractor's property. At completion of work, remove from Project site.
 - 1. Legally dispose of waste off Owner's property.

END OF SECTION 03 30 53

04

DIVISION

MASONRY

SECTION 04 20 00.00 - UNIT MASONRY

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes alterations/restorations to existing masonry work to accommodate new HVAC modifications.
- B. Products installed, but not furnished, under this Section include the following:
 - 1. Steel lintels for unit masonry, furnished under Division 05 Section "Metal Fabrications".
 - 2. Conduits and plumbing will be provided under Division 21 – Fire Suppression, Division 22 – Plumbing, Division 23 – Heating, Ventilating, and Air Conditioning, Division 26 – Electrical, Division 27 – Communications, and Division 28 – Electronic Safety and Security.

1.2 REFERENCES

- A. Definitions
 - 1. General: Definitions, glossary and terminology used in this Section are from the National Concrete Masonry Association TEK 01-04.
- B. Very Low-Pressure Spray: Under 100 psi.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.
 - 1. Flexible flashing materials, including manufacturer's written installation instructions.
 - 2. Typical installation methods with requirements to accommodate specific site conditions.
- B. Samples for Verification: For each type and color of the following:
 - 1. Face brick, in the form of straps of five or more bricks, if salvaged units are of insufficient quantity.
 - a. Provide each type of masonry unit to be used for replacing existing units. Include sets of samples as necessary to show the full range of shape, color, and texture to be expected.
 - 1) For each brick type, provide straps or panels containing at least four bricks. Include multiple straps for brick with a wide range.
 - 2. Pigmented mortar(s) if necessary to match existing. Make Samples using same sand and mortar ingredients to be used on Project. Label Samples to indicate types and amounts of pigments used.
 - a. Provide each type, color, and texture of pointing mortar in the form of sample mortar strips, 6 inches long by 1/2 inch wide, set in aluminum or plastic channels.
 - 1) Include with each sample a list of ingredients with proportions of each. Identify sources, both supplier and quarry, of each type of sand and brand names of cementitious materials and pigments if any.

1.4 INFORMATIONAL/QUALITY ASSURANCE/CONTROL SUBMITTALS

- A. Qualification Data: For restoration specialists, including field supervisors and restoration workers.
- B. Material Certificates: Include statements of material properties indicating compliance with requirements including compliance with standards and type designations within standards. Provide for each type and size of the following:
 - 1. Masonry units.
 - a. Provide material test reports substantiating compliance with requirements, if requested.

2. CMU: Upon regular presentation within past 12 months of representative units by approved manufacturer, a test report from an independent laboratory showing resultant weight, compressive strength (based on net area), and water absorption properties, as well as adherence to standards where so specified, for:
 - a. Each proposed type and size of concrete masonry units.
 - b. Test reports shall conform to ASTM C140 and shall include:
 - 1) Name of Manufacturer
 - 2) Date of Manufacture of Test Specimen
 - 3) Dimension Measurements (in.)
 - 4) Calculated Gross Area (sq.in.)
 - 5) Calculated Net Area (sq.in.)
 - 6) Total Load (lbs.)
 - 7) Net Unit Load (psi)
 - 8) Sample Weight (lbs.)
 - 9) Dry Weight (lbs.)
 - 10) Wet Weight (lbs.)
 - 11) Immersed Weight (lbs.)
 - 12) Density (pcf)
 - 13) Moisture Content (%)
 - 14) Absorption (%)
 - 15) Linear Shrinkage Coefficient (%)
 3. Cementitious materials. Include brand, type, and name of manufacturer.
 4. Mortar admixtures.
 5. Preblended, dry mortar mixes. Include description of type and proportions of ingredients.
 6. Grout mixes. Include description of type and proportions of ingredients.
 7. Joint reinforcement.
 8. Anchors, ties, and metal accessories.
- C. Mix Designs: For each type of mortar and grout. Include description of type and proportions of ingredients.
1. Include test reports, per ASTM C 780, for mortar mixes required to comply with property specification.
 2. Include test reports, per ASTM C 1019, for grout mixes required to comply with compressive strength requirement. For both fine and course grouts including complete identities and proportions of ingredients.
 - a. Weight of each ingredient including water.
 - b. Measured slump.
 - c. Water/cement ratio.
 - d. Sieve analysis for aggregates.
- D. Cold-Weather and Hot-Weather Procedures: Detailed description of methods, materials, and equipment to be used to comply with cold-weather requirements.

1.5 QUALITY ASSURANCE

- A. Installer
1. Engage an experienced masonry restoration and cleaning firm to perform work of this Section. Firm shall have completed work similar in material, design, and extent to that indicated for this project with a record of successful in-service performance. Experience installing standard unit masonry is not sufficient experience for masonry restoration work.
 2. Flashing Assemblies: All masonry flashing assemblies shall be installed by masonry craft workers who have completed the International Masonry institute (1-800-IMI-0988) upgrade training course for "Masonry Flashing" or a similar program by flashing manufacturer approved by A/E.
 - a. Instructor/Flashing Manufacturer's Representative conducting training for flashing installation shall:
 - 1) Assist/review flashing at "mockup".
 - 2) Pay at least one other visit to the Project site at the A/E's direction.

3. At least one supervisory journeyman who shall be present at all times during execution of work, who shall be thoroughly familiar with design requirement, type of materials being installed, reference standards and other requirements, and who shall direct all work performed at jobsite.
- B. Cleaning and Repair Appearance Standard: Cleaned and repaired surfaces are to have a uniform appearance as viewed from 20 feet away by A/E. Perform spot cleaning of small areas that are noticeably different, so that surface blends smoothly into surrounding areas.
- C. Mockups: Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution. Do not proceed with work prior to receipt of written acceptance of mockup by A/E. In general, first-in-place masonry items and associated work i.e. louver shall be considered "mockups" and must be reviewed by A/E before similar work advances.
 1. Build mockup of first louver installed in a new opening. Include the following:
 - a. Mortar of correct color and strength; including pointing mortar;
 - b. Loose lintel;
 - c. Flashing (including terminations, plane changes, and end dams); and
 - d. Expansion joints.
 2. Prior to starting general masonry cleaning, prepare mock-up for cleaning using the same cleaning materials and methods proposed for the Work, and under same weather conditions to be expected during cleaning. Obtain A/E's acceptance of visual qualities before proceeding with masonry restoration. Record cleaning process and results of all testing.
 - a. Test materials and methods on samples of adjacent non-masonry materials for possible reaction with cleaning materials, except where materials and methods are known to have a deleterious effect on such materials.
 - b. Allow a waiting period of the duration indicated, but not less than 7 calendar days, after completion of sample cleaning to permit a study of sample panels for negative reactions.
 3. Approval of mockups is for color, texture, and blending of masonry units; relationship of mortar and sealant colors to masonry unit colors; tooling of joints; and aesthetic qualities of workmanship. Panel shall be used as a standard of comparison for all masonry work built of same material.
 - a. Approval of mockups is also for other material and construction qualities specifically approved by A/E in writing.
 - b. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless such deviations are specifically approved by A/E in writing.
 4. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Store masonry units on elevated platforms in a dry location to prevent contamination by mud, dust or materials likely to cause staining or other defects. If units are not stored in an enclosed location, cover tops and sides of stacks with waterproof sheeting, securely tied. If units become wet, do not install until they are dry.
 1. Cover masonry units at all times.
- B. Store cementitious materials on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.
 1. Deliver cementitious and other packaged materials in unopened containers, plainly marked and labeled with manufacturers' names and brands.
 2. Handle cementitious materials in a manner that will prevent the inclusion of foreign materials and damage by water or dampness.
- C. Store aggregates where grading and other required characteristics can be maintained and contamination avoided.
 1. Stockpile and handle aggregates to prevent contamination from foreign materials. Store different aggregates separately.

2. Store sand on tarps to keep ground water from wicking into sand.
- D. Deliver pre-blended, dry mortar mix in moisture-resistant containers designed for lifting and emptying into dispensing silo. Store pre-blended, dry mortar mix in delivery containers on elevated platforms, under cover, and in a dry location or in a metal dispensing silo with weatherproof cover.
- E. Store masonry accessories, including metal items, to prevent corrosion and accumulation of dirt and oil.
 1. Deliver flexible flashing materials and components in manufacturer's original, unopened, undamaged containers with identification labels intact.
 2. Store flexible flashing materials as recommended by manufacturer. Keep away from open flame or sources of ignition.

1.7 FIELD CONDITIONS

- A. Refer to Division 01 Section "Product Requirements".
 1. Do not apply flexible flashing on wet or damp surfaces.
 2. Apply flashing to surfaces free of dirt, oils, lubricants, and other debris.
 3. Install flexible flashing materials at temperature above 40 deg. F. At temperature below 40 deg. F., apply primer in accordance with flashing manufacturer's recommendations, prior to installation of flashing.
 4. Do not use metal reinforcements or ties coated with loose rust or other coatings, including ice, which will reduce bond.
- B. Protection of Masonry: During construction, cover tops of walls, projections, and sills with waterproof sheeting at end of each day's work. Cover partially completed masonry when construction is not in progress. Refer to Section 1.8B ("Masonry Protection") in TMS 402/602.
- C. Cold-Weather Requirements: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen substrates. Remove and replace unit masonry damaged by frost or by freezing conditions. Comply with NCMA TEK 03-01C. Comply with cold-weather construction requirements contained in TMS 402/602.
- D. Hot-Weather Requirements: Comply with hot-weather construction requirements contained in TMS 402/602.
- E. Repair masonry units and repoint mortar joints only when air temperature is between 40 and 90 deg. F and is predicted to remain so for at least 7 days after completion of the work unless otherwise indicated.
- F. For manufactured repair materials, perform work within the environmental limits set by each manufacturer.
- G. Clean masonry surfaces only when air temperature is 40 deg. F and above and is predicted to remain so for at least 7 days after completion of cleaning.

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. Products: Subject to compliance with requirements, provide one of the products specified.
 2. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.

- B. Products of other manufacturers will be considered for acceptance provided they equal or exceed the material requirements and functional qualities of the specified product. The "Substitution Request Form" and complete technical data for evaluation must accompany request for A/E's approval. All materials for evaluation must be received by the Project Manager and Specification Department at least 10 days prior to bid due date. Additional approved manufacturers will be issued by Addendum.

2.2 PERFORMANCE REQUIREMENTS

- A. Regulatory Requirements: Comply with the provisions of the following codes, specifications, and standards, except as otherwise shown or specified:
1. TMS 402/602 "Building Code Requirements and Specification for Masonry Structures."
 - a. Maintain one copy of the standard in project field office at all times during construction. Contractor's supervisory personnel shall be thoroughly familiar with this material as it applies to the project and shall be present at all times and direct work performed under this Section.
 2. National Concrete Masonry Association (NCMA)
 - a. NCMA TEK Bulletin 03-01C "All Weather Concrete Masonry Construction".
 - b. NCMA TEK Bulletin 03-08A "Concrete Masonry Construction".
 - c. NCMA TEK Bulletin 03-4C "Bracing Concrete Masonry Walls Under Construction".
 - d. NCMA TEK Bulletin 09-01A "Mortars for Concrete Masonry."
 - e. NCMA TEK Bulletin 10-01A "Crack Control in Concrete Masonry Walls".
 - f. NCMA TEK Bulletin 10-02D "Control Joints for Concrete Masonry Walls – Empirical Method".
 - g. NCMA TEK Bulletin 19-04A "Flashing Strategies for Concrete Masonry Walls".
 - h. NCMA TEK Bulletin 19-05A "Flashing Details for Concrete Masonry Walls."
 3. International Masonry Industry All-Weather Council (IMIABC).
 - a. "Recommended Practices and Guide Specifications for Cold Weather Masonry Construction – 1993".
 4. International Masonry Institute
 - a. "Internal Bracing Design Guide for Masonry Walls Under Construction".
 - b. Detailing Series.
 5. Brick Industry Association (BIA)
 - a. BIA Technical Notes No. 1 – Revised 1992: All weather construction.
 - b. BIA M1-88: Specifications for Portland Cement Lime Mortar for Brick Masonry.
 - c. BIA Technical Notes No. 7 – Water Penetration Resistance – Design and Detail.
 - d. BIA Technical Notes No. 18A – Accommodating Expansion of Brickwork.
 - e. BIA Technical Notes No. 20 – Revised 1990: Cleaning Brick Masonry.
 - f. BIA Technical Notes No. 28B – Revised 1987: Brick Veneer.

2.3 MASONRY UNITS, GENERAL

- A. Masonry Standard: Comply with ACI/ASCE 6/TMS 602, unless modified by requirements in the Contract Documents.
- B. Defective Units: Referenced masonry unit standards may allow a certain percentage of units to exceed tolerances and to contain chips, cracks, or other defects exceeding limits stated in the standard. Do not use units where such defects, including dimensions that vary from specified dimensions by more than stated tolerances, will be exposed in the completed Work or will impair the quality of completed masonry.

2.4 CONCRETE MASONRY UNITS (CMUs)

- A. Shapes: Provide shapes indicated and as follows:
1. Provide special shapes for lintels, corners, jambs, sashes, movement joints, headers, bonding, and other special conditions.
 - a. Match existing adjacent materials.
- B. Concrete Masonry Units: ASTM C 90.
1. Unit Compressive Strength: Provide units with minimum average net-area compressive strength of 1900 psi.

2. Weight Classification: Normal weight.
3. Exposed Faces: Manufacturer's standard color and texture, unless otherwise indicated.

2.5 MASONRY LINTELS

- A. Masonry Lintels: Prefabricated masonry lintels made from specially formed "U" shaped lintel units with reinforcing bars placed as indicated and filled with coarse grout. Open-bottom, bond-beam type units are not acceptable for use as reinforced lintels. Cure prefabricated lintels before handling and installing. Temporarily support built-in-place lintels until cured. Prefabricated lintels shall have a faux head joint pattern on their exposed faces, and shall have their top side clearly marked in the factory. Prefabricated lintels are to be installed such that the faux head joint pattern aligns with that of the surrounding masonry.

2.6 BRICK

- A. Face Brick: Provide face brick, including specially molded, ground, cut, or sawed shapes where required to complete masonry restoration work and salvaged brick is unavailable.
 1. Provide units with colors, color variation within units, surface texture, size, and shape to match existing brickwork and with physical properties within 10 percent of those determined from preconstruction testing of selected existing units.
 - a. For existing brickwork that exhibits a range of colors or color variation within units, provide brick that proportionally matches that range and variation rather than brick that matches an individual color within that range.
 2. Special Shapes:
 - a. Provide specially molded, 100 percent solid shapes for applications where core holes or "frogs" could be exposed to view or weather when in final position and where shapes produced by sawing would result in sawed surfaces being exposed to view.
 - b. Provide specially ground units, shaped to match patterns, for arches and where indicated.
 - c. Mechanical chopping or breaking brick, or bonding pieces of brick together by adhesive, are not acceptable procedures for fabricating special shapes.
 3. Tolerances as Fabricated: Comply with tolerance requirements in ASTM C 216, Type FBS.
- B. Salvaged Brick: Obtain salvaged brick from selective demolition. Clean off residual mortar.

2.7 MORTAR MATERIALS

- A. Portland Cement: ASTM C 150, Type I, except Type III may be used for cold-weather construction. Provide natural color or white cement as required to produce mortar color(s) indicated.
 1. Alkali content shall not be more than 0.6 percent when tested according to ASTM C 114.
- B. Hydrated Lime: ASTM C 207, Type S.
- C. Portland Cement-Lime Mix: Packaged blend of portland cement complying with ASTM C 150, Type I or Type III, and hydrated lime complying with ASTM C 270, Type S.
- D. Masonry Cement: ASTM C 91 veneer only.
 1. Products:
 - a. Brixment or Velvet; Essroc, Italcementi Group.
 - b. Mortamix Masonry Cement or Rainbow Mortamix Custom Buff Masonry Cement or White Mortamix Masonry Cement; Holcim (US) Inc.
 - c. Magnolia Masonry Cement or Lafarge Masonry Cement or Trinity White Masonry Type S or Trinity White Masonry Type N; Lafarge North America Inc.
 - d. Lehigh Masonry Cement or Lehigh White Masonry Cement; Lehigh Cement Company.
 - e. Richmortar; CEMEX.
 - f. Miami Masonry Cement; Fairborn Cement Company.

- E. Mortar Cement: ASTM C 1329.
- F. Mortar Pigments (if needed to match existing): Natural and synthetic iron oxides and chromium oxides, compounded for use in mortar mixes and complying with ASTM C 979. Use only pigments with a record of satisfactory performance in masonry mortar.
1. Products:
 - a. Bayferrox Iron Oxide Pigments; Bayer Corporation, Industrial Chemicals Div.
 - b. True Tone Mortar Colors; Davis Colors.
 - c. MasterColor; Master Builders Solutions.
 - d. SGS Mortar Colors; Solomon Grind-Chem Services, Inc.
 - e. Prism Pigments, a Division of Mix Manufacturing, Inc.
 - f. Euclid Chemical Company.
 - g. Lanxess Corp.
 - h. Acme-Hardesty Co., Acme-Shield Plus Admixture; Cargill.
- G. Colored Cement Product (if needed to match existing): Packaged blend made from Portland cement and lime, masonry cement, or mortar cement and mortar pigments, all complying with specified requirements, and containing no other ingredients.
1. Products:
 - a. Colored Portland Cement-Lime Mix:
 - 1) Rainbow Mortamix Custom Color Cement/Lime; Holcim (US) Inc.
 - 2) Eaglebond; Lafarge North America Inc.
 - 3) Lehigh Custom Color Portland/Lime Cement; Lehigh Cement Company.
 - 4) Color Mortar Blend; Glen-Gery Corp.
 - 5) Salyor's PLUS; Essroc.
 - 6) PCL; CEMEX.
 - b. Colored Masonry Cement:
 - 1) Flamingo-Brixment; Essroc, Italcementi Group.
 - 2) Rainbow Mortamix Custom Color Masonry Cement; Holcim (US) Inc.
 - 3) Magnolia Masonry Cement; Lafarge North America Inc.
 - 4) Lehigh Custom Color Masonry Cement; Lehigh Cement Company.
 - 5) Coosa Masonry Cement; National Cement Company, Inc.
 - 6) Richcolor Masonry Cement; CEMEX.
 - 7) Miamicolor Masonry Cement; Fairborn Cement Company.
 2. Formulate blend as required to produce color(s) indicated or, if not indicated, as selected from manufacturer's standard colors.
 3. Pigments shall not exceed 10 percent of Portland cement by weight.
 4. Pigments shall not exceed 5 percent of masonry cement or mortar cement by weight.
- H. Aggregate for Mortar: ASTM C 144.
1. For mortar that is exposed to view, use washed aggregate consisting of natural sand or crushed stone, necessary to produce required mortar color.
 2. For joints less than 1/4 inch thick, use aggregate graded with 100 percent passing the No. 16 sieve.
- I. Admixtures, General:
1. No air-entraining admixtures or material containing air-entraining admixtures.
 2. No antifreeze compounds shall be added to mortar.
 3. No admixtures containing chlorides shall be added to mortar.

2.8 REINFORCEMENT

- A. Masonry Joint Reinforcement, General: ASTM A 951 and as necessary to accommodate new work.
1. Fabricate from cold-drawn steel wire complying with ASTM A82, with deformed or embossed continuous side rods and plain cross-rods, with unit width of 1-1/2 to 2 inches less than thickness of wall or partition.
 2. Wire shall be galvanized in accordance with the following:
 - a. Joint reinforcement, wire ties, or anchors in exterior walls or a mean relative humidity exceeding 75 percent
 - 1) ASTM A153, Class B (1.50 oz. per sq.ft.)

- b. Sheet metal ties or anchors in exterior walls or a mean relative humidity exceeding 75 percent
 - 1) ASTM A153, Class B (1.50 oz. per sq.ft.)
 - 3. All ladder type joint reinforcing shall have cross rods spaced at 16 inches o.c.
 - 4. All ladder type joint reinforcing shall be lapped 6 inches minimum.
 - 5. All ladder type joint reinforcing shall be discontinuous across movement joints.

2.9 TIES AND ANCHORS

- A. Wire Ties, General: Unless otherwise indicated, size wire ties to extend at least halfway through veneer but with at least 5/8-inch cover on outside face. Outer ends of wires are bent 90 degrees and extend 2 inches parallel to face of veneer.
 - 1. Ensure components and materials are compatible with specified accessories and adjacent materials.
- B. Materials: Provide ties and anchors specified in subsequent paragraphs that are made from materials that comply with subparagraphs below, unless otherwise indicated.
 - 1. Hot-Dip Galvanized, Carbon-Steel Wire: ASTM A 1064; with ASTM A 153, Class B-2 coating, unless otherwise noted.
 - 2. Steel Sheet, Galvanized after Fabrication: ASTM A 1008, Commercial Steel, hot-dip galvanized after fabrication to comply with ASTM A 153, unless otherwise noted.
- C. Individual Wire Ties: Rectangular units with closed ends and not less than 4 inches wide.
 - 1. Z-shaped ties with ends bent 90 degrees to provide hooks not less than 2 inches long may be used for masonry constructed from solid units or hollow units laid with cells horizontal.
 - 2. Where wythes do not align or are of different materials, use adjustable ties with pintle-and-eye connections having a maximum adjustment of 1-1/4 inches.
 - 3. Wire: Fabricate from 3/16-inch diameter, hot-dip galvanized steel wire.

2.10 MISCELLANEOUS ANCHORS

- A. Masonry Repair Anchors, Expansion Type: Mechanical fasteners designed for masonry veneer stabilization consisting of 1/4-inch- diameter, Type 304 stainless-steel rod with brass expanding shells at each end and water-shedding washer in the middle. Expanding shells shall be designed to provide positive mechanical anchorage to veneer on one end and backup masonry on the other.
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Torq-Lok. BLOK-LOK Limited;
 - b. Dur-O-Wal Repair Anchor or Dur-O-Wal Panel Anchor. Dur-O-Wal, a division of Dayton Superior;
 - c. #521RA-B Restoration Anchor. Hohmann & Barnard, Inc.;
- B. Masonry Repair Anchors, Spiral Type: Type 304 stainless-steel spiral rods designed to anchor to backing and veneer. Anchors are flexible in plane of veneer but rigid perpendicular to it.
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Spira-Lok; BLOK-LOK Limited.
 - b. Dur-O-Pair Resin Anchor or Dur-O-Flex Friction Pin Anchor; Dur-O-Wal, a division of Dayton Superior.
 - c. #391 Remedial Tie; Heckmann Building Products Inc.
 - d. Helix Spiro-Ties; Hohmann & Barnard, Inc.
 - e. Stitch-Tie Helical Wall Tie Anchor; Construction Tie Products, Inc.

2.11 EMBEDDED FLASHING MATERIALS

- A. Metal Flashing: Provide metal flashing, where flashing is exposed or partly exposed and where indicated, complying with SMACNA's "Architectural Sheet Metal Manual" and as follows:
 - 1. Reglets/Receivers: Units of type, material, and profile indicated, formed to provide secure interlocking of separate reglet and counterflashing pieces, and compatible with flashing indicated with mitered and welded corners and junctions.
 - a. Materials, provide one of the following:

- 1) Stainless Steel: 0.0187 inch thick (fka 26 gauge).
 - 2) Pre-Painted Metallic-Coated Steel: 0.0217 inch thick (fka 26 gauge).
 - b. Masonry Type: Provide extension leg to extend to face of inner CMU wythe (or sheathing with a veneer wall configuration) with an off-set top flange.
 2. Metal Terminations for Flexible Flashing: Fabricate from 26 or 28 gauge stainless steel. Extend into wall as indicated (but not less than 3 inches) and out to exterior face of wall. At exterior face of wall, bend metal down at an angle and back on itself for 3/4 inch to form a drip edge.
 - a. Provide a bead of elastomeric silicone sealant between lintel and drip edge to prevent water from wicking back onto lintel.
 - b. Provide hemmed edge turning back 180 degrees to be flush with face of veneer at base of wall only.
 3. Stainless steel end dams may also be used in conjunction with flexible flashing.
- B. Flexible Flashing: For flashing not exposed to the exterior, use the following, unless otherwise indicated:
1. Provide one of the following:
 - a. York 304 SA Self-Adhered, Stainless Steel; York Manufacturing, Inc.
 - b. Gorilla Flash SS Peel and Stick Butyl; STS Coatings, Inc.
 - c. IPCO Self-Adhesive Stainless Steel; Illinois Products, Inc.
 - d. TK Self-Adhering Stainless Steel TWF; TK Products, Inc.
 - e. Mighty-Flash-SA; Hohmann and Barnard Inc.
 - f. Bond-N-Flash S.A.; Wire Bond
 2. Characteristics/Properties
 - a. Type: Stainless steel core with one stainless steel face with a butyl block co-polymer adhesive.
 - b. Stainless steel type: 304, ASTM A 167.
 - c. Adhesive: Block co-polymer.
 - d. Size: Manufacturer's standard width rolls.
 - e. Performance attributes
 - 1) Tensile strength, > 90,000 psi
 - 2) Puncture resistance, > 2,500 pounds average
 - 3) When tested as manufactured, product resists growth of mold pursuant to test method ASTM D 3273.
 3. Accessories: Products shall be as recommended by flashing manufacturer
 - a. Polyether Sealant
 - 1) UniverSeal US-100; York Manufacturing, Inc.
 - 2) GreatSeal LT-100; STS Coatings, Inc.
 - 3) R-Guard Joint Seam Sealer; Prosoco, Inc.
 - 4) HB Sealant; Hohmann and Barnard Inc.
 - 5) Quick Set Sealant; Wire Bond
 - b. Splice Tape/Transition Flashing (Self Adhered)
 - 1) York 304SS; York Manufacturing, Inc.
 - 2) IPCO Self-Adhering Stainless Steel Flashing; Illinois Products, Inc.
 - 3) X-Seal Splice Tape; Hohmann and Barnard Inc.
 - 4) Anchorseal Tape; Wire Bond
 - c. Corner and End Dams: Use only 26 gauge stainless steel pre-manufactured corners.
 - d. Water-Based Primer: Provide when recommended by manufacturer for application indicated.
 - 1) Primer-SA; Hohmann and Barnard Inc.
 - 2) Aqua Flash Primer; Wire Bond
- C. Adhesives, Mastic, Sealant, Primers, and Seam Tapes for Flashings: Flashing manufacturer's standard products or products recommended by flashing manufacturer for bonding flashing sheets to each other and to substrates.
- D. Termination Bar: 26 gauge, minimum predrilled stainless-steel approximately 1-1/2 inch wide by 8 foot sections, 45 deg. lip at top for sealant, to be used at top of flashing to secure it to backup.
1. Acceptable Manufacturers/Products

- a. T-2 Termination Bar; Hohmann & Barnard, Inc.
- b. #4210 Termination Bar; Wire-Bond.
- c. Stainless Steel Accessories 45; York Flashings.
- d. Stainless Steel Termination Bar; IPCO.

2.12 MISCELLANEOUS MASONRY ACCESSORIES

- A. Compressible Filler: Premolded filler strips complying with ASTM D 1056, Grade 2A1; compressible up to 35 percent; of width and thickness indicated; formulated from neoprene or urethane.
 - 1. Products:
 - a. Neo-Seal IV 2218-3/Everlastic 1056 Joint Filler; Williams Products, Inc.
 - b. #NS-Closed Cell Neoprene Sponge; Hohmann and Barnard, Inc.
 - c. Neocell; IPCO.
 - d. #NS-Closed Cell; National Construction Materials Corp.
 - e. Sandell's Closed Cell Neoprene; Sandell Construction Solutions.
- B. Bond-Breaker Strips: Asphalt-saturated, organic roofing felt complying with ASTM D 226, Type I (No. 15 asphalt felt).
- C. Weep/Vent Products: Use one of the following, unless otherwise indicated:
 - 1. Cellular Plastic Weep/Vent: One-piece, flexible extrusion made from UV-resistant polypropylene copolymer, full height and width of head joint and depth 1/8 inch less than depth of outer wythe, in color(s) selected from manufacturer's standard.
 - a. Products:
 - 1) Mortar Maze weep vent; Advanced Building Products Inc.
 - 2) No. 85 Cell Vent; Heckmann Building Products Inc.
 - 3) Quadro-Vent; Hohmann & Barnard, Inc.
 - 4) Cell Vent, 3601; Wire-Bond.
 - 5) Sandell's Cell Vents; Sandell Construction Solutions.
 - 6) Cell Vent; MasonPro.
 - 7) Cell Vent; Mortar Net Solutions.
 - 2. Mesh Weep/Vent: Free-draining mesh; made from polyethylene strands, full height and width of head joint and depth 1/8 inch less than depth of outer wythe; in color(s) selected from manufacturer's standard.
 - 3. Adjustable Weep Vent: IPCO.
 - 4. Stainless Steel Weep/Vent: Type 304 stainless steel.
 - a. York Manufacturing Inc.
- D. Cavity Mortar Protection Material: Free-draining mesh, made from polymer strands that will not degrade within the wall cavity. Installer shall select product thickness(es) in the field based on observed clear air space between cavity insulation and outer wythe. Clear air space shall not exceed selected product thickness by more than 0.40-inch. Where clear air space exceeds manufacturer's thickest available product by more than 0.40-inch, Installer shall insert a supplemental wythe of extruded polystyrene (XEPS) insulation on inner face, sized to make up the difference.
 - 1. Provide one of the following types:
 - a. Profiled strips, 10-inches high, with dovetail shaped notches 7-inches deep that prevent mesh from being clogged with mortar droppings.
 - b. Rectangular strips, not less than 10-inches high, with or without dimpled surface, designed to catch mortar droppings and prevent weep holes from being clogged with mortar.
 - c. Sheets or rectangular strips installed continuously from flashing to height indicated, to prevent weep holes from being clogged with mortar.
 - 2. Products:
 - a. Mortar Break; Advanced Building Products Inc.
 - b. CavClear Masonry Mat; Archovations, Inc.
 - c. Mortar Web/Trap; Hohmann & Barnard Inc.
 - d. Mortar Mitt; Sandell.
 - e. Driwall Mortar Deflection/Driwall Masonry Vent System; Keene Building Products.
 - f. Mason ProNet DT; MasonPro.

- g. Mortar Net; Mortar Net Solutions.
 - h. Weep-Net; York Manufacturing Inc.
- 3. Fabric Mesh to Prevent Clogging of Weep Holes (Option): Non-woven polyester fabric used as part of masonry cavity drainage systems with flashing, weep holes or weep vents. Drapes over interior side of weep holes/vents keeping them free of mortar and debris; routes water to flashing and to weeps by draining through body of product.
 - a. Materials: Recycled polyester, free-draining mesh, made from polymer stands that will not degrade within cavity wall.
 - b. Mold Growth Resistance: In compliance with ASTM D 3273 and ASTM G 21.
- E. Grout Stop: Fiberglass, galvanized steel, or polypropylene screen.
 - 1. Products:
 - a. Metal Lath 268; Heckmann Building Products, Inc.
 - b. MGS - Mortar/Grout Screen; Hohmann & Barnard, Inc.
 - c. Grout Stop 3612; Wire-Bond.
 - d. Grout Stop; MasonPro.
- F. Setting Buttons: Resilient plastic buttons, non-staining to masonry, sized to suit joint thicknesses and bed depths of masonry units without intruding into required depths of pointing materials.
- G. Antirust Coating: Fast-curing, lead- and chromate-free, self-curing, universal modified-alkyd primer complying with SSPC-Paint 20 or SSPC-Paint 29 zinc-rich coating or MPI #23, Surface-Tolerant Anticorrosive Metal Primer.
 - 1. Use coating requiring no better than SSPC-SP 2, "Hand Tool Cleaning" surface preparation according to manufacturer's literature or certified statement.
 - 2. Use coating with a VOC content of 400 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
- H. Miscellaneous Products: Select materials and methods of use based on the following, subject to approval of a mockup:
 - 1. Previous effectiveness in performing the work involved.
 - 2. Little possibility of damaging exposed surfaces.
 - 3. Consistency of each application.
 - 4. Uniformity of the resulting overall appearance.
 - 5. Do not use products or tools that could do the following:
 - a. Remove, alter, or in any way harm the present condition or future preservation of existing surfaces, including surrounding surfaces not in contract.
 - b. Leave a residue on surfaces.

2.13 MASONRY CLEANERS AND ACCESSORIES

- A. Preformed Expansion Joint Filler: Provide closed cell sponge neoprene expansion joint filler conforming to ASTM D1056, Grade 2A1; compressible up to 35 percent; of width and thickness indicated.
- B. Masonry Cleaners: Provide one of the following cleaning products expressly approved for intended use by cleaner manufacturer and manufacturer of unit being cleaned as verified on "mock-up".
 - 1. Job Mixed Detergent Solution: Solution of trisodium phosphate (1/2 cup dry measure) and laundry detergent (1/2 cup dry measure) dissolved in one gallon of water.
 - 2. Proprietary Acidic Cleaner: Manufacturer's standard strength, general purpose cleaner designed for removing mortar/grout stains, efflorescence, and other new construction stains from masonry surfaces of type indicated below without discoloring or damaging masonry surfaces; expressly approved for intended use by manufacturer of masonry units being cleaned. Do not use products containing hydrochloric (muriatic acid, hydrofluoric acid, or ammonium bifluoride.
 - a. For brick masonry not subject to metallic oxidation stains, use formulation consisting of a concentrated blend of surface acting acids, chelating, and wetting agents.
 - 1) Products:

- a) Sure Klean No. 600 Detergent; ProSoCo., Inc.
 - b) 202 Detergent; Diedrich Technologies.
 - c) NMD 80 New Masonry Detergent; EaCo Chem, Inc.
 - b. For dark colored brick masonry not subject to metallic oxidation stains, use formulation consisting of a liquid blend of surface acting acids and special inhibitors.
 - 1) Products:
 - a) ProSoCo., Inc.; Sure Klean No. 101 Lime Solvent.
 - b) Diedrich Technologies; 200 Lime Solv.
 - c) EaCo Chem, Inc., NMD 80 New Masonry Detergent.
 - c. For brick masonry subject to metallic oxidation stains, use formulation consisting of a liquid blend of organic acids and special inhibitors.
 - 1) Products:
 - a) Sure Klean Vana Trol; ProSoCo., Inc.
 - b) 202 Vana-Stop; Diedrich Technologies.
 - c) NMD 80 New Masonry Detergent; EaCo Chem, Inc.
- C. Spray Equipment: Provide equipment for controlled spray application of water and chemical cleaners, if any, at rates indicated or recommended for pressure, measured at spray tip, and for volume. Adjust pressure and volume, as required, to ensure that damage to masonry does not result from cleaning methods.
 - 1. For chemical cleaner spray application, provide a low pressure tank or chemical pump suitable for the chemical cleaner indicated, equipped with a cone-shaped spray tip.
 - 2. For water spray application, provide a fan-shaped spray tip that disperses water at an angle of not less than 15 degrees.

2.14 MORTAR MIXES

- A. General: Do not use admixtures, including pigments, air-entraining agents, accelerators, retarders, water-repellent agents, antifreeze compounds, or other admixtures, unless otherwise indicated. When specifically approved by the A/E, admixtures shall meet ASTM C1384 Standard Specification for Admixtures for Masonry Mortars.
 - 1. Do not use calcium chloride in mortar or grout.
 - 2. Maintain workability of standard grey mortar by remixing or retempering. No mortar shall be used beyond 2-1/2 hours after mixing. Do not retemper colored pigmented mortar because color variations may result.
- B. Mortar Batching
 - 1. For each unit volume of cementitious materials, provide 2.25 to 3.5 volumes of aggregates.
 - 2. In a running mechanical paddle mixer, add 2/3 of the water and 1/2 of the aggregate (sand), then add the cementitious materials. Follow by adding the remaining water. Mix for a minimum of 5 minutes, adding water if required to produce a workable consistency.
 - a. Do not hand mix mortar, unless approved in writing by A/E.
- C. Mortar for Unit Masonry: Comply with ASTM C 270, Property Specification. Provide the following types of mortar for applications stated unless another type is indicated or needed to provide required compressive strength of masonry and match existing as approved in mockup.
 - 1. For masonry, use Type S, unless otherwise noted.
 - 2. For exterior, above-grade, masonry veneer, use Type N or S, unless otherwise noted.
- D. Colored Mortar, as Necessary to Match Existing: Produce mortar of color required by using specified ingredients. Do not alter specified proportions without A/E approval.
 - 1. Pigmented Mortar: Select and proportion pigments with other ingredients to produce color(s) required. Limit pigments to the following percentages of cement content by weight:
 - a. For mineral oxide pigments and Portland cement lime mortar, not more than 10 percent.
 - b. For carbon black pigment and Portland cement lime mortar, not more than 2 percent.
 - c. For mineral oxide pigments and masonry cement mortar not more than 5 percent.

- d. For carbon black pigment and masonry cement mortar, not more than 1 percent.
- E. Pointing mortar shall conform to ASTM C270, except that all sand shall pass a No. 16 sieve. Nonstaining and dirt resistant mortar shall be used to which ammonium stearate or calcium stearate is added to the amount equal to 3 percent of the weight of the cement used.
 - 1. Pointing mortar shall be proportioned by volume with one part portland cement, 1/8 part Type S hydrated lime, and 2 parts graded (50 mesh or finer) sand to which ammonium stearate or calcium stearate is added in an amount equal to 2 percent of the weight of the cement used. Use mortar within 30 minutes of final mixing; do not retemper or use partially hardened material.
 - 2. Add colored mortar pigment to produce mortar colors required.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of work in accordance with TMS 402/602, Article 2.1.
- B. Verify substrate and surface conditions are in accordance with flexible flashing manufacturer recommended tolerances prior to installation.
 - 1. Review requirements for sequencing of installation of flexible flashing assembly with installation of windows, doors, louvers and wall penetrations to provide a weathertight flashing assembly.
 - 2. Verify flexible flashing will be continuously supported by substrate, and not span any gaps or voids in excess of 1/2 inch.
- C. Protect persons, motor vehicles, surrounding surfaces of building being restored, building site, plants, and surrounding buildings from harm resulting from masonry work.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 BRICK REMOVAL AND REPLACEMENT

- A. Remove bricks as necessary to accommodate new work. Carefully remove entire units from joint to joint to joint, without damaging surrounding masonry, in a manner that permits replacement with full-size units. Remove in an undamaged condition as whole bricks as possible.
 - 1. Remove mortar, loose particles, and soil from brick by cleaning with hand chisels, brushes, and water.
 - 2. Remove sealants by cutting close to brick with utility knife and cleaning with solvents.
 - 3. Store brick for reuse. Store off ground, on skids, and protect from weather.
- B. Support and protect remaining masonry that surrounds removal area. Where possible maintain flashing, reinforcement, lintels, and adjoining construction in an undamaged condition.
- C. Clean bricks surrounding removal areas by removing mortar, ducts, and loose particles in preparation for replacement.
- D. Replace with salvaged brick in good quality, where possible, or with new brick matching existing brick matching existing brick, including size. Do not use broken units unless they can be cut to usable size.
- E. Install replacement brick into bonding and coursing pattern of existing brick. If cutting is required, use a motor-driven saw designed to cut masonry with clean, sharp, unchipped edges.
 - 1. Maintain joint width for replacement units to match existing joints.
 - 2. Use setting buttons or shims to set units accurately spaced with uniform joints.
- F. Lay replacement brick with completely filled bed, head, and collar joints. Butter ends with sufficient mortar to fill head joints and shove into place. Wet both replacement and surrounding

bricks that have ASTM C67 initial rates of absorption (suction) of more than 30g/30sq.in. per min. Use wetting methods that ensure that units are nearly saturated, but surface is dry when laid.

1. Tool exposed mortar joints in repaired areas to match joints of surrounding existing brickwork.
2. Rake out mortar used for laying brick before mortar sets and point new mortar joints in adjacent area to comply with requirements for repoint existing masonry to blend in patched areas with existing masonry.
3. When mortar is sufficiently hard to support units, remove shims and other devices interfering with pointing of joints.

3.3 PAINT STEEL UNCOVERED DURING WORK

- A. Inspect steel exposed during masonry removal. Unless A/E determines that it is no longer fit for intended purpose, prepare and point it as follows:
 1. Remove paint, rust, and other contaminants according to SSPC-SP2, "Hand Tool Cleaning", SSPC-SP3, "Power Tool Cleaning", or SSPC-SP6/NACE No. 3, "Commercial Blast Cleaning", as applicable to meet paint manufacturer's recommended preparation.
 2. Immediately paint exposed steel with two coats of antirust coating, following coating manufacturer's written instructions and without exceeding manufacturer's recommended rate of application (dry film thickness per coat).
- B. If on inspection and rust removal, the cross section of a steel member is found to be reduced from rust by more than 1/16 inch, notify A/E before proceeding.
 1. Replacement of existing lintels, if necessary, shall be done by a Change Order.

3.4 CONTROL AND EXPANSION JOINTS (MOVEMENT JOINTS)

- A. General: Install control and expansion joint materials in unit masonry as masonry progresses. Other than bond beams do not allow materials to span control and expansion joints without provision to allow for in-plane wall or partition movement.
 1. Reinforcing and grout for masonry bond beams are to run continuous through vertical control joints.
 2. Keep joints clean from all mortar and debris.
- B. Form control joints in concrete masonry using one of the following methods:
 1. Fit bond-breaker strips into hollow contour in ends of concrete masonry units on one side of control joint. Fill resultant core with grout and rake out joints in exposed faces for application of sealant.
 2. Install preformed control-joint gaskets designed to fit standard sash block.
 3. Install interlocking units designed for control joints. Install bond-breaker strips at joint. Keep head joints free and clear of mortar or rake out joint for application of sealant.
 4. Install temporary foam-plastic filler in head joints and remove filler when unit masonry is complete for application of sealant.
- C. Form expansion joints in brick made from clay or shale as follows:
 1. Build in compressible joint fillers, unless otherwise noted.
- D. Provide horizontal, pressure-relieving joints by either leaving an air space or inserting a compressible filler of width required for installing sealant and backer rod specified in Division 07 Section "Joint Sealants," but not less than 3/8 inch.
 1. Locate horizontal, pressure-relieving joints beneath shelf angles supporting masonry.
- E. Control Joint Locations in CMU: Provide vertical control joints in reinforced CMU where called for on the Drawings. Provide vertical control joints in unreinforced CMU in accordance with NCMA TEK Bulletins 10-01A, 10-02D, 10-03, and 10-04, and at all offsets, returns, openings, and intersections with dissimilar materials and as follows to prevent cracking:
 1. At end of lintel bearing on one end of openings less than or equal to 6'-4" and at both ends of openings greater than 6'-4".
 2. Distance between joints should not exceed the lesser of the following:
 - a. A length-to-height ratio of 3 to 2.

b. 25 feet.

- F. Expansion Joint Locations in Brick: Provide in accordance with BIA Technical Note No. 18A at vertical expansion joints in brick masonry at all offsets, returns, openings, intersections with dissimilar materials, and elsewhere as shown on Drawings and indicated hereinafter. For brick work without openings, space no more than 25 feet o.c.
1. Place as follows:
 - a. Where support of brick veneer changes
 - b. At one jamb of openings 12 feet or wider.
 2. Form open joint of width indicated but not less than 3/8 inch for installation of preformed expansion joint filler, and sealant and backer rod specified in Division 07 Section "Joint Sealants". Maintain joint free and clear of mortar.

3.5 LINTELS

- A. Install loose steel lintels furnished under Division 05 at new openings.
1. Shore steel lintels until the masonry has attained sufficient strength to carry its own weight. Limit the deflection of masonry during this period to L/600 or 0.3 inch (whichever is less). This shoring period should not be less than 24 hour. This minimum time period should be increased to three days when there are imposed loads to be supported. If the masonry is built in cold weather construction conditions, the length of cure should be increased.
- B. Provide masonry lintels where shown and wherever openings of more than 8 inches for brick size units and 16 inches for block size units are shown without structural steel or other supporting lintels. Provide prefabricated. Do not use precast concrete lintels without A/E approval, unless precast lintels are specifically indicated. Thoroughly cure prefabricated lintels before handling and installation. Temporarily support formed-in place lintels.
1. For hollow masonry lintels, use specially formed "U"-shaped lintel units with solid bottom and reinforcing bars placed as shown, and filled with coarse grout. Bond beam block shall not be used to form masonry lintels.
 2. Bond pattern for masonry lintels shall match the pattern at the adjacent wall unless otherwise noted.
- C. Provide minimum 8 inch solid bearing at each end, unless otherwise noted. Provide solid masonry units or hollow units filled solid.
1. Provide a slip plane in the form of flashing or other bond breaker between the lintel and masonry.
- D. For steel lintels in exterior wythe, rake back mortar in preparation for sealant as specified in Division 07 Section "Joint Sealants".

3.6 FLASHING, WEEPS, CAVITY DRAINAGE, AND VENTS

- A. General: Install embedded flashing and weep vents in first course of masonry above ground level, at lintels, and other obstructions to downward flow of water in wall. Flashing shall be installed longitudinally continuous or terminated with end dams. Install vents at shelf angles, ledges, and other obstructions to upward flow of air in cavities. Comply with NCMA recommendations for "drainage wall system" masonry construction.
1. Install concealed through wall flashing in accordance with SMACNA "Architectural Sheet Metal Manual" Chapter 4 Flashing and with NCMA TEK Bulletins 19-04A and 19-05A details to ensure water resistant masonry construction.
 2. Apply primer, if required by manufacturer according to manufacturer's written instructions.
 3. Install preformed corners and end dams, cants, if required, under flexible flashing membrane, bedded in sealant in appropriate locations along wall.
 4. Starting at a corner, remove release sheet, if applicable, and apply membrane to primed, if required by manufacturer for substrate indicated.
 5. Extend membrane through wall and leave 1/4 inch minimum exposed.
 6. Roll flashing into place. Ensure continuous and direct contact with substrate. Avoid trapping air and forming wrinkles.
 7. Lap ends and overlap preformed corners 4 inches minimum. Seal all laps with sealant.

8. Trim exterior edge of flexible flashing membrane 3/4 inch and secure to metal drip edge per manufacturers written instructions, where drip edge is required.
 - a. Embedded flashing materials shall not be used for drip edges.
 9. Terminate flexible flashing membrane on vertical wall with a termination bar.
 10. Apply sealant bead at each termination.
 11. Protect installed flexible flashing from damage during construction.
 - a. Inspect before covering and make repairs as necessary. Remove and replace damaged material. Repair holes and tears by covering with cut patch of similar product overlapping damage 2 inches minimum. Seal perimeter of patch repair with sealant/mastic.
 - b. Cover flexible flashing as soon as possible after installation has been observed and tested. Do not expose longer than 60 days, unless otherwise approved by membrane manufacturer in writing.
- B. Install flashing as follows, unless otherwise indicated:
1. Prepare masonry surfaces so they are smooth and free from projections that could puncture flashing. Where flashing is within mortar joint, place through-wall flashing on sloping bed of mortar and cover with mortar. Before covering with mortar, seal penetrations in flashing with adhesive, sealant, or tape as recommended by flashing manufacturer.
 - a. Install proprietary flashing/drainage system in accordance with manufacturer's installation instructions.
 2. Where wall intersects grade, extend flashing through outer wythe, turn up 16 inches or a minimum of 6 inches above cavity mortar protection, and terminate on exterior face of inner wythe with termination bar and sealant. Cut flexible flashing off flush at face of wall after masonry wall construction is completed.
 3. At lintels extend flashing over top flange of angle across air space behind veneer and turn up a 16 inches or a minimum of 6 inches above cavity mortar protection, and terminate on exterior face of inner wythe or sheathing with termination bar and sealant. At outer wythe extend flashing at least 6 inches beyond end of lintel and turn up ends not less than 2 inches to form end dams. Install metal drip edges beneath flexible flashing at exterior face of wall and seal with sealant to lintel. Stop flexible flashing 1/2 inch back from outside face of wall and adhere flexible flashing to top of metal drip edge.
 - a. Where the lintel is bolt-mounted in place, cut-off excess bolt length at face of nut prior to installing the flexible flashing. After positioning the flexible flashing, cut a small "X" in the flashing to allow the flashing to fit over the nut and then apply compatible mastic to the flashing a minimum of 1 inch out from the "X" in all directions.
- C. Install weep vents in head joints in exterior wythes of first course of masonry immediately above embedded flashing (not mortar) and as follows:
1. Use specified weep/vent products to form weeps.
 2. Space weep vents 16 inches o.c., unless otherwise indicated.
 3. Keep weep holes and area above flashing free of mortar droppings.
- D. Place cavity mortar protection material in cavities to comply with configuration requirements for cavity mortar protection material in Part 2 "Miscellaneous Masonry Accessories" Article.
1. Option: Use geotextile drainage fabric as recommended by flashing manufacturer and install to have the fabric reach the base of the flashing and covering the weep vents.
 - a. Inspect flashing for holes prior to installing fabric mesh. Coordinate repair of holes with installer of flashing.
 - b. Place a continuous row of fabric mesh one inch into the mortar joint of the third row of standard size exterior bricks in collar joints, cavity walls, or lintels. Drape excess material onto base of flashing. Ensure that flashing is clean of mortar droppings and debris. Adhesives and fasteners are not required; mortar need not have set.
 - c. If excessive droppings are expected, use a taller height fabric mesh and taller flashing.
 - d. Cut or tear to accommodate wall ties, conduit, plumbing or other materials that bridge or intrude into cavity between inner and outer walls.

- E. Install vents in head joints in exterior wythes at 32 inches o.c., unless otherwise indicated. Use specified weep/vent products to form vents.
 - 1. Close cavities off vertically with elastomeric tube sealant back rod in manner indicated. Install through-wall flashing and weep vents above horizontal blocking.

3.7 REPAIRING, POINTING, AND CLEANING

- A. Cleaning, General
 - 1. Know your surface. Positively identify every substrate to be cleaned. Review all manufacturers literature for cleaning recommendations.
 - 2. Always test before overall cleaning. Always test, and always clean under the same conditions you tested under. Retest if conditions change.
 - 3. Use the mildest cleaner and dilution that still gives effective results.
 - 4. Clean early:
 - a. Don't give mortar smears and films a chance to become as hard as the masonry. Get it off while it's still relatively soft. Clean masonry within 7 to 21 days of installation.
 - b. Clay brick maybe cleaned within 14 to 28 days.
 - 5. Use the right cleaner for the right job. Follow the masonry manufacturer's guidelines for cleaning each type of masonry.
 - 6. Never clean with raw acid.
 - 7. Cleaning basics
 - a. Don't spare the water. Pre-wetting masonry is recommended. Rise with 100 psi to remove stains and cleaner residue.
 - b. Clean bottom-to-top, and always keep lower areas wet to prevent streaking.
 - c. Follow all safety precautions in the product literature.
 - d. Cold weather
 - 1) Water-saturated masonry is vulnerable to freeze/thaw damage. Never clean if the masonry could freeze before drying.
 - 2) Chemical cleaners and rinse water rely on chemical reactions to dissolve and rinse away construction soiling. Cold temperatures slow these chemical reactions. Compensating for the cold by using a stronger cleaning solution may cause permanent damage to the masonry, especially colored concrete.
 - a) Instead, extend the dwelling time of the properly diluted cleaning solution by 10-20 percent. Scrub areas of heavy soiling with a masonry washing brush. Pre-wetting and rinsing with hot water warms surface and improves results.
 - 3) Schedule wet cleaning for when air and surface temperatures are 40 deg. F. and rising. In cold weather this means your wet-cleaning window may be only a few hours. Use the time before and after to dry-brush and scrape away heavy accumulations of excess mortar and job dirt from the next day's work area.
 - 4) If a limited cleaning window is impractical, enclose the work area with polyethylene and use approved heaters to warm masonry.
 - 5) Warm weather test panels won't work for cold weather cleaning. Test in cold clean in cold.
- B. Pointing: During the tooling of joints, enlarge voids and holes, except weep holes, and completely fill with mortar. Point up joints, including corners, openings, and adjacent construction, to provide a neat, uniform appearance. Prepare joints for sealant application, where indicated.
 - 1. Tuckpointing
 - a. Rake mortar joints to a depth of not less than 1/2 inch nor more than 3/4 inch.
 - b. Saturate joints with clean water.
 - c. Fill solidly with pointing mortar.
 - d. Tool joints.
- C. In-Progress Cleaning: Clean unit masonry as work progresses by dry brushing to remove mortar fins and smears before tooling joints. Dry brush exposed masonry with bristle brushes at end of each work day.

1. Promptly remove excess wet mortar containing integral water-repellent mortar admixture from the face of the masonry as work progresses. Do not use strong acids, over-aggressive sandblasting or high-pressure cleaning.
- D. Final Cleaning: After mortar is thoroughly set and cured, clean exposed masonry as follows:
1. Remove large mortar particles by hand with wooden paddles and nonmetallic scrape hoes or chisels.
 2. Test cleaning methods on sample wall panel; leave one-half of panel uncleaned for comparison purposes or use methods used on approved mock-up. Obtain A/E's approval of sample cleaning before proceeding with cleaning of masonry.
 - a. Comply with applicable environment laws and restrictions.
 3. Protect adjacent non-masonry surfaces from contact with cleaner by covering them with liquid strippable masking agent or polyethylene film and waterproof masking tape.
 4. Wet wall surfaces with water before applying cleaners; remove cleaners promptly by rinsing surfaces thoroughly with clear water.
 5. Clean brick by bucket-and-brush hand-cleaning method described in BIA Technical Notes 20.
 - a. Remove efflorescence in accordance with brick manufacturer's recommendations. Cleaning agents may be used only with approval of masonry unit manufacturer. Cleaning agents must be same as those used on test area.
 - b. If chemical cleaners are to be sprayed on, the pressure shall not exceed 50 psi.
 6. Clean masonry with a proprietary acidic cleaner applied according to manufacturer's written instructions.
 7. Clean concrete masonry by cleaning method indicated in NCMA TEK 08-02A and 08-03A, applicable to type of stain on exposed surfaces.

3.8 MASONRY WASTE DISPOSAL

- A. Salvageable Materials: Unless otherwise indicated, excess masonry materials are Contractor's property. At completion of unit masonry work, remove from Project site.
- B. Excess Masonry Waste: Remove excess clean masonry waste and other masonry waste, and legally dispose of off Owner's property.

END OF SECTION 04 20 00.00

05 METALS

DIVISION

SECTION 05 50 00 - METAL FABRICATIONS

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the following:
 - 1. Steel framing and supports for mechanical and electrical equipment.
 - 2. Post-installed, torque-controlled expansion anchors.
 - 3. Adhesive anchor bolts.
- B. Products furnished, but not installed, under this Section include the following:
 - 1. Loose steel lintels.
- C. Related Sections include the following:
 - 1. Division 04 Section "Unit Masonry" for installing loose lintels, anchor bolts, and other items indicated to be built into unit masonry.
 - 2. Division 09 painting Sections for surface-preparation and priming requirements.

1.2 ACTION SUBMITTALS

- A. Product Data: For the following:
 - 1. Adhesive anchor bolts.
 - 2. Post-installed, torque-controlled expansion anchors.
- B. Shop Drawings: Show fabrication and installation details for metal fabrications.
 - 1. Include plans, elevations, sections, and details of metal fabrications and their connections. Show anchorage and accessory items. Provide Shop Drawings for the following:
 - a. Steel framing and supports for mechanical and electrical equipment.

1.3 QUALITY ASSURANCE

- A. Qualifications:
 - 1. Structural fasteners shall be manufactured in the United States. Fabricator shall furnish proof of U.S. manufacturer. If it becomes necessary to use imported fasteners, each size, type, and each large quantity package (500 pcs. or more) shall undergo a random sampling of a minimum 5 pieces for testing. Test results are to be provided to A/E. Test shall be performed by an independent testing agency, and the cost shall be included in the Base Bid. If inferior fasteners are discovered, all fasteners of that type shall be removed and replaced with acceptable fasteners at no cost to the Owner. If possible, fasteners shall be tested prior to use in construction.
- B. Welding: Qualify procedures and personnel according to the following:
 - 1. AWS D1.1, "Structural Welding Code--Steel."
 - 2. AWS D1.3, "Structural Welding Code--Sheet Steel."
- C. Post-Installed Torque-Controlled expansion Anchors and Adhesive Anchor Bolts: Installers of post-installed anchors shall undergo a manufacturer's training program or be provided with on-

1.4 FIELD CONDITIONS

- A. Field Measurements: Verify actual locations of walls, floor slabs, decks, and other construction contiguous with metal fabrications by field measurements before fabrication and indicate measurements on Shop Drawings.
 - 1. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish dimensions and proceed with fabricating metal fabrications without field measurements. Coordinate wall and other contiguous construction to ensure that actual dimensions correspond to established dimensions.

2. Provide allowance for trimming and fitting at site.

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. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.
 2. Products: Subject to compliance with requirements, provide one of the products specified.
- B. Products of other manufacturers will be considered for acceptance provided they equal or exceed the material requirements and functional qualities of the specified product. The "Substitution Request Form" and complete technical data for evaluation must accompany request for A/E's approval. All materials for evaluation must be received by the Project Manager and Specification Department at least 10 days prior to bid due date. Additional approved manufacturers will be issued by Addendum.

2.2 METALS, GENERAL

- A. Metal Surfaces, General: Provide materials with smooth, flat surfaces, unless otherwise indicated. For metal fabrications exposed to view in the completed Work, provide materials without seam marks, roller marks, rolled trade names, or blemishes.

2.3 FERROUS METALS

- A. Steel Plates, Shapes, and Bars: ASTM A 36.
- B. Steel Tubing: ASTM A 500, cold-formed steel tubing.
- C. Steel Pipe: ASTM A 53, standard weight (Schedule 40), unless another weight is indicated or required by structural loads.
- D. Slotted Channel Framing: Cold-formed metal channels with continuous slot complying with MFMA-4.
 1. Size of Channels: 1-5/8 by 1-5/8 inches.
 2. Material: Steel complying with ASTM A 1008, structural steel, Grade 33; 0.0528-inch minimum thickness; coated with rust-inhibitive, baked-on, acrylic enamel.
 - a. Galvanized steel complying with ASTM A 653, structural steel, Grade 33, with G90 coating; 0.079-inch nominal thickness, where indicated.

2.4 FASTENERS

- A. General: Unless otherwise indicated, provide Type 304 stainless-steel fasteners for exterior use and zinc-plated fasteners with coating complying with ASTM B 633, or ASTM F 1941 Class Fe/Zn 5, at exterior walls.
- B. Post Installed, Torque-Controlled Expansion Anchors: Anchor bolt and sleeve assembly satisfying the cracked concrete requirements of ICC-ES AC 193 with capability to sustain, without failure, a load equal to six times the load imposed when installed in unit masonry and four times the load imposed when installed in concrete, as determined by testing according to ASTM E 488, conducted by a qualified independent testing agency.
 1. Products:
 - a. Kwik Bolt TZ Concrete of Kwik Bolt 3 (Masonry); Hilti, Inc.
 - b. Strong Bolt II; Simpson Strong-Tie Company, Inc.
 - c. Powder-Stud +302 (Concrete) Power-Stud 301 (Masonry); Powers Fasteners

2. Material for Anchors in Interior Locations: Carbon-steel components zinc-plated to comply with ASTM B 633, Class Fe/Zn 5 or ASTM F 1941, Class Fc/Zn5, unless otherwise indicated. .
 3. Material for Anchors in Exterior Locations: Alloy Group 1 stainless-steel bolts complying with ASTM F 593 and nuts complying with ASTM F 594.
- C. Adhesive (Chemical) Anchor Bolts (In Concrete): Chemically grouted adhesive (chemical) anchor bolts satisfying the cracked concrete requirements of ICC-ES AC 308. Subject to compliance with requirements, provide one of the following:
1. Products:
 - a. HY 200 Safe Set system or RE 500 V3 Safe Set; Hilti, Inc.
 - b. Powers PE 1000+; Powers Fasteners
 - c. Epcon G5, ITW Rod Head
 - d. Simpson Set Epoxy-Tie Adhesive Anchors; Simpson Strong-Tie Company, Inc.
 2. Anchors to be ASTM A36 or A307, zinc plated steel threaded rods ($F_y = 36$ ksi) unless otherwise noted.
 3. Where noted on the drawings anchors to be ASTM F593, Condition CW stainless steel threaded rods ($F_y = 65$ ksi for diameters 3/8 inch through 5/8 inch and $F_y = 45$ ksi for diameters 3/4 inch through 1-1/4 inch).
 4. Anchors to be installed in strict conformance to manufacturer's installation instructions.
 5. Adhesive Anchors shall have the following minimum allowable load capacities: (Based on embedment in 4000 psi concrete and a minimum safety factor on ultimate load capacities of 3.5. Use proportional allowable loads for other strengths of concrete. Note: Actual anchor load capacity varies with spacing and edge distance.)

<u>Size</u>	<u>Allowable Shear</u>	<u>Allowable Tension</u>	<u>Minimum Embedment</u>
3/8 inch	1000 lbs.	2100 lbs.	3-3/8 inch
1/2 inch	1850 lbs.	3300 lbs.	4-1/4 inch
5/8 inch	2900 lbs.	5100 lbs.	5 inches
3/4 inch	4200 lbs.	6800 lbs.	6-5/8 inch
1 inch	7500 lbs.	11,000 lbs.	8-1/4 inch

- D. Adhesive Anchor Bolts (In Masonry)
1. In hollow CMU: Chemically grouted adhesive anchor systems with nylon or stainless steel screen inserts.
 - a. Products:
 - 1) HIT HY270 Adhesive Anchors, Hilti, Inc.
 - 2) AC100+ Gold; Powers Fasteners
 - 3) Simpson Set Epoxy-Tie Adhesive Anchors, "AT-HP" Simpson Strong-Tie Company, Inc.
 2. In solid grouted CMU: Chemically grouted adhesive anchor systems. If voids in grout are encountered, use adhesive anchor bolts specified above for hollow CMU.
 - a. Products:
 - 1) HIT-ICE (Cold Weather) or HY270 (Hot Weather) Adhesive Anchors, Hilti, Inc.
 - 2) AC100+ Gold; Powers Fasteners
 - 3) Simpson Set Epoxy-Tie Adhesive Anchors, "AT-XP" Simpson Strong-Tie Company, Inc.
 3. Anchors to be ASTM A36 or A307 zinc plated steel threaded rods ($F_y = 36$ ksi) unless otherwise noted.
 4. Where noted on the drawings, anchors to be ASTM F593, Condition CW stainless steel threaded rods ($F_y = 65$ ksi for diameters 3/8 inch through 5/8 inch and $F_y = 45$ ksi for diameters 3/4 inch through 1-1/4 inch).
 5. Anchors to be installed in strict conformance to manufacturer's installation instructions.
 6. Adhesive anchors shall have the following minimum allowable load capacities: (Based on $F'_m = 1500$ psi, grout with $f'_c = 2500$ psi at 28 days and a minimum safety factor on ultimate load capacities of 3.5. Note: Actual anchor load capacity varies with spacing and edge distance.)
 - a. In Hollow CMU:

	<u>Size</u>	<u>Allowable Shear</u>	<u>Allowable Tension</u>	<u>Minimum Embedment</u>
	3/8 inch	600 lbs.	500 lbs.	2 inch
	1/2 inch	900 lbs.	500 lbs.	2 inch
b.	In Solid Grouted CMU:			

	<u>Size</u>	<u>Allowable Shear</u>	<u>Allowable Tension</u>	<u>Minimum Embedment</u>
	1/2 inch	1200 lbs.	1400 lbs.	4-1/4 inch
	5/8 inch	1600 lbs.	1800 lbs.	5 inch
	3/4 inch	1600 lbs.	2900 lbs.	6-5/8 inch

7. Adhesive anchor bolt suppliers shall submit product data, including certified test results showing the ultimate and allowable shear and tension load capacities for all anchors sizes and types to be furnished.

2.5 MISCELLANEOUS MATERIALS

- A. Welding Rods and Bare Electrodes: Select according to AWS specifications for metal alloy welded.
- B. Universal Shop Primer: Fast-curing, lead- and chromate-free, universal modified-alkyd primer complying with MPI#79.
- C. Galvanizing Repair Paint: High-zinc-dust-content paint for regalvanizing welds in steel, complying with SSPC-Paint 20 and compatible with paints specified to be used over it.

2.6 FABRICATION, GENERAL

- A. Shop Assembly: Preassemble items in the shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Use connections that maintain structural value of joined pieces. Clearly mark units for reassembly and coordinated installation.
- B. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32 inch, unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.
- C. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.
- D. Fabricate seams and other connections that will be exposed to weather in a manner to exclude water. Provide weep holes where water may accumulate.
- E. Cut, reinforce, drill, and tap metal fabrications as indicated to receive finish hardware, screws, and similar items.
- F. Provide for anchorage of type indicated; coordinate with supporting structure. Space anchoring devices to secure metal fabrications rigidly in place and to support indicated loads.

2.7 MISCELLANEOUS FRAMING AND SUPPORTS

- A. General: Provide steel framing and supports not specified in other Sections as needed to complete the Work.
- B. Fabricate units from steel shapes, plates, and bars of welded construction, unless otherwise indicated. Fabricate to sizes, shapes, and profiles indicated and as necessary to receive adjacent construction retained by framing and supports. Cut, drill, and tap units to receive hardware, hangers, and similar items.
 - 1. Fabricate units from slotted channel framing where indicated.

2.8 LOOSE STEEL LINTELS

- A. Fabricate loose steel lintels from steel angles and shapes of size indicated for openings and recesses in masonry walls and partitions at locations indicate. Fabricate in single lengths for each opening, unless otherwise indicated. Weld adjoining members together to form a single unit where indicated.
- B. Galvanize loose steel lintels located in exterior walls and where indicated.

2.9 STEEL AND IRON FINISHES

- A. Galvanizing: Hot-dip galvanize items as indicated to comply with applicable standard listed below:
 - 1. ASTM A 123, for galvanizing steel and iron products.
 - 2. ASTM A 153, for galvanizing steel and iron hardware.
 - 3. Do not quench or apply post-galvanizing treatments that might interfere with paint adhesion.
- B. Shop prime iron and steel items, not indicated to be galvanized unless they are to be embedded in concrete, sprayed-on fireproofing, or masonry, or unless otherwise indicated.
 - 1. Shop prime with universal shop primer.
- C. Preparation for Shop Priming: Prepare uncoated ferrous-metal surfaces to comply with minimum requirements indicated below for SSPC surface preparation specifications and environmental exposure conditions of installed metal fabrications:
 - 1. Exterior Items: SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning".
 - 2. Other Steel Items: SSPC-SP3, "Power Tool Cleaning".
 - 3. Galvanized-Steel Items: SSPC-SP16, "Brush-off Blast Cleaning of Coated and Uncoated Galvanized Steel, Stainless Steels, and Non-Ferrous Metals".
- D. Shop Priming: Apply shop primer to uncoated surfaces of metal fabrications, except those with galvanized finishes and those to be embedded or masonry, unless otherwise indicated. Comply with SSPC-PA 1, "Paint Application Specification No. 1: Shop, Field, and Maintenance Painting of Steel," for shop painting.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Installer shall examine areas and conditions under which miscellaneous metal items shall be installed. Notify Contractor in writing of conditions detrimental to proper and timely completion of the Work. Do not proceed with the Work until unsatisfactory conditions have been corrected in a manner acceptable to installer.

3.2 INSTALLATION, GENERAL

- A. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installing metal fabrications. Set metal fabrications accurately in location, alignment, and elevation; with edges and surfaces level, plumb, true, and free of rack; and measured from established lines and levels.
- B. Fit exposed connections accurately together to form hairline joints. Weld connections that are not to be left as exposed joints but cannot be shop welded because of shipping size limitations. Do not weld, cut, or abrade surfaces of exterior units that have been hot-dip galvanized after fabrication and are for bolted or screwed field connections.
- C. Field Welding: Comply with the following requirements:
 - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 - 2. Obtain fusion without undercut or overlap.

3. Remove welding flux immediately.
 4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.
- D. Fastening to In-Place Construction: Provide anchorage devices and fasteners where metal fabrications are required to be fastened to in-place construction. Provide threaded fasteners for use with concrete and masonry inserts, toggle bolts, through bolts, lag bolts, wood screws, and other connectors.
- E. Provide temporary bracing or anchors in formwork for items that are to be built into concrete, masonry, or similar construction.

3.3 INSTALLING MISCELLANEOUS FRAMING AND SUPPORTS

- A. General: Install framing and supports to comply with requirements of items being supported, including manufacturers' written instructions and requirements indicated on Shop Drawings.

3.4 ADJUSTING AND CLEANING

- A. Touchup Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas. Paint uncoated and abraded areas with the same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.
1. Apply by brush or spray to provide a minimum 2.0-mil dry film thickness.
- B. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM A 780.

END OF SECTION 05 50 00

06

DIVISION

CARPENTRY

SECTION 06 41 16 – PLASTIC-LAMINATE-FACED ARCHITECTURAL CABINETS

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes modifying casework to accommodate new unit ventilators.

1.2 DEFINITIONS

- A. Interior architectural woodwork includes wood furring, blocking, shims, and hanging strips for installing woodwork items unless concealed within other construction before woodwork installation.
- B. Exposed Portions of Casework: Include surfaces visible when doors and drawers are closed. Bottoms of casework more than 4 feet above floor and tops less than 6 feet 6 inches above floor shall be considered as exposed. Visible members in open cases or behind glass doors also shall be considered as exposed portions. Any unit exterior side surface that is visible after installation.
- C. Semi-Exposed Portions of Casework: Includes those members behind opaque doors, such as shelves, divisions, interior faces of ends, case back, drawer sides, backs and bottoms, and back face of doors. Tops of casework 6 feet 6 inches or more above floor shall be considered semi-exposed.
- D. Concealed Portions of Casework: Include sleepers, web frames, dust panels, and other surfaces not usually visible after installation.

1.3 ADMINISTRATIVE REQUIREMENTS

- A. Coordination: Coordinate modifications of adjacent casework to accommodate new unit ventilators. Units maybe either larger or smaller.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: Show location of each item, dimensioned plans and elevations, large-scale details, attachment devices, and other components.
 - 1. Indicate sizes of new unit ventilators.
- C. Samples for Verification:
 - 1. Plastic laminates, 8 by 10 inches, for each type, color, pattern, and surface finish, with 1 sample applied to core material and specified edge material applied to 1 edge.
 - 2. Thermally Fused Laminate (TFL) Panels: 8 by 10 inches, for each color, pattern, and surface finish, with edge banding on one edge.

1.5 QUALITY ASSURANCE

- A. Quality Standard: Unless otherwise indicated, comply with AWI's "Architectural Woodwork Quality Standards" for grades of interior architectural woodwork indicated for construction, finishes, installation, and other requirements.
- B. Manufacturer's Fabricator Qualifications: Shop that employs skilled workers who custom fabricate products similar to those required for this Project and whose product have a record of successful in-service performance.

- C. Mockups: Build mockups to demonstrate aesthetic effects, and to set quality standards for materials and execution.
 - 1. Mockups of first typical architectural cabinet modification required to accommodate new unit ventilator.
 - 2. Subject to compliance with requirements, approved mockups may become part of the completed work if undisturbed at time of Substantial Completion.

1.6 FIELD CONDITIONS

- A. Field Measurements: Where woodwork is indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication, and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. In other Part 2 articles where titles below introduce lists, the following requirements apply for product selection:
 - 1. Manufacturers: Subject to compliance with requirements, provide product by the manufacturers specified.
 - 2. Products: Subject to compliance with requirements, provide one of the products specified.
- B. Products of other manufacturers will be considered for acceptance provided they equal or exceed the material requirements and functional qualities of the specified product. The "Substitution Request Form" and complete technical data for evaluation must accompany requests for A/E's approval. All materials for evaluation must be received by the Project Manager and Specification Department at least 10 days prior to bid due date. Additional approved manufacturers will be issued by Addendum.

2.2 PLASTIC-LAMINATE-FACED ARCHITECTURAL CABINETS

- A. Quality Standard: Unless otherwise indicated, comply with the "Architectural Woodwork Standards" for grades of architectural wood cabinets indicated for construction, finishes, installation, and other requirements.
 - 1. The Contract Documents contain selections chosen from options in the quality standard and additional requirements beyond those of the quality standard. Comply with those selections and requirements in addition to the quality standard.
 - a. Grade: Custom.

2.3 MATERIALS

- A. Composite Wood and Agrifiber Products: Provide materials that comply with requirements of referenced quality standard for each type of woodwork and quality grade specified, unless otherwise indicated.
 - 1. Medium-Density Fiberboard: ANSI A208.2, Grade 130, made with binder containing no urea formaldehyde.
 - 2. Particleboard: ANSI A208.1, Grade M-2, made with binder containing no urea formaldehyde or Grade M-2-Exterior Glue.
 - 3. Particleboard: Straw-based particleboard complying with requirements in ANSI A208.1, Grade M-2, except for density.
 - a. Products: Subject to compliance with requirements, provide one of the following:
 - 1) Environ Biocomposites Manufacturing LLC; Bio Fiber Wheat.
 - 2) Sorm Incorp.; Primeboard Premium Wheat.
 - 4. Softwood Plywood: DOC PS 1, medium-density overlay.

- B. Thermally Fused Laminate (TFL) Panels: Particleboard or medium-density fiberboard finished with thermally fused, melamine-impregnated decorative paper complying with requirements of NEMA LD3, Grade VGL, for Test Methods 3.3, 3.4, 3.6, 3.8, and 3.10.
- C. High-Pressure Decorative Laminate: NEMA LD 3, grades as indicated or, if not indicated, as required by woodwork quality standard.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. ABET Inc.
 - b. Formica Corporation
 - c. Laminate LLC
 - d. Pionite; a Panolam Industries International, Inc. brand
 - e. Wilsonart LLC

2.4 MISCELLANEOUS MATERIALS

- A. Furring, Blocking, Shims, and Hanging Strips: Fire-retardant-treated softwood lumber, kiln dried to less than 15 percent moisture content.
- B. Anchors: Select material, type, size, and finish required for each substrate for secure anchorage. Provide nonferrous-metal or hot-dip galvanized anchors and inserts on inside face of exterior walls and elsewhere as required for corrosion resistance. Provide toothed-steel or lead expansion sleeves for drilled-in-place anchors.
- C. Adhesives, General: Do not use adhesives that contain urea formaldehyde.

2.5 FABRICATION, GENERAL

- A. Interior Woodwork Grade: Unless otherwise indicated, provide Custom-grade interior woodwork complying with referenced quality standard.

2.6 PLASTIC-LAMINATE CASSEWORK

- A. Laminate Cladding for Exposed Surfaces: High-pressure decorative laminate complying with the following requirements:
 - 1. Horizontal Surfaces Other Than Tops: Grade HGS.
 - 2. Vertical Surfaces: Grade HGS or VGS.
 - 3. Edges: PVC edge banding 3mm thick, through-door in satin finish matching laminate in color and pattern, as indicated.
 - a. Provide PVC tape, 0.018 inch minimum thickness, matching laminate in color, pattern, and finish, where indicated.
- B. Materials for Semi-exposed Surfaces:
 - 1. Surfaces: High-pressure decorative laminate, Grade VGS, High-pressure decorative laminate, Grade CLS, or Thermally Fused Laminate (TFL).
 - a. For semi-exposed backs of panels with exposed plastic-laminate surfaces, provide surface of high-pressure decorative laminate, Grade VGS or CLS.
- C. Concealed Backs of Panels with Exposed Plastic Laminate Surfaces: High-pressure decorative laminate, Grade BKL.
- D. Colors, Patterns, and Finishes: Provide materials and products that match existing.

2.7 PLASTIC-LAMINATE COUNTERTOPS

- A. High-Pressure Decorative Laminate Grade: HGS.
- B. Colors, Patterns, and Finishes: Provide materials and products that result in colors and textures of exposed laminate surfaces that match existing.

- C. Edge Treatment: Provide on front edge of top.
 - 1. PVC edge-banding 3mm thick, through-color with satin finish, matching laminate in color and pattern.
- D. Core Material: Particleboard made with exterior glue.
- E. Fabrication
 - 1. Modify countertops to dimensions, profiles and details required to accommodate new unit ventilators.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Architectural Wood Standards Grade: Modify cabinets and woodwork to comply with requirements for the same grade specified in Part 2 for fabrication of type of woodwork involved.
- B. Scribe and cut woodwork to fit adjoining work, refinish cut surfaces, and repair damaged finish at cuts.
- C. Countertops
 - 1. Scribe tops to other adjoining vertical surfaces.
 - 2. Caulk space between backsplash and wall with mildew-resistant silicone sealant or another permanently elastic sealing compound recommended by countertop material manufacturer.

3.2 ADJUSTING AND CLEANING

- A. Repair damaged and defective woodwork, where possible, to eliminate functional and visual defects; where not possible to repair, replace woodwork. Adjust joinery for uniform appearance.
- B. Clean cabinets and woodwork on exposed and semi-exposed surfaces. Touch up shop-applied finishes to restore damaged or soiled areas.

END OF SECTION 06 41 16

07

DIVISION

THERMAL AND MOISTURE PROTECTION

SECTION 07 84 13 – PENETRATION FIRESTOPPING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Tested or engineering judgment based firestopping materials and systems to retain the integrity of fire-rated construction by maintaining an effective barrier against the spread of flame, smoke, and/or hot gases through penetrations. Section includes firestopping for the following:
 - 1. Through-Penetration Firestop Systems
 - a. Penetrations through fire resistance rated floor and roof construction including both empty openings and openings containing cables, pipes, ducts, conduits, and other penetrating items.
 - 1) Water tight firestop systems for penetrations in fire-resistance-rated floor assemblies.
 - b. Penetrations through fire resistance rated walls and partitions including both empty openings and openings containing cables, pipes, ducts, conduits, and other penetrating items.
 - c. Penetrations through smoke barriers and construction enclosing compartmentalized areas involving both empty openings and openings containing penetrating items.
 - d. Penetrations through partitions that are not required to be fire-resistance-rated due to the presence of automatic fire-extinguishing systems – but are still required to resist the passage of smoke.
 - e. Blank openings through fire-rated vertical barriers (walls and partitions), horizontal barriers (floor/ceiling assemblies), and vertical service shaft walls and partitions.
 - f. Openings and penetrations in fire-rated partitions or walls containing fire doors.
 - g. Openings around structural members which penetrate floors or walls.
- B. Related Work: Examine Contract Documents for requirements that affect Work of this Section. Other Specification Sections that relate directly to Work of this Section include, but are not limited to:
 - 1. Division 07 Section "Joint Sealants" for joint sealants used at penetrations through non-fire-resistance-rated construction.
 - 2. Division 09 Section "Interior Painting" for paint requirements.
 - 3. Division 21 Sections specifying fire-suppression piping penetrations.
 - 4. Division 22 and 23 Sections specifying duct and piping penetrations.
 - 5. Division 26, 27, and 28 Sections specifying cable and conduit penetrations.

1.2 DEFINITIONS

- A. Firestopping: Material or combination of materials to retain integrity of fire rated construction by maintaining an effective barrier against the spread of flame, smoke, and gases through penetrations in fire rated wall and floor assemblies.
 - 1. Exception: When used in non-fire-resistance-rated partitions firestopping shall be applied to the exposed face of mineral wool, glass fiber, or other approved non-rigid materials to maintain an effective resistance to the passage of smoke.
- B. Through-Penetration Firestop Systems: An assemblage of specific materials or products that are designed, tested and fire-resistance-rated to resist for a prescribed period of time the spread of fire, the passage of hot gases, and the transfer of heat through penetrations.
- C. Through-Penetration Firestop Devices: Factory built products designed to resist fire spread. Complete when delivered to site ready for installation.
- D. Assembly: Particular arrangement of materials specific to a given type of construction described or defined in referenced documents.

- E. Engineering Judgment: Evaluations that are developed by a manufacturer for a new firestop system that complies with similar UL approved designs or tests that are acceptable to the code enforcing authorities.
- F. Intumescent: Materials that expand with heat to seal around objects threatened by fire.
- G. Penetration: Opening or foreign material passing through a floor, wall or ceiling barrier such that the full thickness of the rated material(s) is breached either in total or in part.
- H. Sleeve: Metal fabrication or pipe section that is part of a system that extends through a barrier.
- I. Annular Space: The opening around the penetrating item. Since the penetrating item cannot be perfectly centered in the hole, the annular space has a minimum and maximum dimension.
- J. Approved: Acceptable to the code official or authority having jurisdiction.
- K. F-Rating: The time period that the through-penetration firestop system limits the spread of fire through the penetration when tested in accordance with ASTM E 814.
- L. Fire Barrier: A fire-resistance-rated wall assembly of materials designed to restrict the spread of fire in which continuity is maintained.
- M. Fire Partition: A vertical assembly of materials designed to restrict the spread of fire in which openings are protected. Fire partitions are used as wall assemblies to enclose corridors.
- N. Fire Wall: A fire-resistance-rated wall having protected openings, which restricts the spread of fire and extends continuously from the foundation to or through the roof, with sufficient structural stability under fire conditions to allow collapse of construction on either side without collapse of the wall. A fire wall is commonly used to divide a structure into separate buildings – or to separate a new addition from the existing portion of a structure.
- O. Fireblocking: Building materials installed to resist the free passage of flame, gases, heat, smoke, and other products of combustion to other areas of the building through concealed spaces. The term “draftstopping” is also used to define building materials installed to resist the movement of smoke, gases, and flames to other areas – but through relatively larger concealed spaces. Examples of fireblocking materials include – but are not limited to – the following:
 - 1. 2-inch nominal lumber.
 - 2. Two thicknesses of 1-inch nominal lumber with broken lap joints.
 - 3. One thickness of 0.75-inch particleboard with backed-up joints.
 - 4. Gypsum board.
 - 5. Cement fiber board.
 - 6. Batt-type or roll-type blankets of mineral wool, glass fiber, or other approved non-rigid materials installed in such a manner as to be securely retained in place. Loose-fill insulation material shall not be used as a fireblock unless specifically tested in the form and manner intended for use to demonstrate its ability to remain in place and to retard the spread of fire and hot gases.
- P. Horizontal Assembly: A fire-resistance-rated floor or roof assembly of materials designed to restrict the spread of fire in which continuity is maintained.
- Q. L-Rating: The quantitative indication of a through-penetration firestop system’s ability to resist the passage of smoke when tested in accordance with UL 2079.
- R. Membrane-Penetration: An opening made through one side (wall, floor or ceiling membrane) of an assembly.
- S. Smoke Barrier: A continuous membrane, either vertical or horizontal, such as a wall, floor, or ceiling assembly, that is designed and constructed to restrict the movement of smoke.

- T. Smoke Partition: A non-fire-resistance-rated wall designed to resist the spread of fire and the unmitigated movement of smoke for an unspecified period of time. A smoke partition is not required to be continuous through ceilings and other concealed spaces.
- U. T-Rating: The time period that the penetration firestop system, including the penetrating item, limits the maximum temperature rise to 325 degrees Fahrenheit (163 degrees Celsius) above its initial temperature through the penetration on the non-fire side when tested in accordance with ASTM E 814.
- V. Through-Penetration: An opening that passes through an entire assembly.

1.3 REFERENCES

- A. Comply with applicable requirements of the following standards. Where these standards conflict with other specified requirements, the most restrictive requirement shall govern.
 - 1. American Society for Testing and Materials (ASTM).
 - a. E 84 Test Method for Surface Burning Characteristics of Building Materials.
 - b. E 119 Test Method for Fire Tests of Building Construction and Materials.
 - c. E 136 Test Method for Behavior of Materials in a Vertical Tube Furnace at 750 deg. F.
 - d. E 814 Fire Tests of Through-Penetration Fire Stops.
 - e. E 1349 Cyclic Movement and Measurement Minimum and Maximum Joint Widths.
 - f. E 1966 Test Method for Resistance of Building Joint.
 - g. E 2174 Standard Practice for On-Site Inspection of Installed Fire Stops.
 - h. E 2307 Standard Test Method for Determining the Fire Endurance of Perimeter Fire Barrier Systems Using the Intermediate – Scale, Multi-Story Test Apparatus (ISMA).
 - i. E 2393 Standard Practice for On-Site Inspection of Installed Fire Stop Joint Systems.
 - 2. Factory Mutual (FM) Approvals: FM Approval Standard of Firestop Contractors – Class 4991.
 - 3. Firestop Contractors International Association (FCIA): MOP – FCIA Firestop Manual of Practice.
 - a. FM Approval Standard of Firestop Contractors – Class 4991.
 - 4. International Firestop Council (IFC):
 - a. Ref. 1 Recommended IFC Guidelines for Evaluating Firestop Engineering Judgments (April 2001).
 - b. Ref. 2 Inspectors Field Pocket Guide.
 - c. Ref. 3 IFC Recommended Guidelines for Performing Destructive Testing for Installed Penetration Firestop Systems, Fire Resistive Joint Systems, or Perimeter Fire Barrier Systems.
 - 5. National Fire Protection Association (NFPA):
 - a. NFPA 70 – National Electric Code.
 - b. NFPA 101 – Life Safety Code.
 - c. NFPA 221 – Fire Walls and Fire Barriers.
 - d. NFPA 251 – Fire Tests of Building Construction and Materials.
 - 6. Underwriters Laboratories, Inc. (UL):
 - a. UL 263 Fire Tests of Building Construction and Materials.
 - b. UL 723 Surface Burning Characteristics of Building Materials.
 - c. UL 1479 Fire-Tests of Through-Penetration Fire Stops.
 - d. UL Building Materials Directory:
 - 1) Through-Penetration Firestops Systems (XHEZ).
 - 2) Firestop Devices (XHJI).
 - 3) Forming Materials (XHKU).
 - 4) Wall Opening Protective Materials (CLIV).
 - 5) Fill, Void or Cavity Materials (XHHW).
 - 7. International Building Code (IBC 2015)

1.4 SEQUENCING

- A. Coordinate this Work as required with work of other trades. Coordinate sizing of sleeves, openings, core-drilled holes, or cut openings to accommodate through-penetration firestop systems.
 - 1. Coordinating Work: Coordinate construction of openings and penetrating items to ensure that designated through-penetration firestop systems are installed per specified requirements.
 - 2. Schedule firestopping after installation of penetrants but prior to concealing the openings.
- B. Do not cover up those firestopping installations that will become concealed behind other construction until Owner's inspection agency and authorities having jurisdiction, if required, have examined each installation.

1.5 ACTION SUBMITTALS

- A. Product Data: Manufacturer's specifications and technical data for each material including the composition and limitations, documentation of UL or other nationally recognized independent testing laboratories firestop systems to be used, and manufacturer's installation instructions. Product characteristics, typical uses, installation procedures, performance, and limitation criteria.
 - 1. Manufacturer's engineering judgment identification number and drawing details when no tested system is available.
 - a. Engineering Judgments: Where project conditions require modification to a qualified testing and inspecting agencies illustration for a particular penetration firestopping system, submit illustration, with modifications marked, approved by penetration firestopping system manufacturers fire protection engineer as an engineering judgment or equivalent fire-resistance-rated assembly. Obtain approval of authorities having jurisdiction prior to submittal. Engineering judgement must include both project name and contractor's name who will install firestop system as described in document.
 - 2. Storage and handling requirements and recommendations.
- B. Through-Penetration Firestop System Location Plan and Schedule: Indicate locations of each through-penetration firestop system, along with the following information:
 - 1. Types of penetrating items.
 - 2. Types of constructions penetrated, including fire-resistance ratings and, where applicable, thicknesses of construction penetrated.
 - 3. Through-penetration firestop systems for each location identified by firestop design designation of qualified testing and inspecting agency.
 - a. Systems shall be submitted and reference system numbers in the UL Fire Reference Directory or Online Certification Directory, under product categories XHEZ, XHDG, or XHBN.
 - b. Where Project conditions require modification to a qualified testing and inspecting agency's illustration for a particular penetration firestopping condition, submit illustration, with modifications marked, approved by penetration firestopping manufacturer's fire-protection engineer as an engineering judgment or equivalent fire-resistance-rated assembly.

1.6 INFORMATIONAL/QUALITY ASSURANCE/CONTROL SUBMITTALS

- A. Qualification Data: For firms and persons specified in the "Quality Assurance" article, to demonstrate their capabilities and experience, include a list of names and addresses of completed projects, A/E's and Owners, and other information specified.
- B. Listed System Designs: For each penetration firestopping system, for tests performed by a qualified testing agency.

1.7 CLOSEOUT SUBMITTALS

- A. General: Closeout Submittals are to be submitted with O and M Manuals only. Do not submit with other ACTION or INFORMATIONAL SUBMITTALS.
 - 1. Installer Certificates: From Installer indicating that penetration firestopping systems have been installed in compliance with requirements and manufacturer's written instructions.

1.8 QUALITY ASSURANCE

- A. Qualifications
 - 1. Installer Qualifications: Engage an experienced Installer (including individual trades people such as: electrical, mechanical, insulators, etc.) who is qualified by having at least 3 firestop projects similar in type and size to that of this project and has the necessary experience, staff, and training to install manufacturer's products per specified requirements, plus the following:
 - a. Acceptable to or licensed by state or local authority, where applicable.
 - b. Establish a record of successful in-service experience with firestop systems or completion of manufacturer's certified product installation training.
 - c. A supplier's willingness to sell its firestopping products to the Contractor or to an Installer engaged in does not in itself confer qualification on the buyer. Each individual engaged in performing the firestopping work shall have a certification card from the manufacturer acknowledging their completion of the manufacturer's firestop installation training.
 - d. Any firm that has been approved by FM according to FM 4991, "Approval of Firestopping Contractors," or been evaluated by UL and found to comply with its "Qualified Firestop Contractors Program Requirements" shall be acceptable as well.
 - 2. Provide firestopping products containing no detectable asbestos as determined by the method specified in 40 CFR Part 763, Subpart F, Appendix A, Section 1, "Polarized Light Microscopy" or ASTM D6620.
 - 3. Do not use any product containing solvents that require hazardous waste disposal or which after curing dissolve in water.
- B. Regulatory Requirements
 - 1. Proposed firestop materials and methods shall conform to applicable governing codes having local jurisdiction.
 - 2. Meet requirements of ASTM E814, UL1479, UL2079, or ASTM E2307 tested assemblies that provide a fire rating equal to that of construction being penetrated and other ASTM Standards as applicable for the installation.
 - a. ASTM E84 "Test Method for Surface Burning Characteristics of Building Materials."
 - b. ASTM E119 "Test Methods for Fire Tests of Building Construction and Materials."
 - 3. Fire-Test-Response Characteristics: Provide through-penetration firestop systems that comply with the following requirements and those specified in "Performance Requirements" article:
 - a. A qualified testing and inspection agency shall perform firestopping tests. A qualified testing and inspecting agency is UL or another agency performing test and follow-up inspection services for firestop systems acceptable to authorities having jurisdiction.
 - b. Through-penetration firestop systems are identical to those tested per ASTM E 814. Provide rated systems complying with the following requirements:
 - 1) Through-penetration firestop system products bear classification marking of qualified testing and inspecting agency.
 - 2) Through-penetration firestop systems correspond to those indicated by reference to through-penetration firestop system listed by the following:
 - a) UL in "Fire Resistance Directory".
 - b) Intertek ETL SEMKO in its "Directory of Listed Building Products".
 - c) FM Global in its "Building Materials Approved Guide".

4. For those firestop applications that exist for which no UL tested system is available through a manufacturer, an engineering judgment derived from similar UL system designs or other tests will be submitted to local authorities having jurisdiction for their review and approval prior to installation. Engineer judgment drawings must follow requirement set forth by the International Firestop Council (September 7, 1994, as may be amended from time to time).

1.9 DELIVERY, STORAGE, AND HANDLING

- A. Deliver firestopping undamaged products to project site in original, unopened containers or packages with intact and legible manufacturers' labels identifying product and manufacturer; date of manufacturer; lot number; shelf life, if applicable; qualified testing and inspecting agency's classification marking applicable to Project; curing time; and mixing instructions for multicomponent materials.
 1. Comply with recommended procedures, precautions, or remedies described in material safety data sheets as applicable.
- B. Store and handle firestopping materials to prevent their deterioration or damage due to moisture, temperature changes, contaminants, or other causes.
- C. Do not use damaged or expired materials.

1.10 FIELD CONDITIONS

- A. Environmental Conditions: Do not install firestopping when ambient or substrate temperatures are outside limits permitted by firestopping manufacturers or when substrates are wet due to rain, frost, condensation, or other causes.
- B. Install and cure penetration firestopping materials or manufacturer's written instructions using natural means of ventilation or, where this is inadequate, forced-air circulation.
- C. Ventilation: Ventilate firestopping per firestopping manufacturers' instructions by natural means or, where this is inadequate, forced air circulation.
- D. Existing Conditions: Verify the condition of the substrates and correct unsatisfactory conditions before installing products. Follow manufacturers' instructions.
- E. Protection: Provide masking and drop cloths to prevent contamination of adjacent surfaces, if required.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products from one of the manufacturers specified.
 1. Hilti Inc.
 2. Specified Technologies, Inc., (STI)
 3. 3M Fire Protection Products
 4. Balco; a CSW Industrials Company
 5. Tremco, Inc.; Tremco Fire Protection Systems Group
 6. A/D Fire Protection Systems Inc.
 7. Grabber Construction Products
 8. HOLDRITE
 9. Passive Fire Protection Partners
 10. NUCO Inc.

- B. Products of other manufacturers will be considered for acceptance provided they equal or exceed the material requirements and functional qualities of the specified product. The "Substitution Request Form" and complete technical data for evaluation must accompany requests for A/E's approval. All materials for evaluation must be received by the Project Manager and Specification Department at least 10 days prior to bid due date. Additional approved manufacturers will be issued by Addendum.

2.2 SYSTEM DESCRIPTION

- A. General, Through-Penetration Firestop Systems: For penetrations through the following fire-resistance-rated constructions, including both empty openings and openings containing penetrating items, provide through-penetration firestop systems that are produced and installed to resist spread of fire according to requirements indicated, resist passage of smoke and other gases, and maintain original fire-resistance rating of construction penetrated. Systems shall once installed to the tested and listed system or engineered judgment become firestop systems that are produced to resist the spread of fire, and the passage of smoke through breaches, gaps, openings, in fire-resistance, rated and smoke resistant assemblies according to requirements indicated.
1. Fire-resistance-rated walls including fire walls, fire partitions, fire barriers, and smoke barriers as indicated by labels or rated openings.
 2. Fire-resistance-rated horizontal assemblies including floors, floor/ceiling assemblies, and ceiling membranes of roof/ceiling assemblies as indicated by labels.
 3. Install complete through penetration firestop systems that have been tested and/or listed by recognized testing agencies per ASTM E814 or UL 1479 fire tests in a configuration that is representative of site conditions.
 4. Provide firestop products that are flexible enough to allow for pipe vibration in a through penetration application.
 5. Provide products that are compatible with each other, with the substrates forming openings, and with the items, if any, penetrating the firestopping, under the conditions represented by this Project, based on testing and field performance demonstrated by manufacturer.
 6. For firestopping exposed to view, traffic, moisture, and physical damage, provide firestop systems for these conditions that meet conditions expected as communicated through construction documents.
- B. Rated Systems: Provide through-penetration firestop systems with the following ratings determined per ASTM E 814 or UL 1479:
1. F-Rated Through-Penetration Firestop Systems: Provide through-penetration firestop systems with F ratings indicated as determined per ASTM E814, UL 1479 but not less than that equaling or exceeding the fire resistance rating of the constructions penetrated.
 2. T-Rated Through-Penetration Firestop Systems: Provide through-penetration firestop systems with T ratings, in addition to F ratings, as determined per ASTM E814 and ASTM E119, where indicated and where systems protect penetrating items exposed to contact with adjacent materials in occupiable floor areas. T-rated assemblies are required where specified by codes or where the following conditions exist:
 - a. Where firestop systems protect penetrations located outside of wall cavities.
 - b. Where firestop systems protect penetrations located outside fire resistive shaft enclosures.
 - c. Where firestop systems protect penetrations located in construction containing doors required to have a temperature rise rating.
 - d. Where firestop systems protect penetrating items larger than a 4-inch diameter nominal pipe or 16 square inch in overall cross sectional area.
 3. L-Rated Systems: Provide firestop systems with L-ratings indicated, as determined per ASTM UL1479, where systems maintain a barrier to smoke at:
 - a. Penetrations.
 - b. Connections with other surfaces.
 - c. Separations required to permit building movement.
 - d. Sound or vibration absorption, and.
 - e. Other construction gaps.
 4. For firestopping exposed to traffic, moisture, and physical damage, provide products that do not deteriorate when exposed to these conditions and will meet load requirements.

- a. For piping penetrations for plumbing and wet pipe sprinkler systems, provide moisture-resistant through-penetration firestop systems.
 - b. For floor penetrations with annular spaces exceeding 4 inches in width and exposed to possible loading and traffic, provide firestop systems capable of supporting floor loads involved either by installing floor plates or by other means.
 - c. For penetrations involving insulated piping, provide through-penetration firestop systems not requiring removal of insulation.
- 5. For through-penetration firestop systems exposed to view, provide products with flame spread of less than 25 and smoke developed ratings of less than 450, as determined per ASTM E 84.
- 6. W-Rated of Class 1 when tested in accordance with UL Water Leakage Test for systems tested and listed in accordance with ANSI/UL 1479, where indicated or required by authority having jurisdiction.
- 7. For piping penetration for plumbing and wet-pipe sprinkler systems, provide moisture-resistant through-penetration firestop systems.
- 8. For penetrations involving insulated piping, provide through-penetration firestop systems not requiring removal of insulation.

2.3 PERFORMANCE REQUIREMENTS

- A. Fire-Test-Response Characteristics:
 - 1. Perform penetration firestopping system tests by a qualified testing agency acceptable to authorities having jurisdiction.
 - 2. Test per testing standards referenced in "Penetration Firestopping Systems" article. Provide rated systems complying with the following requirements:
 - a. Penetration firestopping systems shall bear classification marking of a qualified testing agency.
 - 1) UL in its "Fire Resistance Directory".
 - 2) Intertek Group in its "Director of Listed Building Products".
 - 3) FM Approval in its "Approval Guide".

2.4 PENETRATION FIRESTOPPING, GENERAL

- A. Provide penetration firestopping that is produced and installed to resist spread of fire according to requirements indicated, resist passage of smoke and other gases, and maintain original fire-resistance rating of construction penetrated. Penetration firestopping systems shall be compatible with one another, with the substrates forming openings, and with penetrating items if any.
 - 1. Systems listed by approved testing agencies, may be used, providing they conform to the construction type, penetrant type, annular space requirements and fire rating involved in each separate instance.
- B. Penetrations in Fire-Resistance-Rated Walls: Provide penetration firestopping with ratings determined per ASTM E 814 or UL 1479, based on testing at a positive pressure differential of 0.01-inch wg.
 - 1. Fire-resistance-rated walls include fire walls, fire-barrier walls, smoke-barriers, and fire partitions.
 - 2. F-Rating: Not less than the fire-resistance rating of constructions penetrated.
- C. Penetrations in Horizontal Assemblies: Provide penetration firestopping with ratings determined per ASTM E 814 or UL 1479, based on testing at a positive pressure differential of 0.01-inch wg.
 - 1. Horizontal assemblies include floors, floor/ceiling assemblies, and ceiling membranes of roof/ceiling assemblies.
 - 2. F-Rating: At least 1 hour, but not less than the fire-resistance rating of constructions penetrated.
 - 3. T-Rating: At least 1 hour, but not less than the fire-resistance rating of constructions penetrated except for floor penetrations within the cavity of a wall.
 - 4. W-Rating: Provide penetration firestopping showing no evidence of water leakage when tested according to UL 1479.

- D. Penetrations through Smoke Barriers, Smoke Partitions, and partitions that enclose that are not required to be fire-resistance-rated due to the presence of automatic fire-extinguishing systems – but are still required to resist the passage of smoke: Provide penetration firestopping with ratings determined per UL 1479.
 - 1. L-Rating: Not exceeding 5.0 cfm/sq. ft. of penetration opening at 0.30-inch wg at both ambient and elevated temperatures and no more than 50-cfm cumulative total for any 100 sq.ft. at both ambient and elevated temperatures.
- E. Mold Resistance: Provide penetration firestopping with mold and mildew resistance rating of 0 as determined by ASTM G 21.
- F. Firestopping materials are either “cast-in-place” (integral with concrete placement) or “post installed”. Provide cast-in-place firestop devices prior to concrete placement.
- G. Exposed Penetration Firestopping: Provide products with flame-spread and smoke-developed indexes of less than 25 and 450, respectively, as determined per ASTM E 84.
- H. Accessories: Provide components for each penetration firestopping systems, including primers and forming materials, that are needed to install fill materials and to maintain ratings required. Use only those components specified by penetration firestopping manufacturer and approved by qualified testing and inspecting agency for firestopping indicated.
 - 1. Permanent forming/damming/backing materials, including the following:
 - a. Slag-wool-fiber or rock-wool-fiber insulation.
 - b. Sealants used in combination with other forming/damming/backing materials to prevent leakage of fill materials in liquid state.
 - c. Fire-rated form board.
 - d. Fillers for sealants.
 - 2. Temporary forming materials
 - 3. Substrate primers
 - 4. Collars
 - 5. Steel sleeves

2.5 FILL MATERIALS

- A. Use only firestop products that have been UL 1479, ASTM E 814, or UL 2079 tested for specific fire-rated construction conditions conforming to construction assembly type, penetrating item type, annular space requirements, and fire-rating involved for each separate instance.
- B. Cast-in-Place Firestop Devices: Factory-assembled devices for use in cast-in-place concrete floors and consisting of an outer metallic sleeve lined with an intumescent strip, a radial extended flange attached to one end of the sleeve for fastening to concrete formwork, and a neoprene gasket. Cast-in-place devices for use with only noncombustible penetrants shall be red in color.
- C. Fire Rated Cable Management Devices: Factory-assembled round metallic sleeve device for use with cable penetrations, containing an integrated smoke seal fabric membrane that can be opened and closed for repenetration.
- D. Drop-In Firestop Devices: Factory-assembled devices for use with combustible or noncombustible penetrants in cored holes within concrete floors. Device shall consist of galvanized steel sleeve lined with an intumescent strip, an extended rectangular flange attached to one end of the sleeve for fastening to concrete floor, and neoprene gasket.
- E. Latex Sealants: Simple-component latex formulations that do not pre-emulsify after cure during exposure to moisture.
- F. Acrylic Sprayable Mastic: Acrylic (water) based sprayable fire-rated mastic containing no halogens, solvents, or asbestos.
- G. Firestop Collars/Devices: Factory-assembled collars formed from galvanized steel and lined with intumescent material sized to fit specific diameter of penetrant.

- H. Intumescent Composite Board: Rigid panels consisting of a lightweight, polyurethane foam material.
- I. Intumescent Putties: Non-hardening dielectric, water-resistant putties containing no solvents, inorganic fibers, or silicone compounds.
- J. Intumescent Putties: Nonhardening dielectric, water-resistant putties containing no solvents, inorganic fibers, or silicone compounds.
- K. Intumescent Wrap Strips: Single-component intumescent elastomeric sheets with aluminum foil on one side for use around combustible penetrants.
- L. Mortars: Prepackaged dry mixes consisting of a blend of inorganic binders, hydraulic cement, fillers, and lightweight aggregate formulated for mixing with water at Project site to form a nonshrinking, homogeneous mortar.
- M. Pillows/Blocks/Plugs: Intumescent flexible block/plug suitable for reuse in repenetration of openings. Blocks shall allow up to 12 inches of unreinforced annular space.
- N. Silicone Foams: Multicomponent, silicone-based liquid elastomers that, when mixed, expand and cure in place to produce a flexible, nonshrinking foam.
- O. Silicone Sealants: Single-component, silicone-based, neutral-curing elastomeric sealants of grade indicated below:
 - 1. Grade: Pourable (self-leveling) formulation for openings in floors and other horizontal surfaces, and nonsag formulation for openings in vertical and other surfaces, unless indicated firestop system limits use to nonsag grade for both opening conditions.

2.6 MIXING

- A. For those products requiring mixing before application, comply with through-penetration firestop system manufacturer's written instructions for accurate proportioning of materials, water (if required), type of mixing equipment, selection of mixer speeds, mixing containers, mixing time, and other items or procedures needed to produce products of uniform quality with optimum performance characteristics for application indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Installer present, for compliance with requirements for opening configurations, penetrating items, substrates, and other conditions affecting performance of firestopping. Do not proceed with installation until unsatisfactory conditions have been corrected.
 - 1. Verify penetrations are properly sized and in suitable condition for application of materials.
 - 2. Conduct tests according to firestop systems manufacturer's written recommendations to verify that substrates are free of oil, grease, rolling compounds, incompatible primers, loose mill scale, dirt or other foreign substances capable of impairing bond of fire resistive materials.
 - 3. Verify objects penetrating firestop materials, including clips, hangers, support sleeves, and similar items, are securely attached to substrates.
 - 4. Verify substrates are not obstructed by ducts, piping, equipment, and other suspended construction that will interfere with applying fire resistive materials.
- B. Verify that environmental conditions are safe and suitable for installation of firestop materials.
- C. Do not proceed with installation of firestop system until the Contractor in a manner acceptable to the A/E has corrected unsatisfactory conditions.

3.2 PREPARATION

- A. Surface Cleaning: Clean out openings immediately prior to installing firestopping to comply with recommendations of firestopping manufacturer and the following requirements:
 - 1. Remove all foreign materials from surfaces of openings and from penetrating items that could interfere with adhesion of firestopping.
 - 2. Clean openings and penetrating items to produce clean, sound surfaces capable of developing optimum bond with firestopping. Remove loose particles remaining from cleaning operation.
 - 3. Remove laitance and form release agents from concrete.
 - 4. Do not apply firestopping and smoke seals to surfaces previously painted or treated with sealers, curing compounds, water repellent or other coatings unless tests have been performed to ensure compatibility of materials. Remove coatings as required.
- B. Verify that field dimensions are as tested and listed, classified systems, Engineering Judgments, EFRRA's and as recommended by the manufacturer's installation instructions.
- C. Priming: Prime substrates where recommended in writing by through-penetration firestop system manufacturer using that manufacturer's recommended products and methods. Confine primers to areas of bond; do not allow spillage and migration onto exposed surfaces.
- D. Ensure that anchoring devices, back-up materials, clips, sleeves, and supports and other related materials used in the actual fire tests are provided.
- E. Masking Tape: Use masking tape to prevent through-penetration firestop systems from contacting adjoining surfaces that will remain exposed on completion of work and that would otherwise be permanently stained or damaged by such contact or by cleaning methods used to remove smears from firestop system materials. Remove tape as soon as possible without disturbing firestop systems seal with substances.

3.3 INSTALLING THROUGH-PENETRATION FIRESTOPS

- A. General: Comply with the "Performance Requirements" in Part 1 and the through-penetration firestop manufacturer's installation instructions and drawings pertaining to products and applications indicated.
 - 1. Coordinate with other trades to assure that all pipes, conduit, cable, and other items, which penetrate fire rated construction, have been permanently installed prior to installation of firestop assemblies.
 - 2. Schedule the Work to assure that partition and all other construction that conceals penetrations are not erected prior to the installation of firestop and smoke seals.
- B. Install forming/damming materials and other accessories of types required to support fill materials during their application and in the position needed to produce the cross sectional shapes and depths required to achieve fire ratings of designated through- penetration firestop systems.
 - 1. After installing fill materials, remove combustible forming materials and other accessories not indicated as permanent components of firestop systems.
- C. Install fill materials for through-penetration firestop systems by proven techniques to produce the following results:
 - 1. Completely fill voids and cavities formed by openings, forming materials, accessories, and penetrating items to achieve required fire-resistance ratings.
 - 2. Apply materials so they contact and adhere to substrates formed by openings and penetrating items.
 - 3. For fill materials that will remain exposed after completing Work, finish to produce smooth, uniform surfaces that are flush with adjoining finishes.

4. Where through-penetration firestops are indicated to be watertight, they shall meet UL Water Leakage Test – Class I requirements for systems tested and listed in accordance with the criteria of ASTM E814 (UL1479) Standard Test Method for Fire Tests of Through-Penetration Fire Stops. W Rated – Class I requirements include a minimum water column exposure of 3 feet for 72 hours prior to the standard time/temperature curve for the fire test.
5. Through Penetration Sealants with a Fungicide. Sealants must meet the requirements of ASTM G21 Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi.

3.4 IDENTIFICATION

- A. Penetration Identification: Identify penetration firestop systems with pressure-sensitive, self-adhesive, preprinted vinyl labels or with legible metal or plastic labels. Attach labels permanently to surfaces adjacent to and within 6 inches of firestopping edge so labels will be visible to anyone seeking to remove penetrating items or firestop systems use mechanical fasteners or self-adhering-type labels with adhesives capable of permanently bonding labels to surfaces on which labels are placed. Include the following information on labels:
 1. The words "Warning – Through-Penetration Firestop System – Do Not Disturb. Notify Building Management of Any Damage".
 2. Contractor's name, address, and phone number.
 3. Through-penetration firestop system designation of applicable testing and inspecting agency.
 4. Date of installation.
 5. Through-penetration firestop system manufacturer's name.
 6. Installer's name.
- B. Marking and Identification: In addition to identification of firestop systems, fire walls, fire barriers, fire partitions, smoke barriers and smoke partitions or any other wall required to have protected openings or penetrations shall be effectively and permanently identified with signs or stenciling. Such identification shall:
 1. Be located in accessible concealed floor, floor-ceiling, or attic spaces at 15 feet from end of wall; and
 2. Be repeated at intervals not exceeding 30 feet measured horizontally along the wall or partition; and
 3. Include lettering not less than 3 inches in height, incorporating the suggested wording: "FIRE AND/OR SMOKE BARRIER – PROTECT ALL OPENINGS." Other wording must be pre-approved by Authorities with Jurisdiction.

3.5 CLEANING AND PROTECTION

- A. Clean off excess fill materials and sealants adjacent to openings as work progresses by methods and with cleaning materials approved by manufacturers of firestopping products and of products in which openings occur.
- B. Provide final protection and maintain conditions during and after installation that ensure through-penetration firestop systems are without damage or deterioration at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated through-penetration firestop systems immediately and install new materials to produce through-penetration firestop system complying with specified requirements.

3.6 FIELD QUALITY CONTROL

- A. Owner will engage a qualified testing agency to perform tests and inspections[**of mockups**].
- B. Keep areas of work accessible until inspection by applicable code authorities.
- C. Inspection of through-penetration firestopping shall be performed in accordance with ASTM E 2174, "Standard Practice for On-Site Inspection of Installed Fire Stops" or other recognized standard.

- D. Where deficiencies are found or penetration firestopping is damaged or removed because of testing, repair or replace penetration firestopping to comply with requirements.
- E. Proceed with enclosing penetration firestopping with other construction only after inspection reports are issued and installations comply with requirements.

END OF SECTION 07 84 13

SECTION 07 92 00 – JOINT SEALANTS

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes joint sealants for the applications indicated in the Joint-Sealant Schedule at the end of Part 3.
 - 1. Silicone joint sealants
 - 2. Urethane joint sealants
 - 3. Silyl-terminated polyether (STPE) joint sealants
 - 4. Latex joint sealants
- B. Related Sections include the following:
 - 1. Division 04 Section "Unit Masonry" for masonry control and expansion joint fillers and gaskets.

1.2 ACTION SUBMITTALS

- A. Product Data: For each joint-sealant product indicated, including backing materials.
- B. Samples for Verification: For each type and color of joint sealant required, provide Samples with joint sealants in 1/2-inch-wide joints formed between two 6-inch-long strips of material matching the appearance of exposed surfaces adjacent to joint sealants.
- C. Joint-Sealant Schedule: Include the following information:
 - 1. Joint-sealant application, joint location, and designation.
 - 2. Joint-sealant manufacturer and product name.
 - 3. Joint-sealant formulation.
 - 4. Joint-sealant color.

1.3 INFORMATIONAL/QUALITY ASSURANCE/CONTROL SUBMITTALS

- A. Preconstruction Field-Adhesion Test Reports: Indicate which sealants and joint preparation methods resulted in optimum adhesion to joint substrate based on testing specified in "Preconstruction Testing" article.

1.4 CLOSEOUT SUBMITTALS:

- A. General: Closeout Submittals are to be submitted with O and M Manuals only. Do not submit with other ACTION and INFORMATIONAL Submittals.
 - 1. Warranties: Special warranties specified in this Section.
 - a. Manufacturer's special warranties.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: Manufacturer's recognized and recommended installer for installation of elastomeric sealants required for this Project, as required by terms of warranty.
- B. Mockups: Install sealant in mockups of assemblies specified in other Sections that are indicated to receive joint sealants specified in this Section. Use materials and installation methods specified in this Section.
 - 1. Refer to Division 04 Section "Unit Masonry" for additional mockup requirements.

1.6 PRECONSTRUCTION TESTING

- A. Preconstruction Field-Adhesion Testing: Before installing sealants, field test their adhesion to Project joint substrates as follows:
 - 1. Locate test joints at mockups.
 - 2. Conduct field tests for each application indicated below:

- a. Each kind of sealant and joint substrate indicated.
- 3. Notify A/E seven days in advance of dates and times when joint will be tested.
- 4. Arrange for tests to take place with joint-sealant manufacturer's technical representative present.
 - a. Test Method: Test joint sealants according to Method A, Field-Applied Sealant Joint Hand Pull Tab, in Appendix XI in ASTM C1193 or Method A, Tail Procedure, in ASTM C1521.
 - 1) For joints with dissimilar substrates, verify adhesion to each substrate separately; extend cut along one side, verifying adhesion to opposite side. Repeat procedure for opposite side.
- 5. Report whether sealant failed to adhere to joint substrate or tore cohesively. Include data on pull distance used to test each kind of product and joint substrate. For sealants that fail adhesively, retest until satisfactory adhesions is obtained.
 - a. Record required substrate preparation and whether or not a primer was required.
- 6. Evaluation of Preconstruction Field-Adhesion-Test Results: Sealants not evidencing adhesive failure from testing, in absence of other indications of noncompliance with requirements, will be considered satisfactory. Do not use sealants that fail to adhere to joint substrates during testing.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to Project site in original unopened containers or bundles with labels indicating manufacturer, product name and designation, color, expiration period for use, pot life, curing time, and mixing instructions for multiple-component materials.
- B. Store and handle materials in compliance with manufacturer's recommendations to prevent their deterioration or damage due to moisture, high or low temperatures, contaminants, or other causes.

1.8 FIELD CONDITIONS

- A. Do not proceed with installation of joint sealants under the following conditions:
 - 1. When ambient and substrate temperature conditions are outside limits permitted by joint-sealant manufacturer or are below 40 deg F.
 - 2. When joint substrates are wet.
 - 3. Where joint widths are less than those allowed by joint-sealant manufacturer for applications indicated.
 - 4. Contaminants capable of interfering with adhesion have not yet been removed from joint substrates.
- B. Coordinate as required with other trades to assure proper and adequate provision in the work of those trades for interface with the work of this section.

1.9 WARRANTY

- A. Special Installer's Warranty: Installer's standard form in which Installer agrees to repair or replace elastomeric joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.
 - 1. Warranty Period: 2 years from date of Substantial Completion.
- B. Special Manufacturer's Warranty: Manufacturer's standard form in which silicone sealant manufacturer agrees to furnish silicone joint sealants to repair or replace those that do not comply with performance and other requirements specified in this Section within specified warranty period.
 - 1. Warranty Period: 5 years from date of Substantial Completion.
- C. Special warranties specified in this Article exclude deterioration or failure of elastomeric joint sealants from the following:
 - 1. Movement of the structure resulting in stresses on the sealant exceeding sealant manufacturer's written specifications for sealant elongation and compression caused by structural settlement or errors attributable to design or construction.

2. Disintegration of joint substrates from natural causes exceeding design specifications.
3. Mechanical damage caused by individuals, tools, or other outside agents.
4. Changes in sealant appearance caused by accumulation of dirt or other atmospheric contaminants.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Products: Subject to compliance with requirements, provide one of the products listed in other Part 2 articles.
- B. Products of other manufacturers will be considered for acceptance provided they equal or exceed the material requirements and functional qualities of the specified product. The "Substitution Request Form" and complete technical data for evaluation must accompany requests for A/E's approval. All materials for evaluation must be received by the Project Manager and Specification Department at least 10 days prior to bid due date. Additional approved manufacturers will be issued by Addendum.
- C. Obtain joint sealants from a single manufacturer for each sealant type.

2.2 PERFORMANCE REQUIREMENTS

- A. Provide elastomeric joint sealants that establish and maintain watertight and airtight continuous joint seals without staining or deteriorating joint substrates.

2.3 MATERIALS, GENERAL

- A. Compatibility: Provide joint sealants, backings, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by sealant manufacturer, based on testing and field experience.
- B. Liquid-Applied Sealants: Comply with ASTM C920 and other requirements indicated for each liquid-applied chemically curing sealant specified, including those referencing ASTM C920 classifications for type, grade, class, and uses related to exposure and joint substrates.
- C. Colors of Exposed Joint Sealants: As selected by A/E from manufacturer's full range, unless otherwise noted.
 1. Provide tintable silicones where custom silicones are necessary to compliment/match adjacent materials.

2.4 SILICONE JOINT SEALANTS

- A. Single-Component, Nonsag, Silicone Joint Sealant: ASTM C920, Type S, Grade NS, Class 100/50, for Use NT.
 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. 790 or NS Parking Structure Sealant; DuPont Corporation.
 - b. SilPruf LM SCS2700; GE Construction Sealants; Momentive Performance Materials, Inc.
 - c. 301 NS, 311 NS, 890NST, or 890FTS; Pecora Corporation.
 - d. Sikasil WS-290 or Sikasil 728 NS; Sika Corporation.
 - e. Spectrem 1 or Spectrem 800; Tremco Incorporated.
- B. Single-Component, Nonsag, Silicone Joint Sealant: ASTM C920, Type S, Grade NS, Class 50, for Use NT.
 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. 756 SMS, 791, 795, or 995; DuPont Corporation.
 - b. SilGlaze II SCS2800, SilPruf NB SCS9000, or SilPruf SCS2000; GE Construction Sealants; Momentive Performance Materials, Inc.
 - c. PCS; Pecora Corporation.
 - d. Whitford Worldwide; PSI-641; Polymeric Systems, Inc.

- e. Sikasil WS-295 or Sikasil N+; Sika Corporation.
 - f. Spectrem 2 or 3; Tremco Incorporated.
- C. Multiple-Component, Nonsag, Silicone Joint Sealant: ASTM C920, Type M, Grade NS, Class 50, for Use NT.
- 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. 890FTS-TXTR; Pecora Corporation.
 - b. Sikasil WS-295 FPS; Sika Corporation.
 - c. Spectrem 4-TS; Tremco Incorporated.
- D. Mildew-Resistant, Single-Component, Silicone Joint Sealant: ASTM C920, Type S, Grade NS, Class 25, for Use NT.
- 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. 786 Mildew Resistant; DuPont Corporation.
 - b. Sanitary SCS1700; GE Construction Sealants; Momentive Performance Materials, Inc.
 - c. Tremsil 200 Sanitary; Tremco Incorporated.
 - d. 898; Pecora Corporation.
 - e. White Lightning Silicone Ultra Low Odor All Purpose Sealant; Sherwin-Williams.
 - f. Sikail-GP; Sika.

2.5 URETHANE JOINT SEALANTS

- A. Single-Component, Nonsag, Urethane Joint Sealant: ASTM C920, Type S, Grade NS, Class 25 or 35, for Use NT.
- 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Sonolastic NP1, Sonolastic TX1, or Sonolastic Ultra; MBCC Group.
 - b. Chem-Calk GPS1, 900, 915, or 916 Textured; Bostik, Inc.
 - c. Elasto-Thane 230; Pacific Polymers Division, ITW.
 - d. Dynatrol I-XL; Pecora Corporation.
 - e. Flexiprene 1000; Polymeric Systems, Inc., Whitford Worldwide.
 - f. Sikaflex – 1A+ or Sikaflex Textured; Sika Corporation, Construction Products Division.
 - g. Dymonic, Dymonic FC, or Vulkem 116; Tremco Incorporated.
 - h. EP-1000; Henkel (fka OSI).
 - i. Stampede 1 Polyurethane Sealant; Sherwin-Williams.
- B. Multi-component, Nonsag, Urethane Joint Sealant: ASTM C920, Type M, Grade NS, Class 25, for Use T.
- 1. Products: Subject to compliance with requirements.
 - a. Dynatrol II; Pecora Corporation.
 - 1) For traffic-grade applications, install per guidelines in manufacturer's technical bulletin.
 - b. Dymeric 240 or Dymeric 240 FC, Tremco Incorporated.
- C. Multi-component, Nonsag, Urethane Joint Sealant: ASTM C920, Type M, Grade NS, Class 25, for Use NT.
- 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Sonolastic NP 2; MBCC Group.
 - b. Chem-Calk 500; Bostik, Inc.
 - c. Elasto-Thane 227 High Shore Type II, Elasto-Thane 227 R Type II or Elasto-Thane 227 Type II; Pacific Polymers Division, ITW.
 - d. Dynatred; Pecora Corporation.
 - e. Sikaflex – 2c NS or Sikaflex – 2c NS EZ Mix; Sika Corporation, Construction Products Division.
 - f. Vulkem 227; Tremco Incorporated.

2.6 SILYL-TERMINATED POLYETHER (STPE) JOINT SEALANTS

- A. STPE, S, NS, 50, NT: Single-component, nonsag, plus 50 percent and minus 50 percent movement capability, nontraffic-use, silyl-terminated polyether joint sealant; ASTM C 920, Type S, Grade NS, Class 50, Use NT.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. MBCC Group.
 - b. GE Construction Sealants; Momentive Performance Materials, Inc.
 - c. Pecora Corporation.
 - d. Sherwin-Williams Company.
 - e. Sika Hyflex 150LM; Sika Corporation.

2.7 LATEX JOINT SEALANTS

- A. Latex Joint Sealant: Acrylic latex or siliconized acrylic latex, ASTM C834, Type OP, Grade NF or better.
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Sonolac; MBCC Group.
 - b. Chem-Calk 600; Bostik, Inc.
 - c. AC-20+ Silicone; Pecora Corporation.
 - d. SM 8200; Schnee-Morehead, Division, ITW.
 - e. Tremflex 834; Tremco Incorporated.
 - f. 950A Siliconized Acrylic Latex Caulk; Sherwin-Williams.
 - g. Titebond Kitchen and Bath Sealant; Franklin International.
- B. Paintable Mildew-Resistant Latex Joint Sealant: Acrylic latex or siliconized acrylic latex, ASTM C834, Type OP, Grade NF or better.
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Sonolac; MBCC Group.
 - b. AC-20+Silicone; Pecora Corporation.
 - c. Sherwin-Williams:
 - 1) Powerhouse 1110A Siliconized Acrylic Latex Sealant.
 - 2) White Lightning Kitchen and Bath Latex Ultra Sealant.
 - d. Tremflex 834; Tremco.

2.8 JOINT-SEALANT BACKING

- A. General: Provide sealant backings of material and type that are nonstaining; are compatible with joint substrates, sealants, primers, and other joint fillers; and are approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.
- B. Cylindrical Sealant Backings: ASTM C1330, Type C (closed-cell material with a surface skin) as approved in writing by joint-sealant manufacturer for joint application indicated, and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance:
- C. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint-filler materials or joint surfaces at back of joint where such adhesion would result in sealant failure. Provide self-adhesive tape where applicable.

2.9 MISCELLANEOUS MATERIALS

- A. Primer: Material recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.

- B. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable of staining or harming joint substrates and adjacent nonporous surfaces in any way, and formulated to promote optimum adhesion of sealants to joint substrates.
- C. Masking Tape: Non-staining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine joints indicated to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting joint-sealant performance.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint-sealant manufacturer's written instructions and the following requirements:
 - 1. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, paints (except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer), old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.
 - 2. Clean porous joint substrate surfaces by brushing, grinding, blast cleaning, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants. Remove loose particles remaining after cleaning operations above by vacuuming or blowing out joints with oil-free compressed air. Porous joint substrates include the following:
 - a. Concrete.
 - b. Masonry.
 - 3. Clean nonporous surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants. Nonporous joint substrates include the following:
 - a. Metal.
- B. Joint Priming: Prime joint substrates, where recommended in writing by joint-sealant manufacturer, based on preconstruction joint-sealant-substrate tests or prior experience. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.
- C. Masking Tape: Use masking tape where required to prevent contact of sealant with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

3.3 INSTALLATION OF JOINT SEALANTS

- A. General: Comply with joint-sealant manufacturer's written installation instructions for products and applications indicated, unless more stringent requirements apply.
 - 1. Mix and apply multi-component sealants in accordance with manufacturer's printed instructions.
- B. Sealant Installation Standard: Comply with recommendations in ASTM C1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.
 - 1. Joints or gaps that require sealant are to be filled with one of the specified sealants even though the note may read "Caulked".
 - 2. Joints to be filled shall be thoroughly dry and free from dust, dirt, oil, and grease at the time of application of sealants.

3. Expansion and control joints in exterior walls shall have the joint filler material built into the wall, or between wall and slab, at the time of construction.
 4. Masking: Metal shall be masked with masking tape, as well as other surfaces where it's required to prevent the sealant smearing the adjacent surface. Upon completion of the sealants, remove the tape.
- C. Install sealant backings of type indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.
1. Do not leave gaps between ends of sealant backings.
 2. Do not stretch, twist, puncture, or tear sealant backings.
 3. Remove absorbent sealant backings that have become wet before sealant application and replace them with dry materials.
- D. Install bond-breaker tape behind sealants where sealant backings are not used between sealants and backs of joints.
- E. Install sealants using proven techniques that comply with the following and at the same time backings are installed:
1. Place sealants so they directly contact and fully wet joint substrates.
 2. Completely fill recesses in each joint configuration.
 3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.
- F. Tooling of Non-sag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants according to requirements specified below to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.
1. Remove excess sealant from surfaces adjacent to joints.
 2. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces. Avoid "over-tooling" or "stretching" sealant material during application.
 3. Dry tool only, no wet tooling permitted.
 4. Provide concave joint profile per Figure 8A in ASTM C1193, unless otherwise indicated.

3.4 CLEANING

- A. Clean off excess sealant or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved in writing by manufacturers of joint sealants and of products in which joints occur.

3.5 PROTECTION

- A. Protect joint sealants during and after curing period from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated joint sealants immediately so installations with repaired areas are indistinguishable from original work.

3.6 JOINT-SEALANT SCHEDULE

- A. Joint-Sealant Application: Exterior joints in vertical surfaces and non-traffic horizontal surfaces.
1. Joint locations such as, but not limited to:
 - a. Control and expansion joints in unit masonry.
 - 1) Provide joint sealants slightly darker than the adjacent masonry units. Provide multiple colors as may be required for match.
 - b. Perimeter joints between masonry, and frames of louvers and similar openings.
 - c. Lintels to masonry construction.
 - d. Exterior joints between dissimilar materials where the joining of the two surfaces leaves a gap between the meeting materials or components as may be dictated by various methods of construction to make building watertight.

- e. Other joints as indicated on Drawings.
 - 2. Provide one of the following acceptable sealants as approved by manufacturer for substrates and uses indicated:
 - a. Neutral-Curing Silicone Joint Sealant:
 - 1) Single-Component, Nonsag: ASTM C920, Type S, Grade NS, Class 100/50, for Use NT.
 - 2) Single-Component, Nonsag: ASTM C920, Type S, Grade NS, Class 50, for Use NT.
 - 3) Multi-Component, Nonsag: ASTM C920, Type S, Grade NS, Class 50, for Use NT.
 - 3. Color: Custom color to match A/E's sample of adjacent materials.
- B. Joint-Sealant Application: Interior joints in vertical surfaces and horizontal non-traffic surfaces, subject to movement, unless otherwise noted.
- 1. Joint locations such as, but not limited to:
 - a. Control joints on exposed interior surfaces of exterior walls.
 - b. Other joints as indicated on Drawings.
 - 2. Provide the following acceptable sealants as approved by manufacturer for substrates and uses indicated.
 - a. Urethane Joint Sealant:
 - 1) Single-Component, Nonsag: ASTM C920, Type S, Grade NS, Class 25 or 35, for Use NT.
 - 2) Multi-Component, Nonsag: ASTM C920, Type M, Grade NS, Class 25, for Use NT.
 - b. Silyl-Terminated Polyester
 - 1) Single-Component, STPE, S, NS, 50, NT.
 - 3. Color: Custom to match A/E's sample.
- C. Joint-Sealant Application: Interior joints in vertical surfaces not subject to movement.
- 1. Joint locations such as, but not limited to:
 - a. Interior perimeter joints of exterior openings.
 - b. Interior joints between dissimilar materials where a gap is created where materials meet, unless otherwise noted.
 - 2. Provide the following acceptable sealants as approved by manufacturer for substrates and uses indicated:
 - a. Latex Joint Sealant: Acrylic latex or siliconized acrylic latex, ASTM C834, Type OP, Grade NF or better.
 - 3. Color: As selected by A/E from manufacturer's full range.
- D. Joint-Sealant Application: Mildew-resistant interior joints in non-painted vertical surfaces and horizontal non-traffic surfaces.
- 1. Joint locations such as, but not limited to:
 - a. Interior joints between plumbing fixtures and adjoining floors and counters.
 - b. Other joints as indicated on Drawings.
 - 2. Provide the following acceptable sealants as approved by manufacturer for substrates and uses indicated:
 - a. Mildew-Resistant, Single-Component, Acid-Curing, or Neutral-Curing Silicone Joint Sealant: ASTM C920, Type S, Grade NS, Class 25, for Use NT.
 - 3. Color: As selected by A/E from manufacturer's full range of colors.
- E. Joint-Sealant Application: Mildew-resistant interior joints in painted vertical surfaces and horizontal non-traffic surfaces.
- 1. Joint locations such as, but not limited to:
 - a. Interior joints between plumbing fixtures and adjoining painted walls.
 - 2. Provide the following acceptable sealants as approved by manufacturer for substrates and uses indicated:
 - a. Mildew-Resistant Latex Joint Sealant: Acrylic latex or siliconized acrylic latex, ASTM C834, Type OP, Grade NF or better.
 - 3. Color: As selected by A/E from manufacturer's full range of colors.

END OF SECTION 07 92 00

DIVISION

09

FINISHES

SECTION 09 91 13 - EXTERIOR PAINTING

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes surface preparation and the application of paint systems on the following exterior substrates:
 - 1. Steel and iron.
 - 2. Galvanized metal.
- B. Work under this contract shall also include, but not necessarily be limited to the following:
 - 1. Surface preparation of substrates as required for acceptance of painting, including cleaning, small crack repair, patching, caulking, and making good surfaces and areas to the limits defined under Master Painters Institute (MPI) preparation requirements.
 - a. Preparation and testing of existing painted surfaces, indicated to be repainted to accommodate new work, shall be preformed as work of this Section.
 - 2. Priming (except where pre-primed with an approved primer under other sections of work) and painting of miscellaneous metal.
 - 3. Painting of exposed to view fire suppression, plumbing, HVAC, electrical, communication, and electronic safety and security work unless prefinished.
- C. Do not paint prefinished items, concealed surfaces, finished metal surfaces, operating parts, and labels.
 - 1. Prefinished items including but not limited to the following factory finished components:
 - a. Architectural wall louvers
 - 2. Finished metal surfaces include the following:
 - a. Anodized aluminum
 - b. Stainless steel
 - c. Chromium plate
 - d. Copper and copper alloys
 - e. Bronze and brass
 - 3. Operating parts include moving parts of operating equipment.
 - 4. Labels: Do not paint over UL, FM Global, or other code required labels or equipment name, identification, performance rating, or nomenclature plates.
- D. Related Sections include the following:
 - 1. Division 04 Section "Unit Masonry" for painting of steel uncovered by new work.
 - 2. Division 05 Sections for shop priming of metal substrates with primers specified in this Section.
 - 3. Division 09 Section "Interior Painting" for surface preparation and the application of paint systems on interior substrates.

1.2 DEFINITIONS

- A. General: Standard coating terms defined in ASTM D 16 apply to this Section.
 - 1. Flat refers to a lusterless or matte finish with a gloss range below 15 when measured at an 85-degree meter. (MPI values similar to G1 and G2).
 - 2. Eggshell refers to low-sheen finish with a gloss range between 20 and 35 when measured at a 60-degree meter. (MPI values similar to G3 and G4).
 - 3. Semigloss refers to medium-sheen finish with a gloss range between 35 and 70 when measured at a 60-degree meter. (MPI values similar to G5).
 - 4. Full gloss refers to high-sheen finish with a gloss range more than 70 when measured at a 60-degree meter. (MPI values similar to G6 and G7).

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated, including primers and the following:
 - 1. Product characteristics.
 - 2. Surface preparation instructions and recommendations.

3. Primer requirements and finish specification.
4. Storage and handling requirements and recommendations.
5. Application methods.
6. VOC content.

B. Samples for Initial Selection: For each type of topcoat product, where color is not preselected.

C. Samples for Verification: For each type of paint system and each color and gloss of topcoat.

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.

1.4 INFORMATIONAL/QUALITY ASSURANCE/CONTROL SUBMITTALS

A. 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. Include color designations.

1.5 CLOSEOUT SUBMITTALS

A. General: Closeout Submittals are to be submitted with O and M Manuals only. Do not submit with other ACTION and INFORMATIONAL Submittals:

1. Receipt of extra materials.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to the Project site in the manufacturer's original, unopened packages and containers bearing manufacturer's name and label, and the following information:

1. Product name or title of material.
2. Product description (generic classification or binder type).
3. Manufacturer's stock number and date of manufacture.
4. Contents by volume, for pigment and vehicle constituents.
5. Thinning instructions.
6. Application instructions.
7. Color name and number.
8. VOC content.

B. Store Materials

1. Store only the approved materials at the Project site and store only in a suitable and designated area restricted to the storage of paint materials and related equipment.
 - a. Store materials not in use in tightly covered containers in a well ventilated area at a minimum ambient temperature of 45 degrees F. Maintain containers used in storage in a clean condition, free of foreign materials and residue.
 - b. Protect from freezing. Keep storage area neat and orderly.
 - c. Remove oily rags and waste daily.
2. Use means necessary to ensure the safe storage and use of paint materials and the prompt and safe disposal of waste.
3. Use means necessary to protect paint materials before, during, and after application and to protect the installed work and materials of other trades.
4. Where toxic and/or volatile/explosive/flammable materials are being used, provide adequate fireproof storage lockers and take all necessary precautions and post adequate warnings (e.g. no smoking) as required.
5. Take all necessary precautionary and safety measures to prevent fire hazards and spontaneous combustion and to protect the environment from hazard spills. Materials that constitute a fire hazard (paints, solvents, drop clothes, etc.) shall be stored in suitable closed and rated containers and removed from site on a daily basis.

1.7 FIELD CONDITIONS

- A. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 95 deg F.
 - 1. Apply solvent-thinned paints only when the temperature of surfaces to be painted and surrounding air temperatures are between 45 and 95 degrees 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. Painting may continue during inclement weather if surfaces and areas to be painted are enclosed and heated within temperature limits specified by the manufacturer during application and drying periods.
- C. Apply paint only to dry, clean, properly cured and adequately prepared surfaces in areas where dust is no longer generated by construction activities such that airborne particles will not affect the quality of finished surfaces.

1.8 SCHEDULING

- A. Schedule painting operations at occupied facilities to prevent disruption of occupants in and about the building. Painting shall be carried out after facility working hours and weekends in accordance with Owner's operating requirements, where work cannot be sectioned off. Schedule work such that painted surfaces will have dried before occupants are affected. Obtain written authorization from Owner for changes in work schedule once established.

1.9 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 1 gal. of each material and color applied.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers as listed hereinafter.
- B. Products of other manufacturers will be considered for acceptance provided they equal or exceed the material requirements and functional qualities of the specified product. The "Substitution Request Form" and complete technical data for evaluation must accompany requests for A/E's approval. All materials for evaluation must be received by the Project Manager and Specification Department at least 10 days prior to bid due date. Additional approved manufacturers will be issued by Addendum.

2.2 PAINT, GENERAL

- A. Material Compatibility: Paint materials selected for coating systems for each type of surface shall be the product of a single manufacturer.
 - 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. Thinners, when used, shall be only those thinners recommended for that purpose by the manufacturer of the material to be thinned.

- C. All materials used shall be lead- and mercury-free and shall have a VOC content not exceeding the following, unless a lower VOC content is required by authorities having jurisdiction.

Exterior Coatings:

<u>Coating Type</u>	<u>VOC weight in grams/liter of product minus water</u>
Non-flat coatings	50
Flat coatings	50
Dry-Fog Coatings	150
Primers, Sealers and Undercoaters	100
Rust-Preventive Coatings	100
Zinc-Rich Industrial Maintenance Primers	100
Pretreatment Wash Primers	420
Shellacs, Clear	730
Shellacs, Pigmented	550

- D. Colors: As selected by A/E manufacturer's full range to compliment adjacent finishes.
- E. Submission of a proposal indicates that the Contractor has reviewed the bidding documents with the painting subcontractor and accepts the Specifications as sufficient to produce approved painting results. If the painting subcontractor contends that the materials or number of coats specified will not produce satisfactory results, he shall so notify the A/E directly or indirectly through a Bidding Contractor 10 days prior to receipt of bids for proper action.

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.
- B. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers.
- C. Begin coating application only after unsatisfactory conditions have been corrected and surfaces are dry.
1. Beginning coating application constitutes Contractor's acceptance of substrates and conditions.

3.2 PREPARATION

- A. Comply with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual" applicable to substrates and paint systems indicated.
- B. Clean substrates of substances that could impair bond of paints, including dirt, oil, grease, and incompatible paints and encapsulants.
1. Remove incompatible primers and reprime substrate with compatible primers or provide barrier coats as required to produce paint systems indicated. Notify A/E in writing about anticipated problems using the specified finish coat materials with substrates primed by others.
- C. Steel Substrates: Remove rust, loose mill scale, and shop primer, if any. Clean using methods recommended in writing by paint manufacturer, but not less than the following:
1. SSPC-SP 2, "Hand Tool Cleaning," unless otherwise recommended by manufacturer for application indicated.
- D. Shop-Primed Steel Substrates: Clean field welds, bolted connections, and abraded areas of shop paint and paint exposed areas with same material as used for shop priming to comply with SSPC-PA 1 for touching up shop-primed surfaces.

- E. 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.
 - 1. Surface preparation should start with SSPC SP-1 Solvent Cleaning to remove oil/grease contamination. If the galvanized surface is shinney, the surface must be de-glossed and roughened in one of two ways:
 - a. In mild building environments, wash with a chemical etching solution such as MPI #25.
 - 2. Galvanized metals are very smooth and have virtually no profile for the coating to adhere to. It is important to abrade the surface of the galvanized metal through Brush of Blast (SSPC SP7), or an etching primer before coatings application, as recommended by paint manufacturer.
 - 3. Galvanized surfaces must use a primer before applying a topcoat. Topcoats will not adhere to the zinc layer of the galvanized surface and requires a primer to form a bond between the two. Manufacturer's water-based bonding primers as an alternative to the previously used cementitious primers. An epoxy primer may also be used, however, it should be noted that epoxy primers typically require an abrasive blast-cleaned surface.
- F. Aluminum Substrates: Remove loose surface oxidation.

3.3 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.
 - 3. Do not paint over labels of independent testing agencies of equipment name, identification, performance rating, or nomenclature plates.
 - 4. Primers specified in paint schedules may be omitted on items that are factory primed or factory finished if acceptable to topcoat manufacturers.
- B. Scheduling Painting: Apply first coat material to surfaces that have been cleaned, pretreated, or otherwise prepared for painting as soon as practicable after preparation and before subsequent surface deterioration.
 - 1. Allow sufficient time between successive coatings to permit proper drying. Do not recoat until paint has dried to where it feels firm, does not deform or feel sticky under moderate thumb pressure, and application of another coat of paint does not cause lifting or loss of adhesion of the undercoat.
 - 2. Slightly vary the color of succeeding coats.
- C. Minimum Coating Thickness: Apply materials at not less than manufacturer's recommended spreading rate.
 - 1. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.
 - 2. Recoat primed and sealed surfaces where there is evidence of suction spots or unsealed areas in first coat, to assure a finish coat with no burn through or other defects due to insufficient sealing.
- D. 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.
- E. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.
- F. 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.

- G. Painting Fire Suppression, Plumbing, HVAC, Electrical, Communication, and Electronic Safety and Security Work:
 - 1. Paint the following where exposed to view:
 - a. Equipment, including panel boards.
 - b. Uninsulated metal piping.
 - c. Pipe hangers and supports.
 - d. Metal conduit.

3.4 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:
 - 1. Owner will engage the services of a qualified testing agency to sample paint materials being used. Samples of material delivered to Project site will be taken, identified, sealed, and certified in presence of Contractor.
 - 2. Testing agency will perform tests for compliance of paint materials with product requirements, including dry film thicknesses.
 - a. Contractor shall touch up and restore painted surfaces damaged by testing.
 - b. If test results show that dry film thickness of applied paint does not comply with paint manufacturer's written recommendations, Contractor shall pay for testing and apply additional coats as needed to provide dry film thickness that complies with paint manufacturer's written recommendations.
 - 3. Owner may direct Contractor to stop applying paints if test results show materials being used do not comply with product requirements. Contractor shall remove noncomplying-paint materials from Project site, pay for testing, and repaint surfaces painted with rejected materials. Contractor will be required to remove rejected materials from previously painted surfaces if, on repainting with complying materials, the two paints are incompatible.

3.5 CLEANING AND PROTECTION

- A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.
 - 1. Do not clean equipment with free-draining water and prevent solvents, thinners, cleaners, and other contaminants from entering into waterways, sanitary and storm drain systems, and ground.
 - 2. Dispose of contaminants in accordance with requirements of authorities having jurisdiction.
 - 3. Allow empty cans to dry before disposal.
- 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 A/E, and leave in an undamaged condition.
- D. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

3.6 EXTERIOR PAINTING SCHEDULE (P-Code)

- A. Steel and Iron (Ferrous) Substrates:
 - 1. W.B. Light Industrial Coating System: (Code #5.1)
 - a. Prime Coat: Primer, Rust-Inhibitive, Water-Based.
 - 1) Sherwin Williams; Pro-Industrial Pro-Cryl Universal Primer
 - 2) PPG; 4020 Pitt-Tech Plus DTM Industrial Primer
 - 3) Benjamin Moore: Super Spec HP Metal Primer, P04.
 - b. Intermediate Coat: Light industrial coating, exterior matching topcoat.
 - c. Topcoat: Light industrial coating, exterior (semigloss).

- 1) Sherwin Williams; B66-600 Pro Industrial Acrylic
- 2) PPG; 4216HP Pitt-Tech Plus DTM
- 3) Benjamin Moore: Super Spec HP, P28
- 4) Applications: Include, but are not limited to:
 - a) Structural steel and metal fabrications.
 - b) Uninsulated metal piping.
 - c) Pipe hangers and supports.
 - d) Metal conduit.

B. Galvanized-Metal (Non-Ferrous) Substrates:

1. Water-Based Light Industrial Coating System: (Code #5.3).
 - a. Prime Coat: Primer, galvanized, water based, or topcoat manufacturer's recommended primer for indicated application.
 - 1) Sherwin Williams; Pro-Industrial Pro-Cryl Universal Primer
 - 2) PPG; 4020 Pitt-Tech Plus DTM Industrial Primer
 - 3) Benjamin Moore: Super Spec HP Metal Primer, P04.
 - 4) Note: Prime coat may be omitted when not required by paint manufacturer.
 - b. Intermediate Coat: Light industrial coating, exterior, water based, matching topcoat.
 - c. Topcoat: Light industrial coating, exterior, water based (semigloss).
 - 1) Sherwin Williams: B66-600 Pro Industrial Acrylic
 - 2) PPG: 4216HP Pitt-Tech Plus DTM
 - 3) Benjamin Moore: Super Spec HP, P28
 - 4) Applications: Include, but are not limited to:
 - a) Exterior lintels.
 - b) Miscellaneous exposed metal items.
 - c) Uninsulated metal piping.
 - d) Pipe hangers and supports.
 - e) Metal conduit.

C. Aluminum Substrates:

1. Water-Based Light Industrial Coating System: MPI EXT 5.4G (Code 5.4)
 - a. Prime Coat: Primer, quick dry, for aluminum, MPI #95 or topcoat manufacturer's recommended primer for application indicated and VOC compliance.
 - b. Intermediate Coat: Light industrial coating, exterior, water based matching topcoat.
 - c. Topcoat: Light industrial coating, exterior, water based, semi-gloss (Gloss Level 5), MPI #163.
 - d. Applications: Include, but not limited to:
 - 1) Miscellaneous exposed unfinished VAC work.
 - a) Uninsulated metal piping.
 - b) Metal conduit.

END OF SECTION 09 91 13

SECTION 09 91 23.00 - INTERIOR PAINTING

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes surface preparation and application of paint systems on the following interior substrates:
 - 1. Concrete masonry units (CMU) (patching only).
 - 2. Steel and iron.
 - 3. Galvanized metal.
 - 4. Aluminum (not anodized or otherwise coated).
 - 5. Fiberglass and Plastic.
 - 6. Cotton or canvas insulation covering.
 - 7. ASJ insulation covering.
- B. Work under this contract shall also include, but not necessarily be limited to following:
 - 1. Surface preparation of substrates as required for acceptance of painting, including cleaning, small crack repair, patching, caulking, and making good surfaces and areas to limits defined under Master Painters Institute (MPI) preparation requirements.
 - a. Provide for safe and adequate ventilation as required over and above temporary ventilation supplied by others, where toxic and/or volatile/flammable materials are being used.
 - 2. Priming (except where pre-primed with an approved primer under other sections of work) and painting of miscellaneous metal and primed steel equipment.
 - 3. Painting of exposed-to-view HVAC exposed as a result of new work.
- C. Do not paint prefinished items, concealed surfaces, finished metal surfaces, operating parts, and labels.
 - 1. Concealed surfaces including walls or ceilings in following generally inaccessible spaces:
 - a. Foundation spaces
 - b. Furred areas
 - c. Ceiling plenums
 - d. Utility tunnels
 - e. Pipe spaces
 - f. Duct shafts, unless otherwise noted
 - g. Elevator shafts
 - 2. Finished metal surfaces include following:
 - a. Anodized aluminum
 - b. Stainless steel
 - c. Chromium plate
 - d. Copper and copper alloys
 - e. Bronze and brass
 - 3. Operating parts include moving parts of operating equipment.
 - a. Valve and damper operators (including valve stems).
 - b. Linkages
 - c. Sensing devices
 - d. Motor and fan shafts
 - 4. Labels: Do not paint over UL, FMG, or other code required labels or equipment name, identification, performance rating, or nomenclature plates.
 - 5. Communication Cable: Do not paint cable and protect communications cabling from overspray. Paint voids warranty of cable and if painted shall be replaced at painting contractors expense.
 - a. Communications plenum cable.
 - b. Communications riser cable.
 - c. Communications general purpose cable.
 - d. Communications cable, limited use.
 - e. Under carpet communications wire and cable.

- D. Remodeling Work: Where it is necessary to patch and match existing surfaces, prepare surfaces as specified under "Surface Preparation" of this Specification Section. Apply finish paint coats to entire surface adjacent to patched work, terminating paint application at nearest change in surface plane or as directed by A/E.
1. Where required, prepare existing substrate as necessary (sand, prime, and clean) to receive new finish material. Prepare existing painted surfaces to receive painted finish; new paint finish to be applied over properly prepared existing paint finish may be a 2-coat system, eliminating initial prime coat.
 - a. Contractors shall assume that painted and coated surfaces that may be disturbed during work contain lead and cadmium. Contractors shall follow all applicable OSHA and EPA regulations.
 - 1) OSHA requirements include, but not limited to: air monitoring; engineering controls and respirator usage; designation of a competent person; certain housekeeping activities; hand washing facilities; hazard communication and safety training; and clean lunchroom facilities.
 - 2) EPA requirements include, but are not limited to sampling and/or disposal of lead waste.
 2. When repainting occupied areas, submit work schedule for various stages of work for A/E's and Owner's review.
- E. Related Sections include following:
1. Division 05 Sections for shop priming of metal substrates.
 2. Division 09 Section "Exterior Painting" for surface preparation and application of paint systems on exterior substrates.

1.2 DEFINITIONS

- A. General: Standard coating terms defined in ASTM D 16 apply to this Section.
1. Flat refers to a lusterless or matte finish with a gloss range below 15 when measured at an 85-degree meter. (MPI values similar to G1 and G2).
 2. Eggshell refers to low-sheen finish with a gloss range between 20 and 35 when measured at a 60-degree meter. (MPI values similar to G3 and G4).
 3. Semigloss refers to medium-sheen finish with a gloss range between 35 and 70 when measured at a 60-degree meter. (MPI values similar to G5).
 4. Full gloss refers to high-sheen finish with a gloss range more than 70 when measured at a 60-degree meter. (MPI values similar to G6 and G7).

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated. Include recommendations for application and use.
- B. Samples for Verification: For each type of paint system and in 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.

1.4 INFORMATIONAL/QUALITY ASSURANCE/CONTROL SUBMITTALS

- A. Product List: For each product indicated, include following:
1. Cross-reference to paint system and locations of application areas. Use same designations indicated in schedules.

1.5 CLOSEOUT SUBMITTALS

- A. General: Closeout Submittals are to be submitted with O and M Manuals only. Do not submit with other ACTION and INFORMATIONAL Submittals:
1. Receipt of extra materials. Properly package materials and obtain a signed receipt.

2. At Project completion provide an itemized list complete with manufacturer, paint type and color coding of all paints used for Owner's later use in maintenance.

1.6 QUALITY ASSURANCE

A. Regulatory Requirements

1. Conform to work place safety regulations for storage, mixing, application and disposal of all paint related materials to requirements of those authorities having jurisdiction.
2. To reduce amount of contaminants entering waterways, sanitary/storm drain systems or into ground following procedures shall be strictly adhered to:
 - a. Retain cleaning water for water-based materials to allow sediments.
 - b. Retain cleaners, thinners, solvents, and excess paint and place in designated containers and ensure proper disposal.
 - c. Return solvent and oil soaked rags used during painting operations for contaminant recovery, proper disposal, or appropriate cleaning and laundering.
 - d. Dispose of contaminants in an approved legal manner in accordance with hazardous waste regulations.
 - e. Empty paint cans are to be dry prior to disposal or recycling.
 - f. Close and seal tightly partly used cans of materials including sealant and adhesive containers and store protected in well ventilated fire-safe area at moderate temperature.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to job site in manufacturer's original, unopened packages and containers bearing manufacturer's name and label, and following information:

1. Product name or title of material.
2. Product description (generic classification or binder type).
3. Manufacturer's stock number and date of manufacture.
4. Contents by volume, for pigment and vehicle constituents.
5. Thinning instructions.
6. Application instructions.
7. Color name and number.
8. VOC content.

B. Store Materials

1. Store only approved materials at jobsite and store only in a suitable and designated area restricted to storage of paint materials and related equipment.
 - a. Store materials not in use in tightly covered containers in a well-ventilated area at a minimum ambient temperature of 45 degrees F. Maintain containers used in storage in a clean condition, free of foreign materials and residue.
 - b. Protect from freezing. Keep storage area neat and orderly. Remove oily rags and waste daily.
 - c. Remove rags and waste from storage areas daily.
2. Use means necessary to ensure safe storage and use of paint materials and prompt and safe disposal of waste.
3. Use means necessary to protect paint materials before, during, and after application and to protect installed work and materials of other trades.
4. Where toxic and/or volatile/explosive/flammable materials are being used, provide adequate fireproof storage lockers and take all necessary precautions and post adequate warnings as required.
5. Take all necessary precautionary and safety measures to prevent fire hazards and spontaneous combustion and to protect environment from hazard spills. Materials that constitute a fire hazard (paints, solvents, drop clothes, etc.) shall be stored in suitable closed and rated containers and removed from site on a daily basis.

1.8 FIELD CONDITIONS

- ### A.
- Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 95 deg F.

1. Apply solvent thinned paints only when temperature of surfaces to be painted and surrounding air temperatures are between 45 degrees F. and 95 degrees F.
- B. Do not apply paints when relative humidity exceeds 85 percent; at temperatures less than 5 deg F above dew point; or to damp or wet surfaces.
- C. Perform no interior painting or decorating work unless adequate continuous ventilation and sufficient heating facilities are in place to maintain ambient air and substrate temperatures above minimum requirements for 24 hours before, during, and after paint application. Provide supplemental ventilating and heating equipment if ventilation and heating from existing system is inadequate to meet minimum requirements.
- D. Apply paint only to dry, clean, properly cured and adequately prepared surfaces in areas where dust is no longer generated by construction activities such that airborne particles will not affect quality of finished surfaces.
- E. Perform no painting or decorating work unless a minimum lighting level of 30 foot candles is provided on surfaces to be painted.

1.9 SCHEDULING

- A. Schedule painting operations in occupied facilities to prevent disruption of occupants in and about building. Paint shall be carried out after facility working hours or on weekends in accordance with Owner's operating requirements. Schedule work such that painted surfaces will have dried before occupants are affected. Obtain written authorization from Owner for changes in work schedule.

1.10 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials described below that are from same production run (batch mix) as materials applied in unopened cans and that are packaged for storage and identified with labels describing contents for Owner's later use in maintenance. Store where directed.
 1. Quantity: Furnish 1 gal. of each material and color applied.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of manufacturers as listed hereinafter.
- B. Products of other manufacturers will be considered for acceptance provided they equal or exceed material requirements and functional qualities of specified product. "Substitution Request Form" and complete technical data for evaluation must accompany requests for A/E's approval. All materials for evaluation must be received by Project Manager and Specification Department at least 10 days prior to bid due date. Additional approved manufacturers will be issued by Addendum.

2.2 PAINT, GENERAL

- A. Material Compatibility: Paint materials selected for coating systems for each type of surface shall be product of a single manufacturer.
 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. Paint materials and equipment shall be compatible in use; finish coats shall be compatible with prime coats; prime coats shall be compatible with surface to be coated; tools and equipment shall be compatible with coating to be applied.
 - 1. Review other Sections in which primers are provided to ensure compatibility of total system for various substrates. On request, furnish information on characteristic of finish materials to ensure use of compatible primers.
- C. Thinners, when used, shall be only those thinners recommended for that purpose by manufacturer of material to be thinned.
- D. All materials used shall be lead- and mercury-free and VOC-compliant with local authorities with jurisdiction.
- E. Colors: Match existing and or adjacent material colors as approved by A/E.
- F. By submitting a proposal, Contractor has reviewed bidding documents with painting subcontractor and accepts Specifications as sufficient to produce approved painting results. If painting subcontractor contends that materials or number of coats specified will not produce satisfactory results, he shall so notify A/E directly or indirectly through a Bidding Contractor 10 days prior to receipt of bids for proper action.

2.3 MIXING AND TINTING

- A. Unless otherwise specified or pre-approved, all paints shall be ready mixed and pre-tinted. Re-mix all paint in containers prior to and during application to ensure break-up of lumps, complete dispersion of settled pigment, and color and gloss uniformity.
- B. Paste, powder, or catalyzed paint mixes shall be mixed in strict accordance with manufacturer's written instructions.
- C. Where thinner is used, addition shall not exceed paint manufacturer's recommendations.
- D. If required, thin paint for spraying in strict accordance with paint manufacturer's instructions. If directions are not on container, obtain instructions in writing from manufacturer and provide copy of instructions to A/E.

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.
- B. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers.
 - 1. Test galvanized surfaces for chromates or other passivating treatments.
- C. Begin coating application only after unsatisfactory conditions have been corrected and surfaces are dry.
 - 1. Beginning coating application constitutes Contractor's acceptance of substrates and conditions.

3.2 PREPARATION

- A. Warning. Removal of old paint by sanding, scraping, or other means may generate dust or fumes that contain lead. Exposure to lead dust or fumes may cause brain damage or other adverse health effects, especially in children or pregnant women. Controlling exposure to lead or other hazardous substances requires use of proper protective equipment, such as a properly fitted respirator (NIOSH approved) and proper containment and cleanup. For more information, call National Lead Information Center at 1-800-424-LEAD (in US) or contact your local health authority. Removal must be done in accordance with EPA Renovation, Repair and Painting Rule and all related state and local regulations. Care should be taken to follow all state and local regulations which may be stricter than those set under federal RRP Rule.
- B. Comply with manufacturer's written instructions applicable to substrates indicated.
 - 1. Proper product selection, surface preparation and application affect coating performance. Coating integrity and service life will be reduced because of improperly prepared surfaces. Selection and implementation of proper surface preparation ensures coating adhesion to substrate and prolongs service life of coating system.
- C. Protect all adjacent interior surfaces and areas, including rating and instruction labels on doors, frames, equipment, piping, etc., from painting operations and damage by drop cloths, shields, masking, templates, or other suitable protective means and make good any damage caused by failure to provide such protection.
 - 1. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, nomenclature plates, or communicating cabling.
- D. Clean substrates of substances that could impair bond of paints, including dirt, oil, grease, and incompatible paints and encapsulants.
 - 1. Schedule cleaning and painting application so dust and other contaminants from cleaning process will not fall on wet, newly coated surfaces.
- E. Steel Substrates: Remove rust, loose mill scale, and shop primer, if any. Clean using methods recommended in writing by paint manufacturer, but not less than following:
 - 1. SSPC-SP 2, "Hand Tool Cleaning," unless otherwise recommended by paint manufacturer for application indicated.
- F. Shop-Primed Steel Substrates: Clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with same material as used for shop priming to comply with SSPC-PA 1 for touching up shop-primed surfaces.
- G. 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.
 - 1. Surface preparation should start with SSPC SP-1 Solvent Cleaning to remove oil/grease contamination. If galvanized surface is shiny, surface must be de-glossed and roughened in one of two ways:
 - a. In mild building environments, wash with a chemical etching solution such as MPI #25.
 - 2. Galvanized metals are very smooth and have virtually no profile for coating to adhere to. It is important to abrade surface of galvanized metal through Brush of Blast (SSPC SP7), or an etching primer before coatings application, as recommended by paint manufacturer.
 - 3. Galvanized surfaces must use a primer before applying a topcoat. Topcoats will not adhere to zinc layer of galvanized surface and requires a primer to form a bond between two. Manufacturer's water-based bonding primers as an alternative to previously used cementitious primers. An epoxy primer may also be used, however, it should be noted that epoxy primers typically require an abrasive blast-cleaned surface.
- H. Aluminum Substrates: Remove loose surface oxidation.
- I. Cotton or Canvas Insulation Covering Substrates: Remove dust, dirt, and other foreign material that might impair bond of paints to substrates.

- J. Existing Painted Surfaces: Prepare all interior surfaces for repainting in accordance with paint manufacturers requirements.
1. In accordance with good painting practice, all surface and absorbed contaminants (i.e., dirt, dust, grease, oil, mildew, moisture, chemical fall-out, etc.) shall be removed prior to applying any new coat of paint, since performance and adhesion of new coat is directly proportional to cleanliness of substrate.

3.3 APPLICATION

- A. General: Do not commence painting unless substrates are acceptable and until all environmental conditions (heating, ventilation, lighting and completion of other substrate work, if applicable) are acceptable for applications of products.
- B. Apply paints according to manufacturer's written instructions.
1. Use applicators and techniques suited for paint and substrate indicated.
 2. Paint surfaces behind movable equipment and furniture same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed equipment or furniture with prime coat only.
 3. Paint interior surfaces of ducts, where visible through registers or grilles, with a flat, non-specular black paint.
 4. Omit first coat (primer) on metal surfaces that have been shop primed and touch-up painted, unless otherwise indicated.
- C. Scheduling Painting: Apply first coat material to surfaces that have been cleaned, pretreated, or otherwise prepared for painting as soon as practicable after preparation and before subsequent surface deterioration.
1. Allow sufficient time between successive coatings to permit proper drying. Do not recoat until paint has dried to where it feels firm, does not deform or feel sticky under moderate thumb pressure, and application of another coat of paint does not cause lifting or loss of adhesion of undercoat, unless manufacturer's directions state otherwise, each coat shall be sufficiently dry and hard before a following coat is applied.
 2. Slightly vary color of succeeding coats.
- D. Minimum Coating Thickness: Apply materials at not less than manufacturer's recommended spreading rate.
1. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.
 2. Sand and dust between each coat to provide an anchor for next coat and to remove defects in previous coat (runs, sags, etc.) visible from a distance up to 39 inches.
 3. Deep and accent clear base colors may require 1 or 2 more coats to achieve proper hide.
- E. 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.
- F. 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.
1. To avoid air entrapment in applied coats, apply material in strict accordance with manufacturer's spread rates and application requirements.
- G. Painting Fire Suppression, Plumbing, HVAC, Electrical, Communication and Electronic Safety and Security Work:
1. Paint following work where exposed in occupied spaces:
 - a. Mechanical, electrical, and other equipment:
 - 1) Exceptions:
 - a) Do not paint electrical switchgear, transformers or substation equipment.
 - b) Do not paint new electrical panelboards.
 - c) Do not paint communication cabling.
 - d) Do not paint sprinkler heads.

- b. Uninsulated metal piping.
 - c. Pipe hangers and supports.
 - d. Metal conduit.
 - e. Duct, equipment, and pipe insulation having cotton or canvas insulation covering or other paintable jacket material.
2. Paint portions of internal surfaces of metal ducts, without liner behind air inlets and outlets that are visible from occupied spaces.

3.4 FIELD QUALITY CONTROL

- A. Testing of Paint Materials: Owner reserves right to invoke following procedure at any time and as often as Owner deems necessary during period when paints are being applied:
- 1. Owner will engage services of a qualified testing agency to sample paint materials being used. Samples of material delivered to Project site will be taken, identified, sealed, and certified in presence of Contractor.
 - 2. Testing agency will perform tests for compliance with product requirements, including dry film thicknesses.
 - a. Contractor shall touch up and restore painted surfaces damaged by testing.
 - b. If test results show that dry film thickness of applied paint does not comply with paint manufacturer's written recommendations, Contractor shall pay for testing and apply additional coats as needed to provide dry film thickness that complies with paint manufacturer's written recommendations.
 - 3. Owner may direct Contractor to stop applying paints if test results show materials being used do not comply with product requirements. Contractor shall remove noncomplying-paint materials from Project site, pay for testing, and repaint surfaces painted with rejected materials. Contractor will be required to remove rejected materials from previously painted surfaces if, on repainting with complying materials, two paints are incompatible.
- B. Standard of Acceptance
- 1. All surfaces, preparation and paint applications shall be inspected by A/E.
 - 2. Painted interior surfaces shall be considered to lack uniformity and soundness if any of following defects are apparent to A/E:
 - a. Brush/roller marks, streaks, laps, runs, sags, drips, heavy stippling, hiding or shadowing by inefficient application methods, skipped or missed areas, and foreign materials in paint coatings.
 - b. Evidence of poor coverage at rivet heads, plate edges, lap joints, crevices, pockets, corners and re-entrant angles.
 - c. Damage due to touching before paint is sufficiently dry or any other contributory cause.
 - d. Damage due to application on moist surfaces or caused by inadequate protection from weather.
 - e. Damage and/or contamination of paint due to blown contaminants (dust, spray paint, etc.).
 - 3. Painted surfaces shall be considered unacceptable if any of following are evident under natural lighting source for exterior surfaces and final lighting source (including daylight) for interior surfaces:
 - a. Visible defects are evident on vertical surfaces when viewed at normal viewing angles from a distance of not less than 39 inches.
 - b. Visible defects are evident on horizontal surfaces when viewed at normal viewing angles from a distance of not less than 39 inches.
 - c. Visible defects are evident on ceiling, soffit and other overhead surfaces when viewed at normal viewing angles.
 - d. When final coat on any surface exhibits a lack of uniformity of color, sheen, texture, and hiding across full surface area.
 - 4. Painted surfaces rejected by A/E shall be made good at expense of Contractor. Small affected areas may be touched up; large affected areas or areas without sufficient dry film thickness of paint shall be repainted. Runs, sags of damaged paint shall be removed by scraper or by sanding prior to application of paint.

3.5 CLEANING AND PROTECTION

- A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.
 - 1. Remove combustible rubbish materials and empty paint cans each day and safely dispose of same in accordance with requirements of authorities having jurisdiction.
 - 2. Clean equipment and dispose of wash water/solvents as well as all other cleaning and protective materials (e.g. rags, drop cloths, masking papers, etc.), paints, thinners, paint removers/strippers in accordance with safety requirements of authorities having jurisdiction.
- 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 A/E, and leave in an undamaged condition.
 - 1. Erect barriers or screens and post signs to warn, limit or direct traffic away or around work area as required.
- D. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

3.6 INTERIOR PAINTING SCHEDULE (P-CODE)

- A. CMU Substrates:
 - 1. Institutional Low-Odor/VOC Latex System: (Code #4.14)
 - a. Prime Coat: Interior/exterior latex block filler.
 - 1) Sherwin Williams; PreRite Block Filler.
 - 2) PPG; 6-15XI Speedhide Hi-Fill Latex Block Filler
 - 3) Benjamin Moore: Moorcraft S-H Latex Filler, 285
 - b. Intermediate Coat: Institutional low-odor/VOC interior latex matching topcoat.
 - c. Topcoat: Institutional low-odor/VOC interior latex (semigloss).
 - 1) Sherwin Williams; Pro Mar 200 Zero VOC
 - 2) PPG: Speedhide Zero, 0 VOC
 - 3) Benjamin Moore: Ultra Spec 500, N539
 - 4) Application includes, but is not limited to:
 - a) Concrete block walls where patching was required to accommodate new work.
- B. Steel (Ferrous) Substrates:
 - 1. Institutional Low-Odor/VOC Latex System: (Code #5.12)
 - a. Prime Coat: Rust-inhibitive primer (water based).
 - 1) Sherwin Williams; Pro Industrial Pro-Cryl Universal Primer
 - 2) PPG: 4020 Pitt-Tech Plus DTM Primer
 - 3) Benjamin Moore: Super Spec Metal Primer, P04.
 - 4) Verify compatibility with primer, if shop-applied primer is used.
 - b. Intermediate Coat: Institutional low-odor/VOC interior latex matching topcoat.
 - c. Topcoat: Institutional low-odor/VOC interior latex (semigloss).
 - 1) Sherwin Williams; B66-600 Pro Industrial Acrylic or Pro Industrial Waterbased Alykd Urethane, B53-1150
 - 2) PPG: 4216HP Pitt-Tech Plus DTM.
 - 3) Benjamin Moore: Super Spec HP P28
 - 4) Application includes, but is not limited to:
 - a) Miscellaneous ferrous metal surfaces.
 - b) Uninsulated metal piping.
 - c) Pipe hangers and supports.
 - d) Metal conduit.
- C. Galvanized-Metal Substrates:
 - 1. Institutional Low-Odor/VOC Latex System: MPI INT 5.3N. (Code #5.32).

- a. Prime Coat: Waterborne galvanized-metal bonding primer. MPI #134.
 - 1) Sherwin Williams: Pro Industrial Pro-Cryl Universal Primer
 - 2) PPG: 4020 Pitt-Tech Plus DTM Primer
 - 3) Benjamin Moore: Super Spec Metal Primer, P04.
 - 4) Note: Primer may be omitted, if not required by paint manufacturer.
 - b. Intermediate Coat: Institutional low-odor/VOC interior latex matching topcoat.
 - c. Topcoat: Institutional low-odor/VOC interior latex (semigloss).
 - 1) Sherwin Williams: B66-600 Pro Industrial Acrylic or Pro Industrial Waterbased Alkyd Urethane B53-1150
 - 2) PPG; 4216HP Pitt-Tech Plus DTM
 - 3) Benjamin Moore: Super Spec HP P28
 - 4) Application includes, but is not limited to:
 - a) Miscellaneous non-ferrous surfaces.
 - b) Exterior lintels and exposed structural steel.
 - c) Uninsulated metal piping.
 - d) Pipe hangers and supports.
 - e) Metal conduit.
- D. Aluminum (Not Anodized or Otherwise Coated) Substrates: MPI INT 5.4G
- 1. Institutional Low-Odor/VOC Latex System:
 - a. Prime Coat: Primer, quick dry, for aluminum, MPI #95.
 - b. Intermediate Coat: Latex, interior, institutional low odor/VOC, matching topcoat.
 - c. Topcoat: Latex, interior, institutional low odor/VOC, semi-gloss.
 - 1) MPI #147.
 - 2) Application: Aluminum surfaces of mechanical, electrical, and other equipment.
- E. Fiberglass and Plastic Substrates:
- 1. Institutional Low-Odor/VOC Latex System: MPI INT 6.7J (Code #6.71)
 - a. Prime Coat: Primer, bonding either, water based, MPI #17.
 - b. Intermediate Coat: Latex, interior, institutional low odor/VOC, matching topcoat.
 - c. Topcoat: Latex, interior, institutional low odor/VOC, semi-gloss.
 - 1) MPI #147.
 - 2) Application: Fiberglass or plastic surfaces of mechanical, electrical, and other equipment.
- F. Cotton or Canvas and ASJ Insulation-Covering Substrates:
- 1. Institutional Low-Odor/VOC Latex System: (Code #10.11)
 - a. Prime Coat: Interior latex primer/sealer.
 - 1) Sherwin Williams; Pro Mar 200 Zero VOC Latex Primer
 - 2) PPG; 6-2 Speedhide Quick Drying Latex Sealer
 - 3) Benjamin Moore: Super Spec, 253.
 - b. Intermediate Coat: Institutional low-odor/VOC interior latex matching topcoat.
 - c. Topcoat: Institutional low-odor/VOC interior latex (flat).
 - 1) Sherwin Williams; Pro Mar 200 Zero VOC
 - 2) PPG; Speedhide Zero, 0 VOC
 - 3) Benjamin Moore: Ultra Spec 500, N539
 - 4) Application includes, but is not limited to:
 - a) Pipe and duct coverings, where exposed.

END OF SECTION 09 91 23.00

23

DIVISION

HEATING, VENTILATING, AND AIR CONDITIONING (HVAC)

SECTION 23 05 00 - COMMON WORK RESULTS FOR HVAC

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.
- B. Warranty, closeout procedures, and submitted requirements are specified in Division 01 Sections.

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Piping materials and installation instructions common to most piping systems.
 - 2. Transition fittings.
 - 3. Mechanical sleeve seals.
 - 4. Sleeves.
 - 5. Escutcheons.
 - 6. Grout.
 - 7. Equipment installation requirements common to equipment sections.
 - 8. Painting and finishing.
 - 9. Concrete bases.
 - 10. Supports and anchorages.

1.3 DEFINITIONS

- A. Finished Spaces: Spaces other than mechanical and electrical equipment rooms, furred spaces, pipe and duct chases, unheated spaces immediately below roof, spaces above ceilings, unexcavated spaces, crawlspaces, and tunnels.
- B. Exposed, Interior Installations: Exposed to view indoors. Examples include finished occupied spaces and mechanical equipment rooms.
- C. Exposed, Exterior Installations: Exposed to view outdoors or subject to outdoor ambient temperatures and weather conditions. Examples include rooftop locations.
- D. Concealed, Interior Installations: Concealed from view and protected from physical contact by building occupants. Examples include above ceilings and chases.
- E. Concealed, Exterior Installations: Concealed from view and protected from weather conditions and physical contact by building occupants but subject to outdoor ambient temperatures. Examples include installations within unheated shelters.
- F. The following are industry abbreviations for plastic materials:
 - 1. CPVC: Chlorinated polyvinyl chloride plastic.
 - 2. PE: Polyethylene plastic.
 - 3. PVC: Polyvinyl chloride plastic.
- G. The following are industry abbreviations for rubber materials:
 - 1. EPDM: Ethylene-propylene-diene monomer rubber.
 - 2. NBR: Acrylonitrile-butadiene rubber.

1.4 ACTION SUBMITTALS

- A. Product Data: For the following:
 - 1. Transition fittings.
 - 2. Mechanical sleeve seals.

3. Escutcheons.

1.5 INFORMATIONAL/QUALITY ASSURANCE/CONTROL SUBMITTALS

- A. Welding certificates.

1.6 QUALITY ASSURANCE

- A. Steel Support Welding: Qualify processes and operators according to AWS D1.1, "Structural Welding Code--Steel."
- B. Steel Pipe Welding: Qualify processes and operators according to ASME Boiler and Pressure Vessel Code: Section IX, "Welding and Brazing Qualifications."
1. Comply with provisions in ASME B31 Series, "Code for Pressure Piping."
 2. Certify that each welder has passed AWS qualification tests for welding processes involved and that certification is current.
- C. Electrical Characteristics for HVAC Equipment: Equipment of higher electrical characteristics may be furnished provided such proposed equipment is approved in writing and connecting electrical services, circuit breakers, and conduit sizes are appropriately modified. If minimum energy ratings or efficiencies are specified, equipment shall comply with requirements. Mechanical Contractor is to assume all financial responsibility associated with higher electrical characteristics.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver pipes and tubes with factory-applied end caps. Maintain end caps through shipping, storage, and handling to prevent pipe end damage and to prevent entrance of dirt, debris, and moisture.
- B. Store plastic pipes protected from direct sunlight. Support to prevent sagging and bending.
- C. Equipment covered under this article include the following:
1. Split System Heat Pumps
- D. Equipment shall be stored at the site indoors, or outdoors on pallets where approved by A/E and CM. Do not set units directly on grade.
- E. Equipment shall be fully protected from moisture while being stored. Use heavy tarps with tie down straps or other means to protect the units from moisture and outdoor weather conditions.

1.8 COORDINATION

- A. Arrange for pipe spaces, chases, slots, and openings in building structure during progress of construction, to allow for HVAC installations.
- B. Coordinate installation of required supporting devices and set sleeves in poured-in-place concrete and other structural components as they are constructed.
- C. Coordinate requirements for access panels and doors in walls, ceilings, and floors for HVAC items requiring access that are concealed behind finished surfaces. Access panels and doors for building components are specified in Division 08 Section "Access Doors and Frames."
- D. Coordinate with the Division 26 Contractor regarding the location of all Switchboards and Switchgear. Piping shall not be run over or near any Switchboard or Switchgear. Piping or ductwork foreign to the electrical installation whose malfunction would endanger the operation of the electrical system shall not be routed through the Main Electrical Room, shall not be routed through the Main Emergency Equipment Room, and shall not be routed through the Emergency Generator Room. The exception would be statutorily required fire protection piping.

1. Piping should be avoided over any wall mounted electrical panel with a voltage of 120 volts or higher. Obtain written approval from Owners Representative before routing piping above an electrical panel.

1.9 PROJECT CONDITIONS

- A. Unless otherwise stipulated under a particular heading, the following rules relative to responsibilities of the several Contractors and subcontractors will apply.
 1. Each Contractor shall install roughing-in work pertaining to his trade for connection of Work performed under other Sections of these Specifications.
- B. Certain areas will be designated for the storage of materials and equipment and cooperation/coordination with the Owner in minimizing interferences with existing operations will be mandatory.
 1. Where possible, store materials inside and protected from weather. Where necessary to store outside, elevate above grade and enclose the durable, waterproof wrapping.
 2. Follow manufacturer's instructions for receiving, inspecting, handling, storage, and protection of products prior to final installation.
- C. Equipment Clearances and Requirements
 1. Due to the possibility of restrictions imposed by space limitations, the responsibility for resolving conflicts resulting from the use of equipment other than the design basis shall rest with the equipment supplier and the Contractor. Submittals for this equipment will be considered as a statement that clearances for access, service, maintenance, etc., have been checked and found adequate.
 2. Alternate equipment or the equipment of additional manufacturers named in these documents shall meet Base Bid specifications. In the event such equipment or any equipment which the bidder proposes to furnish, deviates from the requirements of equipment first named regarding electric service, power wiring, control wiring, plumbing or piping, sound attenuation, or vibration damping, it shall be the responsibility of the bidder to include in his price a sufficient sum to cover additional costs or charges resulting there from.
- D. In general, the piping and ductwork shown on the Drawings shall be considered as diagrammatic for clearness in indicating the general run and connections required, and may not be shown in its true position. The piping and ductwork and equipment may have to be offset, lowered or raised, as required, or as directed at the site in order to accommodate field conditions.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. In other Part 2 articles where subparagraph titles below introduce lists, the following requirements apply for product selection:
 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 manufacturers specified.
 2. Manufacturers: Subject to compliance with requirements, provide products by the manufacturers specified.

2.2 PIPE, TUBE, AND FITTINGS

- A. Refer to individual Division 23 piping Sections for pipe, tube, and fitting materials and joining methods.
- B. Pipe Threads: ASME B1.20.1 for factory-threaded pipe and pipe fittings.

2.3 JOINING MATERIALS

- A. Refer to individual Division 23 piping Sections for special joining materials not listed below.
- B. Pipe-Flange Gasket Materials: Suitable for chemical and thermal conditions of piping system contents.
 - 1. ASME B16.21, nonmetallic, flat, asbestos-free, 1/8-inch maximum thickness unless thickness or specific material is indicated.
 - a. Full-Face Type: For flat-face, Class 125, cast-iron and cast-bronze flanges.
 - b. Narrow-Face Type: For raised-face, Class 250, cast-iron and steel flanges.
 - 2. AWWA C110, rubber, flat face, 1/8 inch thick, unless otherwise indicated; and full-face or ring type, unless otherwise indicated.
- C. Flange Bolts and Nuts: ASME B18.2.1, carbon steel, unless otherwise indicated.
- D. Plastic, Pipe-Flange Gasket, Bolts, and Nuts: Type and material recommended by piping system manufacturer, unless otherwise indicated.
- E. Solder Filler Metals: ASTM B 32, lead-free alloys. Include water-flushable flux according to ASTM B 813.
- F. Brazing Filler Metals: AWS A5.8, BCuP Series, copper-phosphorus alloys for general-duty brazing, unless otherwise indicated; and AWS A5.8, BAg1, silver alloy for refrigerant piping, unless otherwise indicated.
- G. Welding Filler Metals: Comply with AWS D10.12 for welding materials appropriate for wall thickness and chemical analysis of steel pipe being welded.
- H. Solvent Cements for Joining Plastic Piping:
 - 1. CPVC Piping: ASTM F 493.
 - 2. PVC Piping: ASTM D 2564. Include primer according to ASTM F 656.
- I. Fiberglass Pipe Adhesive: As furnished or recommended by pipe manufacturer.

2.4 TRANSITION FITTINGS

- A. Plastic-to-Metal Transition Fittings: CPVC and PVC one-piece fitting with manufacturer's Schedule 80 equivalent dimensions; one end with threaded brass insert, and one solvent-cement-joint end.
- B. Plastic-to-Metal Transition Adaptors: One-piece fitting with manufacturer's SDR 11 equivalent dimensions; one end with threaded brass insert, and one solvent-cement-joint end.
- C. Plastic-to-Metal Transition Unions: MSS SP-107, CPVC and PVC four-part union. Include brass end, solvent-cement-joint end, rubber O-ring, and union nut.

2.5 MECHANICAL SLEEVE SEALS

- A. Description: Modular sealing element unit, designed for field assembly, to fill annular space between pipe and sleeve.
 - 1. Manufacturers:
 - a. Advance Products & Systems, Inc.
 - b. Calpico, Inc.
 - c. Link-Seal
 - d. Metraflex Co.
 - e. Pipeline Seal and Insulator, Inc.
 - 2. Sealing Elements: EPDM interlocking links shaped to fit surface of pipe. Include type and number required for pipe material and size of pipe.
 - 3. Pressure Plates: Stainless steel. Include two for each sealing element.

4. Connecting Bolts and Nuts: Carbon steel with corrosion-resistant coating or Stainless steel of length required to secure pressure plates to sealing elements. Include one for each sealing element.

2.6 SLEEVES

- A. Galvanized-Steel Sheet: 24 gauge minimum thickness; round tube closed with welded longitudinal joint.
- B. Steel Pipe: ASTM A 53, Type E, Grade B, Schedule 40, galvanized, plain ends.
- C. Cast Iron: Cast or fabricated "wall pipe" equivalent to ductile-iron pressure pipe, with plain ends and integral waterstop, unless otherwise indicated.
- D. Stack Sleeve Fittings: Manufactured, cast-iron sleeve with integral clamping flange. Include clamping ring and bolts and nuts for membrane flashing.
 1. Underdeck Clamp: Clamping ring with set screws.

2.7 ESCUTCHEONS

- A. Description: Manufactured wall and ceiling escutcheons and floor plates, with an ID to closely fit around pipe, tube, and insulation of insulated piping and an OD that completely covers opening.
- B. One-Piece, Deep-Pattern Type: Deep-drawn, box-shaped brass with polished chrome-plated finish.
- C. One-Piece, Cast-Brass Type: With set screw.
 1. Finish: Polished chrome-plated.
- D. Split-Casting, Cast-Brass Type: With concealed hinge and set screw.
 1. Finish: Polished chrome-plated.
- E. One-Piece, Stamped-Steel Type: With set screw or spring clips and chrome-plated finish.
- F. Split-Plate, Stamped-Steel Type: With concealed or exposed-rivet hinge, set screw or spring clips, and chrome-plated finish.
- G. One-Piece, Floor-Plate Type: Cast-iron floor plate.
- H. Split-Casting, Floor-Plate Type: Cast brass with concealed hinge and set screw.

2.8 GROUT

- A. Description: ASTM C 1107, Grade B, nonshrink and nonmetallic, dry hydraulic-cement grout.
 1. Characteristics: Post-hardening, volume-adjusting, nonstaining, noncorrosive, nongaseous, and recommended for interior and exterior applications.
 2. Design Mix: 5000-psi, 28-day compressive strength.
 3. Packaging: Premixed and factory packaged.

PART 3 - EXECUTION

3.1 PIPING SYSTEMS - COMMON REQUIREMENTS

- A. Install piping according to the following requirements and Division 23 Sections specifying piping systems.

- B. Drawing plans, schematics, and diagrams indicate general location and arrangement of piping systems. Indicated locations and arrangements were used to size pipe and calculate friction loss, expansion, pump sizing, and other design considerations. Install piping in general location as indicated in Contract Documents unless deviations to layout are approved on Coordination Drawings. Minor offsets, lowering or raising the piping shall be routed to accommodate field conditions at no expense to the project.
- C. Install piping in concealed locations, unless otherwise indicated and except in equipment rooms and service areas.
- D. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.
- E. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal.
- F. Install piping to permit valve servicing.
- G. Install piping at indicated slopes.
- H. Install piping free of sags and bends.
- I. Install fittings for changes in direction and branch connections.
- J. Install piping to allow applications of insulation.
- K. Select system components with pressure rating equal to or greater than system operating pressure.
- L. Install escutcheons for penetrations of walls, ceilings, and floors according to the following:
 - 1. New Piping:
 - a. Piping with Fitting or Sleeve Protruding from Wall: One-piece, deep-pattern type.
 - b. Chrome-Plated Piping: One-piece, cast-brass type with polished chrome-plated finish.
 - c. Insulated Piping: One-piece, stamped-steel type with spring clips.
 - d. Bare Piping at Wall and Floor Penetrations in Finished Spaces: One-piece, cast-brass type with polished chrome-plated finish.
 - e. Bare Piping at Wall and Floor Penetrations in Finished Spaces: One-piece, stamped-steel type.
 - f. Bare Piping at Ceiling Penetrations in Finished Spaces: One-piece, cast-brass type with polished chrome-plated finish.
 - g. Bare Piping at Ceiling Penetrations in Finished Spaces: One-piece, stamped-steel type and set screw.
 - h. Bare Piping in Unfinished Service Spaces: One-piece, cast-brass type with polished chrome-plated finish.
 - i. Bare Piping in Unfinished Service Spaces: One-piece, stamped-steel type with hinge and set screw.
 - j. Bare Piping in Equipment Rooms: One-piece, cast-brass type.
 - k. Bare Piping in Equipment Rooms: One-piece, stamped-steel type with set screw.
 - l. Bare Piping at Floor Penetrations in Equipment Rooms: One-piece, floor-plate type.
- M. Sleeves are not required for core-drilled holes.
- N. Permanent sleeves are not required for holes formed by removable PE sleeves.
- O. Install sleeves for pipes passing through concrete and masonry walls, gypsum-board partitions, and concrete floor and roof slabs.
 - 1. Cut sleeves to length for mounting flush with both surfaces.

- a. Exception: Extend sleeves installed in floors of mechanical equipment areas or other wet areas 2 inches above finished floor level. Extend cast-iron sleeve fittings below floor slab as required to secure clamping ring if ring is specified.
 - 2. Install sleeves in new walls and slabs as new walls and slabs are constructed.
 - 3. Install sleeves that are large enough to provide 1/4-inch annular clear space between sleeve and pipe or pipe insulation. Use the following sleeve materials:
 - a. Steel Pipe Sleeves: For pipes smaller than NPS 6.
 - b. Steel Sheet Sleeves: For pipes NPS 6 and larger, penetrating gypsum-board partitions.
 - c. Stack Sleeve Fittings: For pipes penetrating floors with membrane waterproofing. Secure flashing between clamping flanges. Install section of cast-iron soil pipe to extend sleeve to 2 inches above finished floor level. Refer to Division 07 Section "Sheet Metal Flashing and Trim" for flashing.
 - 1) Seal space outside of sleeve fittings with grout.
 - 4. Except for underground wall penetrations, seal annular space between sleeve and pipe or pipe insulation, using joint sealants appropriate for size, depth, and location of joint. Refer to Division 07 Section "Joint Sealants" for materials and installation.
- P. Aboveground, Exterior-Wall Pipe Penetrations: Seal penetrations using sleeves and mechanical sleeve seals. Select sleeve size to allow for 1-inch annular clear space between pipe and sleeve for installing mechanical sleeve seals.
- 1. Install steel pipe for sleeves smaller than 6 inches in diameter.
 - 2. Install cast-iron "wall pipes" for sleeves 6 inches and larger in diameter.
 - 3. Mechanical Sleeve Seal Installation: Select type and number of sealing elements required for pipe material and size. Position pipe in center of sleeve. Assemble mechanical sleeve seals and install in annular space between pipe and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.
- Q. Fire-Barrier Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at pipe penetrations. Seal pipe penetrations with firestop materials. Refer to Division 07 Section "Penetration Firestopping" for materials.
- R. Verify final equipment locations for roughing-in.
- S. Refer to equipment specifications in other Sections of these Specifications for roughing-in requirements.
- ### 3.2 PIPING JOINT CONSTRUCTION
- A. Join pipe and fittings according to the following requirements and Division 23 Sections specifying piping systems.
 - B. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.
 - C. Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly.
 - D. Soldered Joints: Apply ASTM B 813, water-flushable flux, unless otherwise indicated, to tube end. Construct joints according to ASTM B 828 or CDA's "Copper Tube Handbook," using lead-free solder alloy complying with ASTM B 32.
 - E. Brazed Joints: Construct joints according to AWS's "Brazing Handbook," "Pipe and Tube" Chapter, using copper-phosphorus brazing filler metal complying with AWS A5.8.
 - F. Threaded Joints; Thread pipe with tapered pipe treads according to ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and restore full ID. Join pipe fittings and valves as follows:
 - 1. Apply appropriate tape or thread compound to external pipe threads unless dry seal threading is specified.

- 2. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged. Do not use pipe sections that have cracked or open welds.
- G. Welded Joints: Construct joints according to AWS D10.12, using qualified processes and welding operators according to Part 1 "Quality Assurance" Article.
- H. Flanged Joints: Select appropriate gasket material, size, type, and thickness for service application. Install gasket concentrically positioned. Use suitable lubricants on bolt threads.
- I. Plastic Piping Solvent-Cement Joints: Clean and dry joining surfaces. Join pipe and fittings according to the following:
 - 1. Comply with ASTM F 402 for safe-handling practice of cleaners, primers, and solvent cements.
 - 2. CPVC Piping: Join according to ASTM D 2846/D 2846M Appendix.
 - 3. PVC Pressure Piping: Join schedule number ASTM D 1785, PVC pipe and PVC socket fittings according to ASTM D 2672. Join other-than-schedule-number PVC pipe and socket fittings according to ASTM D 2855.
 - 4. PVC Nonpressure Piping: Join according to ASTM D 2855.
- J. Plastic Pressure Piping Gasketed Joints: Join according to ASTM D 3139.
- K. Plastic Nonpressure Piping Gasketed Joints: Join according to ASTM D 3212.
- L. PE Piping Heat-Fusion Joints: Clean and dry joining surfaces by wiping with clean cloth or paper towels. Join according to ASTM D 2657.
 - 1. Plain-End Pipe and Fittings: Use butt fusion.
 - 2. Plain-End Pipe and Socket Fittings: Use socket fusion.
- M. Fiberglass Bonded Joints: Prepare pipe ends and fittings, apply adhesive, and join according to pipe manufacturer's written instructions.

3.3 PIPING CONNECTIONS

- A. Make connections according to the following, unless otherwise indicated:
 - 1. Install unions, in piping NPS 2 and smaller, adjacent to each valve and at final connection to each piece of equipment.
 - 2. Install flanges, in piping NPS 2-1/2 and larger, adjacent to flanged valves and at final connection to each piece of equipment.
 - 3. Dry Piping Systems: Install dielectric unions and flanges to connect piping materials of dissimilar metals.
 - 4. Wet Piping Systems: Install dielectric coupling and nipple fittings to connect piping materials of dissimilar metals.

3.4 EQUIPMENT INSTALLATION - COMMON REQUIREMENTS

- A. Install equipment to allow maximum possible headroom unless specific mounting heights are indicated.
- B. Install equipment level and plumb, parallel and perpendicular to other building systems and components in exposed interior spaces, unless otherwise indicated.
- C. Install HVAC equipment to facilitate service, maintenance, and repair or replacement of components. Connect equipment for ease of disconnecting, with minimum interference to other installations. Extend grease fittings to accessible locations.
- D. Install equipment to allow right of way for piping installed at required slope.

- E. Coordinate ceiling mounted equipment locations to provide proper maintenance access and where possible, maintain a 24 by 24 inch clear path from the floor level to the equipment. All equipment above the ceiling shall be accessible via 10 foot (or shorter) ladder and shall be no more than 24 inches above the ceiling grid. Equipment mounted above ceilings that are greater than 10 feet high, shall have access via other means approved by the Owner, and as a minimum shall not require special lifts to access. The contractor shall coordinate with other trades to ensure that systems below the equipment (piping, cable trays, ductwork, etc.) shall not impede the service area or path to that service area. The contractor shall note service access areas on all shop drawings for ceiling mounted systems for all trades to ensure proper clearance.

3.5 PAINTING

- A. Damage and Touchup: Repair marred and damaged factory-painted finishes with materials and procedures to match original factory finish.

3.6 CONCRETE BASES

- A. Concrete Bases: Anchor equipment to concrete base according to equipment manufacturer's written instructions.
 - 1. Construct concrete bases of dimensions indicated, but not less than 4 inches larger in both directions than supported unit.
 - 2. Install dowel rods to connect concrete base to concrete floor. Unless otherwise indicated, install dowel rods on 18-inch centers around the full perimeter of the base.
 - 3. Install epoxy-coated anchor bolts for supported equipment that extend through concrete base, and anchor into structural concrete floor.
 - 4. Place and secure anchorage devices. Use supported equipment manufacturer's setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
 - 5. Install anchor bolts to elevations required for proper attachment to supported equipment.
 - 6. Install anchor bolts according to anchor-bolt manufacturer's written instructions.
 - 7. Use 3000-psi, 28-day compressive-strength concrete and reinforcement as specified in Division 03 Section "Cast-in-Place Concrete."

3.7 ERECTION OF METAL SUPPORTS AND ANCHORAGES

- A. Refer to Division 05 Section "Metal Fabrications" for structural steel.
- B. Cut, fit, and place miscellaneous metal supports accurately in location, alignment, and elevation to support and anchor HVAC materials and equipment.
- C. Field Welding: Comply with AWS D1.1.

3.8 ERECTION OF WOOD SUPPORTS AND ANCHORAGES

- A. Cut, fit, and place wood grounds, nailers, blocking, and anchorages to support, and anchor HVAC materials and equipment.
- B. Select fastener sizes that will not penetrate members if opposite side will be exposed to view or will receive finish materials. Tighten connections between members. Install fasteners without splitting wood members.
- C. Attach to substrates as required to support applied loads.

3.9 GROUTING

- A. Mix and install grout for HVAC equipment base bearing surfaces, pump and other equipment base plates, and anchors.
- B. Clean surfaces that will come into contact with grout.

- C. Provide forms as required for placement of grout.
- D. Avoid air entrapment during placement of grout.
- E. Place grout, completely filling equipment bases.
- F. Place grout on concrete bases and provide smooth bearing surface for equipment.
- G. Place grout around anchors.
- H. Cure placed grout.

END OF SECTION 23 05 00

SECTION 23 05 13 - COMMON MOTOR REQUIREMENTS FOR HVAC EQUIPMENT

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 general requirements for single-phase and polyphase, general-purpose, horizontal, small and medium, squirrel-cage induction motors for use on ac power systems up to 600 V and installed at equipment manufacturer's factory or shipped separately by equipment manufacturer for field installation.

1.3 COORDINATION

- A. Coordinate features of motors, installed units, and accessory devices to be compatible with the following:
 - 1. Motor controllers.
 - 2. Torque, speed, and horsepower requirements of the load.
 - 3. Ratings and characteristics of supply circuit and required control sequence.
 - 4. Ambient and environmental conditions of installation location.

PART 2 - PRODUCTS

2.1 GENERAL MOTOR REQUIREMENTS

- A. Comply with requirements in this Section except when stricter requirements are specified in HVAC equipment schedules or Sections.
- B. Motor shall be Premium Efficient as described in NEMA Standards Publication MG 1-2006.

2.2 MOTOR CHARACTERISTICS

- A. Duty: Continuous duty at ambient temperature of 40 deg C and at altitude of 3300 feet above sea level.
- B. Capacity and Torque Characteristics: Sufficient to start, accelerate, and operate connected loads at designated speeds, at installed altitude and environment, with indicated operating sequence, and without exceeding nameplate ratings or considering service factor.

2.3 POLYPHASE MOTORS

- A. Description: NEMA MG 1, Design B, medium induction motor.
- B. Service Factor: 1.15.
- C. Rotor: Random-wound, squirrel cage.
- D. Bearings: Regreasable, shielded, antifriction ball bearings suitable for radial and thrust loading.
- E. Temperature Rise: Match insulation rating.
- F. Insulation: Class F.

- G. Code Letter Designation:
 - 1. Motors 15 HP and Larger: NEMA starting Code F or Code G.
 - 2. Motors Smaller than 15 HP: Manufacturer's standard starting characteristic.
- H. Enclosure Material: Cast iron for motor frame sizes 324T and larger; rolled steel for motor frame sizes smaller than 324T.

2.4 POLYPHASE MOTORS WITH ADDITIONAL REQUIREMENTS

- A. Motors Used with Reduced-Voltage and Multispeed Controllers: Match wiring connection requirements for controller with required motor leads. Provide terminals in motor terminal box, suited to control method.

2.5 SINGLE-PHASE MOTORS

- A. Motors larger than 1/20 hp shall be one of the following, to suit starting torque and requirements of specific motor application:
 - 1. Permanent-split capacitor.
 - 2. Split phase.
 - 3. Capacitor start, inductor run.
 - 4. Capacitor start, capacitor run.
- B. Multispeed Motors: Variable-torque, permanent-split-capacitor type.
- C. Bearings: Prelubricated, antifriction ball bearings or sleeve bearings suitable for radial and thrust loading.
- D. Motors 1/20 HP and Smaller: Shaded-pole type.
- E. Thermal Protection: Internal protection to automatically open power supply circuit to motor when winding temperature exceeds a safe value calibrated to temperature rating of motor insulation. Thermal-protection device shall automatically reset when motor temperature returns to normal range.

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 23 05 13

SECTION 23 05 29 - HANGERS AND SUPPORTS FOR HVAC PIPING AND EQUIPMENT

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 hangers and supports for HVAC system piping and equipment:
 - 1. Steel pipe hangers and supports.
 - 2. Trapeze pipe hangers.
 - 3. Metal framing systems.
 - 4. Thermal-hanger shield inserts.
 - 5. Pipe stands.
 - 6. Equipment supports.
 - 7. Pipe curbs.

1.3 DEFINITIONS

- A. MSS: Manufacturers Standardization Society for The Valve and Fittings Industry Inc.
- B. Terminology: As defined in MSS SP-90, "Guidelines on Terminology for Pipe Hangers and Supports."

1.4 PERFORMANCE REQUIREMENTS

- A. Design supports for multiple pipes, including pipe stands, capable of supporting combined weight of supported systems, system contents, and test water.
- B. Design equipment supports capable of supporting combined operating weight of supported equipment and connected systems and components.
- C. Provide additional supplemental steel as required to support equipment, ductwork, piping, etc. from structure above.

1.5 ACTION SUBMITTALS

- A. Product Data: For the following:
 - 1. Steel pipe hangers and supports.

1.6 QUALITY ASSURANCE

- A. Welding: Qualify procedures and personnel according to the following:
 - 1. AWS D1.1, "Structural Welding Code--Steel."
 - 2. AWS D1.2, "Structural Welding Code--Aluminum."
 - 3. AWS D1.3, "Structural Welding Code--Sheet Steel."
 - 4. AWS D1.4, "Structural Welding Code--Reinforcing Steel."
 - 5. ASME Boiler and Pressure Vessel Code: Section IX.

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. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, manufacturers specified.
 - 2. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.

2.2 STEEL PIPE HANGERS AND SUPPORTS

- A. Description: MSS SP-58, Types 1 through 58, factory-fabricated components. Refer to Part 3 "Hanger and Support Applications" Article for where to use specific hanger and support types.
- B. Manufacturers:
 - 1. B-Line Systems, Inc.; a division of Cooper Industries.
 - 2. ERICO/Michigan Hanger Co.
 - 3. Grinnell Corp.
 - 4. GS Metals Corp.
 - 5. PHD Manufacturing, Inc.
- C. Galvanized, Metallic Coatings: Pregalvanized or hot dipped.
- D. Nonmetallic Coatings: Plastic coating, jacket, or liner.
- E. Padded Hangers: Hanger with fiberglass or other pipe insulation pad or cushion for support of bearing surface of piping.

2.3 TRAPEZE PIPE HANGERS

- A. Description: MSS SP-69, Type 59, shop- or field-fabricated pipe-support assembly made from structural-steel shapes with MSS SP-58 hanger rods, nuts, saddles, and U-bolts.

2.4 METAL FRAMING SYSTEMS

- A. Description: MFMA-3, shop- or field-fabricated pipe-support assembly made of steel channels and other components.
- B. Manufacturers:
 - 1. B-Line Systems, Inc.; a division of Cooper Industries.
 - 2. ERICO/Michigan Hanger Co.; ERISTRUT Div.
 - 3. GS Metals Corp.
 - 4. Unistrut Corp.; Tyco International, Ltd.
- C. Coatings: Manufacturer's standard finish, unless bare metal surfaces are indicated.
- D. Nonmetallic Coatings: Plastic coating, jacket, or liner.

2.5 THERMAL-HANGER SHIELD INSERTS

- A. Description: 100-psig minimum, compressive-strength insulation insert encased in sheet metal shield.
- B. Manufacturers:
 - 1. Carpenter & Paterson, Inc.
 - 2. ERICO/Michigan Hanger Co.

3. PHS Industries, Inc.
4. Pipe Shields, Inc.
5. Rilco Manufacturing Company, Inc.
6. Value Engineered Products, Inc.

- C. Insulation-Insert Material for Cold Piping: ASTM C 552, Type II cellular glass with vapor barrier.
- D. Insulation-Insert Material for Hot Piping: ASTM C 552, Type II cellular glass.
- E. For Trapeze or Clamped Systems: Insert and shield shall cover entire circumference of pipe.
- F. For Clevis or Band Hangers: Insert and shield shall cover lower 180 degrees of pipe.
- G. Insert Length: Extend 2 inches beyond sheet metal shield for piping operating below ambient air temperature.

2.6 EQUIPMENT SUPPORTS

- A. Description: Welded, shop- or field-fabricated equipment support made from structural-steel shapes.

2.7 EQUIPMENT WALL BRACKET

- A. Wall bracket designed to support mini-split condensing units and shall be provided by unit manufacturer.
- B. Supports to be hot-dipped galvanized steel.
- C. Coordinate installation with existing exterior wall material and condition.

2.8 MISCELLANEOUS MATERIALS

- A. Structural Steel: ASTM A 36, steel plates, shapes, and bars; black and galvanized.
- B. Grout: ASTM C 1107, factory-mixed and -packaged, dry, hydraulic-cement, nonshrink and nonmetallic grout; suitable for interior and exterior applications.
 1. Properties: Nonstaining, noncorrosive, and nongaseous.
 2. Design Mix: 5000-psi, 28-day compressive strength.

PART 3 - EXECUTION

3.1 HANGER AND SUPPORT APPLICATIONS

- A. Specific hanger and support requirements are specified in Sections specifying piping systems and equipment.
- B. Comply with MSS SP-69 for pipe hanger selections and applications that are not specified in piping system Sections.
- C. Use hangers and supports with galvanized, metallic coatings for piping and equipment that will not have field-applied finish.
- D. Use nonmetallic coatings on attachments for electrolytic protection where attachments are in direct contact with copper tubing.
- E. Use padded hangers for piping that is subject to scratching.
- F. Horizontal-Piping Hangers and Supports: Unless otherwise indicated and except as specified in piping system Sections, install the following types:

1. Adjustable, Steel Clevis Hangers (MSS Type 1): For suspension of noninsulated or insulated stationary pipes, NPS 1/2 to NPS 30.
 2. Yoke-Type Pipe Clamps (MSS Type 2): For suspension of 120 to 450 deg F pipes, NPS 4 to NPS 16, requiring up to 4 inches of insulation.
 3. Carbon- or Alloy-Steel, Double-Bolt Pipe Clamps (MSS Type 3): For suspension of pipes, NPS 3/4 to NPS 24, requiring clamp flexibility and up to 4 inches of insulation.
 4. Steel Pipe Clamps (MSS Type 4): For suspension of cold and hot pipes, NPS 1/2 to NPS 24, if little or no insulation is required.
 5. Pipe Hangers (MSS Type 5): For suspension of pipes, NPS 1/2 to NPS 4, to allow off-center closure for hanger installation before pipe erection.
 6. Adjustable, Swivel Split- or Solid-Ring Hangers (MSS Type 6): For suspension of noninsulated stationary pipes, NPS 3/4 to NPS 8.
 7. Adjustable, Steel Band Hangers (MSS Type 7): For suspension of noninsulated stationary pipes, NPS 1/2 to NPS 8.
 8. Adjustable Band Hangers (MSS Type 9): For suspension of noninsulated stationary pipes, NPS 1/2 to NPS 8.
 9. Adjustable, Swivel-Ring Band Hangers (MSS Type 10): For suspension of noninsulated stationary pipes, NPS 1/2 to NPS 2.
 10. Split Pipe-Ring with or without Turnbuckle-Adjustment Hangers (MSS Type 11): For suspension of noninsulated stationary pipes, NPS 3/8 to NPS 8.
 11. Extension Hinged or 2-Bolt Split Pipe Clamps (MSS Type 12): For suspension of noninsulated stationary pipes, NPS 3/8 to NPS 3.
 12. U-Bolts (MSS Type 24): For support of heavy pipes, NPS 1/2 to NPS 30.
 13. Clips (MSS Type 26): For support of insulated pipes not subject to expansion or contraction.
 14. Pipe Saddle Supports (MSS Type 36): For support of pipes, NPS 4 to NPS 36, with steel pipe base stanchion support and cast-iron floor flange.
 15. Pipe Stanchion Saddles (MSS Type 37): For support of pipes, NPS 4 to NPS 36, with steel pipe base stanchion support and cast-iron floor flange and with U-bolt to retain pipe.
 16. Adjustable, Pipe Saddle Supports (MSS Type 38): For stanchion-type support for pipes, NPS 2-1/2 to NPS 36, if vertical adjustment is required, with steel pipe base stanchion support and cast-iron floor flange.
 17. Single Pipe Rolls (MSS Type 41): For suspension of pipes, NPS 1 to NPS 30, from 2 rods if longitudinal movement caused by expansion and contraction might occur.
 18. Adjustable Roller Hangers (MSS Type 43): For suspension of pipes, NPS 2-1/2 to NPS 20, from single rod if horizontal movement caused by expansion and contraction might occur.
 19. Complete Pipe Rolls (MSS Type 44): For support of pipes, NPS 2 to NPS 42, if longitudinal movement caused by expansion and contraction might occur but vertical adjustment is not necessary.
 20. Pipe Roll and Plate Units (MSS Type 45): For support of pipes, NPS 2 to NPS 24, if small horizontal movement caused by expansion and contraction might occur and vertical adjustment is not necessary.
 21. Adjustable Pipe Roll and Base Units (MSS Type 46): For support of pipes, NPS 2 to NPS 30, if vertical and lateral adjustment during installation might be required in addition to expansion and contraction.
- G. Vertical-Piping Clamps: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
1. Extension Pipe or Riser Clamps (MSS Type 8): For support of pipe risers, NPS 3/4 to NPS 20.
 2. Carbon- or Alloy-Steel Riser Clamps (MSS Type 42): For support of pipe risers, NPS 3/4 to NPS 20, if longer ends are required for riser clamps.
- H. Hanger-Rod Attachments: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
1. Steel Turnbuckles (MSS Type 13): For adjustment up to 6 inches for heavy loads.
 2. Steel Clevises (MSS Type 14): For 120 to 450 deg F piping installations.
 3. Swivel Turnbuckles (MSS Type 15): For use with MSS Type 11, split pipe rings.

4. Malleable-Iron Sockets (MSS Type 16): For attaching hanger rods to various types of building attachments.
 5. Steel Weldless Eye Nuts (MSS Type 17): For 120 to 450 deg F piping installations.
 6. Swivel connections shall be utilized for attachment to sloping structure. Threaded rod shall not be bent.
- I. Building Attachments: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
1. Steel or Malleable Concrete Inserts (MSS Type 18): For upper attachment to suspend pipe hangers from concrete ceiling.
 2. Top-Beam C-Clamps (MSS Type 19): For use under roof installations with bar-joist construction to attach to top flange of structural shape.
 3. Side-Beam or Channel Clamps (MSS Type 20): For attaching to bottom flange of beams, channels, or angles.
 4. Center-Beam Clamps (MSS Type 21): For attaching to center of bottom flange of beams.
 5. Welded Beam Attachments (MSS Type 22): For attaching to bottom of beams if loads are considerable and rod sizes are large.
 6. C-Clamps (MSS Type 23): For structural shapes.
 7. Top-Beam Clamps (MSS Type 25): For top of beams if hanger rod is required tangent to flange edge.
 8. Side-Beam Clamps (MSS Type 27): For bottom of steel I-beams.
 9. Steel-Beam Clamps with Eye Nuts (MSS Type 28): For attaching to bottom of steel I-beams for heavy loads.
 10. Linked-Steel Clamps with Eye Nuts (MSS Type 29): For attaching to bottom of steel I-beams for heavy loads, with link extensions.
 11. Malleable Beam Clamps with Extension Pieces (MSS Type 30): For attaching to structural steel.
 12. Welded-Steel Brackets: For support of pipes from below, or for suspending from above by using clip and rod. Use one of the following for indicated loads:
 - a. Light (MSS Type 31): 750 lb.
 - b. Medium (MSS Type 32): 1500 lb.
 - c. Heavy (MSS Type 33): 3000 lb.
 13. Side-Beam Brackets (MSS Type 34): For sides of steel or wooden beams.
 14. Plate Lugs (MSS Type 57): For attaching to steel beams if flexibility at beam is required.
 15. Horizontal Travelers (MSS Type 58): For supporting piping systems subject to linear horizontal movement where headroom is limited.
- J. Saddles and Shields: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
1. Steel Pipe-Covering Protection Saddles (MSS Type 39): To fill interior voids with insulation that matches adjoining insulation.
 2. Protection Shields (MSS Type 40): Of length recommended in writing by manufacturer to prevent crushing insulation.
 3. Thermal-Hanger Shield Inserts: For supporting insulated pipe.
- K. Spring Hangers and Supports: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
1. Restraint-Control Devices (MSS Type 47): Where indicated to control piping movement.
 2. Spring Cushions (MSS Type 48): For light loads if vertical movement does not exceed 1-1/4 inches.
 3. Spring-Cushion Roll Hangers (MSS Type 49): For equipping Type 41 roll hanger with springs.
 4. Spring Sway Braces (MSS Type 50): To retard sway, shock, vibration, or thermal expansion in piping systems.
 5. Variable-Spring Hangers (MSS Type 51): Preset to indicated load and limit variability factor to 25 percent to absorb expansion and contraction of piping system from hanger.
 6. Variable-Spring Base Supports (MSS Type 52): Preset to indicated load and limit variability factor to 25 percent to absorb expansion and contraction of piping system from base support.

7. Variable-Spring Trapeze Hangers (MSS Type 53): Preset to indicated load and limit variability factor to 25 percent to absorb expansion and contraction of piping system from trapeze support.
8. Constant Supports: For critical piping stress and if necessary to avoid transfer of stress from one support to another support, critical terminal, or connected equipment. Include auxiliary stops for erection, hydrostatic test, and load-adjustment capability. These supports include the following types:
 - a. Horizontal (MSS Type 54): Mounted horizontally.
 - b. Vertical (MSS Type 55): Mounted vertically.
 - c. Trapeze (MSS Type 56): Two vertical-type supports and one trapeze member.
- L. Comply with MSS SP-69 for trapeze pipe hanger selections and applications that are not specified in piping system Sections.
- M. Comply with MFMA-102 for metal framing system selections and applications that are not specified in piping system Sections.
- N. Use powder-actuated fasteners or mechanical-expansion anchors instead of building attachments where required in concrete construction. The use of powder-actuated fasteners or mechanical-expansion anchors may only be used after approval from the structural engineer.

3.2 HANGER AND SUPPORT INSTALLATION

- A. Steel Pipe Hanger Installation: Comply with MSS SP-69 and MSS SP-89. Install hangers, supports, clamps, and attachments as required to properly support piping from building structure.
- B. Trapeze Pipe Hanger Installation: Comply with MSS SP-69 and MSS SP-89. Arrange for grouping of parallel runs of horizontal piping and support together on field-fabricated trapeze pipe hangers.
 1. Pipes of Various Sizes: Support together and space trapezes for smallest pipe size or install intermediate supports for smaller diameter pipes as specified above for individual pipe hangers.
 2. Field fabricate from ASTM A 36/A 36M, steel shapes selected for loads being supported. Weld steel according to AWS D1.1.
- C. Metal Framing System Installation: Arrange for grouping of parallel runs of piping and support together on field-assembled metal framing systems.
- D. Thermal-Hanger Shield Installation: Install in pipe hanger or shield for insulated piping.
- E. Pipe Stand Installation:
 1. Pipe Stand Types except Curb-Mounting Type: Assemble components and mount on smooth roof surface. Do not penetrate roof membrane.
 2. Curb-Mounting-Type Pipe Stands: Assemble components or fabricate pipe stand and mount on permanent, stationary roof curb. Refer to Division 07 Section "Roof Accessories" for curbs.
- F. Install hangers and supports complete with necessary inserts, bolts, rods, nuts, washers, and other accessories.
- G. Equipment Support Installation: Fabricate from welded-structural-steel shapes.
- H. Install hangers and supports to allow controlled thermal movement of piping systems, to permit freedom of movement between pipe anchors, and to facilitate action of expansion joints, expansion loops, expansion bends, and similar units.
- I. Install lateral bracing with pipe hangers and supports to prevent swaying.

- J. Install building attachments within concrete slabs or attach to structural steel. Install additional attachments at concentrated loads, including valves, flanges, and strainers, NPS 2-1/2 and larger and at changes in direction of piping. Install concrete inserts before concrete is placed; fasten inserts to forms and install reinforcing bars through openings at top of inserts.
- K. Load Distribution: Install hangers and supports so piping live and dead loads and stresses from movement will not be transmitted to connected equipment.
- L. Pipe Slopes: Install hangers and supports to provide indicated pipe slopes and so maximum pipe deflections allowed by ASME B31.1 (for power piping) and ASME B31.9 (for building services piping) are not exceeded.
- M. Insulated Piping: Comply with the following:
 - 1. Attach clamps and spacers to piping.
 - a. Piping Operating above Ambient Air Temperature: Clamp may project through insulation.
 - b. Piping Operating below Ambient Air Temperature: Use thermal-hanger shield insert with clamp sized to match OD of insert.
 - c. Do not exceed pipe stress limits according to ASME B31.1 for power piping and ASME B31.9 for building services piping.
 - 2. Install MSS SP-58, Type 39, protection saddles if insulation without vapor barrier is indicated. Fill interior voids with insulation that matches adjoining insulation.
 - a. Option: Thermal-hanger shield inserts may be used. Include steel weight-distribution plate for pipe NPS 4 and larger if pipe is installed on rollers.
 - 3. Install MSS SP-58, Type 40, protective shields on cold piping with vapor barrier. Shields shall span an arc of 180 degrees.
 - a. Option: Thermal-hanger shield inserts may be used. Include steel weight-distribution plate for pipe NPS 4 and larger if pipe is installed on rollers.
 - 4. Shield Dimensions for Pipe: Not less than the following:
 - a. NPS 1/4 to NPS 3-1/2: 12 inches long and 0.048 inch thick.
 - b. NPS 4: 12 inches long and 0.06 inch thick.
 - c. NPS 5 and NPS 6: 18 inches long and 0.06 inch thick.
 - d. NPS 8 to NPS 14: 24 inches long and 0.075 inch thick.
 - e. NPS 16 to NPS 24: 24 inches long and 0.105 inch thick.
 - 5. Pipes NPS 8 and Larger: Include wood inserts.
 - 6. Insert Material: Length at least as long as protective shield.
 - 7. Thermal-Hanger Shields: Install with insulation same thickness as piping insulation.

3.3 EQUIPMENT SUPPORTS

- A. Fabricate structural-steel stands to suspend equipment from structure overhead or to support equipment above floor.
- B. Grouting: Place grout under supports for equipment and make smooth bearing surface.
- C. Provide lateral bracing, to prevent swaying, for equipment supports.

3.4 METAL FABRICATIONS

- A. Cut, drill, and fit miscellaneous metal fabrications for trapeze pipe hangers and equipment supports.
- B. Fit exposed connections together to form hairline joints. Field weld connections that cannot be shop welded because of shipping size limitations.
- C. Field Welding: Comply with AWS D1.1 procedures for shielded metal arc welding, appearance and quality of welds, and methods used in correcting welding work, and with the following:
 - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 - 2. Obtain fusion without undercut or overlap.

3. Remove welding flux immediately.
4. Finish welds at exposed connections so no roughness shows after finishing and contours of welded surfaces match adjacent contours.

3.5 ADJUSTING

- A. Hanger Adjustments: Adjust hangers to distribute loads equally on attachments and to achieve indicated slope of pipe.
- B. Trim excess length of continuous-thread hanger and support rods to 1-1/2 inches.

3.6 PAINTING

- A. Touch Up: Clean field welds and abraded areas of shop paint. Paint exposed areas immediately after erecting hangers and supports. Use same materials as used for shop painting. Comply with SSPC-PA 1 requirements for touching up field-painted surfaces.
 1. Apply paint by brush or spray to provide minimum dry film thickness of 2.0 mils.
- B. Touch Up: Cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint on miscellaneous metal are specified in Division 09 painting Sections.
- C. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas and apply galvanizing-repair paint to comply with ASTM A 780.

END OF SECTION 23 05 29

SECTION 23 05 48 – VIBRATION AND SEISMIC CONTROLS FOR HVAC PIPING AND EQUIPMENT

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. Isolation pads.
 - 2. Isolation mounts.
 - 3. Spring isolators.
 - 4. Housed spring mounts.
 - 5. Spring hangers.
 - 6. Steel, vibration isolation equipment bases.

1.3 DEFINITIONS

- A. IBC: International Building Code.
- B. ICC-ES: ICC-Evaluation Service.
- C. OSHPD: Office of Statewide Health Planning and Development for the State of California.

1.4 PERFORMANCE REQUIREMENTS

- A. Wind-Restraint Loading:
 - 1. Minimum 10 lb/sq. ft. multiplied by the maximum area of the HVAC component projected on a vertical plane that is normal to the wind direction, and 45 degrees either side of normal.

1.5 ACTION SUBMITTALS

- A. Product Data: For the following:
 - 1. Include rated load, rated deflection, and overload capacity for each vibration isolation device.
 - 2. Illustrate and indicate style, material, strength, fastening provision, and finish for each type.

1.6 INFORMATIONAL/QUALITY ASSURANCE/CONTROL SUBMITTALS

- A. Welding certificates.
- B. Field quality-control test reports.

1.7 CLOSEOUT DOCUMENTS

- A. General: Closeout Submittals are to be submitted with O and M Manuals only. Do not submit with other ACTION and INFORMATIONAL Submittals:
 - 1. Operation and Maintenance Data: For air-mounting systems to include in operation and maintenance manuals.

1.8 QUALITY ASSURANCE

- A. Testing Agency Qualifications: An independent agency, with the experience and capability to conduct the testing indicated, that is a nationally recognized testing laboratory (NRTL) as defined by OSHA in 29 CFR 1910.7, and that is acceptable to authorities having jurisdiction.
- B. Welding: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."

PART 2 - PRODUCTS

2.1 VIBRATION ISOLATORS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Amber/Booth Company, Inc.
 - 2. Isolation Technology, Inc.
 - 3. Kinetics Noise Control.
 - 4. Mason Industries.
 - 5. Vibration Eliminator Co., Inc.
 - 6. Vibration Isolation.
 - 7. Vibration Mountings & Controls, Inc.
- B. Pads: Arranged in single or multiple layers of sufficient stiffness for uniform loading over pad area, molded with a nonslip pattern and galvanized-steel baseplates, and factory cut to sizes that match requirements of supported equipment.
 - 1. Resilient Material: Oil- and water-resistant neoprene.
- C. Mounts: Double-deflection type, with molded, oil-resistant rubber, hermetically sealed compressed fiberglass, or neoprene isolator elements with factory-drilled, encapsulated top plate for bolting to equipment and with baseplate for bolting to structure. Color-code or otherwise identify to indicate capacity range.
 - 1. Materials: Cast-ductile-iron or welded steel housing containing two separate and opposing, oil-resistant rubber or neoprene elements that prevent central threaded element and attachment hardware from contacting the housing during normal operation.
 - 2. Neoprene: Shock-absorbing materials compounded according to the standard for bridge-bearing neoprene as defined by AASHTO.
- D. Spring Isolators: Freestanding, laterally stable, open-spring isolators.
 - 1. Outside Spring Diameter: Not less than 80 percent of the compressed height of the spring at rated load.
 - 2. Minimum Additional Travel: 50 percent of the required deflection at rated load.
 - 3. Lateral Stiffness: More than 80 percent of rated vertical stiffness.
 - 4. Overload Capacity: Support 200 percent of rated load, fully compressed, without deformation or failure.
 - 5. Baseplates: Factory drilled for bolting to structure and bonded to 1/4-inch- thick, rubber isolator pad attached to baseplate underside. Baseplates shall limit floor load to 500 psig.
 - 6. Top Plate and Adjustment Bolt: Threaded top plate with adjustment bolt and cap screw to fasten and level equipment.
- E. Spring Hangers: Combination coil-spring and elastomeric-insert hanger with spring and insert in compression.
 - 1. Frame: Steel, fabricated for connection to threaded hanger rods and to allow for a maximum of 30 degrees of angular hanger-rod misalignment without binding or reducing isolation efficiency.
 - 2. Outside Spring Diameter: Not less than 80 percent of the compressed height of the spring at rated load.
 - 3. Minimum Additional Travel: 50 percent of the required deflection at rated load.

4. Lateral Stiffness: More than 80 percent of rated vertical stiffness.
5. Overload Capacity: Support 200 percent of rated load, fully compressed, without deformation or failure.
6. Elastomeric Element: Molded, oil-resistant rubber or neoprene. Steel-washer-reinforced cup to support spring and bushing projecting through bottom of frame.
7. Self-centering hanger rod cap to ensure concentricity between hanger rod and support spring coil.

2.2 VIBRATION ISOLATION EQUIPMENT BASES

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 1. Amber/Booth Company, Inc.
 2. Isolation Technology, Inc.
 3. Kinetics Noise Control.
 4. Mason Industries.
 5. Vibration Eliminator Co., Inc.
 6. Vibration Isolation.
 7. Vibration Mountings & Controls, Inc.
- B. Steel Base: Factory-fabricated, welded, structural-steel bases and rails.
 1. Design Requirements: Lowest possible mounting height with not less than 1-inch clearance above the floor. Include equipment anchor bolts and auxiliary motor slide bases or rails.
 - a. Include supports for suction and discharge elbows for pumps.
 2. Structural Steel: Steel shapes, plates, and bars complying with ASTM A 36/A 36M. Bases shall have shape to accommodate supported equipment.
 3. Support Brackets: Factory-welded steel brackets on frame for outrigger isolation mountings and to provide for anchor bolts and equipment support.

2.3 FACTORY FINISHES

- A. Finish: Manufacturer's standard prime-coat finish ready for field painting.
- B. Finish: Manufacturer's standard paint applied to factory-assembled and -tested equipment before shipping.
 1. Powder coating on springs and housings.
 2. All hardware shall be galvanized. Hot-dip galvanize metal components for exterior use.
 3. Baked enamel or powder coat for metal components on isolators for interior use.
 4. Color-code or otherwise mark vibration isolation-control devices to indicate capacity range.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas and equipment to receive vibration isolation-control devices for compliance with requirements for installation tolerances and other conditions affecting performance.
- B. Examine roughing-in of reinforcement and cast-in-place anchors to verify actual locations before installation.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 APPLICATIONS

- A. Multiple Pipe Supports: Secure pipes to trapeze member with clamps approved for application.

- B. Hanger Rod Stiffeners: Install hanger rod stiffeners where indicated or scheduled on Drawings to receive them and where required to prevent buckling of hanger rods due to seismic forces.
- C. Strength of Support Assemblies: Where not indicated, select sizes of components so strength will be adequate to carry present and future static loads within specified loading limits.

3.3 VIBRATION-CONTROL DEVICE INSTALLATION

- A. Comply with requirements in Division 07 Section "Roof Accessories" for installation of roof curbs, equipment supports, and roof penetrations.
- B. Install cables so they do not bend across edges of adjacent equipment or building structure.
- C. Install bushing assemblies for anchor bolts for floor-mounted equipment, arranged to provide resilient media between anchor bolt and mounting hole in concrete base.
- D. Install bushing assemblies for mounting bolts for wall-mounted equipment, arranged to provide resilient media where equipment or equipment-mounting channels are attached to wall.
- E. Attachment to Structure: If specific attachment is not indicated, anchor bracing to structure at flanges of beams, at upper truss chords of bar joists, or at concrete members.
- F. Drilled-in Anchors:
 - 1. Identify position of reinforcing steel and other embedded items prior to drilling holes for anchors. Do not damage existing reinforcing or embedded items during coring or drilling. Notify the structural engineer if reinforcing steel or other embedded items are encountered during drilling. Locate and avoid prestressed tendons, electrical and telecommunications conduit, and gas lines.
 - 2. Do not drill holes in concrete or masonry until concrete, mortar, or grout has achieved full design strength.
 - 3. Wedge Anchors: Protect threads from damage during anchor installation. Heavy-duty sleeve anchors shall be installed with sleeve fully engaged in the structural element to which anchor is to be fastened.
 - 4. Adhesive Anchors: Clean holes to remove loose material and drilling dust prior to installation of adhesive. Place adhesive in holes proceeding from the bottom of the hole and progressing toward the surface in such a manner as to avoid introduction of air pockets in the adhesive.
 - 5. Set anchors to manufacturer's recommended torque, using a torque wrench.
 - 6. Install zinc-coated steel anchors for interior and stainless-steel anchors for exterior applications.

3.4 ADJUSTING

- A. Adjust isolators after piping system is at operating weight.
- B. Adjust active height of spring isolators.
- C. Adjust restraints to permit free movement of equipment within normal mode of operation.

3.5 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain air-mounting systems. Refer to Division 01 Section "Demonstration And Training."

END OF SECTION 23 05 48

SECTION 23 05 53 - IDENTIFICATION FOR HVAC PIPING AND EQUIPMENT

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. Equipment labels.
 - 2. Warning signs and labels.
 - 3. Pipe labels.
 - 4. Valve tags.
 - 5. Warning tags.

1.3 ACTION SUBMITTALS

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

1.4 INFORMATIONAL/QUALITY ASSURANCE/CONTROL SUBMITTALS

- A. Valve Schedules: For each piping system to include in maintenance manuals.

1.5 COORDINATION

- A. Coordinate installation of identifying devices with completion of covering and painting of surfaces where devices are to be applied.
- B. Coordinate installation of identifying devices with locations of access panels and doors.
- C. Install identifying devices before installing acoustical ceilings and similar concealment.

PART 2 - PRODUCTS

2.1 EQUIPMENT LABELS

- A. Metal Labels for Equipment:
 - 1. Material and Thickness: Brass, 0.032-inch Stainless steel, 0.025-inch Aluminum, 0.032-inch or anodized aluminum, 0.032-inch minimum thickness, and having predrilled or stamped holes for attachment hardware.
 - 2. Minimum Label Size: Length and width vary for required label content, but not less than 2-1/2 by 3/4 inch.
 - 3. Minimum Letter Size: 1/4 inch for name of units if viewing distance is less than 24 inches, 1/2 inch for viewing distances up to 72 inches, and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-fourths the size of principal lettering.
 - 4. Fasteners: Stainless-steel self-tapping screws.
 - 5. Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.
- B. Plastic Labels for Equipment:
 - 1. Material and Thickness: Multilayer, multicolor, plastic labels for mechanical engraving, 1/8 inch thick, and having predrilled holes for attachment hardware.
 - 2. Letter Color: White.
 - 3. Background Color: Black.
 - 4. Maximum Temperature: Able to withstand temperatures up to 160 deg F.

5. Minimum Label Size: Length and width vary for required label content, but not less than 2-1/2 by 3/4 inch.
6. Minimum Letter Size: 1/4 inch for name of units if viewing distance is less than 24 inches, 1/2 inch for viewing distances up to 72 inches, and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-fourths the size of principal lettering.
7. Fasteners: Stainless-steel self-tapping screws.
8. Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.

C. Label Content: Include equipment's Drawing designation or unique equipment number.

2.2 WARNING SIGNS AND LABELS

- A. Material and Thickness: Multilayer, multicolor, plastic labels for mechanical engraving, 1/8 inch thick, and having predrilled holes for attachment hardware.
- B. Letter Color: Black.
- C. Background Color: Yellow.
- D. Maximum Temperature: Able to withstand temperatures up to 160 deg F.
- E. Minimum Label Size: Length and width vary for required label content, but not less than 2-1/2 by 3/4 inch.
- F. Minimum Letter Size: 1/4 inch for name of units if viewing distance is less than 24 inches, 1/2 inch for viewing distances up to 72 inches, and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-fourths the size of principal lettering.
- G. Fasteners: Stainless-steel self-tapping screws.
- H. Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.
- I. Label Content: Include caution and warning information, plus emergency notification instructions.

2.3 PIPE LABELS

- A. General Requirements for Manufactured Pipe Labels: Preprinted, color-coded, with lettering indicating service, and showing flow direction.
- B. Pretensioned Pipe Labels: Precoiled, semirigid plastic formed to cover full circumference of pipe and to attach to pipe without fasteners or adhesive.
- C. Self-Adhesive Pipe Labels: Printed plastic with contact-type, permanent-adhesive backing.
- D. Pipe Label Contents: Include identification of piping service using same designations or abbreviations as used on Drawings, pipe size, and an arrow indicating flow direction.
 1. Flow-Direction Arrows: Integral with piping system service lettering to accommodate both directions, or as separate unit on each pipe label to indicate flow direction.
 2. Lettering Size: At least 1-1/2 inches high.

2.4 STENCILS

- A. Stencils: Prepared with letter sizes according to ASME A13.1 for piping; minimum letter height of 1-1/4 inches for ducts; and minimum letter height of 3/4 inch for access panel and door labels, equipment labels, and similar operational instructions.

1. Stencil Paint: Exterior, gloss, black unless otherwise indicated. Paint may be in pressurized spray-can form.
2. Identification Paint: Exterior, in colors according to ASME A13.1 unless otherwise indicated.

2.5 VALVE TAGS

- A. Valve Tags: Stamped or engraved with 1/4-inch letters for piping system abbreviation and 1/2-inch numbers.
 1. Tag Material: Brass, 0.032-inch minimum thickness, and having predrilled or stamped holes for attachment hardware.
 2. Fasteners: Brass wire-link or beaded chain; or S-hook.
- B. Valve Schedules: For each piping system, on 8-1/2-by-11-inch bond paper. Tabulate valve number, piping system, system abbreviation (as shown on valve tag), location of valve (room or space), normal-operating position (open, closed, or modulating), and variations for identification. Mark valves for emergency shutoff and similar special uses.
 1. Valve-tag schedule shall be included in operation and maintenance data.

2.6 WARNING TAGS

- A. Warning Tags: Preprinted or partially preprinted, accident-prevention tags, of plasticized card stock with matte finish suitable for writing.
 1. Size: 3 by 5-1/4 inches minimum.
 2. Fasteners: Brass grommet and wire.
 3. Nomenclature: Large-size primary caption such as "DANGER," "CAUTION," or "DO NOT OPERATE."
 4. Color: Yellow background with black lettering.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Clean piping and equipment surfaces of substances that could impair bond of identification devices, including dirt, oil, grease, release agents, and incompatible primers, paints, and encapsulants.

3.2 EQUIPMENT LABEL INSTALLATION

- A. Install or permanently fasten labels on each major item of mechanical equipment, along with all associated devices such as starters, disconnect switches, etc.
- B. Locate equipment labels where accessible and visible.

3.3 PIPE LABEL INSTALLATION

- A. Piping Color-Coding: Painting of piping is specified in Division 09 Section "Interior Painting."
- B. Stenciled Pipe Label Option: Stenciled labels may be provided instead of manufactured pipe labels, at Installer's option. Install stenciled pipe labels with painted, color-coded bands or rectangles, complying with ASME A13.1, on each piping system.
 1. Identification Paint: Use for contrasting background.
 2. Stencil Paint: Use for pipe marking.
- C. Locate pipe labels where piping is exposed or above accessible ceilings in finished spaces; machine rooms; accessible maintenance spaces such as shafts, tunnels, and plenums; and exterior exposed locations as follows:
 1. Near each valve and control device.

2. Near each branch connection, excluding short takeoffs for fixtures and terminal units. Where flow pattern is not obvious, mark each pipe at branch.
3. Near penetrations through walls, floors, ceilings, and inaccessible enclosures.
4. At access doors, manholes, and similar access points that permit view of concealed piping.
5. Near major equipment items and other points of origination and termination.
6. Spaced at maximum intervals of 25 feet along each run. Reduce intervals to 10 feet in areas of congested piping and equipment.
7. On piping above removable acoustical ceilings. Omit intermediately spaced labels.

3.4 VALVE-TAG INSTALLATION

- A. Install tags on valves and control devices in piping systems, except check valves; valves within factory-fabricated equipment units; shutoff valves; faucets; convenience and lawn-watering hose connections; and HVAC terminal devices and similar roughing-in connections of end-use fixtures and units. List tagged valves in a valve schedule.

3.5 WARNING-TAG INSTALLATION

- A. Write required message on, and attach warning tags to, equipment and other items where required.

END OF SECTION 23 05 53

SECTION 23 05 93 - TESTING, ADJUSTING, AND BALANCING FOR HVAC

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 TAB to produce design objectives for the following:
 - 1. Refrigerant Coils.
 - 2. HVAC equipment quantitative-performance settings.
 - 3. Verifying that automatic control devices are functioning properly.
 - 4. Reporting results of activities and procedures specified in this Section.

1.3 DEFINITIONS

- A. Adjust: To regulate fluid flow rate and air patterns at the terminal equipment, such as to reduce fan speed or adjust a damper.
- B. Balance: To proportion flows within the distribution system, including submains, branches, and terminals, according to indicated quantities.
- C. Barrier or Boundary: Construction, either vertical or horizontal, such as walls, floors, and ceilings that are designed and constructed to restrict the movement of airflow, smoke, odors, and other pollutants.
- D. Draft: A current of air, when referring to localized effect caused by one or more factors of high air velocity, low ambient temperature, or direction of airflow, whereby more heat is withdrawn from a person's skin than is normally dissipated.
- E. NC: Noise criteria.
- F. Procedure: An approach to and execution of a sequence of work operations to yield repeatable results.
- G. RC: Room criteria.
- H. Report Forms: Test data sheets for recording test data in logical order.
- I. Smoke-Control System: An engineered system that uses fans to produce airflow and pressure differences across barriers to limit smoke movement.
- J. Smoke-Control Zone: A space within a building that is enclosed by smoke barriers and is a part of a zoned smoke-control system.
- K. Stair Pressurization System: A type of smoke-control system that is intended to positively pressurize stair towers with outdoor air by using fans to keep smoke from contaminating the stair towers during an alarm condition.
- L. Static Head: The pressure due to the weight of the fluid above the point of measurement. In a closed system, static head is equal on both sides of the pump.
- M. Suction Head: The height of fluid surface above the centerline of the pump on the suction side.

- N. System Effect: A phenomenon that can create undesired or unpredicted conditions that cause reduced capacities in all or part of a system.
- O. System Effect Factors: Allowances used to calculate a reduction of the performance ratings of a fan when installed under conditions different from those presented when the fan was performance tested.
- P. TAB: Testing, adjusting, and balancing.
- Q. Terminal: A point where the controlled medium, such as fluid or energy, enters or leaves the distribution system.
- R. Test: A procedure to determine quantitative performance of systems or equipment.
- S. Testing, Adjusting, and Balancing (TAB) Firm: The entity responsible for performing and reporting TAB procedures.

1.4 INFORMATIONAL/QUALITY ASSURANCE/CONTROL SUBMITTALS

- A. Certified TAB Reports: Submit two copies of reports prepared, as specified in this Section, on approved forms certified by TAB firm.
- B. Warranties specified in this Section.

1.5 QUALITY ASSURANCE

- A. TAB Firm Qualifications: Engage a TAB firm certified by either AABC or NEBB.
- B. Certification of TAB Reports: Certify TAB field data reports. This certification includes the following:
 - 1. Review field data reports to validate accuracy of data and to prepare certified TAB reports.
 - 2. Certify that TAB team complied with approved TAB plan and the procedures specified and referenced in this Specification.
- C. TAB Report Forms: Use standard forms from AABC's "National Standards for Testing and Balancing Heating, Ventilating, and Air Conditioning Systems," NEBB's "Procedural Standards for Testing, Adjusting, and Balancing of Environmental Systems," or SMACNA's "HVAC Systems - Testing, Adjusting, and Balancing."
- D. Instrumentation Type, Quantity, and Accuracy: As described in AABC's "National Standards for Testing and Balancing Heating, Ventilating, and Air Conditioning Systems or NEBB's "Procedural Standards for Testing, Adjusting, and Balancing of Environmental Systems, " Section II, " Required Instrumentation for NEBB Certification."
- E. Instrumentation Calibration: Calibrate instruments at least every six months or more frequently if required by instrument manufacturer.
 - 1. Keep an updated record of instrument calibration that indicates date of calibration and the name of party performing instrument calibration.
- F. Establish setpoints and calibrate controls. Coordinate with the Owner and HVAC Contractor.

1.6 PROJECT CONDITIONS

- A. Partial Owner Occupancy: Owner may occupy completed areas of building before Substantial Completion. Coordinate/cooperate with Owner during TAB operations to minimize conflicts with Owner's operations.

1.7 COORDINATION

- A. Coordinate the efforts of factory-authorized service representatives for systems and equipment, HVAC controls installers, and other mechanics to operate HVAC systems and equipment to support and assist TAB activities.
- B. Notice: Provide seven days' advance notice for each test. Include scheduled test dates and times.
- C. Perform TAB after leakage and pressure tests on air and water distribution systems have been satisfactorily completed.

1.8 WARRANTY

- A. National Project Performance Guarantee: Provide a guarantee on AABC's "National Standards for Testing and Balancing Heating, Ventilating, and Air Conditioning Systems" forms stating that AABC will assist in completing requirements of the Contract Documents if TAB firm fails to comply with the Contract Documents. Guarantee includes the following provisions:
 - 1. The certified TAB firm has tested and balanced systems according to the Contract Documents.
 - 2. Systems are balanced to optimum performance capabilities within design and installation limits.
- B. Special Guarantee: Provide a guarantee on NEBB forms stating that NEBB will assist in completing requirements of the Contract Documents if TAB firm fails to comply with the Contract Documents. Guarantee shall include the following provisions:
 - 1. The certified TAB firm has tested and balanced systems according to the Contract Documents.
 - 2. Systems are balanced to optimum performance capabilities within design and installation limits.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine the Contract Documents to become familiar with Project requirements and to discover conditions in systems' designs that may preclude proper TAB of systems and equipment.
 - 1. Contract Documents are defined in the General and Supplementary Conditions of Contract.
 - 2. Verify that balancing devices, such as test ports, gauge cocks, thermometer wells, flow-control devices, balancing valves and fittings, and manual volume dampers, are installed as required by the Contract Documents. Verify that quantities and locations of these balancing devices are accessible and appropriate for effective balancing and for efficient system and equipment operation.
- B. Examine approved submittal data of HVAC systems and equipment.
- C. Examine Project Record Documents described in Division 01 Section "Project Record Documents."
- D. Examine design data, including HVAC system descriptions, statements of design assumptions for environmental conditions and systems' output, and statements of philosophies and assumptions about HVAC system and equipment controls.

- E. Examine equipment performance data including fan curves. Relate performance data to Project conditions and requirements, including system effects that can create undesired or unpredicted conditions that cause reduced capacities in all or part of a system. Calculate system effect factors to reduce performance ratings of HVAC equipment when installed under conditions different from those presented when the equipment was performance tested at the factory. To calculate system effects for air systems, use tables and charts found in AMCA 201, "Fans and Systems," Sections 7 through 10; or in SMACNA's "HVAC Systems--Duct Design," Sections 5 and 6. Compare this data with the design data and installed conditions.
- F. Examine system and equipment installations to verify that they are complete and that testing, cleaning, adjusting, and commissioning specified in individual Sections have been performed.
- G. Examine system and equipment test reports.
- H. Examine systems for functional deficiencies that cannot be corrected by adjusting and balancing.
- I. Examine HVAC equipment to ensure that clean filters have been installed, bearings are greased, belts are aligned and tight, and equipment with functioning controls is ready for operation.
- J. Examine terminal units, such as split system heat pumps, to verify that they are accessible and their controls are connected and functioning.
- K. Examine plenum ceilings used for supply air to verify that they are airtight. Verify that pipe penetrations and other holes are sealed.
- L. Examine strainers for clean screens and proper perforations.
- M. Examine three-way valves for proper installation for their intended function of diverting or mixing fluid flows.
- N. Examine heat-transfer coils for correct piping connections and for clean and straight fins.
- O. Examine equipment for installation and for properly operating safety interlocks and controls.
- P. Examine automatic temperature system components to verify the following:
 - 1. Dampers, valves, and other controlled devices are operated by the intended controller.
 - 2. Dampers and valves are in the position indicated by the controller.
 - 3. Integrity of valves and dampers for free and full operation and for tightness of fully closed and fully open positions. This includes dampers in rooftop air handling units.
 - 4. Automatic modulating and shutoff valves, including two-way valves and three-way mixing and diverting valves, are properly connected.
 - 5. Thermostats and humidistats are located to avoid adverse effects of sunlight, drafts, and cold walls.
 - 6. Sensors are located to sense only the intended conditions.
 - 7. Sequence of operation for control modes is according to the Contract Documents.
 - 8. Controller set points are set at indicated values.
 - 9. Interlocked systems are operating.
 - 10. Changeover from heating to cooling mode occurs according to indicated values.
- Q. Report deficiencies discovered before and during performance of TAB procedures. Observe and record system reactions to changes in conditions. Record default set points if different from indicated values.

3.2 PREPARATION

- A. Prepare a TAB plan that includes strategies and step-by-step procedures.

- B. Complete system readiness checks and prepare system readiness reports. Verify the following:
 - 1. Permanent electrical power wiring is complete.
 - 2. Hydronic systems are filled, clean, and free of air.
 - 3. Automatic temperature-control systems are operational.
 - 4. Equipment and duct access doors are securely closed.
 - 5. Balance, smoke, and fire dampers are open.
 - 6. Isolating and balancing valves are open and control valves are operational.
 - 7. Ceilings are installed in critical areas where air-pattern adjustments are required and access to balancing devices is provided.
 - 8. Windows and doors can be closed so indicated conditions for system operations can be met.

3.3 GENERAL PROCEDURES FOR TESTING AND BALANCING

- A. Perform testing and balancing procedures on each system according to the procedures contained in AABC's "National Standards for Testing and Balancing Heating, Ventilating, and Air Conditioning Systems", NEBB's "Procedural Standards for Testing, Adjusting, and Balancing of Environmental Systems", or SMACNA's "HVAC Systems - Testing, Adjusting, and Balancing" and this Section.
- B. Cut insulation, ducts, pipes, and equipment cabinets for installation of test probes to the minimum extent necessary to allow adequate performance of procedures. After testing and balancing, close probe holes and patch insulation with new materials identical to those removed. Restore vapor barrier and finish according to insulation Specifications for this Project.
- C. Mark equipment and balancing device settings with paint or other suitable, permanent identification material, including damper-control positions, valve position indicators, fan-speed-control levers, and similar controls and devices, to show final settings.
- D. Take and report testing and balancing measurements in inch-pound (IP) units.

3.4 PROCEDURES FOR MOTORS

- A. Motors, 1/2 HP and Larger: Test at final balanced conditions and record the following data:
 - 1. Manufacturer, model, and serial numbers.
 - 2. Motor horsepower rating.
 - 3. Motor rpm.
 - 4. Efficiency rating.
 - 5. Nameplate and measured voltage, each phase.
 - 6. Nameplate and measured amperage, each phase.
 - 7. Starter thermal-protection-element rating.
- B. Motors Driven by Variable-Frequency Controllers: Test for proper operation at speeds varying from minimum to maximum. Test the manual bypass for the controller to prove proper operation. Record observations, including controller manufacturer, model and serial numbers, and nameplate data.

3.5 PROCEDURES FOR CONDENSING UNITS

- A. Verify proper rotation of fans.
- B. Measure entering- and leaving-air temperatures.
- C. Record compressor data.

3.6 PROCEDURES FOR HEAT-TRANSFER COILS

- A. Refrigerant Coils: Measure the following data for each coil:
 - 1. Dry-bulb temperature of entering and leaving air.
 - 2. Wet-bulb temperature of entering and leaving air.

3. Airflow.
4. Air pressure drop.
5. Refrigerant suction pressure and temperature.

3.7 PROCEDURES FOR TEMPERATURE MEASUREMENTS

- A. During TAB, report the need for adjustment in temperature regulation within the automatic temperature-control system.
- B. Measure indoor wet- and dry-bulb temperatures every other hour for a period of two successive eight-hour days, in each separately controlled zone, to prove correctness of final temperature settings. Measure when the building or zone is occupied.
- C. Measure outside-air, wet- and dry-bulb temperatures.

3.8 TEMPERATURE-CONTROL VERIFICATION

- A. Verify that controllers are calibrated and commissioned.
- B. Check transmitter and controller locations and note conditions that would adversely affect control functions.
- C. Record controller settings and note variances between set points and actual measurements.
- D. Check the operation of limiting controllers (i.e., high- and low-temperature controllers).
- E. Check free travel and proper operation of control devices such as damper and valve operators.
- F. Check the sequence of operation of control devices. Note air pressures and device positions and correlate with airflow and water flow measurements. Note the speed of response to input changes.
- G. Check the interaction of electrically operated switch transducers.
- H. Check the interaction of interlock and lockout systems.
- I. Record voltages of power supply and controller output. Determine whether the system operates on a grounded or nongrounded power supply.
- J. Note operation of electric actuators using spring return for proper fail-safe operations.

3.9 TOLERANCES

- A. Set HVAC system airflow and water flow rates within the following tolerances:
 1. Supply, Return, and Exhaust Fans and Equipment with Fans: 0 to plus 10 percent.
 2. Air Outlets and Inlets: 0 plus 10 percent.

3.10 REPORTING

- A. Initial Construction-Phase Report: Based on examination of the Contract Documents as specified in "Examination" Article, prepare a report on the adequacy of design for systems' balancing devices. Recommend changes and additions to systems' balancing devices to facilitate proper performance measuring and balancing. Recommend changes and additions to HVAC systems and general construction to allow access for performance measuring and balancing devices.

- B. Status Reports: As Work progresses, prepare reports to describe completed procedures, procedures in progress, and scheduled procedures. Include a list of deficiencies and problems found in systems being tested and balanced. Prepare a separate report for each system and each building floor for systems serving multiple floors.

3.11 FINAL REPORT

- A. General: Typewritten, or computer printout in letter-quality font, on standard bond paper, in three-ring binder, tabulated and divided into sections by tested and balanced systems.
- B. Include a certification sheet in front of binder signed and sealed by the certified testing and balancing engineer.
 - 1. Include a list of instruments used for procedures, along with proof of calibration.
- C. Final Report Contents: In addition to certified field report data, include the following:
 - 1. Pump curves.
 - 2. Fan curves.
 - 3. Manufacturers' test data.
 - 4. Field test reports prepared by system and equipment installers.
 - 5. Other information relative to equipment performance, but do not include Shop Drawings and Product Data.
- D. General Report Data: In addition to form titles and entries, include the following data in the final report, as applicable:
 - 1. Title page.
 - 2. Name and address of TAB firm.
 - 3. Project name.
 - 4. Project location.
 - 5. Architect's name and address.
 - 6. Engineer's name and address.
 - 7. Contractor's name and address.
 - 8. Report date.
 - 9. Signature of TAB firm who certifies the report.
 - 10. Table of Contents with the total number of pages defined for each section of the report. Number each page in the report.
 - 11. Summary of contents including the following:
 - a. Indicated versus final performance.
 - b. Notable characteristics of systems.
 - c. Description of system operation sequence if it varies from the Contract Documents.
 - 12. Nomenclature sheets for each item of equipment.
 - 13. Data for terminal units, including manufacturer, type size, and fittings.
 - 14. Notes to explain why certain final data in the body of reports varies from indicated values.
 - 15. Test conditions for fans and pump performance forms including the following:
 - a. Conditions of filters.
 - b. Cooling coil, wet- and dry-bulb conditions.
 - c. Face and bypass damper settings at coils.
 - d. Other system operating conditions that affect performance.
- E. Compressor and Condenser Reports: For refrigerant side of unitary systems, stand-alone refrigerant compressors, air-cooled condensing units, or water-cooled condensing units, include the following:
 - 1. Unit Data:
 - a. Unit identification.
 - b. Location.
 - c. Unit make and model number.
 - d. Compressor make.
 - e. Compressor model and serial numbers.
 - f. Refrigerant weight in lb.
 - g. Low ambient temperature cutoff in deg F.

2. Test Data (Indicated and Actual Values):
 - a. Inlet-duct static pressure in inches wg.
 - b. Outlet-duct static pressure in inches wg.
 - c. Entering-air, dry-bulb temperature in deg F.
 - d. Leaving-air, dry-bulb temperature in deg F.
 - e. Condenser entering-water temperature in deg F.
 - f. Condenser leaving-water temperature in deg F.
 - g. Condenser-water temperature differential in deg F.
 - h. Condenser entering-water pressure in feet of head or psig.
 - i. Condenser leaving-water pressure in feet of head or psig.
 - j. Condenser-water pressure differential in feet of head or psig.
 - k. Control settings.
 - l. Unloader set points.
 - m. Low-pressure-cutout set point in psig.
 - n. High-pressure-cutout set point in psig.
 - o. Suction pressure in psig.
 - p. Suction temperature in deg F.
 - q. Condenser refrigerant pressure in psig.
 - r. Condenser refrigerant temperature in deg F.
 - s. Oil pressure in psig.
 - t. Oil temperature in deg F.
 - u. Voltage at each connection.
 - v. Amperage for each phase.
 - w. Kilowatt input.
 - x. Crankcase heater kilowatt.
 - y. Number of fans.
 - z. Condenser fan rpm.
 - aa. Condenser fan airflow rate in cfm.
 - bb. Condenser fan motor make, frame size, rpm, and horsepower.
 - cc. Condenser fan motor voltage at each connection.
 - dd. Condenser fan motor amperage for each phase.

F. Instrument Calibration Reports:

1. Report Data:
 - a. Instrument type and make.
 - b. Serial number.
 - c. Application.
 - d. Dates of use.
 - e. Dates of calibration.

3.12 INSPECTIONS

A. Initial Inspection:

1. After testing and balancing are complete, operate each system and randomly check measurements to verify that the system is operating according to the final test and balance readings documented in the Final Report.
2. Randomly check the following for each system:
 - a. Measure airflow of at least 10 percent of air outlets.
 - b. Measure water flow of at least 5 percent of terminals.
 - c. Measure room temperature at each thermostat/temperature sensor. Compare the reading to the set point.
 - d. Measure sound levels at two locations.
 - e. Measure space pressure of at least 10 percent of locations.
 - f. Verify that balancing devices are marked with final balance position.
 - g. Note deviations to the Contract Documents in the Final Report.

B. Final Inspection:

1. After initial inspection is complete and evidence by random checks verifies that testing and balancing are complete and accurately documented in the final report, request that a final inspection be made by Engineer.

2. TAB firm test and balance engineer shall conduct the inspection in the presence of Owner and/or the Engineer.
3. Engineer shall select measurements documented in the final report to be rechecked. The rechecking shall be limited to either 10 percent of the total measurements recorded, or the extent of measurements that can be accomplished in a normal 8-hour business day.
4. If the rechecks yield measurements that differ from the measurements documented in the final report by more than the tolerances allowed, the measurements shall be noted as "FAILED."
5. If the number of "FAILED" measurements is greater than 10 percent of the total measurements checked during the final inspection, the testing and balancing shall be considered incomplete and shall be rejected.
6. TAB firm shall recheck all measurements and make adjustments. Revise the final report and balancing device settings to include all changes and resubmit the final report.
7. Request a second final inspection. If the second final inspection also fails, Owner shall contract the services of another TAB firm to complete the testing and balancing in accordance with the Contract Documents and deduct the cost of the services from the final payment.

3.13 ADDITIONAL TESTS

- A. Within 90 days of completing TAB, perform additional testing and balancing to verify that balanced conditions are being maintained throughout and to correct unusual conditions.
- B. Seasonal Periods: If initial TAB procedures were not performed during near-peak summer and winter conditions, perform additional testing, inspecting, and adjusting during near-peak summer and winter conditions.
- C. 11 Month Warranty Walk: TAB to perform additional testing and balancing to verify that balanced conditions are being maintained throughout and to report unusual conditions with recommendations of adjustments. TAB Contractor shall allow two days for this work.

END OF SECTION 23 05 93

SECTION 23 07 00 - HVAC INSULATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Insulation Materials:
 - a. Flexible elastomeric.
 - b. Mineral fiber.
 - 2. Insulating cements.
 - 3. Adhesives.
 - 4. Mastics.
 - 5. Sealants.
 - 6. Factory-applied jackets.
 - 7. Field-applied fabric-reinforcing mesh.
 - 8. Field-applied cloths.
 - 9. Field-applied jackets.
 - 10. Tapes.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated. Include thermal conductivity, thickness, and jackets (both factory and field applied, if any).

1.4 QUALITY ASSURANCE

- A. Fire-Test-Response Characteristics: Insulation and related materials shall have fire-test-response characteristics indicated, as determined by testing identical products per ASTM E 84, by a testing and inspecting agency acceptable to authorities having jurisdiction. Factory label insulation and jacket materials and adhesive, mastic, tapes, and cement material containers, with appropriate markings of applicable testing and inspecting agency.
 - 1. Insulation Installed Indoors: Flame-spread index of 25 or less, and smoke-developed index of 50 or less.
 - 2. Insulation Installed Outdoors: Flame-spread index of 75 or less, and smoke-developed index of 150 or less.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Packaging: Insulation material containers shall be marked by manufacturer with appropriate ASTM standard designation, type and grade, and maximum use temperature.

1.6 COORDINATION

- A. Coordinate size and location of supports, hangers, and insulation shields specified in Division 23 Section "Hangers and Supports for HVAC Piping and Equipment."
- B. Coordinate clearance requirements with piping Installer for piping insulation application, duct Installer for duct insulation application, and equipment Installer for equipment insulation application. Before preparing piping and ductwork Shop Drawings, establish and maintain clearance requirements for installation of insulation and field-applied jackets and finishes and for space required for maintenance.

1.7 SCHEDULING

- A. Schedule insulation application after pressure testing systems and, where required, after installing and testing heat tracing. Insulation application may begin on segments that have satisfactory test results.
- B. Complete installation and concealment of plastic materials as rapidly as possible in each area of construction.

PART 2 - PRODUCTS

2.1 INSULATION MATERIALS

- A. Comply with requirements in Part 3 schedule articles for where insulating materials shall be applied.
- B. Products shall not contain asbestos, lead, mercury, or mercury compounds.
- C. Products that come in contact with stainless steel shall have a leachable chloride content of less than 50 ppm when tested according to ASTM C 871.
- D. Insulation materials for use on austenitic stainless steel shall be qualified as acceptable according to ASTM C 795.
- E. Foam insulation materials shall not use CFC or HCFC blowing agents in the manufacturing process.
- F. Flexible Elastomeric: Closed-cell, sponge- or expanded-rubber materials. Comply with ASTM C 534, Type I for tubular materials and Type II for sheet materials. "K" Value: 0.28 at 75 degrees F (0.04 at 24 degrees C.).
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Aeroflex USA Inc.; Aerocel.
 - b. Armacell LLC; AP Armaflex.
 - c. RBX Corporation; Insul-Sheet 1800 and Insul-Tube 180.
 - d. Armstrong
 - e. Certainteed
 - f. Johns Manville
 - g. Knauf Insulation
 - h. Owens Corning
 - i. Rubatex Corp.
- G. Mineral-Fiber Blanket Insulation: Mineral or glass fibers bonded with a thermosetting resin. Comply with ASTM C 553, Type II and ASTM C 1290, Type III with factory-applied FSK jacket. "K" Value: 0.24 at 75 degrees F (0.35 at 24 degrees C.), factory-applied jacket requirements are specified in "Factory-Applied Jackets" Article.
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. CertainTeed Corp.; Duct Wrap.
 - b. Johns Manville; Microlite.
 - c. Knauf Insulation; Duct Wrap.
 - d. Manson Insulation Inc.; Alley Wrap.
 - e. Owens Corning; All-Service Duct Wrap.
- H. Mineral-Fiber Board Insulation: Mineral or glass fibers bonded with a thermosetting resin. Comply with ASTM C 612, Type IA or Type IB. "K" Value: 0.23 at 75 degrees F (0.033 at 24 degrees C.). For duct and plenum applications, provide insulation with factory-applied FSK jacket. For equipment applications, provide insulation with factory-applied FSK jacket. Factory-applied jacket requirements are specified in "Factory-Applied Jackets" Article.
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. CertainTeed Corp.; Commercial Board.
 - b. Fibrex Insulations Inc.; FBX.

- c. Johns Manville; 800 Series Spin-Glas.
 - d. Knauf Insulation; Insulation Board.
 - e. Manson Insulation Inc.; AK Board.
 - f. Owens Corning; Fiberglas 700 Series.
- I. Mineral-Fiber, Preformed Pipe Insulation:
- 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Fibrex Insulations Inc.; Coreplus 1200.
 - b. Johns Manville; Micro-Lok.
 - c. Knauf Insulation; 1000 Pipe Insulation.
 - d. Manson Insulation Inc.; Alley-K.
 - e. Owens Corning; Fiberglas Pipe Insulation.
 - 2. Type I, 850 deg F Materials: Mineral or glass fibers bonded with a thermosetting resin. "K" Value: 0.23 at 75 degrees F (0.033 at 24 degrees C.). Comply with ASTM C 547, Type I, Grade A, with factory-applied ASJ. Factory-applied jacket requirements are specified in "Factory-Applied Jackets" Article.
 - 3. Type II, 1200 deg F Materials: Mineral or glass fibers bonded with a thermosetting resin. Comply with ASTM C 547, Type II, Grade A, with factory-applied ASJ. Factory-applied jacket requirements are specified in "Factory-Applied Jackets" Article.
- J. Mineral-Fiber, Pipe and Tank Insulation: Mineral or glass fibers bonded with a thermosetting resin. Semirigid board material with factory-applied ASJ complying with ASTM C 1393, Type II or Type IIIA Category 2, or with properties similar to ASTM C 612, Type IB. Nominal density is 2.5 lb/cu. ft. or more. Thermal conductivity (k-value) at 100 deg F is 0.29 Btu x in./h x sq. ft. x deg F or less. Factory-applied jacket requirements are specified in "Factory-Applied Jackets" Article.
- 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. CertainTeed Corp.; CrimpWrap.
 - b. Johns Manville; MicroFlex.
 - c. Knauf Insulation; Pipe and Tank Insulation.
 - d. Manson Insulation Inc.; AK Flex.
 - e. Owens Corning; Fiberglas Pipe and Tank Insulation.

2.2 INSULATING CEMENTS

- A. Mineral-Fiber Insulating Cement: Comply with ASTM C 195.
- 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Insulco, Division of MFS, Inc.; Triple I.
 - b. P. K. Insulation Mfg. Co., Inc.; Super-Stik.
 - c. Rock Wool Manufacturing Company; Delta One Shot.
- B. Expanded or Exfoliated Vermiculite Insulating Cement: Comply with ASTM C 196.
- 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. P. K. Insulation Mfg. Co., Inc.; Thermal-V-Kote.
- C. Mineral-Fiber, Hydraulic-Setting Insulating and Finishing Cement: Comply with ASTM C 449/C 449M.
- 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Insulco, Division of MFS, Inc.; SmoothKote.
 - b. P. K. Insulation Mfg. Co., Inc.; PK No. 127, and Quik-Cote.
 - c. Rock Wool Manufacturing Company; Delta One Shot.

2.3 ADHESIVES

- A. Materials shall be compatible with insulation materials, jackets, and substrates and for bonding insulation to itself and to surfaces to be insulated, unless otherwise indicated.
- 1. For indoor applications, adhesive shall have a VOC content of 50g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

- B. Cellular-GlassAdhesive: Solvent-based resin adhesive, with a service temperature range of minus 75 to plus 300 deg F.
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Childers Products, Division of ITW; CP-96.
 - b. Foster Products Corporation, H. B. Fuller Company; 81-33.
 - c. Bakor; 830-05.
- C. Flexible Elastomeric: Comply with MIL-A-24179A, Type II, Class I.
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Aeroflex USA Inc.; Aeroseal.
 - b. Armacell LCC; 520 Adhesive.
 - c. Foster Products Corporation, H. B. Fuller Company; 85-75.
 - d. RBX Corporation; Rubatex Contact Adhesive.
- D. Mineral-Fiber Adhesive: Comply with MIL-A-3316C, Class 2, Grade A.
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Childers Products, Division of ITW; CP-82.
 - b. Foster Products Corporation, H. B. Fuller Company; 85-20.
 - c. ITW TACC, Division of Illinois Tool Works; S-90/80.
 - d. Marathon Industries, Inc.; 225.
 - e. Mon-Eco Industries, Inc.; 22-25.
- E. ASJ Adhesive, and FSK and PVDC Jacket Adhesive: Comply with MIL-A-3316C, Class 2, Grade A for bonding insulation jacket lap seams and joints.
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Childers Products, Division of ITW; CP-82.
 - b. Foster Products Corporation, H. B. Fuller Company; 85-20.
 - c. ITW TACC, Division of Illinois Tool Works; S-90/80.
 - d. Marathon Industries, Inc.; 225.
 - e. Mon-Eco Industries, Inc.; 22-25.
- F. PVC Jacket Adhesive: Compatible with PVC jacket.
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Dow Chemical Company (The); 739, Dow Silicone.
 - b. Johns-Manville; Zeston Perma-Weld, CEEL-TITE Solvent Welding Adhesive.
 - c. P.I.C. Plastics, Inc.; Welding Adhesive.
 - d. Red Devil, Inc.; Celulon Ultra Clear.
 - e. Speedline Corporation; Speedline Vinyl Adhesive.

2.4 MASTICS

- A. Materials shall be compatible with insulation materials, jackets, and substrates; comply with MIL-C-19565C, Type II.
 - 1. For indoor applications, use mastics that have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
- B. Vapor-Barrier Mastic: Water based; suitable for indoor and outdoor use on below ambient services.
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Childers Products, Division of ITW; CP-35.
 - b. Foster Products Corporation, H. B. Fuller Company; 30-90.
 - c. ITW TACC, Division of Illinois Tool Works; CB-50.
 - d. Marathon Industries, Inc.; 590.
 - e. Mon-Eco Industries, Inc.; 55-40.
 - f. Vimasco Corporation; 749.
 - 2. Water-Vapor Permeance: ASTM E 96, Procedure B, 0.013 perm at 43-mil dry film thickness.
 - 3. Service Temperature Range: Minus 20 to plus 180 deg F.
 - 4. Solids Content: ASTM D 1644, 59 percent by volume and 71 percent by weight.
 - 5. Color: White.

- C. Vapor-Barrier Mastic: Solvent based; suitable for indoor use on below ambient services.
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Childers Products, Division of ITW; CP-30.
 - b. Foster Products Corporation, H. B. Fuller Company; 30-35.
 - c. ITW TACC, Division of Illinois Tool Works; CB-25.
 - d. Marathon Industries, Inc.; 501.
 - e. Mon-Eco Industries, Inc.; 55-10.
 - 2. Water-Vapor Permeance: ASTM F 1249, 0.05 perm at 35-mil dry film thickness.
 - 3. Service Temperature Range: 0 to 180 deg F.
 - 4. Solids Content: ASTM D 1644, 44 percent by volume and 62 percent by weight.
 - 5. Color: White.
- D. Vapor-Barrier Mastic: Solvent based; suitable for outdoor use on below ambient services.
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Childers Products, Division of ITW; Encacel.
 - b. Foster Products Corporation, H. B. Fuller Company; 60-95/60-96.
 - c. Marathon Industries, Inc.; 570.
 - d. Mon-Eco Industries, Inc.; 55-70.
 - 2. Water-Vapor Permeance: ASTM F 1249, 0.05 perm at 30-mil dry film thickness.
 - 3. Service Temperature Range: Minus 50 to plus 220 deg F.
 - 4. Solids Content: ASTM D 1644, 33 percent by volume and 46 percent by weight.
 - 5. Color: White.
- E. Breather Mastic: Water based; suitable for indoor and outdoor use on above ambient services.
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Childers Products, Division of ITW; CP-10.
 - b. Foster Products Corporation, H. B. Fuller Company; 35-00.
 - c. ITW TACC, Division of Illinois Tool Works; CB-05/15.
 - d. Marathon Industries, Inc.; 550.
 - e. Mon-Eco Industries, Inc.; 55-50.
 - f. Vimasco Corporation; WC-1/WC-5.
 - 2. Water-Vapor Permeance: ASTM F 1249, 3 perms at 0.0625-inch dry film thickness.
 - 3. Service Temperature Range: Minus 20 to plus 200 deg F.
 - 4. Solids Content: 63 percent by volume and 73 percent by weight.
 - 5. Color: White.

2.5 SEALANTS

- A. Joint Sealants:
 - 1. Joint Sealants for Cellular-Glass: Subject to compliance with requirements, provide one of the following:
 - a. Childers Products, Division of ITW; CP-76.
 - b. Foster Products Corporation, H. B. Fuller Company; 30-45.
 - c. Marathon Industries, Inc.; 405.
 - d. Mon-Eco Industries, Inc.; 44-05.
 - e. Pittsburgh Corning Corporation; Pittseal 444.
 - f. Vimasco Corporation; 750.
 - 2. For indoor applications, sealants shall have a VOC content of 420 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
 - 3. Sealants shall comply with the testing and product requirements of the California Department of Health Services' *Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers*.
- B. FSK and Metal Jacket Flashing Sealants:
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Childers Products, Division of ITW; CP-76-8.
 - b. Foster Products Corporation, H. B. Fuller Company; 95-44.
 - c. Marathon Industries, Inc.; 405.
 - d. Mon-Eco Industries, Inc.; 44-05.
 - e. Vimasco Corporation; 750.
 - 2. Materials shall be compatible with insulation materials, jackets, and substrates.

3. Fire- and water-resistant, flexible, elastomeric sealant.
4. Service Temperature Range: Minus 40 to plus 250 deg F.
5. Color: Aluminum.
6. For indoor applications, sealants shall have a VOC content of 420 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
7. Sealants shall comply with the testing and product requirements of the California Department of Health Services' *Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers*.

C. ASJ Flashing Sealants, and Vinyl, PVDC, and PVC Jacket Flashing Sealants:

1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Childers Products, Division of ITW; CP-76.
2. Materials shall be compatible with insulation materials, jackets, and substrates.
3. Fire- and water-resistant, flexible, elastomeric sealant.
4. Service Temperature Range: Minus 40 to plus 250 deg F.
5. Color: White.
6. For indoor applications, sealants shall have a VOC content of 420 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
7. Sealants shall comply with the testing and product requirements of the California Department of Health Services' *Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers*.

2.6 FACTORY-APPLIED JACKETS

A. Insulation system schedules indicate factory-applied jackets on various applications. When factory-applied jackets are indicated, comply with the following:

1. ASJ: White, kraft-paper, fiberglass-reinforced scrim with aluminum-foil backing; complying with ASTM C 1136, Type I.
2. ASJ-SSL: ASJ with self-sealing, pressure-sensitive, acrylic-based adhesive covered by a removable protective strip; complying with ASTM C 1136, Type I.
3. FSK Jacket: Aluminum-foil, fiberglass-reinforced scrim with kraft-paper backing; complying with ASTM C 1136, Type II.
4. FSP Jacket: Aluminum-foil, fiberglass-reinforced scrim with polyethylene backing; complying with ASTM C 1136, Type II.
5. Vinyl Jacket: White vinyl with a permeance of 1.3 perms when tested according to ASTM E 96, Procedure A, and complying with NFPA 90A and NFPA 90B.

2.7 FIELD-APPLIED JACKETS

A. Field-applied jackets shall comply with ASTM C 921, Type I, unless otherwise indicated.

B. FSK Jacket: Aluminum-foil-face, fiberglass-reinforced scrim with kraft-paper backing.

C. PVC Jacket: High-impact-resistant, UV-resistant PVC complying with ASTM D 1784, Class 16354-C; thickness as scheduled; roll stock ready for shop or field cutting and forming. Thickness is indicated in field-applied jacket schedules.

1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Johns Manville; Zeston.
 - b. P.I.C. Plastics, Inc.; FG Series.
 - c. Proto PVC Corporation; LoSmoke.
 - d. Speedline Corporation; SmokeSafe.
2. Adhesive: As recommended by jacket material manufacturer.
3. Color: White.
4. Factory-fabricated fitting covers to match jacket if available; otherwise, field fabricate.
 - a. Shapes: 45- and 90-degree, short- and long-radius elbows, tees, valves, flanges, unions, reducers, end caps, soil-pipe hubs, traps, mechanical joints, and P-trap and supply covers for lavatories.
5. Factory-fabricated tank heads and tank side panels.

D. Metal Jacket:

1. Products: Subject to compliance with requirements, provide one of the following:

- a. Childers Products, Division of ITW; Metal Jacketing Systems.
 - b. PABCO Metals Corporation; Surefit.
 - c. RPR Products, Inc.; Insul-Mate.
- 2. Aluminum Jacket: Comply with ASTM B 209, Alloy 3003, 3005, 3105 or 5005, Temper H-14.
 - a. Factory cut and rolled to size.
 - b. Finish and thickness are indicated in field-applied jacket schedules.
 - c. Moisture Barrier for Indoor Applications: 3-mil thick, heat-bonded polyethylene and kraft paper.
 - d. Moisture Barrier for Outdoor Applications: 3-mil thick, heat-bonded polyethylene and kraft paper.
 - e. Factory-Fabricated Fitting Covers:
 - 1) Same material, finish, and thickness as jacket.
 - 2) Preformed 2-piece or gore, 45- and 90-degree, short- and long-radius elbows.
 - 3) Tee covers.
 - 4) Flange and union covers.
 - 5) End caps.
 - 6) Beveled collars.
 - 7) Valve covers.
 - 8) Field fabricate fitting covers only if factory-fabricated fitting covers are not available.
- E. Self-Adhesive Outdoor Jacket (Asphaltic): 60-mil thick, laminated vapor barrier and waterproofing membrane for installation over insulation located aboveground outdoors; consisting of a rubberized bituminous resin on a crosslaminated polyethylene film covered with white or stucco-embossed aluminum-foil facing.
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Polyguard; Alumaguard 60.
- F. Self-Adhesive Indoor/Outdoor Jacket (Non Asphaltic): Vapor barrier and waterproofing jacketing for installation over insulation located aboveground outdoors or indoors. Specialized jacket with five layers of laminated aluminum and polyester film with low temperature, acrylic, pressure sensitive adhesive; outer aluminum surface coated with UV resistant coating for protection from environmental contaminants. Permeance: 0.00 perm as tested by ASTM F 1249. Flame Spread <25, Smoke Developed <50 tested by ASTM E84. Aluminum finish. [Embossed] [Smooth].
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Foster Brand; Vapor Fas 62-05.
 - b. Ventureclad 1577CW.

2.8 TAPES

- A. ASJ Tape: White vapor-retarder tape matching factory-applied jacket with acrylic adhesive, complying with ASTM C 1136.
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Avery Dennison Corporation, Specialty Tapes Division; Fasson 0835.
 - b. Compac Corp.; 104 and 105.
 - c. Ideal Tape Co., Inc., an American Biltrite Company; 428 AWF ASJ.
 - d. Venture Tape; 1540 CW Plus, 1542 CW Plus, and 1542 CW Plus/SQ.
 - 2. Width: 3 inches.
 - 3. Thickness: 11.5 mils.
 - 4. Adhesion: 90 ounces force/inch in width.
 - 5. Elongation: 2 percent.
 - 6. Tensile Strength: 40 lbf/inch in width.
 - 7. ASJ Tape Disks and Squares: Precut disks or squares of ASJ tape.
- B. FSK Tape: Foil-face, vapor-retarder tape matching factory-applied jacket with acrylic adhesive; complying with ASTM C 1136.
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Avery Dennison Corporation, Specialty Tapes Division; Fasson 0827.

- b. Compac Corp.; 110 and 111.
 - c. Ideal Tape Co., Inc., an American Biltrite Company; 491 AWF FSK.
 - d. Venture Tape; 1525 CW, 1528 CW, and 1528 CW/SQ.
 - 2. Width: 3 inches.
 - 3. Thickness: 6.5 mils.
 - 4. Adhesion: 90 ounces force/inch in width.
 - 5. Elongation: 2 percent.
 - 6. Tensile Strength: 40 lbf/inch in width.
 - 7. FSK Tape Disks and Squares: Precut disks or squares of FSK tape.
- C. PVC Tape: White vapor-retarder tape matching field-applied PVC jacket with acrylic adhesive. Suitable for indoor and outdoor applications.
- 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Avery Dennison Corporation, Specialty Tapes Division; Fasson 0555.
 - b. Compac Corp.; 130.
 - c. Ideal Tape Co., Inc., an American Biltrite Company; 370 White PVC tape.
 - d. Venture Tape; 1506 CW NS.
 - 2. Width: 2 inches.
 - 3. Thickness: 6 mils.
 - 4. Adhesion: 64 ounces force/inch in width.
 - 5. Elongation: 500 percent.
 - 6. Tensile Strength: 18 lbf/inch in width.
- D. Aluminum-Foil Tape: Vapor-retarder tape with acrylic adhesive.
- 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Avery Dennison Corporation, Specialty Tapes Division; Fasson 0800.
 - b. Compac Corp.; 120.
 - c. Ideal Tape Co., Inc., an American Biltrite Company; 488 AWF.
 - d. Venture Tape; 3520 CW.
 - 2. Width: 2 inches.
 - 3. Thickness: 3.7 mils.
 - 4. Adhesion: 100 ounces force/inch in width.
 - 5. Elongation: 5 percent.
 - 6. Tensile Strength: 34 lbf/inch in width.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions for compliance with requirements for installation and other conditions affecting performance of insulation application.
 - 1. Verify that systems and equipment to be insulated have been tested and are free of defects.
 - 2. Verify that surfaces to be insulated are clean and dry.
 - 3. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Surface Preparation: Clean and dry surfaces to receive insulation. Remove materials that will adversely affect insulation application.
- B. Coordinate insulation installation with the trade installing heat tracing. Comply with requirements for heat tracing that apply to insulation.
- C. Mix insulating cements with clean potable water; if insulating cements are to be in contact with stainless-steel surfaces, use demineralized water.

3.3 GENERAL INSTALLATION REQUIREMENTS

- A. Install insulation materials, accessories, and finishes with smooth, straight, and even surfaces; free of voids throughout the length of equipment, ducts and fittings, and piping including fittings, valves, and specialties.
- B. Install insulation materials, forms, vapor barriers or retarders, jackets, and thicknesses required for each item of equipment, duct system, and pipe system as specified in insulation system schedules.
- C. Install accessories compatible with insulation materials and suitable for the service. Install accessories that do not corrode, soften, or otherwise attack insulation or jacket in either wet or dry state.
- D. Install insulation with longitudinal seams at top and bottom of horizontal runs.
- E. Install multiple layers of insulation with longitudinal and end seams staggered.
- F. Do not weld brackets, clips, or other attachment devices to piping, fittings, and specialties.
- G. Keep insulation materials dry during application and finishing.
- H. Install insulation with tight longitudinal seams and end joints. Bond seams and joints with adhesive recommended by insulation material manufacturer.
- I. Install insulation with least number of joints practical.
- J. Where vapor barrier is indicated, seal joints, seams, and penetrations in insulation at hangers, supports, anchors, and other projections with vapor-barrier mastic.
 - 1. Install insulation continuously through hangers and around anchor attachments.
 - 2. For insulation application where vapor barriers are indicated, extend insulation on anchor legs from point of attachment to supported item to point of attachment to structure. Taper and seal ends at attachment to structure with vapor-barrier mastic.
 - 3. Install insert materials and install insulation to tightly join the insert. Seal insulation to insulation inserts with adhesive or sealing compound recommended by insulation material manufacturer.
 - 4. Cover inserts with jacket material matching adjacent pipe insulation. Install shields over jacket, arranged to protect jacket from tear or puncture by hanger, support, and shield.
- K. Apply adhesives, mastics, and sealants at manufacturer's recommended coverage rate and wet and dry film thicknesses.
- L. Install insulation with factory-applied jackets as follows:
 - 1. Draw jacket tight and smooth.
 - 2. Cover circumferential joints with 3-inch wide strips, of same material as insulation jacket. Secure strips with adhesive and outward clinching staples along both edges of strip, spaced 4 inches o.c.
 - 3. Overlap jacket longitudinal seams at least 1-1/2 inches. Install insulation with longitudinal seams at bottom of pipe. Clean and dry surface to receive self-sealing lap. Staple laps with outward clinching staples along edge at 4 inches o.c.
 - a. For below ambient services, apply vapor-barrier mastic over staples.
 - 4. Cover joints and seams with tape as recommended by insulation material manufacturer to maintain vapor seal.
 - 5. Where vapor barriers are indicated, apply vapor-barrier mastic on seams and joints and at ends adjacent to duct and pipe flanges and fittings.
- M. Cut insulation in a manner to avoid compressing insulation more than 75 percent of its nominal thickness.

- N. Finish installation with systems at operating conditions. Repair joint separations and cracking due to thermal movement.
- O. Repair damaged insulation facings by applying same facing material over damaged areas. Extend patches at least 4 inches beyond damaged areas. Adhere, staple, and seal patches similar to butt joints.
- P. For above ambient services, do not install insulation to the following:
 - 1. Vibration-control devices.
 - 2. Testing agency labels and stamps.
 - 3. Nameplates and data plates.
 - 4. Manholes.
 - 5. Handholes.
 - 6. Cleanouts.

3.4 PENETRATIONS

- A. Insulation Installation at Roof Penetrations: Install insulation continuously through roof penetrations.
 - 1. Seal penetrations with flashing sealant.
 - 2. For applications requiring only indoor insulation, terminate insulation above roof surface and seal with joint sealant. For applications requiring indoor and outdoor insulation, install insulation for outdoor applications tightly joined to indoor insulation ends. Seal joint with joint sealant.
 - 3. Extend jacket of outdoor insulation outside roof flashing at least 2 inches below top of roof flashing.
 - 4. Seal jacket to roof flashing with flashing sealant.
- B. Insulation Installation at Aboveground Exterior Wall Penetrations: Install insulation continuously through wall penetrations.
 - 1. Seal penetrations with flashing sealant.
 - 2. For applications requiring only indoor insulation, terminate insulation inside wall surface and seal with joint sealant. For applications requiring indoor and outdoor insulation, install insulation for outdoor applications tightly joined to indoor insulation ends. Seal joint with joint sealant.
 - 3. Extend jacket of outdoor insulation outside wall flashing and overlap wall flashing at least 2 inches.
 - 4. Seal jacket to wall flashing with flashing sealant.
- C. Insulation Installation at Interior Wall and Partition Penetrations (That Are Not Fire Rated): Install insulation continuously through walls and partitions.
- D. Insulation Installation at Fire-Rated Wall and Partition Penetrations: Install insulation continuously through penetrations of fire-rated walls and partitions. Terminate insulation at fire damper sleeves for fire-rated wall and partition penetrations. Externally insulate damper sleeves to match adjacent insulation and overlap duct insulation at least 2 inches.
 - 1. Comply with requirements in Division 07 Section "Penetration Firestopping" firestopping and fire-resistive joint sealers.
- E. Insulation Installation at Floor Penetrations:
 - 1. Duct: Install insulation continuously through floor penetrations that are not fire rated. For penetrations through fire-rated assemblies, terminate insulation at fire damper sleeves and externally insulate damper sleeve beyond floor to match adjacent duct insulation. Overlap damper sleeve and duct insulation at least 2 inches.
 - 2. Pipe: Install insulation continuously through floor penetrations.
 - 3. Seal penetrations through fire-rated assemblies. Comply with requirements in Division 07 Section "Penetration Firestopping."

3.5 GENERAL PIPE INSULATION INSTALLATION

- A. Requirements in this article generally apply to all insulation materials except where more specific requirements are specified in various pipe insulation material installation articles.
- B. Insulate instrument connections for thermometers, pressure gauges, pressure temperature taps, test connections, flow meters, sensors, switches, and transmitters on insulated pipes, vessels, and equipment. Shape insulation at these connections by tapering it to and around the connection with insulating cement and finish with finishing cement, mastic, and flashing sealant.
- C. Install removable insulation covers at locations indicated. Installation shall conform to the following:
 - 1. Make removable flange and union insulation from sectional pipe insulation of same thickness as that on adjoining pipe. Install same insulation jacket as adjoining pipe insulation.
 - 2. When flange and union covers are made from sectional pipe insulation, extend insulation from flanges or union long at least two times the insulation thickness over adjacent pipe insulation on each side of flange or union. Secure flange cover in place with stainless-steel or aluminum bands. Select band material compatible with insulation and jacket.
 - 3. Construct removable valve insulation covers in same manner as for flanges except divide the two-part section on the vertical center line of valve body.
 - 4. When covers are made from block insulation, make two halves, each consisting of mitered blocks wired to stainless-steel fabric. Secure this wire frame, with its attached insulation, to flanges with tie wire. Extend insulation at least 2 inches over adjacent pipe insulation on each side of valve. Fill space between flange or union cover and pipe insulation with insulating cement. Finish cover assembly with insulating cement applied in two coats. After first coat is dry, apply and trowel second coat to a smooth finish.
 - 5. Unless a PVC jacket is indicated in field-applied jacket schedules, finish exposed surfaces with a metal jacket.

3.6 FLEXIBLE ELASTOMERIC INSULATION INSTALLATION

- A. Seal longitudinal seams and end joints with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.
- B. Insulation Installation on Pipe Flanges:
 - 1. Install pipe insulation to outer diameter of pipe flange.
 - 2. Make width of insulation section same as overall width of flange and bolts, plus twice the thickness of pipe insulation.
 - 3. Fill voids between inner circumference of flange insulation and outer circumference of adjacent straight pipe segments with cut sections of sheet insulation of same thickness as pipe insulation.
 - 4. Secure insulation to flanges and seal seams with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.
- C. Insulation Installation on Pipe Fittings and Elbows:
 - 1. Install mitered sections of pipe insulation.
 - 2. Secure insulation materials and seal seams with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.
- D. Insulation Installation on Valves and Pipe Specialties:
 - 1. Install preformed valve covers manufactured of same material as pipe insulation when available.
 - 2. When preformed valve covers are not available, install cut sections of pipe and sheet insulation to valve body. Arrange insulation to permit access to packing and to allow valve operation without disturbing insulation.
 - 3. Install insulation to flanges as specified for flange insulation application.
 - 4. Secure insulation to valves and specialties and seal seams with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.

3.7 MINERAL-FIBER INSULATION INSTALLATION

- A. Insulation Installation on Straight Pipes and Tubes:
 - 1. Secure each layer of preformed pipe insulation to pipe with wire or bands and tighten bands without deforming insulation materials.
 - 2. Where vapor barriers are indicated, seal longitudinal seams, end joints, and protrusions with vapor-barrier mastic and joint sealant.
 - 3. For insulation with factory-applied jackets on above ambient surfaces, secure laps with outward clinched staples at 6 inches o.c.
 - 4. For insulation with factory-applied jackets on below ambient surfaces, do not staple longitudinal tabs but secure tabs with additional adhesive as recommended by insulation material manufacturer and seal with vapor-barrier mastic and flashing sealant.
- B. Insulation Installation on Pipe Flanges:
 - 1. Install preformed pipe insulation to outer diameter of pipe flange.
 - 2. Make width of insulation section same as overall width of flange and bolts, plus twice the thickness of pipe insulation.
 - 3. Fill voids between inner circumference of flange insulation and outer circumference of adjacent straight pipe segments with mineral-fiber blanket insulation.
 - 4. Install jacket material with manufacturer's recommended adhesive, overlap seams at least 1 inch, and seal joints with flashing sealant.
- C. Insulation Installation on Pipe Fittings and Elbows:
 - 1. Install preformed sections of same material as straight segments of pipe insulation when available.
 - 2. When preformed insulation elbows and fittings are not available, install mitered sections of pipe insulation, to a thickness equal to adjoining pipe insulation. Secure insulation materials with wire or bands.
- D. Insulation Installation on Valves and Pipe Specialties:
 - 1. Install preformed sections of same material as straight segments of pipe insulation when available.
 - 2. When preformed sections are not available, install mitered sections of pipe insulation to valve body.
 - 3. Arrange insulation to permit access to packing and to allow valve operation without disturbing insulation.
 - 4. Install insulation to flanges as specified for flange insulation application.

3.8 FIELD-APPLIED JACKET INSTALLATION

- A. Where FSK jackets are indicated, install as follows:
 - 1. Draw jacket material smooth and tight.
 - 2. Install lap or joint strips with same material as jacket.
 - 3. Secure jacket to insulation with manufacturer's recommended adhesive.
 - 4. Install jacket with 1-1/2-inch laps at longitudinal seams and 3-inch wide joint strips at end joints.
 - 5. Seal openings, punctures, and breaks in vapor-retarder jackets and exposed insulation with vapor-barrier mastic.
- B. Where PVC jackets are indicated, install with 1-inch overlap at longitudinal seams and end joints; for horizontal applications, install with longitudinal seams along top and bottom of tanks and vessels. Seal with manufacturer's recommended adhesive.
 - 1. Apply two continuous beads of adhesive to seams and joints, one bead under lap and the finish bead along seam and joint edge.
- C. Where metal jackets are indicated, install with 2-inch overlap at longitudinal seams and end joints. Overlap longitudinal seams arranged to shed water. Seal end joints with weatherproof sealant recommended by insulation manufacturer. Secure jacket with stainless-steel bands 12 inches o.c. and at end joints.

3.9 FINISHES

- A. Duct, Equipment, and Pipe Insulation with ASJ, Glass-Cloth, or Other Paintable Jacket Material: Paint jacket with paint system identified below and as specified in Division 09 painting Sections.
 - 1. Flat Acrylic Finish: Two finish coats over a primer that is compatible with jacket material and finish coat paint. Add fungicidal agent to render fabric mildew proof.
 - a. Finish Coat Material: Interior, flat, latex-emulsion size.
- B. Flexible Elastomeric Thermal Insulation: After adhesive has fully cured, apply two coats of insulation manufacturer's recommended protective coating.
- C. Color: Final color as selected by Architect. Vary first and second coats to allow visual inspection of the completed Work.
- D. Do not field paint aluminum or stainless-steel jackets.

3.10 PIPING INSULATION SCHEDULE, GENERAL

- A. Acceptable preformed pipe and tubular insulation materials and thicknesses are identified for each piping system and pipe size range. If more than one material is listed for a piping system, selection from materials listed is Contractor's option.

3.11 INDOOR PIPING INSULATION SCHEDULE

- A. Condensate and Equipment Drain Water below 60 Deg F:
 - 1. All Pipe Sizes: Insulation shall be one of the following:
 - a. Flexible Elastomeric: 3/4 inch thick.
 - b. Mineral-Fiber, Preformed Pipe Insulation, Type I: 1 inch thick.
- B. Refrigerant Liquid, Suction and Hot-Gas Piping:
 - 1. All Pipe Sizes: Insulation shall be the following:
 - a. Flexible Elastomeric: 1-1/2 inch thick.

3.12 OUTDOOR, ABOVEGROUND PIPING INSULATION SCHEDULE

- A. Refrigerant Suction, Liquid and Hot Gas Bypass
 - 1. All Pipe Sizes: Insulation shall be the following:
 - a. Flexible Elastomeric: 1 inch thick with protective jacketing.

3.13 INDOOR, FIELD-APPLIED JACKET SCHEDULE

- A. Install jacket over insulation material. For insulation with factory-applied jacket, install the field-applied jacket over the factory-applied jacket.
- B. If more than one material is listed, selection from materials listed is Contractor's option.
- C. Piping, Exposed (in Finished Spaces):
 - 1. PVC: 30 mils thick.
 - 2. Aluminum, Stucco Embossed: 0.020 inch thick.

3.14 OUTDOOR, FIELD-APPLIED JACKET SCHEDULE

- A. Install jacket over insulation material. For insulation with factory-applied jacket, install the field-applied jacket over the factory-applied jacket.
- B. If more than one material is listed, selection from materials listed is Contractor's option.
- C. Piping, Exposed:
 - 1. PVC: 30 mils thick.
 - 2. Aluminum, Stucco Embossed: 0.016 inch thick.

3. Self-Adhesive Outdoor Jacket: 60 mil thick.

END OF SECTION 23 07 00

SECTION 23 23 00 - REFRIGERANT PIPING

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 refrigerant piping used for air-conditioning applications.

1.3 PERFORMANCE REQUIREMENTS

- A. Line Test Pressure for Refrigerant R-410A:
 - 1. Suction Lines for Air-Conditioning Applications: 300 psig.
 - 2. Suction Lines for Heat-Pump Applications: 535 psig.
 - 3. Hot-Gas and Liquid Lines: 535 psig.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of valve and refrigerant piping specialty indicated. Include pressure drop, based on manufacturer's test data, for the following:
 - 1. Thermostatic expansion valves.
 - 2. Solenoid valves.
 - 3. Hot-gas bypass valves.
 - 4. Filter dryers.
 - 5. Strainers.
 - 6. Pressure-regulating valves.
- B. Shop Drawings: Show layout of refrigerant piping and specialties, including pipe, tube, and fitting sizes, flow capacities, valve arrangements and locations, slopes of horizontal runs, oil traps, double risers, wall and floor penetrations, and equipment connection details. Show interface and spatial relationships between piping and equipment.
 - 1. Shop Drawing Scale: 1/4 inch equals 1 foot.
 - 2. Refrigerant piping indicated on Drawings is schematic only. Size piping and design actual piping layout, including oil traps, double risers, specialties, and pipe and tube sizes to accommodate, as a minimum, equipment provided, elevation difference between compressor and evaporator, and length of piping to ensure proper operation and compliance with warranties of connected equipment.

1.5 CLOSEOUT DOCUMENTS

- A. General: Closeout Submittals are to be submitted with O and M Manuals only. Do not submit with other ACTION and INFORMATIONAL Submittals:
 - 1. Operation and Maintenance Data: For refrigerant valves and piping specialties to include in maintenance manuals.

1.6 QUALITY ASSURANCE

- A. Welding: Qualify procedures and personnel according to ASME Boiler and Pressure Vessel Code: Section IX, "Welding and Brazing Qualifications."
- B. Comply with ASHRAE 15, "Safety Code for Refrigeration Systems."
- C. Comply with ASME B31.5, "Refrigeration Piping and Heat Transfer Components."

1.7 PRODUCT STORAGE AND HANDLING

- A. Store piping in a clean and protected area with end caps in place to ensure that piping interior and exterior are clean when installed.

1.8 COORDINATION

- A. Coordinate size and location of roof curbs, equipment supports, and roof penetrations. These items are specified in Division 07 Section "Roof Accessories."

PART 2 - PRODUCTS

2.1 COPPER TUBE AND FITTINGS

- A. Copper Tube: ASTM B 280, Type ACR.
- B. Wrought-Copper Fittings: ASME B16.22.
- C. Wrought-Copper Unions: ASME B16.22.
- D. Solder Filler Metals: ASTM B 32. Use 95-5 tin antimony or alloy HB solder to join copper socket fittings on copper pipe.
- E. Brazing Filler Metals: AWS A5.8.
- F. Flexible Connectors:
 - 1. Body: Tin-bronze bellows with woven, flexible, tinned-bronze-wire-reinforced protective jacket.
 - 2. End Connections: Socket ends.
 - 3. Offset Performance: Capable of minimum 3/4-inch misalignment in minimum 7-inch- long assembly.
 - 4. Pressure Rating: Factory test at minimum 500 psig.
 - 5. Maximum Operating Temperature: 250 deg F.

2.2 VALVES AND SPECIALTIES

- A. Diaphragm Packless Valves:
 - 1. Body and Bonnet: Forged brass or cast bronze; globe design with straight-through or angle pattern.
 - 2. Diaphragm: Phosphor bronze and stainless steel with stainless-steel spring.
 - 3. Operator: Rising stem and hand wheel.
 - 4. Seat: Nylon.
 - 5. End Connections: Socket, union, or flanged.
 - 6. Working Pressure Rating: 500 psig.
 - 7. Maximum Operating Temperature: 275 deg F.
- B. Packed-Angle Valves:
 - 1. Body and Bonnet: Forged brass or cast bronze.
 - 2. Packing: Molded stem, back seating, and replaceable under pressure.
 - 3. Operator: Rising stem.
 - 4. Seat: Nonrotating, self-aligning polytetrafluoroethylene.
 - 5. Seal Cap: Forged-brass or valox hex cap.
 - 6. End Connections: Socket, union, threaded, or flanged.
 - 7. Working Pressure Rating: 500 psig.
 - 8. Maximum Operating Temperature: 275 deg F.
- C. Check Valves:
 - 1. Body: Ductile iron, forged brass, or cast bronze; globe pattern.
 - 2. Bonnet: Bolted ductile iron, forged brass, or cast bronze; or brass hex plug.
 - 3. Piston: Removable polytetrafluoroethylene seat.

4. Closing Spring: Stainless steel.
 5. End Connections: Socket, union, threaded, or flanged.
 6. Maximum Opening Pressure: 0.50 psig.
 7. Working Pressure Rating: 500 psig.
 8. Maximum Operating Temperature: 275 deg F.
- D. Service Valves:
1. Body: Forged brass with brass cap including key end to remove core.
 2. Core: Removable ball-type check valve with stainless-steel spring.
 3. Seat: Polytetrafluoroethylene.
 4. End Connections: Copper spring.
 5. Working Pressure Rating: 500 psig.
- E. Solenoid Valves: Comply with ARI 760 and UL 429; listed and labeled by an NRTL.
1. Body and Bonnet: Plated steel.
 2. Solenoid Tube, Plunger, Closing Spring, and Seat Orifice: Stainless steel.
 3. Seat: Polytetrafluoroethylene.
 4. End Connections: Threaded.
 5. Electrical: Molded, watertight coil in NEMA 250 enclosure of type required by location with 1/2-inch conduit adapter, and 24, 115, or 208-V ac coil.
 6. Working Pressure Rating: 400 psig.
 7. Maximum Operating Temperature: 240 deg F.
 8. Manual operator.
- F. Safety Relief Valves: Comply with ASME Boiler and Pressure Vessel Code; listed and labeled by an NRTL.
1. Body and Bonnet: Ductile iron and steel, with neoprene O-ring seal.
 2. Piston, Closing Spring, and Seat Insert: Stainless steel.
 3. Seat Disc: Polytetrafluoroethylene.
 4. End Connections: Threaded.
 5. Working Pressure Rating: 400 psig.
 6. Maximum Operating Temperature: 240 deg F.
- G. Thermostatic Expansion Valves: Comply with ARI 750.
1. Body, Bonnet, and Seal Cap: Forged brass or steel.
 2. Diaphragm, Piston, Closing Spring, and Seat Insert: Stainless steel.
 3. Packing and Gaskets: Non-asbestos.
 4. Capillary and Bulb: Copper tubing filled with refrigerant charge.
 5. Suction Temperature: 40 deg F.
 6. Superheat: Adjustable.
 7. Reverse-flow option (for heat-pump applications).
 8. End Connections: Socket, flare, or threaded union.
 9. Working Pressure Rating: 700 psig.
- H. Hot-Gas Bypass Valves: Comply with UL 429; listed and labeled by an NRTL.
1. Body, Bonnet, and Seal Cap: Ductile iron or steel.
 2. Diaphragm, Piston, Closing Spring, and Seat Insert: Stainless steel.
 3. Packing and Gaskets: Non-asbestos.
 4. Solenoid Tube, Plunger, Closing Spring, and Seat Orifice: Stainless steel.
 5. Seat: Polytetrafluoroethylene.
 6. Equalizer: External.
 7. Electrical: Molded, watertight coil in NEMA 250 enclosure of type required by location with 1/2-inch conduit adapter, and 24, 115, or 208-V ac coil.
 8. End Connections: Socket.
 9. Set Pressure: As required by system.
 10. Throttling Range: Maximum 5 psig.
 11. Working Pressure Rating: 500 psig.
 12. Maximum Operating Temperature: 240 deg F.
- I. Straight-Type Strainers:
1. Body: Welded steel with corrosion-resistant coating.

2. Screen: 100-mesh stainless steel.
 3. End Connections: Socket or flare.
 4. Working Pressure Rating: 500 psig.
 5. Maximum Operating Temperature: 275 deg F.
- J. Angle-Type Strainers:
1. Body: Forged brass or cast bronze.
 2. Drain Plug: Brass hex plug.
 3. Screen: 100-mesh monel.
 4. End Connections: Socket or flare.
 5. Working Pressure Rating: 500 psig.
 6. Maximum Operating Temperature: 275 deg F.
- K. Moisture/Liquid Indicators:
1. Body: Forged brass.
 2. Window: Replaceable, clear, fused glass window with indicating element protected by filter screen.
 3. Indicator: Color coded to show moisture content in ppm.
 4. Minimum Moisture Indicator Sensitivity: Indicate moisture above 60 ppm.
 5. End Connections: Socket or flare.
 6. Working Pressure Rating: 500 psig.
 7. Maximum Operating Temperature: 240 deg F.
- L. Replaceable-Core Filter Dryers: Comply with ARI 730.
1. Body and Cover: Painted-steel shell with ductile-iron cover, stainless-steel screws, and neoprene gaskets.
 2. Filter Media: 10 micron, pleated with integral end rings; stainless-steel support.
 3. Desiccant Media: Activated alumina or charcoal.
 4. Designed for reverse flow (for heat-pump applications).
 5. End Connections: Socket.
 6. Access Ports: NPS 1/4 connections at entering and leaving sides for pressure differential measurement.
 7. Maximum Pressure Loss: 2 psig.
 8. Rated Flow: As required by system.
 9. Working Pressure Rating: 500 psig.
 10. Maximum Operating Temperature: 240 deg F.
- M. Permanent Filter Dryers: Comply with ARI 730.
1. Body and Cover: Painted-steel shell.
 2. Filter Media: 10 micron, pleated with integral end rings; stainless-steel support.
 3. Desiccant Media: Activated alumina or charcoal.
 4. Designed for reverse flow (for heat-pump applications).
 5. End Connections: Socket.
 6. Access Ports: NPS 1/4 connections at entering and leaving sides for pressure differential measurement.
 7. Maximum Pressure Loss: 2 psig.
 8. Rated Flow: As required by system.
 9. Working Pressure Rating: 500 psig.
 10. Maximum Operating Temperature: 240 deg F.
- N. Mufflers:
1. Body: Welded steel with corrosion-resistant coating.
 2. End Connections: Socket or flare.
 3. Working Pressure Rating: 500 psig.
 4. Maximum Operating Temperature: 275 deg F.
- O. Receivers: Comply with ARI 495.
1. Comply with ASME Boiler and Pressure Vessel Code; listed and labeled by an NRTL.
 2. Comply with UL 207; listed and labeled by an NRTL.
 3. Body: Welded steel with corrosion-resistant coating.
 4. Tappings: Inlet, outlet, liquid level indicator, and safety relief valve.

5. End Connections: Socket or threaded.
6. Working Pressure Rating: 500 psig.
7. Maximum Operating Temperature: 275 deg F.

- P. Liquid Accumulators: Comply with ARI 495.
1. Body: Welded steel with corrosion-resistant coating.
 2. End Connections: Socket or threaded.
 3. Working Pressure Rating: 500 psig.
 4. Maximum Operating Temperature: 275 deg F.

2.3 REFRIGERANTS

- 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. Atofina Chemicals, Inc.
 2. DuPont Company; Fluorochemicals Div.
 3. Honeywell, Inc.; Genetron Refrigerants.
 4. INEOS Fluor Americas LLC.
- B. ASHRAE 34, R-410A: Pentafluoroethane/Difluoromethane.
- C. Refrigerant must be CFC free.

PART 3 - EXECUTION

3.1 PIPING APPLICATIONS FOR REFRIGERANT (R-410A)

- A. Suction Lines NPS 1-1/2 and Smaller for Conventional Air-Conditioning Applications: Copper, Type ACR, annealed-temper tubing and wrought-copper fittings with brazed or soldered joints.
- B. Suction Lines NPS 2 to NPS 4 for Conventional Air-Conditioning Applications: Copper, Type ACR, drawn-temper tubing and wrought-copper fittings with joints.
- C. Hot-Gas and Liquid Lines, and Suction Lines for Heat-Pump Applications NPS 1-1/2 and Smaller: Copper, Type ACR, annealed-temper tubing and wrought-copper fittings with brazed or soldered joints.
- D. Hot-Gas and Liquid Lines, and Suction Lines for Heat-Pump Applications NPS 2 and Larger: Copper, Type ACR, drawn-temper tubing and wrought-copper fittings with brazed or soldered joints.
- E. Safety-Relief-Valve Discharge Piping: Copper, Type ACR, drawn-temper tubing and wrought-copper fittings with soldered joints.

3.2 VALVE AND SPECIALTY APPLICATIONS

- A. Install diaphragm packless valves in suction and discharge lines of compressor.
- B. Install service valves for gauge taps at inlet and outlet of hot-gas bypass valves and strainers if they are not an integral part of valves and strainers.
- C. Install a check valve at the compressor discharge and a liquid accumulator at the compressor suction connection.
- D. Except as otherwise indicated, install diaphragm packless valves on inlet and outlet side of filter dryers.
- E. Install a full-sized, three-valve bypass around filter dryers.

- F. Install solenoid valves upstream from each expansion valve and hot-gas bypass valve. Install solenoid valves in horizontal lines with coil at top.
- G. Install thermostatic expansion valves as close as possible to distributors on evaporators.
 - 1. Install valve so diaphragm case is warmer than bulb.
 - 2. Secure bulb to clean, straight, horizontal section of suction line using two bulb straps. Do not mount bulb in a trap or at bottom of the line.
 - 3. If external equalizer lines are required, make connection where it will reflect suction-line pressure at bulb location.
- H. Install safety relief valves where required by ASME Boiler and Pressure Vessel Code. Pipe safety-relief-valve discharge line to outside according to ASHRAE 15.
- I. Install moisture/liquid indicators in liquid line at the inlet of the thermostatic expansion valve or at the inlet of the evaporator coil capillary tube.
- J. Install strainers upstream from and adjacent to the following unless they are furnished as an integral assembly for device being protected:
 - 1. Solenoid valves.
 - 2. Thermostatic expansion valves.
 - 3. Hot-gas bypass valves.
 - 4. Compressor.
- K. Install filter dryers in liquid line between compressor and thermostatic expansion valve.
- L. Install receivers sized to accommodate pump-down charge.
- M. Install flexible connectors at compressors.

3.3 PIPING INSTALLATION

- A. Drawing plans, schematics, and diagrams indicate general location and arrangement of piping systems; indicated locations and arrangements were used to size pipe and calculate friction loss, expansion, pump sizing, and other design considerations. Install piping as indicated unless deviations to layout are approved on Shop Drawings.
- B. Install refrigerant piping according to ASHRAE 15.
- C. Install piping in concealed locations unless otherwise indicated and except in equipment rooms and service areas.
- D. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.
- E. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal.
- F. Install piping adjacent to machines to allow service and maintenance.
- G. Install piping free of sags and bends.
- H. Install fittings for changes in direction and branch connections.
- I. Select system components with pressure rating equal to or greater than system operating pressure.
- J. Refer to Division 23 Sections "Instrumentation and Control for HVAC" and "Sequence of Operation" for solenoid valve controllers, control wiring, and sequence of operation.

- K. Install piping as short and direct as possible, with a minimum number of joints, elbows, and fittings.
- L. Arrange piping to allow inspection and service of refrigeration equipment. Install valves and specialties in accessible locations to allow for service and inspection. Install access doors or panels as specified in Division 08 Section "Access Doors and Frames" if valves or equipment requiring maintenance is concealed behind finished surfaces.
- M. Install refrigerant piping in protective conduit where installed belowground.
- N. Install refrigerant piping in rigid or flexible conduit in locations where exposed to mechanical injury.
- O. Slope refrigerant piping as follows:
 - 1. Install horizontal hot-gas discharge piping with a uniform slope downward away from compressor.
 - 2. Install horizontal suction lines with a uniform slope downward to compressor.
 - 3. Install traps and double risers to entrain oil in vertical runs.
 - 4. Liquid lines may be installed level.
- P. When brazing or soldering, remove solenoid-valve coils and sight glasses; also remove valve stems, seats, and packing, and accessible internal parts of refrigerant specialties. Do not apply heat near expansion-valve bulb.
- Q. Install pipe sleeves at penetrations in exterior walls and floor assemblies.
- R. Seal penetrations through fire and smoke barriers according to Division 07 Section "Penetration Firestopping."
- S. Install piping with adequate clearance between pipe and adjacent walls and hangers or between pipes for insulation installation.
- T. Install sleeves through floors, walls, or ceilings, sized to permit installation of full-thickness insulation.
- U. Seal pipe penetrations through exterior walls according to Division 07 Section "Joint Sealants" for materials and methods.
- V. Identify refrigerant piping and valves according to Division 23 Section "Identification for HVAC Piping and Equipment."
- W. Insulate refrigerant piping the full length and cover piping insulation with jacket according to Division 23 Section "HVAC Insulation".
- X. Refrigerant piping shall be sized per manufacturers requirements.

3.4 PIPE JOINT CONSTRUCTION

- A. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.
- B. Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly.
- C. Fill pipe and fittings with an inert gas (nitrogen or carbon dioxide), during brazing, to prevent scale formation.
- D. Soldered Joints: Construct joints according to ASTM B 828 or CDA's "Copper Tube Handbook."
- E. Brazed Joints: Construct joints according to AWS's "Brazing Handbook," Chapter "Pipe and Tube."

1. Use Type BcuP, copper-phosphorus alloy for joining copper socket fittings with copper pipe.
 2. Use Type BAg, cadmium-free silver alloy for joining copper with bronze or steel.
- F. Flanged Joints: Select appropriate gasket material, size, type, and thickness for service application. Install gasket concentrically positioned. Use suitable lubricants on bolt threads.

3.5 HANGERS AND SUPPORTS

- A. Hanger, support, and anchor products are specified in Division 23 Section "Hangers and Supports for HVAC Piping and Equipment."
- B. Install the following pipe attachments:
1. Adjustable steel clevis hangers for individual horizontal runs less than 20 feet long.
 2. Roller hangers and spring hangers for individual horizontal runs 20 feet or longer.
 3. Pipe Roller: MSS SP-58, Type 44 for multiple horizontal piping 20 feet or longer, supported on a trapeze.
 4. Spring hangers to support vertical runs.
 5. Copper-clad hangers and supports for hangers and supports in direct contact with copper pipe.
- C. Install hangers for copper tubing with the following maximum spacing and minimum rod sizes:
1. NPS 1/2: Maximum span, 60 inches; minimum rod size, 1/4 inch.
 2. NPS 5/8: Maximum span, 60 inches; minimum rod size, 1/4 inch.
 3. NPS 1: Maximum span, 72 inches; minimum rod size, 1/4 inch.
 4. NPS 1-1/4: Maximum span, 96 inches; minimum rod size, 3/8 inch.
 5. NPS 1-1/2: Maximum span, 96 inches; minimum rod size, 3/8 inch.
 6. NPS 2: Maximum span, 96 inches; minimum rod size, 3/8 inch.
 7. NPS 2-1/2: Maximum span, 108 inches; minimum rod size, 3/8 inch.
 8. NPS 3: Maximum span, 10 feet; minimum rod size, 3/8 inch.
 9. NPS 4: Maximum span, 12 feet; minimum rod size, 1/2 inch.
- D. Support multifloor vertical runs at least at each floor.

3.6 FIELD QUALITY CONTROL

- A. Perform tests and inspections and prepare test reports.
- B. Tests and Inspections:
1. Comply with ASME B31.5, Chapter VI.
 2. Test refrigerant piping, specialties, and receivers. Isolate compressor, condenser, evaporator, and safety devices from test pressure if they are not rated above the test pressure.
 3. Test high- and low-pressure side piping of each system separately at not less than the pressures indicated in Part 1 "Performance Requirements" Article.
 - a. Fill system with nitrogen to the required test pressure.
 - b. System shall maintain test pressure at the manifold gauge throughout duration of test.
 - c. Test joints and fittings with electronic leak detector or by brushing a small amount of soap and glycerin solution over joints.
 - d. Remake leaking joints using new materials, and retest until satisfactory results are achieved.

3.7 SYSTEM CHARGING

- A. Charge system using the following procedures:
1. Install core in filter dryers after leak test but before evacuation.
 2. Evacuate entire refrigerant system with a vacuum pump to 500 micrometers. If vacuum holds for 12 hours, system is ready for charging.
 3. Break vacuum with refrigerant gas, allowing pressure to build up to 2 psig.

4. Charge system with a new filter-dryer core in charging line.

3.8 ADJUSTING

- A. Adjust thermostatic expansion valve to obtain proper evaporator superheat.
- B. Adjust high- and low-pressure switch settings to avoid short cycling in response to fluctuating suction pressure.
- C. Adjust set-point temperature of air-conditioning or chilled-water controllers to the system design temperature.
- D. Perform the following adjustments before operating the refrigeration system, according to manufacturer's written instructions:
 1. Open shutoff valves in condenser water circuit.
 2. Verify that compressor oil level is correct.
 3. Open compressor suction and discharge valves.
 4. Open refrigerant valves except bypass valves that are used for other purposes.
 5. Check open compressor-motor alignment and verify lubrication for motors and bearings.
- E. Replace core of replaceable filter dryer after system has been adjusted and after design flow rates and pressures are established.

END OF SECTION 23 23 00

SECTION 23 81 26 - SPLIT-SYSTEM AIR-CONDITIONERS

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 split-system air-conditioning and heat pump units consisting of separate evaporator-fan and compressor-condenser components. Units are designed for exposed or concealed mounting.

1.3 ACTION SUBMITTALS

- A. Product Data: Include rated capacities, furnished specialties, and accessories for each type of product indicated. Include performance data in terms of capacities, outlet velocities, static pressures, sound power characteristics, motor requirements, and electrical characteristics.
- B. Shop Drawings: Diagram power, signal, and control wiring.
- C. Samples for Initial Selection: For units with factory-applied color finishes.

1.4 INFORMATIONAL/QUALITY ASSURANCE/CONTROL SUBMITTALS

- A. Warranty: Special warranty specified in this Section.

1.5 CLOSEOUT DOCUMENTS

- A. General: Closeout Submittals are to be submitted with O and M Manuals only. Do not submit with other ACTION and INFORMATIONAL Submittals:
 - 1. Operation and Maintenance Data: For split-system air-conditioning units to include in emergency, operation, and maintenance manuals.

1.6 QUALITY ASSURANCE

- A. Product Options: Drawings indicate size, profiles, and dimensional requirements of split-system units and are based on the specific system indicated. Refer to Division 01 Section "Product Requirements."
- B. 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.
- C. Energy-Efficiency Ratio: Equal to or greater than prescribed by ASHRAE 90.1, "Energy Efficient Design of New Buildings except Low-Rise Residential Buildings."
- D. Coefficient of Performance: Equal to or greater than prescribed by ASHRAE 90.1, "Energy Efficient Design of New Buildings except Low-Rise Residential Buildings."

1.7 COORDINATION

- A. Coordinate size and location of concrete bases for units. Cast anchor-bolt inserts into bases. Concrete, reinforcement, and formwork are specified in Division 03 Section "Cast-in-Place Concrete."

- B. Coordinate size, location, and connection details with roof curbs, equipment supports, and roof penetrations specified in Division 07 Section "Roof Accessories."

1.8 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of split-system air-conditioning that fail in materials or workmanship within specified period.
 - 1. Compressor Warranty Period: Five years from date of Substantial Completion.

1.9 EXTRA MATERIALS

- A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Filters: One set of filters for each unit.
 - 2. Fan Belts: One set of belts for each unit.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Carrier Air Conditioning; Div. of Carrier Corporation.
 - 2. Mitsubishi Electronics America, Inc.; HVAC Division.
 - 3. Trane Company.
 - 4. York International Corp.
 - 5. Daikin.

2.2 WALL-MOUNTING, EVAPORATOR-FAN COMPONENTS

- A. Cabinet: Enameled steel with removable panels on front and ends in color selected by Architect, and discharge drain pans with drain connection.
- B. Refrigerant Coil: Copper tube, with mechanically bonded aluminum fins, complying with ARI 210/240, and with thermal-expansion valve.
- C. Electric Coil: Helical, nickel-chrome, resistance-wire heating elements with refractory ceramic support bushings; automatic-reset thermal cutout; built-in magnetic contactors; manual-reset thermal cutout; airflow proving device; and one-time fuses in terminal box for overcurrent protection.
- D. Fan: Direct drive, centrifugal fan.
- E. Fan Motors: Comply with requirements in Division 23 Section "Common Motor Requirements for HVAC Equipment."
 - 1. Special Motor Features: Multitapped, multispeed with internal thermal protection and permanent lubrication.
- F. Filters: Permanent, cleanable.

2.3 AIR-COOLED, COMPRESSOR-CONDENSER COMPONENTS

- A. Casing: Steel, finished with baked enamel in color selected by Architect, with removable panels for access to controls, weep holes for water drainage, and mounting holes in base. Provide brass service valves, fittings, and gauge ports on exterior of casing.
- B. Compressor: Hermetically sealed with crankcase heater and mounted on vibration isolation. Compressor motor shall have thermal- and current-sensitive overload devices, start capacitor, relay, and contactor.

1. Compressor Type: Scroll.
- C. Refrigerant Coil: Copper tube, with mechanically bonded aluminum fins, complying with ARI 210/240, and with liquid subcooler.
- D. Heat Pump Components: Reversing valve and low-temperature air cut-off thermostat.
- E. Fan: Aluminum-propeller type, directly connected to motor.
- F. Motor: Permanently lubricated, with integral thermal-overload protection.
- G. Low Ambient Kit: Permits operation down to 45 deg F.
- H. Mounting Base: Polyethylene.

2.4 ACCESSORIES

- A. Control equipment and sequence of operation are specified in Division 23 Sections "Instrumentation and Control for HVAC" and "Sequence of Operations for HVAC Controls."
- B. Thermostat: Low voltage or wireless infrared to control compressor and evaporator fan.
 1. Compressor time delay.
 2. 24-hour time control of system stop and start.
 3. Liquid-crystal display indicating temperature, set-point temperature, time setting, operating mode, and fan speed.
 4. Fan-speed selection, including auto setting.
 5. Provide wall mounting bracket for wireless thermostat.
- C. Automatic-reset timer to prevent rapid cycling of compressor.
- D. Refrigerant Line Kits: Soft-annealed copper suction and liquid lines factory cleaned, dried, pressurized, and sealed; factory-insulated suction line with flared fittings at both ends.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install units level and plumb.
- B. Install evaporator-fan components using manufacturer's standard mounting devices securely fastened to building structure.
- C. Install ground-mounting, compressor-condenser components on 4-inch thick, reinforced concrete base; 4 inches larger on each side than unit. Concrete, reinforcement, and formwork are specified in Division 03 Section "Cast-in-Place Concrete." Coordinate anchor installation with concrete base.
- D. Install roof-mounting compressor-condenser components on prefabricated equipment supports specified in Division 23 Section 230529.
- E. Install compressor-condenser components on restrained, spring isolators with a minimum static deflection of 1 inch. Refer to Division 23 Section "Vibration and Seismic Controls for HVAC Piping and Equipment."
- F. Install and connect precharged refrigerant tubing to component's quick-connect fittings. Install tubing to allow access to unit.

3.2 CONNECTIONS

- A. Piping installation requirements are specified in other Division 23 Sections. Drawings indicate general arrangement of piping, fittings, and specialties.
- B. Install piping adjacent to unit to allow service and maintenance.
- C. Ground equipment according to Division 26 Section "Grounding and Bonding for Electrical Systems."
- D. Electrical Connections: Comply with requirements in Division 26 Sections for power wiring, switches, and motor controls.

3.3 FIELD QUALITY CONTROL

- A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust field-assembled components and equipment installation, including connections, and to assist in field testing. Report results in writing.
- B. Perform the following field tests and inspections and prepare test reports:
 - 1. Leak Test: After installation, charge system and test for leaks. Repair leaks and retest until no leaks exist.
 - 2. Operational Test: After electrical circuitry has been energized, start units to confirm proper motor rotation and unit operation.
 - 3. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
- C. Remove and replace malfunctioning units and retest as specified above.

3.4 STARTUP SERVICE

- A. Engage a factory-authorized service representative to perform startup service.
 - 1. Complete installation and startup checks according to manufacturer's written instructions.

3.5 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain units. Refer to Division 01 Section "Demonstration and Training."

END OF SECTION 23 81 26

26

DIVISION

ELECTRICAL

SECTION 26 00 05 – ELECTRICAL DEMOLITION

PART 1 - GENERAL

1.1 DEMOLITION SUMMARY

- A. This Section Includes Electrical Demolition which includes but is not limited to:
 - 1. Luminaires.
 - 2. Electrical panels.
 - 3. Electrical receptacles.
 - 4. Conduit
 - 5. Underground work
 - 6. Grounding
- B. Refer to drawings for additional requirements

1.2 DEFINITIONS

- A. Refer to abbreviations on Symbol Legend drawings
- B. Refer to Demolition Coded Notes on drawings

1.3 COORDINATION

- A. Contractor shall visit project site before bidding. Verify all conditions, electrical equipment required for demolition and additional demolition that would interfere with new construction.
- B. Refer to architectural, mechanical and plumbing demolition drawings for electrical equipment that will be removed or disconnected, and include in bid.
- C. Coordinate arrangement, mounting, and support of electrical equipment.
- D. Electrical service to the building or any section of this building shall be maintained at all times. If any outage is required, contractor shall obtain written approval from owner or cm at least 48 hours prior to outage.
- E. The integrity and functionality of the fire alarm system shall be maintained to provide continuous operation during construction. If an outage is required it must be approved in writing by the authority having jurisdiction.

PART 2 - ELECTRICAL NOTES

- 2.1 All equipment and conduit shown on the demolition drawings is existing and shall remain in service unless noted otherwise.
- 2.2 All exposed conduit noted to be removed shall be removed in its entire length, unless noted otherwise.
- 2.3 All concealed conduit noted to be removed shall be removed for exposed portions and abandoned in concealed location, unless noted otherwise. Remove all conductors and cap remaining conduit at both ends.
- 2.4 All underground conduit noted to be removed shall be removed for exposed portions and abandoned in underground location, unless noted otherwise. Remove all conductors and cap remaining conduit at both ends.
- 2.5 All conductors noted to be removed, or in conduit which is noted to be removed, shall be removed in its entirety

- 2.6 All conductors scheduled to be removed shall be disposed of, unless noted below or otherwise.
- 2.7 Panel and equipment designations indicated are existing. Refer to new drawing panel board schedule for any new designations. Provide new nameplate as required.
- 2.8 Provide blank cover plates where devices are removed and flush box will remain.
- 2.9 Where walls to remain are damaged by demolition of electrical equipment, patch or repair to match adjacent surfaces and repaint.
- 2.10 All conduit that is reused shall be re-supported as required per National Electrical Code.
- 2.11 When existing circuit conductors are required to be reused, verify continuity, intercept in a new or existing junction box or wireway. Extend new conductors as required per National Electrical Code. Do not splice existing conductors in panelboards. Label conductors as each end.

PART 3 - EXECUTION

- 3.1 When existing equipment that is required to be removed shall be removed by Contractor and disposed of offsite unless noted otherwise. Non Hazardous demolition and construction waste related to the electrical scope of work shall be salvaged, or recycled as much as possible. See specification section 017419-"Construction Waste Management and Disposal" for requirements.
- 3.2 When existing equipment that is required to be relocated it shall be carefully removed with all components, stored in a dry location, protected, cleaned and re-installed where shown.
- 3.3 Hazardous Demolition Waste. Hazardous demolition and construction waste related to the electrical scope of work shall be disposed of or recycled. See specification section 017419-"Construction Waste Management and Disposal" for requirements. The following materials may be present and if so must be disposed of in compliance with statutory requirements.
 - A. Polychlorinated Bi-phenol liquids, (PCB's) such as but not limited to Askarel.
 - B. Liquid filled transformers with liquids such as but not limited to mineral oil, high molecular weight hydrocarbons (MWHC), Silicone, etc
 - C. PCB ballasts or capacitors
 - D. Asbestos insulation on conductors.
 - E. Lamps containing mercury, such as but not limited to compact fluorescent (CFL), mercury vapor, etc
 - F. Fluorescent lamps containing phosphors
 - G. Rechargeable batteries with heavy metals such as but not limited to Nickel Cadmium, etc
 - H. Lead acid batteries

END OF SECTION 26 00 05

SECTION 26 00 50 - GENERAL ELECTRICAL REQUIREMENTS

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. Electrical equipment coordination and installation.
 - 2. Substitutions
 - 3. Sleeves for raceways and cables.
 - 4. Sleeve seals.
 - 5. Grout.
 - 6. Common electrical installation requirements.

1.3 DEFINITIONS

- A. EPDM: Ethylene-propylene-diene terpolymer rubber.
- B. NBR: Acrylonitrile-butadiene rubber.
- C. Provide: Furnish and Install

1.4 SUBSTITUTIONS

- A. Refer Division 01, Section 012500, Substitution Procedures for contractual requirements
- B. Products of other manufacturers will be considered for acceptance provided they equal or exceed the material requirements and functional qualities of the specified product. Submission of the "Substitution Request Form" and complete technical data for evaluation must accompany requests for A/E's approval. All materials for evaluation must be received by the Project Manager and Specification Department at least ten days prior to bid due date. If a manufacturer substitution is approved and allowed, it will be issued by Addendum.
- C. It is the Contractors responsibility to prove that the product submitted for substation is equal or exceeds the requirements. The Engineer's decision will be based on samples submitted and technical literature presented. If the information provided is not adequate, then the substation shall be denied.

1.5 COORDINATION

- A. Coordinate arrangement, mounting, and support of electrical equipment:
 - 1. To allow maximum possible headroom unless specific mounting heights that reduce headroom are indicated.
 - 2. To provide for ease of disconnecting the equipment with minimum interference to other installations.
 - 3. To allow right of way for piping and conduit installed at required slope.
 - 4. So connecting raceways, cables, wireways, cable trays, and busways will be clear of obstructions and of the working and access space of other equipment.

- B. Equipment, furnished by others but installed by Division 26 shall include, but is not limited to: variable frequency controllers, variable speed controllers, motor starters, pump controllers, disconnect switches, flow switches, pressure switches and other control devices. Refer to Mechanical system drawings and specifications, such as Division 23, which shall require equipment to be furnished by them, but installed by others. Division 26 Contractor shall review those documents and make provisions to install that equipment. Refer to specification section 26 29 13 for additional requirements.
- C. Coordinate installation of required supporting devices and set sleeves in cast-in-place concrete, masonry walls, and other structural components as they are constructed.
- D. Coordinate location of access panels and doors for electrical items that are behind finished surfaces or otherwise concealed. Access doors and panels are specified in Division 08 Section "Access Doors and Frames."
- E. Coordinate sleeve selection and application with selection and application of firestopping specified in Division 07 Section "Firestopping."

PART 2 - PRODUCTS

2.1 SLEEVES FOR RACEWAYS AND CABLES

- A. Steel Pipe Sleeves: ASTM A 53/A 53M, Type E, Grade B, Schedule 40, galvanized steel, plain ends.
- B. Cast-Iron Pipe Sleeves: Cast or fabricated "wall pipe," equivalent to ductile-iron pressure pipe, with plain ends and integral waterstop, unless otherwise indicated.
- C. Sleeves for Rectangular Openings: Galvanized sheet steel.
 - 1. Minimum Metal Thickness:
 - a. For sleeve cross-section rectangle perimeter less than 50 inches and no side more than 16 inches, thickness shall be 0.052 inch.
 - b. For sleeve cross-section rectangle perimeter equal to, or more than, 50 inches and 1 or more sides equal to, or more than, 16 inches, thickness shall be 0.138 inch.

2.2 SLEEVE SEALS

- A. Description: Modular sealing device, designed for field assembly, to fill annular space between sleeve and raceway or cable.
 - 1. Sealing Elements: EPDM or NBR interlocking links shaped to fit surface of cable or conduit. Include type and number required for material and size of raceway or cable.
 - 2. Pressure Plates: Carbon steel. Include two for each sealing element.
 - 3. Connecting Bolts and Nuts: Carbon steel with corrosion-resistant coating of length required to secure pressure plates to sealing elements. Include one for each sealing element.

2.3 GROUT

- A. Nonmetallic, Shrinkage-Resistant Grout: ASTM C 1107, factory-packaged, nonmetallic aggregate grout, noncorrosive, nonstaining, mixed with water to consistency suitable for application and a 30-minute working time.

PART 3 - EXECUTION

3.1 COMMON REQUIREMENTS FOR ELECTRICAL INSTALLATION

- A. Comply with NECA 1.
- B. Measure indicated mounting heights to bottom of unit for suspended items and wall-mounting items.

- C. Headroom Maintenance: If mounting heights or other location criteria are not indicated, arrange and install components and equipment to provide maximum possible headroom consistent with these requirements.
- D. Equipment: Install to facilitate service, maintenance, and repair or replacement of components of both electrical equipment and other nearby installations. Connect in such a way as to facilitate future disconnecting with minimum interference with other items in the vicinity.
- E. Right of Way: Give to piping systems installed at a required slope.

3.2 SLEEVE INSTALLATION FOR ELECTRICAL PENETRATIONS

- A. Electrical penetrations occur when raceways, cables, wireways, cable trays, or busways penetrate concrete slabs, concrete or masonry walls, or fire-rated floor and wall assemblies.
- B. Concrete Slabs and Walls: Install sleeves for penetrations unless core-drilled holes or formed openings are used. Install sleeves during erection of slabs and walls.
- C. Use pipe sleeves unless penetration arrangement requires rectangular sleeved opening.
- D. Fire-Rated Assemblies: Install sleeves for penetrations of fire-rated floor and wall assemblies unless openings compatible with firestop system used are fabricated during construction of floor or wall.
- E. Cut sleeves to length for mounting flush with both surfaces of walls.
- F. Extend sleeves installed in floors 2 inches above finished floor level.
- G. Size pipe sleeves to provide 1/4-inch annular clear space between sleeve and raceway or cable, unless indicated otherwise.
- H. Seal space outside of sleeves with grout for penetrations of concrete and masonry
 - 1. Promptly pack grout solidly between sleeve and wall so no voids remain. Tool exposed surfaces smooth; protect grout while curing.
- I. Interior Penetrations of Non-Fire-Rated Walls and Floors: Seal annular space between sleeve and raceway or cable, using joint sealant appropriate for size, depth, and location of joint. Comply with requirements in Division 07 Section "Joint Sealants."
- J. Fire-Rated-Assembly Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at raceway and cable penetrations. Install sleeves and seal raceway and cable penetration sleeves with firestop materials. Comply with requirements in Division 07 Section "Firestopping."
- K. Roof-Penetration Sleeves: Seal penetration of individual raceways and cables with flexible boot-type flashing units applied in coordination with roofing work.
- L. Aboveground, Exterior-Wall Penetrations: Seal penetrations using steel pipe sleeves and mechanical sleeve seals. Select sleeve size to allow for 1-inch annular clear space between pipe and sleeve for installing mechanical sleeve seals.
- M. Underground, Exterior-Wall Penetrations: Install cast-iron pipe sleeves. Size sleeves to allow for 1-inch annular clear space between raceway or cable and sleeve for installing mechanical sleeve seals.

3.3 SLEEVE-SEAL INSTALLATION

- A. Install to seal exterior wall penetrations.

- B. Use type and number of sealing elements recommended by manufacturer for raceway or cable material and size. Position raceway or cable in center of sleeve. Assemble mechanical sleeve seals and install in annular space between raceway or cable and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.

3.4 FIRESTOPPING

- A. Apply firestopping to penetrations of fire-rated floor and wall assemblies for electrical installations to restore original fire-resistance rating of assembly. Firestopping materials and installation requirements are specified in Division 07 Section "Firestopping."

END OF SECTION 26 05 00

SECTION 26 05 05 - ELECTRICAL TESTING

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes requirements for electrical field testing and inspecting of all electrical systems for this project. Each Division 26 Section shall reference components that require testing. The detailed requirements shall be defined in this section, including but not limited to the following:
 - 1. Qualifications of testing agencies and their personnel.
 - 2. Suitability of test equipment.
 - 3. Calibration of test instruments.
 - 4. Coordination requirements for testing and inspecting.
 - 5. Reporting requirements for testing and inspecting.

1.2 QUALITY ASSURANCE

- A. Testing Agency Qualifications: As specified in each Section containing electrical testing requirements and in subparagraph and associated subparagraph below.
 - 1. Independent Testing Agencies: Independent of manufacturers, suppliers, and installers of components to be tested or inspected.
 - a. Testing Agency's Field Supervisor for Power Component Testing: Person currently certified by the InterNational Electrical Testing Association or the National Institute for Certification in Engineering Technologies to supervise on-site testing specified in Division 16 power component Sections.
- B. Test Equipment Suitability: Comply with NETA ATS, Acceptance Testing Specification, Section 5.2.
- C. Test Equipment Calibration: Comply with NETA ATS Acceptance Testing Specification, Section 5.3.

PART 2 - PRODUCTS

2.1 COMPONENTS TO BE TESTED

- A. Low Voltage Cables, Section 26 05 19
 - 1. Perform the following field tests and inspections:
 - a. After installing conductors and cables and before electrical circuitry has been energized, test service entrance and feeder conductors for compliance with requirements.
 - b. Perform each visual and mechanical inspection and electrical test stated in NETA Acceptance Testing Specification. Certify compliance with test parameters.
 - 2. Test Reports: Prepare a written report to record the following:
 - a. Test procedures used.
 - b. Test results that comply with requirements.
 - c. Test results that do not comply with requirements and corrective action taken to achieve compliance with requirements.
 - 3. Remove and replace malfunctioning units and retest as specified above.
- B. Low-Voltage Transformers, Section 26 22 00
 - 1. Perform the following field tests and inspection:
 - a. After installing transformers and after electrical circuitry has been energized, test for compliance with requirements.
 - b. Perform visual and mechanical inspection and electrical test stated in NETA Acceptance Testing Specification. Certify compliance with test parameters.
 - c. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
 - 2. Test Reports: Prepare written reports to record the following:

- a. Test procedures used.
 - b. Test results that comply with requirements.
 - c. Test results that do not comply with requirements and corrective actions taken to achieve compliance with requirements.
 3. Remove and replace units that do not pass tests or inspections and retest as specified above.
 4. Test Labeling: On completion of satisfactory testing of each unit, attach a dated and signed "Satisfactory Test" label to tested component.
- C. Wiring Devices, Section 26 27 26
1. Perform tests and inspections and prepare test reports.
 - a. Test Instruments: Use instruments that comply with UL 1436.
 - b. Test Instrument for Convenience Receptacles: Digital wiring analyzer with digital readout or illuminated LED indicators of measurement.
 2. Tests for Convenience Receptacles:
 - a. Line Voltage: Acceptable range is 105 to 132 V
 - b. Percent Voltage Drop under 15-A Load: A value of 6 percent or higher is not acceptable.
 - c. Ground Impedance: Values of up to 2 ohms are acceptable.
 - d. GFCI Trip: Test for tripping values specified in UL 1436 and UL 943.
 - e. Using the test plug, verify that the device and its outlet box are securely mounted.
 - f. The tests shall be diagnostic, indicating damaged conductors, high resistance at the circuit breaker, poor connections, inadequate fault current path, defective devices, or similar problems. Correct circuit conditions, remove malfunctioning units and replace with new ones, and retest as specified above:

PART 3 - EXECUTION

3.1 GENERAL TESTS AND INSPECTIONS

- A. If a group of tests are specified to be performed by an independent testing agency, prepare systems, equipment, and components for tests and inspections, and perform preliminary tests to ensure that systems, equipment, and components are ready for independent agency testing. Include the following minimum preparations as appropriate:
 1. Perform insulation-resistance tests.
 2. Perform continuity tests.
 3. Perform rotation test (for motors to be tested).
 4. Provide a stable source of single-phase, 208/120-V electrical power for test instrumentation at each test location.
- B. Test and Inspection Reports: In addition to requirements specified elsewhere, report the following:
 1. Manufacturer's written testing and inspecting instructions.
 2. Calibration and adjustment settings of adjustable and interchangeable devices involved in tests.
 3. Tabulation of expected measurement results made before measurements.
 4. Tabulation of "as-found" and "as-left" measurement and observation results.

END OF SECTION 26 05 05

SECTION 26 05 19 - LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

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. Building wires and cables rated 600 V and less.
 - 2. Connectors, splices, and terminations rated 600 V and less.
- B. Related Sections include the following:
 - 1. Division 26 Section "Common Work Results for Electrical" for sleeves and sleeve seals for cables.

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 CONDUCTORS AND CABLES

- A. Copper Conductors: Comply with NEMA WC 70.
- B. Conductor Insulation: Comply with NEMA WC 70 for Types THW, THHN-THWN, XHHW, and SO
 - 1. Provide No. 6 AWG and smaller conductors with color-coded insulation.
- C. Multiconductor Cable: Comply with NEMA WC 70 for metal-clad cable, Type MC.

2.2 CONNECTORS AND SPLICES

- A. 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, No. 10 AWG, minimum.
 - 1. Feeder Conductor sizes indicated on drawings are for copper conductors, unless indicated otherwise.
 - 2. Branch Circuits: Copper. No. 12 AWG, minimum, unless indicated otherwise.
- B. Class 1 Control Circuits: Copper. No. 14 AWG, minimum.
- C. Class 2 Control Circuits: Copper. No. 16 AWG, minimum.
- D. Voltage drop shall not exceed 3 percent from panelboard to farthest outlet.

1. Maximum permitted length of 20 amp, 120, 208, and 240 volt circuits using No. 12 AWG copper wire is 100 feet.
2. Maximum permitted length of 20 amp, 120, 208, and 240 volt circuits using No. 10 AWG copper wire is 140 feet.
3. Maximum permitted length of 20 amp, 277 and 480 volt circuits using No. 12 AWG copper wire is 170 feet.
4. Maximum permitted length of 20 amp, 277 and 480 volt circuits using No. 10 AWG copper wire is 250 feet.

3.2 CONDUCTOR INSULATION AND MULTICONDUCTOR CABLE APPLICATIONS AND WIRING METHODS

- A. Exposed Feeders: Type THHN-THWN, single conductors in raceway; or Type XHHW, single conductors in raceway.
- B. Feeders Concealed in Ceilings, Walls, Partitions, and Crawlspace: Type THHN-THWN, single conductors in raceway; or Type XHHW, single conductors in raceway.
- C. Feeders Concealed in Concrete, below Slabs-on-Grade, and Underground: Type THHN-THWN, single conductors in raceway; or Type XHHW, single conductors in raceway.
- D. Exposed Branch Circuits, Including in Crawlspace: Type THHN-THWN, single conductors in raceway.
- E. Branch Circuits Concealed in Ceilings, Walls, and Partitions: Type THHN-THWN, single conductors in raceway.
- F. Branch Circuits Installed in Accessible Ceiling Spaces and Gypsum-Board Partitions: Type THHN-THWN, single conductors in raceway; or metal-clad cable, Type MC.
- G. Branch Circuits Concealed in Concrete, below Slabs-on-Grade, and Underground: Type THHN-THWN, single conductors in raceway.
- H. Cord Drops and Portable Appliance Connections: Type SO, hard service cord with stainless-steel, wire-mesh, strain relief device at terminations to suit application.
- I. Class 1 Control Circuits: Type THHN-THWN, in raceway.
- J. Class 2 Control Circuits: Type THHN-THWN, in raceway; power-limited cable, concealed in building finishes; or power-limited tray cable, in cable tray.
 1. Exposed-Structure Type Ceiling Spaces: Install Class 2 control circuits in raceway.

3.3 INSTALLATION OF CONDUCTORS AND CABLES

- A. Comply with NECA 1 and NECA 104..
- 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. Identify and color-code conductors and cables according to Division 26 Section "Identification for Electrical Systems."
- E. Conceal cables in finished walls, ceilings, and floors, unless otherwise indicated.

- F. Install exposed cables parallel and perpendicular to surfaces of exposed structural members, and follow surface contours where possible.
- G. Support cables according to Division 26 Section "Hangers and Supports for Electrical Systems."

3.4 CONNECTIONS

- A. 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.
- B. Make splices and taps that are compatible with conductor material and that possess equivalent or better mechanical strength and insulation ratings than unspliced conductors
 - 1. Use oxide inhibitor in each splice and tap conductor for aluminum conductors.
- C. Wiring at Outlets: Install conductor at each outlet, with at least 6 inches of slack.

3.5 FIELD QUALITY CONTROL

- A. Perform tests and inspections and prepare test reports.
- B. Tests and Inspections:
 - 1. After installing conductors and cables and before electrical circuitry has been energized, test service entrance and feeder conductors for compliance with requirements.
 - 2. Perform each visual and mechanical inspection and electrical test stated in NETA Acceptance Testing Specification. Certify compliance with test parameters.
- C. Test Reports: Prepare a written report to record the following:
 - 1. Test procedures used.
 - 2. Test results that comply with requirements.
 - 3. Test results that do not comply with requirements and corrective action taken to achieve compliance with requirements.
- D. Remove and replace malfunctioning units and retest as specified above.

END OF SECTION 26 05 19

SECTION 26 05 26 - GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

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 methods and materials for grounding systems and equipment.

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 UL 467 for grounding and bonding materials and equipment.

PART 2 - PRODUCTS

2.1 CONDUCTORS

- A. Insulated Conductors: Copper wire or cable insulated for 600 V unless otherwise required by applicable Code or authorities having jurisdiction.
- B. Bare Copper Conductors:
 - 1. Solid Conductors: ASTM B 3.
 - 2. Stranded Conductors: ASTM B 8.
 - 3. Tinned Conductors: ASTM B 33.
 - 4. Bonding Cable: 28 kcmil, 14 strands of No. 17 AWG conductor, 1/4 inch in diameter.
 - 5. Bonding Conductor: No. 4 or No. 6 AWG, stranded conductor.
 - 6. Bonding Jumper: Copper tape, braided conductors, terminated with copper ferrules; 1-5/8 inches wide and 1/16 inch thick.
 - 7. Tinned Bonding Jumper: Tinned-copper tape, braided conductors, terminated with copper ferrules; 1-5/8 inches wide and 1/16 inch thick.

2.2 CONNECTORS

- A. Listed and labeled by a nationally recognized testing laboratory acceptable to authorities having jurisdiction for applications in which used, and for specific types, sizes, and combinations of conductors and other items connected.
- B. Bolted Connectors for Conductors and Pipes: Copper or copper alloy, bolted pressure-type, with at least two bolts.
 - 1. Pipe Connectors: Clamp type, sized for pipe.
- C. All cable to cable, cable to rod, cable to steel connection shall be welded connectors: Use exothermic-welding kits of types recommended by kit manufacturer for materials being joined and installation conditions. Exothermic welds shall use powdered copper oxide and aluminum to form a molded homogeneous copper joint connection between the copper conductor and the material being bonded to.

PART 3 - EXECUTION

3.1 APPLICATIONS

- A. Refer to grounding details on drawings which take precedence. If no drawing details are included, then provide the following.
- B. Conductor Terminations and Connections:
 - 1. Pipe and Equipment Grounding Conductor Terminations: Bolted connectors.
 - 2. Underground Connections: Exothermic-welded connectors, except at test wells and as otherwise indicated.

3.2 EQUIPMENT GROUNDING

- A. Install insulated equipment grounding conductors with feeders and branch circuits.
- B. Air-Duct Equipment Circuits: Install insulated equipment grounding conductor to duct-mounted electrical devices operating at 120 V and more, including air cleaners, heaters, dampers, humidifiers, and other duct electrical equipment. Bond conductor to each unit and to air duct and connected metallic piping.
- C. Water Heater, Heat-Tracing, and Antifrost Heating Cables: Install a separate insulated equipment grounding conductor to each electric water heater and heat-tracing cable. Bond conductor to heater units, piping, connected equipment, and components.

3.3 INSTALLATION

- A. Comply with NECA 331.
- B. Grounding Conductors: Route along shortest and straightest paths possible, unless otherwise indicated or required by Code. Avoid obstructing access or placing conductors where they may be subjected to strain, impact, or damage.
- C. Bonding Straps and Jumpers: Install in locations accessible for inspection and maintenance, except where routed through short lengths of conduit.
 - 1. Bonding to Structure: Bond straps directly to basic structure, taking care not to penetrate any adjacent parts. Install at expansion joints.
 - 2. Catwalks: Bond straps directly to catwalks and basic structure, taking care not to penetrate any adjacent parts.
 - 3. Bonding to Equipment Mounted on Vibration Isolation Hangers and Supports: Install so vibration is not transmitted to rigidly mounted equipment.
 - 4. Use exothermic-welded connectors for outdoor locations, but if a disconnect-type connection is required, use a bolted clamp.

3.4 IDENTIFICATION

- A. Comply with requirements in Division 26 Section "Identification for Electrical Systems."

END OF SECTION 26 05 26

SECTION 26 05 29 - HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS

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. Hangers and supports for electrical equipment and systems.
- B. Related Sections include the following:
 - 1. Division 26 Section "Identification for Electrical Systems" for cable ties.

1.3 DEFINITIONS

- A. EMT: Electrical metallic tubing.
- B. IMC: Intermediate metal conduit.
- C. RMC: Rigid metal conduit.

1.4 PERFORMANCE REQUIREMENTS

- A. Design supports for multiple raceways capable of supporting combined weight of supported systems and its contents.
- B. Design equipment supports capable of supporting combined operating weight of supported equipment and connected systems and components.
- C. Rated Strength: Adequate in tension, shear, and pullout force to resist maximum loads calculated or imposed for this Project, with a minimum structural safety factor of five times the applied force.

1.5 QUALITY ASSURANCE

- A. Comply with NFPA 70.

PART 2 - PRODUCTS

2.1 SUPPORT, ANCHORAGE, AND ATTACHMENT COMPONENTS

- A. Steel Slotted Support Systems: Comply with MFMA-4, factory-fabricated components for field assembly.
 - 1. Metallic Coatings: Hot-dip galvanized after fabrication and applied according to MFMA-4.
 - 2. Painted Coatings: Manufacturer's standard painted coating applied according to MFMA-4.
 - 3. Channel Dimensions: Selected for applicable load criteria.
- B. Nonmetallic Slotted Support Systems: Structural-grade, factory-formed, glass-fiber-resin channels and angles with 9/16-inch-diameter holes at a maximum of 8 inches o.c., in at least 1 surface.
 - 1. Fittings and Accessories: Products of channel and angle manufacturer and designed for use with those items.
 - 2. Fitting and Accessory Materials: Same as channels and angles, except metal items may be stainless steel.

- 3. Rated Strength: Selected to suit applicable load criteria.
- C. Raceway and Cable Supports: As described in NECA 1 and NECA 101.
- D. Conduit and Cable Support Devices: Steel hangers, clamps, and associated fittings, designed for types and sizes of raceway or cable to be supported.
- E. Support for Conductors in Vertical Conduit: Factory-fabricated assembly consisting of threaded body and insulating wedging plug or plugs for non-armored electrical conductors or cables in riser conduits. Plugs shall have number, size, and shape of conductor gripping pieces as required to suit individual conductors or cables supported. Body shall be malleable iron.
- F. Structural Steel for Fabricated Supports and Restraints: ASTM A 36/A 36M, steel plates, shapes, and bars; black and galvanized.
- G. Mounting, Anchoring, and Attachment Components: Items for fastening electrical items or their supports to building surfaces include the following:
 - 1. Powder-Actuated Fasteners: Not permitted.
 - 2. Mechanical-Expansion Anchors: Insert-wedge-type, zinc-coated steel, for use in hardened portland cement concrete with tension, shear, and pullout capacities appropriate for supported loads and building materials in which used.
 - 3. Concrete Inserts: Steel or malleable-iron, slotted support system units similar to MSS Type 18; complying with MFMA-4 or MSS SP-58.
 - 4. Clamps for Attachment to Steel Structural Elements: MSS SP-58, type suitable for attached structural element.
 - 5. Through Bolts: Structural type, hex head, and high strength. Comply with ASTM A 325.
 - 6. Toggle Bolts: All-steel springhead type.
 - 7. Hanger Rods: Threaded steel.
 - 8. Wire Rope Systems: Galvanized steel wire rope with spring-loaded, key-releasable locking device with the following rated strength:
 - a. 0.059-inch (1.5-mm): 44 pounds.
 - b. 5/64-inch (2-mm): 100 pounds.
 - c. 1/8-inch (3-mm): 200 pounds.

2.2 FABRICATED METAL EQUIPMENT SUPPORT ASSEMBLIES

- A. Description: Welded or bolted, structural-steel shapes, shop or field fabricated to fit dimensions of supported equipment.
- B. Materials: Comply with requirements in Division 05 Section "Metal Fabrications" for steel shapes and plates.

PART 3 - EXECUTION

3.1 APPLICATION

- A. Comply with NECA 1 and NECA 101 for application of hangers and supports for electrical equipment and systems except if requirements in this Section are stricter.
- B. Maximum Support Spacing and Minimum Hanger Rod Size for Raceway: Space supports for EMT, IMC, and RMC as required by NFPA 70. Minimum rod size shall be 1/4 inch in diameter.
- C. Multiple Raceways or Cables: Install trapeze-type supports fabricated with steel slotted support system, sized so capacity can be increased by at least 25 percent in future without exceeding specified design load limits.
 - 1. Secure raceways and cables to these supports with single-bolt conduit clamps using spring friction action for retention in support channel.

3.2 SLOTTED SUPPORT SYSTEMS APPLICATIONS

- A. Heated Interior Spaces: Painted steel.
- B. Non-Heated Interior Spaces and Outdoors: Hot-dipped galvanized steel.

3.3 SUPPORT INSTALLATION

- A. Comply with NECA 1 and NECA 101 for installation requirements except as specified in this Article.
- B. Raceway Support Methods: In addition to methods described in NECA 1, EMT, IMC, and RMC may be supported by openings through structure members, as permitted in NFPA 70.
- C. Strength of Support Assemblies: Where not indicated, select sizes of components so strength will be adequate to carry present and future static loads within specified loading limits. Minimum static design load used for strength determination shall be weight of supported components plus 200 lb.
- D. Mounting and Anchorage of Surface-Mounted Equipment and Components: Anchor and fasten electrical items and their supports to building structural elements by the following methods unless otherwise indicated by code:
 - 1. To Wood: Fasten with lag screws or through bolts.
 - 2. To New Concrete: Bolt to concrete inserts.
 - 3. To Masonry: Approved toggle-type bolts on hollow masonry units and expansion anchor fasteners on solid masonry units.
 - 4. To Existing Concrete: Expansion anchor fasteners.
 - 5. To Steel: Beam clamps (MSS Type 19, 21, 23, 25, or 27) complying with MSS SP-69.
 - 6. To Light Steel: Sheet metal screws.
 - 7. Items Mounted on Hollow Walls and Nonstructural Building Surfaces: Mount cabinets, panelboards, disconnect switches, control enclosures, pull and junction boxes, transformers, and other devices on slotted-channel racks attached to substrate.
- E. Drill holes for expansion anchors in concrete at locations and to depths that avoid reinforcing bars.
- F. Exposed Conduits: Use one-hole or two-hole straps 8 feet or less AFF. Conduit clamps and hangers that project past the conduit wall are limited to above 8 feet AFF.
- G. Do not use wood plugs, perforated metal bands, chain, or wire to support electrical equipment, unless otherwise indicated.
- H. Open-Web Joists: Install supports only at panel points. Fasten supports to top of bottom chord of joist. Do not exceed 100 pounds working load per panel point.
- I. Roof and Elevated Floor Decks: Do not fasten supports to roof decks or elevated floor decks.

3.4 INSTALLATION OF FABRICATED METAL SUPPORTS

- A. Comply with installation requirements in Division 05 Section "Metal Fabrications" for site-fabricated metal supports.
- B. Cut, fit, and place miscellaneous metal supports accurately in location, alignment, and elevation to support and anchor electrical materials and equipment.
- C. Field Welding: Comply with AWS D1.1/D1.1M.

3.5 PAINTING

- A. Touchup: Comply with requirements in Division 09 painting Sections for cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint on miscellaneous metal.
- B. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas and apply galvanizing-repair paint to comply with ASTM A 780.

END OF SECTION 26 05 29

SECTION 26 05 33 - CONDUIT AND BOXES FOR ELECTRICAL SYSTEMS

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 conduits, fittings, boxes, outlet boxes, enclosures, and cabinets for electrical wiring. The term raceway shall also apply to conduit and boxes.
- B. Related Sections include the following:
 - 1. Division 26 Section "Wiring Devices" for mounting heights of devices.
 - 2. .

1.3 DEFINITIONS

- A. EMT: Electrical metallic tubing.
- B. FMC: Flexible metal conduit.
- C. IMC: Intermediate metal conduit.
- D. LFMC: Liquidtight flexible metal conduit.
- E. RMC: Rigid metal conduit.
- F. RNC: Rigid nonmetallic conduit.

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.

1.5 COORDINATION

- A. HVAC Control and Monitoring: Verify locations of temperature control panels with Building Management System installer.

PART 2 - PRODUCTS

2.1 METAL CONDUIT AND TUBING

- A. RMC: ANSI C80.1.
- B. IMC: ANSI C80.6.
- C. EMT: ANSI C80.3.
- D. FMC: Zinc-coated steel or aluminum.
- E. LFMC: Flexible steel conduit with PVC jacket.

- F. 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.
 - 1. Die-cast type, pot-metal type, and indenter type fittings are not permitted.
 - 2. Conduit Fittings for Hazardous (Classified) Locations: Comply with UL 886.
 - 3. Fittings for EMT: Steel, compression type.
- G. Joint Compound for RMC or IMC: Listed for use in cable connector assemblies, and compounded for use to lubricate and protect threaded raceway joints from corrosion and enhance their conductivity.

2.2 BOXES, ENCLOSURES, AND CABINETS

- A. Sheet Metal Outlet and Device Boxes: NEMA OS 1.
 - 1. Gangable boxes are not permitted.
- B. Cast-Metal Outlet and Device Boxes: NEMA FB 1, aluminum, Type FD, with gasketed cover.
- C. Small Sheet Metal Pull and Junction Boxes: NEMA OS 1.
- D. Cast-Metal Access, Pull, and Junction Boxes: NEMA FB 1, cast aluminum with gasketed cover.
- E. 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.
- F. 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.
 - 5. Accessory feet where required for freestanding equipment.

PART 3 - EXECUTION

3.1 CONDUIT APPLICATION

- A. Outdoors: Apply raceway products as specified below, unless otherwise indicated:
 - 1. Exposed Conduit: RMC or IMC.
 - 2. Concealed Conduit, Aboveground: RNC, Type EPC-40-PVC.
 - 3. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): LFMC.
 - 4. 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.
 - 2. Exposed and Subject to Physical Damage: RMC. Includes raceways in the following locations:
 - a. Loading dock.
 - b. Corridors used for traffic of mechanized carts, forklifts, and pallet-handling units.
 - 3. Concealed in Ceilings and Interior Walls and Partitions: EMT.
 - 4. Concealed in Exterior Walls: RNC, Type EPC-40-PVC
 - 5. Concealed Under Slabs-on-Grade: RNC, Type EPC-40-PVC.
 - 6. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): FMC, except use LFMC in damp or wet locations.
 - 7. Damp or Wet Locations: RMC or IMC.

8. Conduits for Optical Fiber or Communications Cable in Spaces Used for Environmental Air: EMT.
 9. Conduits for Optical Fiber or Communications Cable Risers in Vertical Shafts: EMT.
 10. Conduits for Concealed General Purpose Distribution of Optical Fiber or Communications Cable: EMT.
 11. Boxes and Enclosures: NEMA 250, Type 1, except use NEMA 250, Type 4, stainless steel in damp or wet locations.
- C. Minimum RMC, IMC, EMT, or RNC, Type EPC-40-PVC Size: 1/2-inch trade size, unless indicated otherwise.
 - D. Minimum FMC or LFMC Size: 1/2-inch trade size, unless indicated otherwise.
 - E. Conduit Fittings: Compatible with raceways and suitable for use and location.
 1. RMC or IMC: Use threaded rigid steel conduit fittings, unless otherwise indicated.
- 3.2 OUTLET AND DEVICE BOX APPLICATION
- A. Flush Boxes in Masonry Walls and Partitions: Use masonry boxes at least 3.5 inches deep.
 - B. Flush Boxes in Gypsum-Board Partitions: Use square boxes at least 2.125 inches deep with raised box covers.
 - C. Flush Device Boxes in Ceilings: Use square boxes at least 2.125 inches deep with raised box covers.
 - D. Flush Outlet Boxes in Ceilings: Use 4-inch round or octagonal boxes at least 2.125 inches deep.
 - E. Surface Boxes: Use cast-metal type with matching cover. Provide knock-out plugs in unused openings.
- 3.3 INSTALLATION
- A. Comply with NECA 1 and NECA 101 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 conduits as specified in Division 26 Section "Hangers and Supports for Electrical Systems."
 - E. Arrange stub-ups so curved portions of bends are not visible above the finished slab.
 - F. Conceal conduit and EMT within finished walls, ceilings, and below floors, unless otherwise indicated.
 - G. Conduits Beneath Concrete Slabs:
 1. Install conduit parallel or at right angles building lines, at least 1 inch below top of drainage fill.
 2. Arrange conduits to cross building expansion joints at right angles with expansion fittings.
 3. Do not embed conduits in concrete slabs.
 - H. Threaded Conduit Joints, Exposed to Wet, Damp, Corrosive, or Outdoor Conditions: Apply listed compound to threads of raceway and fittings before making up joints. Follow compound manufacturer's written instructions.

- I. Conduit Terminations at Locations Subject to Moisture or Vibration: Use insulating bushings to protect conductors, including conductors smaller than No. 4 AWG.
- J. 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.
- K. Install conduit sealing fittings at suitable, approved, and accessible locations and fill them with listed sealing compound. For concealed conduits, 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 conduit 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.
- L. Expansion-Joint Fittings for RNC: Install in each run of aboveground conduit that is located where environmental temperature change may exceed 30 deg F, and that has straight-run length that exceeds 25 feet.
 - 1. Install expansion-joint fittings for each of the following locations, and provide type and quantity of fittings that accommodate temperature change listed for location:
 - a. Outdoor Locations Not Exposed to Direct Sunlight: 125 deg F temperature change.
 - b. Outdoor Locations Exposed to Direct Sunlight: 155 deg F temperature change.
 - 2. Install fitting(s) that provide expansion and contraction for at least 0.00041 inch per foot of length of straight run per deg F of temperature change.
 - 3. Install each expansion-joint fitting with position, mounting, and piston setting selected according to manufacturer's written instructions for conditions at specific location at the time of installation.
- M. 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.
- N. Conduits less than 3-inch trade size may be field bent, unless indicated otherwise. Use factory 45 and 90 degree, and special radius elbows for conduits 3-inch and larger.
- O. Conduits for Feeders: Electrically continuous, terminated with grounding and insulating bushings.
- P. Conduits for Branch Circuits: Electrically continuous.
- Q. Finished Spaces: Provide escutcheons where conduits penetrate surfaces of finished spaces. Match finish of adjacent surfaces.

3.4 PROTECTION

- A. Provide final protection and maintain conditions that ensure coatings, finishes, and cabinets are without damage or deterioration at time of Substantial Completion.
 - 1. Repair damage to galvanized finishes with zinc-rich paint recommended by manufacturer.
 - 2. Repair damage to PVC or paint finishes with matching touchup coating recommended by manufacturer.

END OF SECTION 26 05 33

SECTION 26 05 53 - IDENTIFICATION FOR ELECTRICAL SYSTEMS

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. Identification for conductors and control cable.
 - 2. Warning labels and signs.
 - 3. Instruction signs.
 - 4. Equipment identification labels.
 - 5. Factory nameplates
 - 6. Miscellaneous identification products.

1.3 QUALITY ASSURANCE

- A. Comply with ANSI A13.1 and ANSI C2.
- B. Comply with NFPA 70.
- C. Comply with 29 CFR 1910.145.

1.4 COORDINATION

- A. Coordinate identification names, abbreviations, colors, and other features with requirements in the Contract Documents, Shop Drawings, manufacturer's wiring diagrams, and the Operation and Maintenance Manual, and with those required by codes, standards, and 29 CFR 1910.145. Use consistent designations throughout Project.
- B. Coordinate installation of identifying devices with completion of covering and painting of surfaces where devices are to be applied.
- C. Coordinate installation of identifying devices with location of access panels and doors.
- D. Install identifying devices before installing acoustical ceilings and similar concealment.

PART 2 - PRODUCTS

2.1 RACEWAY IDENTIFICATION MATERIALS

- A. Comply with ANSI A13.1 for minimum size of letters for legend and for minimum length of color field for each raceway and cable size.
- B. Color for Printed Legend:
 - 1. Power Circuits: Black letters on an orange field.
 - 2. Legend: Indicate system or service and voltage, if applicable.
- C. Snap-Around Labels: Slit, pretensioned, flexible, preprinted, color-coded acrylic sleeves, with diameter sized to suit diameter of raceway or cable it identifies and to stay in place by gripping action.

- D. Snap-Around, Color-Coding Bands: Slit, pretensioned, flexible, solid-colored acrylic sleeves, 2 inches long, with diameter sized to suit diameter of raceway or cable it identifies and to stay in place by gripping action.

2.2 CONDUCTOR AND COMMUNICATION- AND CONTROL-CABLE IDENTIFICATION MATERIALS

- A. Color-Coding Conductor Tape: Colored, self-adhesive vinyl tape not less than 3 mils thick by 1 to 2 inches wide.
- B. Marker Tapes: Vinyl or vinyl-cloth, self-adhesive wraparound type, with circuit identification legend machine printed by thermal transfer or equivalent process.

2.3 WARNING LABELS AND SIGNS

- A. Comply with NFPA 70 and 29 CFR 1910.145.
- B. Baked-Enamel Warning Signs: Preprinted aluminum signs, punched or drilled for fasteners, with colors, legend, and size required for application. 1/4-inch grommets in corners for mounting. Nominal size, 7 by 10 inches.
- C. Metal-Backed, Butyrate Warning Signs: Weather-resistant, nonfading, preprinted, cellulose-acetate butyrate signs with 0.0396-inch galvanized-steel backing; and with colors, legend, and size required for application. 1/4-inch grommets in corners for mounting. Nominal size, 10 by 14 inches .
- D. Warning label and sign shall include, but are not limited to, the following legends:
 - 1. Multiple Power Source Warning: "DANGER - ELECTRICAL SHOCK HAZARD - EQUIPMENT HAS MULTIPLE POWER SOURCES."
 - 2. Workspace Clearance Warning: "WARNING - OSHA REGULATION - AREA IN FRONT OF ELECTRICAL EQUIPMENT MUST BE KEPT CLEAR FOR 36 INCHES."

2.4 INSTRUCTION SIGNS

- A. Engraved, laminated acrylic or melamine plastic, minimum 1/16 inch thick for signs up to 20 sq. in. and 1/8 inch thick for larger sizes.
 - 1. Engraved legend with black letters on white face.
 - 2. Punched or drilled for mechanical fasteners.
 - 3. Framed with mitered acrylic molding and arranged for attachment at applicable equipment.

2.5 IDENTIFICATION LABELS

- A. All labels required below in Part 3.0 shall meet the following requirements.
 - a. Indoor Equipment: Engraved, laminated acrylic, melamine label or metal. Mounted with corrosion-resistant screws or permanent adhesive.
 - b. Outdoor Equipment: Engraved, laminated acrylic, melamine label or metal. Mounted with corrosion-resistant screws.
 - c. Nameplates shall have a black or dark-gray background with white engraved letters and numbers
 - d. Nameplates for emergency systems or power transfer equipment shall have a red background with white engraved letters and numbers.
 - e. Minimum letter height shall be 3/8 inch.
 - f. Do not use Kroy labels, paper labels
 - g. Do not use double stick tape to attach laminated labels.

2.6 MISCELLANEOUS IDENTIFICATION PRODUCTS

- A. Cable Ties: Fungus-inert, self-extinguishing, 1-piece, self-locking, fluoropolymer cable ties suitable for ducts or plenums; and other spaces used for environmental air.
 - 1. Flammability Rating: UL94V-0.

2. Minimum Width: 3/16 inch .
 3. Tensile Strength: 50 lb, minimum.
 4. Temperature Range: Minus 40 to plus 185 deg F.
 5. Color: Maroon.
- B. Paint: Paint materials and application requirements are specified in Division 09 painting Sections.
- C. Fasteners for Labels and Signs: Self-tapping, stainless-steel screws or stainless-steel machine screws with nuts and flat and lock washers.

PART 3 - EXECUTION

3.1 APPLICATION

- A. Power-Circuit Conductor Identification: For primary and secondary conductors No. 4 AWG and larger in vaults, pull and junction boxes, manholes, and handholes use marker tape. Identify source and circuit number of each set of conductors. For single conductor cables, identify phase in addition to the above.
- B. Branch-Circuit Conductor Identification: Where there are conductors for more than three branch circuits in same junction or pull box, use marker tape. Identify each ungrounded conductor according to source and circuit number.
- C. Conductors to Be Extended in the Future: Attach marker tape to conductors and list source and circuit number.
- D. Auxiliary Electrical Systems Conductor Identification: Identify field-installed alarm, control, and signal connections.
1. Identify conductors, cables, and terminals in enclosures and at junctions, terminals, and pull points. Identify by system and circuit designation.
 2. Use system of marker tape designations that is uniform and consistent with system used by manufacturer for factory-installed connections.
 3. Coordinate identification with Project Drawings, manufacturer's wiring diagrams, and Operation and Maintenance Manual.
- E. Warning Labels for Indoor Cabinets, Boxes, and Enclosures for Power and Lighting: Comply with 29 CFR 1910.145 and apply baked-enamel or metal-backed, butyrate warning signs. Identify system voltage with black letters on an orange background. Apply to exterior of door, cover, or other access.
1. Equipment with Multiple Power or Control Sources: Apply to door or cover of equipment including, but not limited to, the following:
 - a. Power transfer switches.
 - b. Controls with external control power connections.
 2. Equipment Requiring Workspace Clearance According to NFPA 70: Unless otherwise indicated, apply to door or cover of equipment but not on flush panelboards and similar equipment in finished spaces.
- F. Instruction Signs:
1. Operating Instructions: Install instruction signs to facilitate proper operation and maintenance of electrical systems and items to which they connect. Install instruction signs with approved legend where instructions are needed for system or equipment operation.
 2. Emergency Operating Instructions: Install instruction signs with white legend on a red background with minimum 3/8-inch- high letters for emergency instructions at equipment used for power transfer.
- G. Factory installed nameplates. All equipment shall have a factory installed nameplates. Do not install nameplates inside of the equipment. Nameplate shall be metal. Provide the following information on the exterior of panel or inside the door.
1. UL listing.
 2. Name of manufacturer

3. Ampere and voltage rating and phasing
 4. Short circuit rating
- H. Equipment Identification Labels: On each unit of equipment, install unique designation label that is consistent with drawings, wiring diagrams, schedules, and Operation and Maintenance Manual. Apply labels to disconnect switches and protection equipment, central or master units, control panels, control stations, terminal cabinets, and racks of each system. Systems include power, lighting, control, signal, monitoring, and alarm systems unless equipment is provided with its own identification.
1. Labeling Instructions:
 - a. Indoor Equipment: Unless otherwise indicated, provide a single line of text with 1/2-inch- high letters on 1-1/2-inch- high label; where 2 lines of text are required, use labels 2 inches high.
 - 1) For single-gang motor starting switches use 3/8-inch high letters on 3/4-inch high by 2.25-inch wide label.
 - 2) For two-gang motor starting switches, use 3/8-inch high letters on 3/4-inch high by 4 inch wide label.
 - b. Elevated Components: Increase sizes of labels and letters to those appropriate for viewing from the floor.
 - c. (For example) PANEL 1AL1, 1AL2.
 2. Equipment to Be Labeled:
 - a. Panelboards, electrical cabinets, and enclosures.
 - b. Access doors and panels for concealed electrical items.
 - c. Electrical switchgear and switchboards.
 - d. Transformers.
 - e. Electrical substations.
 - f. Emergency system boxes and enclosures.
 - g. Motor-control centers.
 - h. Disconnect switches.
 - i. Enclosed circuit breakers.
 - j. Motor starters.
 - k. Push-button stations.
 - l. Power transfer equipment.(Identify "Emergency" and "Optional Standby")
 - m. Contactors.
 - n. Remote-controlled switches, dimmer modules, and control devices.
 - o. Battery inverter units.
 - p. Battery racks.
 - q. Power-generating units.
 - r. Uninterruptible power supply equipment.
- I. Electrical Energy Source Identification Labels: On each unit of equipment, install unique label to identify the energy source that is consistent with drawings, wiring diagrams, schedules, and Operation and Maintenance Manual. Apply labels to disconnect switches and protection equipment, central or master units, control panels, control stations, terminal cabinets, and racks of each system. Systems include power, lighting, control, signal, monitoring, and alarm systems unless equipment is provided with its own identification.
1. Labeling Instructions:
 - a. Indoor Equipment: Unless otherwise indicated, provide a single line of text with 3/8-inch- high letters on 3/4-inch- high label; where 2 lines of text are required, use labels 1.5 inches high.
 - b. (For example) FED FROM MAIN SWITCHBOARD MSBL.
 2. Equipment to Be Labeled:
 - a. Panelboards, electrical cabinets, and enclosures.
 - b. Electrical switchgear and switchboards.
 - c. Transformers.
 - d. Electrical substations.
 - e. Emergency system boxes and enclosures.
 - f. Motor-control centers.
 - g. Disconnect switches.
 - h. Enclosed circuit breakers.

- i. Motor starters.
 - j. Power transfer equipment.
 - k. Contactors.
 - l. Battery inverter units.
 - m. Battery racks.
 - n. Voice and data cable terminal equipment.
 - o. Master clock and program equipment.
 - p. Intercommunication equipment.
 - q. Audio components, racks, and controls.
 - r. Fire-alarm control panel and annunciators.
 - s. Security and intrusion-detection control stations, control panels, terminal cabinets, and racks.
 - t. Monitoring and control equipment.
 - u. Uninterruptible power supply equipment.
 - v. Terminals, racks, and patch panels for voice and data communication and for signal and control functions.
 - w. Junction boxes and pull boxes with covers larger than 5-by-5-inches.
3. For wiring devices: On inside (back) of cover plate, write the panel name for energy source and circuit number with permanent, indelible ink.
 4. For small Pull Boxes, and small Junction Boxes (less than 5-by-5-inches): On front of cover plate, write the panel name for energy source and circuit number with permanent, indelible ink.
- J. Nominal System Voltage Identification Labels: On each unit of equipment, install unique nominal system voltage and color-coding label that is consistent with drawings, wiring diagrams, schedules, and Operation and Maintenance Manual.
1. Labeling Instructions:
 - a. Indoor Equipment: Unless otherwise indicated, provide a single line of text with 3/8-inch- high letters on 3/4-inch- high label; where 2 lines of text are required, use labels 1.5 inches high.
 - b. (For example) 208/120 V, 3 PH-4W
 2. Equipment to Be Labeled:
 - a. Panelboards.
 - b. Electrical switchgear and switchboards.
 - c. Motor-control centers.
 - d. Safety switches used for service entrance disconnecting means or in mechanical rooms.
 - e. Power transfer equipment
 - f. Generators
- K. Combined equipment labels. When required above a single nameplate can be created for all required information. The equipment identification label **MUST** appear on the first line and shall be notably larger font than the rest of the information, and all information shall appear on a separate line. (For example)

PANEL 1AL1
 208/120 V, 3 PH-4W
 FED FROM MAIN SWITCHBOARD MSBL

- L. Panelboard Circuit Directories: Provide type-written or laser printed circuit directory on heavy card stock. Arrange in two columns with odd numbered circuits on left and even numbered circuits on right. Include panelboard identification at the top and installation date. Indicate spare circuit breakers: "SPARE". Install in metal frame with clear plastic cover over directory. Handwritten directories are not acceptable. Indicating the load description for all circuit numbers installed.
- M. Feeder and Branch Circuit Load Identification Labels: On each overcurrent protective device, install unique load designation label that is consistent with drawings, wiring diagrams, schedules, and Operation and Maintenance Manual.
1. Labeling Instructions:

- a. Panelboard Circuit Directories: Provide type-written or laser printed circuit directory on heavy card stock. Arrange in two columns with odd numbered circuits on left and even numbered circuits on right. Include panelboard identification at the top and installation date. Indicate spare circuit breakers: "SPARE". Install in metal frame with clear plastic cover over directory. Handwritten directories are not acceptable. Indicating the load description for all circuit numbers installed.
 - b. Lighting and Appliance Branch-Circuit Panelboards: Use room names and numbers furnished by Owner for the actual room numbers. **Do not** use room names and numbers indicated on Contract Drawings. Load description shall identify each circuit number with its clear, evident, and specific purpose. Load description shall include sufficient detail to allow each circuit to be distinguished from all others.
- N. GFI receptacles: Provide a self adhesive, factory furnished label on receptacles cover plate, "Protected from ground fault device" (or words to that effect). Apply for all **standard** receptacles that are fed from a ground fault circuit interrupting breaker or fed downstream from a ground fault circuit interrupting receptacle (as a thru feed device).

3.2 INSTALLATION

- A. Verify identity of each item before installing identification products.
- B. Location: Install identification materials and devices at locations for most convenient viewing without interference with operation and maintenance of equipment.
- C. Apply identification devices to surfaces that require finish after completing finish work.
- D. Attach signs and plastic labels with screws and auxiliary hardware appropriate to the location and substrate.
- E. Color-Coding for Phase and Voltage Level Identification, 600 V and Less: Use the colors listed below for ungrounded service, feeder, and branch-circuit conductors.
 - 1. Color shall be factory applied or, for sizes larger than No. 6 AWG if authorities having jurisdiction permit, field applied.
 - 2. Colors for 208/120-V Circuits:
 - a. Phase A: Black.
 - b. Phase B: Red.
 - c. Phase C: Blue.
 - d. Neutral: White.
 - e. Ground: Green.
 - 3. Colors for 480/277-V Circuits:
 - a. Phase A: Brown.
 - b. Phase B: Orange.
 - c. Phase C: Yellow.
 - d. Neutral: Gray.
 - e. Ground: Green.
 - 4. Field-Applied, Color-Coding Conductor Tape: Apply in half-lapped turns for a minimum distance of 6 inches from terminal points and in boxes where splices or taps are made. Apply last two turns of tape with no tension to prevent possible unwinding. Locate bands to avoid obscuring factory cable markings.
- F. Painted Identification: Prepare surface and apply paint according to Division 09 painting Sections.

END OF SECTION 26 05 53

SECTION 26 22 00 - LOW-VOLTAGE TRANSFORMERS

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the following types of dry-type transformers rated 600 V and less, with capacities up to 1000 kVA:
 - 1. Distribution transformers.

1.2 SUBMITTALS

- A. Shop Drawings: Detail equipment assemblies and indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
 - 1. Wiring Diagrams: Power, signal, and control wiring.
- B. Quality Assurance/Control Submittals:
 - 1. Product Data: Include rated nameplate data, capacities, weights, dimensions, minimum clearances, installed devices and features, and performance for each type and size of transformer indicated.
 - 2. Source quality-control test reports.
 - 3. Field quality-control test reports.

1.3 CLOSEOUT DOCUMENTS

- A. General: Closeout Submittals are to be submitted with O and M Manuals only. Do not submit with other ACTION and INFORMATIONAL Submittals:
 - 1. Operation and Maintenance Data: For transformers to include in emergency, operation, and maintenance manuals.

1.4 QUALITY ASSURANCE

- A. Source Limitations: Obtain each transformer type through one source from a single manufacturer.
- B. 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.
- C. Comply with IEEE C57.12.91, "Test Code for Dry-Type Distribution and Power Transformers."

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Temporary Heating: Apply temporary heat according to manufacturer's written instructions within the enclosure of each ventilated-type unit, throughout periods during which equipment is not energized and when transformer is not in a space that is continuously under normal control of temperature and humidity.

1.6 COORDINATION

- A. Coordinate installation of wall-mounting and structure-hanging supports with actual transformer provided.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. In other Part 2 articles where title below introduces lists, the following requirement applies for product selection:
 - 1. Manufacturers: Subject to compliance with requirements, provide products by the manufacturers specified.
- B. Products of other manufacturers will be considered for acceptance only when allowed in Section 260050, General Electrical Requirements.

2.2 GENERAL TRANSFORMER REQUIREMENTS

- A. Description: Factory-assembled and -tested, air-cooled units for 60-Hz service.
- B. Cores: Grain-oriented, non-aging silicon steel.
- C. Coils: Continuous windings without splices except for taps.
 - 1. Internal Coil Connections: Brazed or pressure type.
 - 2. Coil Material: Aluminum or copper.

2.3 DISTRIBUTION TRANSFORMERS

- A. Manufacturers:
 - 1. ACME Electric Corporation; Power Distribution Products Division.
 - 2. Eaton Corporation; Cutler-Hammer Products.
 - 3. Federal Pacific Transformer Company; Division of Electro-Mechanical Corporation.
 - 4. Hammond Co.; Matra Electric, Inc.
 - 5. Jefferson Electric.
 - 6. Siemens Energy & Automation, Inc.
 - 7. Sola/Hevi-Duty.
 - 8. Square D; Schneider Electric.
- B. Comply with NEMA ST 20 and list and label as complying with UL 1561.
- C. Cores: One leg per phase.
- D. Indoor Enclosure: Ventilated, NEMA 250, Type 2.
- E. Outdoor Enclosure: Ventilated, NEMA 250, Type 3R.
 - 1. Core and coil shall be encapsulated within resin compound, sealing out moisture and air.
- F. Taps for Transformers Smaller Than 3 kVA: None.
- G. Taps for Transformers 7.5 to 24 kVA: Two 5 percent taps below normal full capacity.
- H. Taps for Transformers 25 kVA and Larger: Two 2.5 percent taps above and four 2.5 percent taps below normal full capacity.
- I. Insulation Class for Transformers Rated 14 kVA and Smaller: 180 deg C, UL-component-recognized insulation system with a maximum of 115 deg C rise above 40 deg C ambient temperature.
- J. Insulation Class for Transformers Rated 15 kVA and Larger: 220 deg C, UL-component-recognized insulation system with a maximum of 150 deg C rise above 40 deg C ambient temperature.
- K. Wall Brackets: Manufacturer's standard brackets.

- L. Low-Sound-Level Requirements: Minimum of 3 dBA less than NEMA ST 20 standard sound levels when factory tested according to IEEE C57.12.91.
- M. Terminal Boards: Provide top or bottom mounted terminal boards for transformers rated 25 kVA and larger. Loose leads are not acceptable.
- N. Equipment lugs: Provide a mechanical ground lug to the transformer enclosure. In addition, provide a separate ground bar inside the transformer enclosure from termination of all grounding conductors. Refer to grounding details on drawings for location of neutral bonding jumper and method of installation for separately derived systems.
- O. Three-Phase Transformer Minimum Impedance Requirements, Percent Z:
 - 1. 15 kVA: 5.0.
 - 2. 30 kVA: 4.9.
 - 3. 45 kVA: 4.8.
 - 4. 75 kVA: 4.4.
 - 5. 112.5 kVA: 3.9.
 - 6. 150 kVA: 4.4.
 - 7. 225 kVA: 3.9.
 - 8. 300 kVA: 5.5.
 - 9. 500 kVA: 6.0.
 - 10. 750 kVA: 5.4.

2.4 IDENTIFICATION DEVICES

- A. Nameplates: Engraved, laminated-plastic or metal nameplate for each transformer, mounted with corrosion-resistant screws. Nameplates and label products are specified in Division 26 Section "Identification for Electrical Systems."

2.5 SOURCE QUALITY CONTROL

- A. Test and inspect transformers according to IEEE C57.12.91.
- B. Factory Sound-Level Tests: Conduct sound-level tests on equipment for this Project.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine conditions for compliance with enclosure- and ambient-temperature requirements for each transformer.
- B. Verify that field measurements are as needed to maintain working clearances required by NFPA 70 and manufacturer's written instructions.
- C. Examine walls, floors, roofs, and concrete bases for suitable mounting conditions where transformers will be installed.
- D. Verify that ground connections are in place and requirements in Division 26 Section "Grounding and Bonding for Electrical Systems" have been met. Maximum ground resistance shall be 5 ohms at location of transformer.
- E. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Comply with NECA 409.
- B. Install wall-mounting transformers level and plumb with wall brackets fabricated by transformer manufacturer.

3.3 CONNECTIONS

- A. Ground equipment according to Division 26 Section "Grounding and Bonding for Electrical Systems."
- B. Connect wiring according to Division 26 Section "Low-Voltage Electrical Power Conductors and Cables."

3.4 FIELD QUALITY CONTROL

- A. Perform tests and inspections and prepare test reports.
- B. Tests and Inspections:
 - 1. Perform each visual and mechanical inspection and electrical test stated in NETA Acceptance Testing Specification. Certify compliance with test parameters.
- C. Remove and replace units that do not pass tests or inspections and retest as specified above.
- D. Test Labeling: On completion of satisfactory testing of each unit, attach a dated and signed "Satisfactory Test" label to tested component.

3.5 ADJUSTING

- A. Record transformer secondary voltage at each unit for at least 48 hours of typical occupancy period. Adjust transformer taps to provide optimum voltage conditions at secondary terminals. Optimum is defined as not exceeding nameplate voltage plus 10 percent and not being lower than nameplate voltage minus 3 percent at maximum load conditions. Submit recording and tap settings as test results.
- B. Connect buck-boost transformers to provide nameplate voltage of equipment being served, plus or minus 5 percent, at secondary terminals.
- C. Output Settings Report: Prepare a written report recording output voltages and tap settings.

3.6 CLEANING

- A. Vacuum dirt and debris; do not use compressed air to assist in cleaning.

END OF SECTION 26 22 00

SECTION 26 24 16 - PANELBOARDS

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. Lighting and appliance branch-circuit panelboards.

1.3 DEFINITIONS

- A. EMI: Electromagnetic interference.
- B. GFCI: Ground-fault circuit interrupter.
- C. RFI: Radio-frequency interference.

1.4 SUBMITTALS

- A. Shop Drawings: For each panelboard and related equipment.
 - 1. Dimensioned plans, elevations, sections, and details. Show tabulations of installed devices, equipment features, and ratings. Include the following:
 - a. Enclosure types and details for types other than NEMA 250, Type 1.
 - b. Bus configuration, current, and voltage ratings.
 - c. Short-circuit current rating of panelboards and overcurrent protective devices.
 - d. Features, characteristics, ratings, and factory settings of individual overcurrent protective devices and auxiliary components.
 - 2. Wiring Diagrams: Power, signal, and control wiring.
- B. Quality Assurance/Control Submittals:
 - 1. Product Data: For each type of panelboard, overcurrent protective device, surge protective device, accessory, and component indicated. Include dimensions and manufacturers' technical data on features, performance, electrical characteristics, ratings, and finishes.
 - 2. Field quality-control test reports including the following:
 - a. Test procedures used.
 - b. Test results that comply with requirements.
 - c. Results of failed tests and corrective action taken to achieve test results that comply with requirements.
 - 3. Panelboard Schedules: For installation in panelboards.

1.5 CLOSEOUT DOCUMENTS

- A. General: Closeout Submittals are to be submitted with O and M Manuals only. Do not submit with other ACTION and INFORMATIONAL Submittals:
 - 1. Operation and Maintenance Data: For panelboards and components to include in emergency, operation, and maintenance manuals. In addition to items specified in Division 01 Section "Operation and Maintenance Data," include the following:
 - a. Manufacturer's written instructions for testing and adjusting overcurrent protective devices.
 - b. Time-current curves, including selectable ranges for each type of overcurrent protective device.
 - 2. Extra Materials: Receipt for extra materials.

1.6 QUALITY ASSURANCE

- A. Source Limitations: Obtain panelboards, overcurrent protective devices, components, and accessories through one source from a single manufacturer.
- B. Product Options: Drawings indicate size, profiles, and dimensional requirements of panelboards and are based on the specific system indicated. Refer to Division 01 Section "Product Requirements."
- C. 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.
- D. Comply with NEMA PB 1.
- E. Comply with NFPA 70.

1.7 PROJECT CONDITIONS

- A. Environmental Limitations: Rate equipment for continuous operation under the following conditions, unless otherwise indicated:
 - 1. Ambient Temperature: Not exceeding 104 deg F.
 - 2. Altitude: Not exceeding 6600 feet.

1.8 COORDINATION

- A. Coordinate layout and installation of panelboards and components with other construction that penetrates walls or is supported by them, including electrical and other types of equipment, raceways, piping, and encumbrances to workspace clearance requirements.
- B. Coordinate size and location of concrete bases. Cast anchor-bolt inserts into bases. Concrete, reinforcement, and formwork requirements are specified in Division 03.

1.9 WARRANTY

- A. Special Warranty for Surge Protective Devices: Manufacturer's standard form in which manufacturer agrees to repair or replace components that fail in materials or workmanship within specified warranty period.
 - 1. Warranty Period: 5 years from date of Substantial Completion.

1.10 EXTRA MATERIALS

- A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Keys: Six spares for each type of panelboard cabinet lock.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Eaton Corporation; Cutler-Hammer Products.
 - 2. Siemens Energy & Automation, Inc.
 - 3. Square D; Schneider Electric.
- B. Products of other manufacturers will be considered for acceptance only when allowed in Section 260050, General Electrical Requirements.

2.2 MANUFACTURED UNITS

- A. Fabricate and test panelboards according to IEEE 344 to withstand seismic forces defined in Division 26 Section "Vibration and Seismic Controls for Electrical Systems."
- B. Enclosures: Flush- and surface-mounted cabinets. NEMA PB 1, Type 1.
 - 1. Rated for environmental conditions at installed location.
 - a. Outdoor Locations: NEMA 250, Type 3R.
 - b. Kitchen Areas: NEMA 250, Type 4X, stainless steel.
 - c. Other Wet or Damp Indoor Locations: NEMA 250, Type 4.
 - 2. Front: Secured to box with concealed trim clamps. For surface-mounted fronts, match box dimensions; for flush-mounted fronts, overlap box.
 - 3. Skirt for Surface-Mounted Panelboards: Same gage and finish as panelboard front with flanges for attachment to panelboard, wall, and ceiling or floor.
 - 4. Finish: Manufacturer's standard enamel finish over corrosion-resistant treatment or primer coat.
 - 5. Directory Card: With transparent protective cover, mounted in metal frame, inside panelboard door.
- C. Phase and Ground Buses:
 - 1. Material: Hard-drawn copper, 98 percent conductivity; or tin-plated aluminum.
 - 2. Equipment Ground Bus: Adequate for feeder and branch-circuit equipment ground conductors; bonded to box.
 - 3. Split Bus: Vertical buses divided into individual vertical sections.
- D. Conductor Connectors: Suitable for use with conductor material.
 - 1. Main and Neutral Lugs: Mechanical type.
 - 2. Ground Lugs and Bus Configured Terminators: Mechanical type.
 - 3. Feed-Through Lugs: Mechanical type suitable for use with conductor material. Locate at opposite end of bus from incoming lugs or main device.

2.3 PANELBOARD SHORT-CIRCUIT RATING

- A. Short-Circuit Current Rating: Provide 10,000 RMS symmetrical, ampere AIC ratings.
 - 1. Series-connected ratings are not permitted.

2.4 LIGHTING AND APPLIANCE BRANCH-CIRCUIT PANELBOARDS

- A. Doors: Concealed hinges; secured with flush latch with tumbler lock; keyed alike.
- B. Main Overcurrent Devices: Thermal-magnetic circuit breaker.
- C. Branch Overcurrent Protective Devices: Bolt-on circuit breakers, replaceable without disturbing adjacent units.
- D. Circuit Identification: Panelboards shall have each circuit number permanently identified, factory installed label, adjacent to breaker. Identification shall stamped into trim or installed engraved circuit numbers or paper labels. If paper labels are used, they must be covered with a continuous, clear, self adhesive, protective plastic sheet.

2.5 OVERCURRENT PROTECTIVE DEVICES

- A. Molded-Case Circuit Breaker: UL 489, with interrupting capacity to meet available fault currents.
 - 1. Thermal-Magnetic Circuit Breakers: Inverse time-current element for low-level overloads, and instantaneous magnetic trip element for short circuits. Adjustable magnetic trip setting for circuit-breaker frame sizes 250 A and larger.
 - 2. Adjustable Instantaneous-Trip Circuit Breakers: Magnetic trip element with front-mounted, field-adjustable trip setting.
 - 3. GFCI Circuit Breakers: Single- and two-pole configurations with 5-mA trip sensitivity.

- B. Molded-Case Circuit-Breaker Features and Accessories: Standard frame sizes, trip ratings, and number of poles.
 - 1. Lugs: Mechanical style, suitable for number, size, trip ratings, and conductor materials.
 - 2. Application Listing: Appropriate for application; Type SWD for switching fluorescent lighting loads; Type HACR for heating, air-conditioning, and refrigerating equipment.
 - 3. Ground-Fault Protection: Integrally mounted relay and trip unit with adjustable pickup and time-delay settings, push-to-test feature, and ground-fault indicator.
 - 4. Shunt Trip: 120-V trip coil energized from separate circuit, set to trip at 55 percent of rated voltage.
- C. Fused Switch: NEMA KS 1, Type HD; clips to accommodate specified fuses; lockable handle.
- D. Fuses are specified in Division 26 Section "Fuses."

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Comply with NECA 407.
- B. Install panelboards and accessories according to NEMA PB 1.1.
- C. Comply with mounting and anchoring requirements specified in Division 26 Section "Vibration and Seismic Controls for Electrical Systems."
- D. Mount top of trim 74 inches above finished floor, unless otherwise indicated.
- E. Mount plumb and rigid without distortion of box. Mount recessed panelboards with fronts uniformly flush with wall finish.
- F. Install overcurrent protective devices and controllers.
 - 1. Set field-adjustable switches and circuit-breaker trip ranges.
- G. Install filler plates in unused spaces.
- H. Arrange conductors in gutters into groups and bundle and wrap with wire ties.
- I. Panelboards shall not be used as junction boxes, auxiliary gutters, or raceways for conductors feeding through or tapping off to other switches or overcurrent devices. Splices shall not be allowed in any panelboard. Phase conductors shall terminate on breakers and then leave the panelboard either grouped in three phase configuration or with associated neutrals and routed into the branch circuit conduit out to the load.

3.2 IDENTIFICATION

- A. Refer to Division 260533 Section "Identification for Electrical Systems." Provide all identification for field-installed conductors in panels, labels, nameplates, warning signs, etc. including, but not limited to:
 - 1. Equipment Identification Label
 - 2. Nominal System Voltage Identification Label
 - 3. Electrical Energy Source Identification Label
 - 4. Panelboards shall have circuit Directories
 - 5. Distribution Panelboards shall have Load Identification Labels for each Feeder and Branch Circuit
- B. Provide Factory installed nameplates.

3.3 CONNECTIONS

- A. Ground equipment according to Division 26 Section "Grounding and Bonding for Electrical Systems."
- B. Connect wiring according to Division 26 Section "Low-Voltage Electrical Power Conductors and Cables."

3.4 FIELD QUALITY CONTROL

- A. Prepare for acceptance tests as follows:
 - 1. Test insulation resistance for each panelboard bus, component, connecting supply, feeder, and control circuit.
 - 2. Test continuity of each circuit.
- B. Perform the following field tests and inspections and prepare test reports:
 - 1. Perform each electrical test and visual and mechanical inspection stated in NETA ATS, Section 7.5 for switches and Section 7.6 for molded-case circuit breakers. 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.

3.5 CLEANING

- A. On completion of installation, inspect interior and exterior of panelboards. Remove paint splatters and other spots. Repair exposed surfaces to match original finish.
- B. Vacuum interior of panels to remove dirt and debris; do not use compressed air to assist in cleaning.

END OF SECTION 26 24 16

SECTION 26 27 26 - WIRING DEVICES

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. Receptacles, receptacles with integral GFCI, and associated device plates.
 - 2. Twist-locking receptacles.
 - 3. Snap switches.
- B. Related Sections include the following:
 - 1. Division 26 Section "Conduit and Boxes for Electrical Systems" for conduit and boxes.

1.3 DEFINITIONS

- A. GFCI: Ground-fault circuit interrupter.
- B. Pigtail: Short lead used to connect a device to a branch-circuit conductor.

1.4 CLOSEOUT DOCUMENTS

- A. General: Closeout Submittals are to be submitted with O and M Manuals only. Do not submit with other ACTION and INFORMATIONAL Submittals:
 - 1. Operation and Maintenance Data: For wiring devices to include in all manufacturers' packing label warnings and instruction manuals that include labeling conditions.

1.5 QUALITY ASSURANCE

- A. Source Limitations: Obtain each type of wiring device and associated wall plate through one source from a single manufacturer. Insofar as they are available, obtain all wiring devices and associated wall plates from a single manufacturer and one source.
- B. 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.
- C. Comply with NFPA 70.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers' Names: Shortened versions (shown in parentheses) of the following manufacturers' names are used in other Part 2 articles:
 - 1. Arrow Hart/Cooper Wiring Devices; a division of Cooper Industries, Ltd. (Arrow Hart).
 - 2. Hubbell Incorporated; Bryant Electric (Bryant).
 - 3. Hubbell Incorporated; Wiring Device-Kellems (Hubbell).
 - 4. Leviton Mfg. Co., Inc. (Leviton).
 - 5. Pass & Seymour/Legrand; Wiring Devices & Accessories (Pass & Seymour).
- B. Products of other manufacturers will be considered for acceptance only when allowed in Section 260050, General Electrical Requirements.

- C. All wiring devices in this building shall be supplied from the same manufacturer. Use of multiple manufactures of wiring devices in the same building is not allowed.

2.2 STRAIGHT BLADE RECEPTACLES

- A. Convenience Receptacles, 125 V, 20 A: Comply with NEMA WD 1, NEMA WD 6 configuration 5-20R, DSCC W C 596G, and UL 498.
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Arrow Hart; 5361 (single), AH5362 (duplex).
 - b. Bryant; 5361 (single), BRY5362 (duplex).
 - c. Hubbell; HBL5361 (single), HBL5362 (duplex).
 - d. Leviton; 5361 (single), 5362 (duplex).
 - e. Pass & Seymour; 5361 (single), 5362-A (duplex), PT5362A (duplex, with separable pigtailed connector).

2.3 GFCI RECEPTACLES

- A. General Description: Straight blade, feed-through type. Comply with NEMA WD 1, NEMA WD 6, UL 498, and UL 943, Class A, and include indicator light that is lighted when device is tripped.
- B. Duplex GFCI Convenience Receptacles, 125 V, 20 A:
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Arrow Hart; VGF20.
 - b. Bryant; GF20L.
 - c. Hubbell; GF20L.
 - d. Leviton; 7899.
 - e. Pass & Seymour; 2095, or PT2095 (with separable pigtailed connector).
- C. Listed Weather-Resistant Type Duplex GFCI Convenience Receptacles, 125 V, 20 A:
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Arrow Hart; WRVGF20.
 - b. Hubbell; GFTR20.
 - c. Pass & Seymour; 2095-TRWR.

2.4 SNAP SWITCHES

- A. Comply with NEMA WD 1, DSCC W C 896F, and UL 20.
- B. Switches, 120/277 V, 20 A:
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Arrow Hart; AH1221 (single pole), AH1222 (two pole), AH1223 (three way), AH1224 (four way).
 - b. Bryant; 4901 (single pole), 4902 (two pole), 4903 (three way), 4904 (four way).
 - c. Hubbell; HBL1221 (single pole), HBL1222 (two pole), HBL1223 (three way), HBL2224 (four way).
 - d. Leviton; 1221-2 (single pole), 1222-2 (two pole), 1223-2 (three way), 1224-2 (four way).
 - e. Pass & Seymour; PS20AC1 (single pole), PS20AC2 (two pole), PS20AC3 (three way), PS20AC4 (four way).

2.5 WALL PLATES

- A. Single and combination types to match corresponding wiring devices.
 - 1. Plate-Securing Screws: Metal with head color to match plate finish.
 - 2. Material for Finished Spaces: 0.035-inch- thick, medium size, satin-finished stainless steel.
 - 3. Material for Unfinished Spaces: Galvanized steel.
 - 4. Material for Damp Locations: Cast aluminum with spring-loaded lift cover, and listed and labeled for use in "wet locations."

- B. Wet-Location, Weatherproof Cover Plates: NEMA 250, complying with type 3R weather-resistant, die-cast aluminum with lockable cover.

2.6 FINISHES

- A. Color: Wiring device catalog numbers in Section Text do not designate device color. Color as defined by NEMA WD 1 unless otherwise indicated.
 - 1. Wiring Devices Connected to Normal Power System: Gray, unless otherwise indicated or required by NFPA 70 or device listing.
 - 2. Wiring Devices Connected to Emergency Power System: Red.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Comply with NECA 1.
- B. Coordination with Other Trades:
 - 1. Take steps to insure that devices and their boxes are protected. Do not place wall finish materials over device boxes and do not cut holes for boxes with routers that are guided by riding against outside of the boxes.
 - 2. Keep outlet boxes free of plaster, drywall joint compound, mortar, cement, concrete, dust, paint, and other material that may contaminate the raceway system, conductors, and cables.
 - 3. Install device boxes in brick or block walls so that the cover plate does not cross a joint unless the joint is troweled flush with the face of the wall.
 - 4. Install wiring devices after all wall preparation, including painting, is complete.
- C. Conductors:
 - 1. Do not strip insulation from conductors until just before they are spliced or terminated on devices.
 - 2. Strip insulation evenly around the conductor using tools designed for the purpose. Avoid scoring or nicking of solid wire or cutting strands from stranded wire.
 - 3. The length of free conductors at outlets for devices shall meet provisions of NFPA 70, Article 300, without pigtails.
 - 4. Existing Conductors:
 - a. Cut back and pigtail, or replace all damaged conductors.
 - b. Straighten conductors that remain and remove corrosion and foreign matter.
 - c. Pigtailing existing conductors is permitted provided the outlet box is large enough.
- D. Device Installation:
 - 1. Replace all devices that have been in temporary use during construction or that show signs that they were installed before building finishing operations were complete.
 - 2. Keep each wiring device in its package or otherwise protected until it is time to connect conductors.
 - 3. Do not remove surface protection, such as plastic film and smudge covers, until the last possible moment.
 - 4. Connect devices to branch circuits using pigtails that are not less than 6 inches in length.
 - 5. Connect grounding terminals of devices to device box and equipment grounding conductor using pigtails that are not less than 6 inches in length with factory-crimped flanged spade and ring terminals.
 - 6. When using side wiring with binding-head screw terminals, use solid conductor pigtails. Wrap conductor tightly clockwise, 2/3 to 3/4 of the way around terminal screw.
 - 7. Use a torque screwdriver when a torque is recommended or required by the manufacturer.
 - 8. When conductors larger than No. 12 AWG are installed on 15- or 20-A circuits, splice No. 12 AWG pigtails for device connections.
 - 9. Tighten unused terminal screws on the device.
 - 10. When mounting into metal boxes, remove the fiber or plastic washers used to hold device mounting screws in yokes, allowing metal-to-metal contact.
 - 11. Install device boxes so that finish plates do not span different types of building finishes.

- E. Receptacle Orientation:
 - 1. Install ground pin of vertically mounted receptacles up, and on horizontally mounted receptacles to the left.
- F. Device Plates:
 - 1. Install blank device plates on unused device boxes.
 - 2. Repair wall finishes and remount outlet boxes when standard device plates do not fit flush or do not cover rough wall opening. Do not use oversized or extra-deep plates, unless approved by engineer.
- G. Arrangement of Devices: Unless otherwise indicated, mount flush, with long dimension vertical and with grounding terminal of receptacles on top. Group adjacent switches under single, multigang wall plates.
- H. Securely install multioutlet assemblies with screws and anchors. Comply with Division 26 Section "Hangers and Supports for Electrical Systems."
- I. GFCI Receptacles: Where double-duplex GFCI receptacles are indicated, provide one duplex GFCI receptacle and feed-through to standard straight blade convenience receptacle in same device box.
 - 1. Unless indicated otherwise, do not feed-through to receptacles in other device boxes.
- J. Mounting Heights: Refer to drawings for mounting heights. If heights are not shown on drawings, install as follows. Measured from finished floor to bottom of outlet or device box, unless indicated otherwise.
 - 1. General Use Receptacles: 16 inches.
 - 2. Snap Switches, Wall-Box Dimmers, Wall-Switch Sensors: 44 inches.
 - a. Install on strike side of door, 6 to 12 inches from door, unless otherwise indicated.
 - 3. Receptacles in Mechanical and Electrical Equipment Rooms: 48 inches.
 - 4. Recessed Motor Controls: 56 inches.
 - 5. Pushbuttons: 44 inches.
 - 6. Occupant Adjustable Thermostats: 44 inches.
 - 7. Sensor Only Thermostats: 56 inches.
 - 8. Fire Alarm Manual Stations: 44 inches.
 - a. Install within 5'-0" of door.
 - b. Install no higher than 48 inches to top of device.
 - 9. Fire Alarm Notification Appliances: 80 inches, or 6 inches below ceiling. Whichever is lower.

3.2 IDENTIFICATION

- A. Comply with Division 26 05 53 Section "Identification for Electrical Systems" for the following:
 - 1. Receptacles: Identify panelboard and circuit number from which each receptacle is served.

END OF SECTION 26 27 26

SECTION 26 28 13 - FUSES

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. Cartridge fuses rated 600 V and less.

1.3 CLOSEOUT DOCUMENTS

- A. General: Closeout Submittals are to be submitted with O and M Manuals only. Do not submit with other ACTION and INFORMATIONAL Submittals:
 - 1. Operation and Maintenance Data: For fuses to include in emergency, operation, and maintenance manuals.
 - a. In addition to items specified in Division 01 Section "Operation and Maintenance Data," include the following:
 - 1) Let-through current curves for fuses with current-limiting characteristics.
 - 2) Time-current curves, coordination charts and tables, and related data.
 - 2. Extra Materials: Receipt for extra materials.

1.4 QUALITY ASSURANCE

- A. Source Limitations: Obtain fuses from a single manufacturer.
- B. 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.
- C. Comply with NEMA FU 1.
- D. Comply with NFPA 70.

1.5 PROJECT CONDITIONS

- A. Where ambient temperature to which fuses are directly exposed is less than 40 deg F or more than 100 deg F, apply manufacturer's ambient temperature adjustment factors to fuse ratings.

1.6 COORDINATION

- A. Coordinate fuse ratings with utilization equipment nameplate limitations of maximum fuse size.

1.7 EXTRA MATERIALS

- A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Fuses: Quantity equal to 10 percent of each fuse type and size, but no fewer than 3 of each type and size.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Cooper Bussman, Inc.
 - 2. Mersen; (previously Ferraz Shawmut).
 - 3. Tracor, Inc.; Littelfuse, Inc. Subsidiary.
- B. Products of other manufacturers will be considered for acceptance only when allowed in Section 260050, General Electrical Requirements.

2.2 CARTRIDGE FUSES

- A. Characteristics: NEMA FU 1, nonrenewable cartridge fuse; class and current rating indicated; voltage rating consistent with circuit voltage.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine utilization equipment nameplates and installation instructions. Install fuses of sizes and with characteristics appropriate for each piece of equipment.
- B. Evaluate ambient temperatures to determine if fuse rating adjustment factors must be applied to fuse ratings.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 FUSE APPLICATIONS

- A. Service Entrance: Class L, time delay.
- B. Feeders: Class L, time delay; or Class J, time delay.
- C. Motor Branch Circuits: Class RK1, time delay.
- D. Other Branch Circuits: Class J, time delay.

3.3 INSTALLATION

- A. Install fuses in fusible devices. Arrange fuses so rating information is readable without removing fuse.

3.4 IDENTIFICATION

- A. Install labels indicating fuse replacement information on inside door of each fused switch.

END OF SECTION 26 28 13

SECTION 26 28 16 - ENCLOSED SWITCHES AND CIRCUIT BREAKERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes the following individually mounted, enclosed switches and circuit breakers:
 - 1. Fusible switches.
 - 2. Nonfusible switches.
 - 3. Enclosures.

1.3 DEFINITIONS

- A. GFCI: Ground-fault circuit interrupter.
- B. HD: Heavy duty.
- C. SPDT: Single pole, double throw.

1.4 CLOSEOUT DOCUMENTS

- A. General: Closeout Submittals are to be submitted with O and M Manuals only. Do not submit with other ACTION and INFORMATIONAL Submittals:
 - 1. Operation and Maintenance Data: For enclosed switches and circuit breakers to include in emergency, operation, and maintenance manuals. In addition to items specified in Division 01 Section "Operation and Maintenance Data," include the following:
 - a. Manufacturer's written instructions for testing and adjusting enclosed switches and circuit breakers.
 - b. Time-current curves, including selectable ranges for each type of circuit breaker.

1.5 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.
- C. Product Selection for Restricted Space: Drawings indicate maximum dimensions for enclosed switches and circuit breakers, including clearances between enclosures, and adjacent surfaces and other items. Comply with indicated maximum dimensions.

1.6 PROJECT CONDITIONS

- A. Environmental Limitations: Rate equipment for continuous operation under the following conditions, unless otherwise indicated:
 - 1. Ambient Temperature: Not less than minus 22 deg F and not exceeding 104 deg F.
 - 2. Altitude: Not exceeding 6600 feet.

1.7 COORDINATION

- A. Coordinate layout and installation of switches, circuit breakers, and components with other construction, including conduit, piping, equipment, and adjacent surfaces. Maintain required workspace clearances and required clearances for equipment access doors and panels.

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. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.
- B. Products of other manufacturers will be considered for acceptance only when allowed in Section 260050, General Electrical Requirements.

2.2 FUSIBLE AND NONFUSIBLE SWITCHES

- A. Manufacturers:
 - 1. Eaton Corporation; Cutler-Hammer Products.
 - 2. Siemens Energy & Automation, Inc.
 - 3. Square D; Schneider Electric.
- B. Fusible Switch, 1200 A and Smaller: NEMA KS 1, Type HD, with clips or bolt pads to accommodate specified fuses, lockable handle with capability to accept two padlocks, and interlocked with cover in closed position. Provide fuses, sized as shown on drawings. Switches shall be two or three pole. Refer to Plan Drawings for location of the following sizes.
 - 1. 30 A, 60 A, 100 A, 200 A, 400 A, 600 A, 800 A, or 1200 A
- C. Nonfusible Switch, 1200 A and Smaller: NEMA KS 1, Type HD, lockable handle with capability to accept two padlocks, and interlocked with cover in closed position. Switches shall be two or three pole. Refer to Plan Drawings for location of the following sizes.
 - 1. 30 A, 60 A, 100 A, 200 A, 400 A, 600 A, 800 A, or 1200 A
- D. Accessories:
 - 1. Equipment Ground Kit: Internally mounted and labeled for copper and aluminum ground conductors.
 - 2. Neutral Kit: Internally mounted; insulated, capable of being grounded, and bonded; and labeled for copper and aluminum neutral conductors.
 - 3. Auxiliary Contact Kit: Auxiliary set of contacts arranged to open before switch blades open.

2.3 ENCLOSURES

- A. NEMA AB 1 and NEMA KS 1 to meet environmental conditions of installed location.
 - 1. General purpose locations: Nema 1
 - 2. Outdoor Locations: NEMA 250, Type 3R.
 - 3. Kitchen Areas: NEMA 250, Type 4X, stainless steel.
 - 4. Other Wet or Damp Indoor Locations: NEMA 250, Type 4.
 - 5. Heavy Industrial locations: Nema 12

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine elements and surfaces to receive enclosed switches and circuit breakers for compliance with installation tolerances and other conditions affecting performance.

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

3.2 INSTALLATION

- A. Comply with applicable portions of NECA 1, NEMA PB 1.1, and NEMA PB 2.1 for installation of enclosed switches and circuit breakers.
- B. Mount individual wall-mounting switches and circuit breakers with tops at uniform height, unless otherwise indicated.

3.3 IDENTIFICATION

- A. Identify field-installed conductors, interconnecting wiring, and components; provide warning signs as specified in Division 26 Section "Identification for Electrical Systems."
- B. Enclosure Nameplates: Label each enclosure with engraved metal or laminated-plastic nameplate as specified in Division 26 Section "Identification for Electrical Systems."

3.4 FIELD QUALITY CONTROL

- A. Prepare for acceptance testing as follows:
 - 1. Inspect mechanical and electrical connections.
 - 2. Verify switch and relay type and labeling verification.
 - 3. Verify rating of installed fuses.
 - 4. Inspect proper installation of type, size, quantity, and arrangement of mounting or anchorage devices complying with manufacturer's certification.
- B. Perform the following field tests and inspections and prepare test reports:
 - 1. Perform each electrical test and visual and mechanical inspection stated in NETA ATS, Section 7.5 for switches and Section 7.6 for molded-case circuit breakers. 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.

3.5 CLEANING

- A. On completion of installation, vacuum dirt and debris from interiors; do not use compressed air to assist in cleaning.
- B. Inspect exposed surfaces and repair damaged finishes.

END OF SECTION 26 28 16

32

DIVISION

EXTERIOR IMPROVEMENTS

SECTION 32 92 00.00 - TURF AND GRASSES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Lawn renovation.

1.2 DEFINITIONS

- A. **Manufactured Soil:** Soil produced off-site by homogeneously blending mineral soils or sand with stabilized organic soil amendments to produce topsoil or planting soil.
- B. **Planting Soil:** Native or imported topsoil, manufactured topsoil, or surface soil modified to become topsoil; mixed with soil amendments.
- C. **Subsoil:** All soil beneath the topsoil layer of the soil profile, and typified by the lack of organic matter and soil organisms.
- D. **Lawn Maintenance:** All materials and operations necessary to establish and maintain a healthy stand of turf following initial seeding operations. Including but not limited to, mowing, fertilization, watering and treatment for weeds, fungus and disease as needed.

1.3 SUBMITTALS

- A. **Product Data:** For each type of product indicated.
- B. **Informational/Quality Assurance/Control Submittals:**
 - 1. **Certification of Grass Seed:** From seed vendor for each grass-seed monostand or mixture stating the botanical and common name and percentage by weight of each species and variety, and percentage of purity, germination, and weed seed. Include the year of production and date of packaging.
 - 2. **Qualification Data:** For qualified landscape Installer.
 - 3. **Product Certificates:** For soil amendments and fertilizers from manufacturer.
 - 4. **Material Test Reports:** For existing surface soil and imported topsoil.
 - 5. **Planting Schedule:** Indicating anticipated planting dates for each type of planting.

1.4 QUALITY ASSURANCE

- A. **Installer Qualifications:** A qualified landscape installer whose work has resulted in successful lawn establishment.
 - 1. **Installer's Field Supervision:** Require Installer to maintain an experienced full-time supervisor on Project site when planting is in progress.
- B. **Soil-Testing Laboratory Qualifications:** An independent laboratory, recognized by the State Department of Agriculture, with the experience and capability to conduct the testing indicated and that specializes in types of tests to be performed.
- C. **Topsoil Analysis:** Furnish soil analysis by a qualified soil-testing laboratory stating percentages of organic matter; gradation of sand, silt, and clay content; cation exchange capacity; deleterious material; pH; and mineral and plant-nutrient content of topsoil.
 - 1. **Report suitability of topsoil for lawn growth.** State-recommended quantities of nitrogen, phosphorus, and potash nutrients and soil amendments to be added to produce satisfactory topsoil.
- D. **Seeds:** Packages of seed shall bear official State or Federal stamps or certificates indicating type, quality, and content of seed packages. Deliver packages unopened. Do not open until observed by Architect/Engineer.

- E. Requirements of Regulatory Agencies: Comply with all Federal and State laws governing fertilizers.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Seed: Deliver seed in original sealed, labeled, and undamaged containers showing weight, certified analysis name and address of manufacturer, and indication of compliance with State and Federal laws, as applicable.
- B. Bulk Materials
 - 1. Do not dump or store bulk materials near structures, utilities, walkways and pavements, or on existing turf areas or plants.
 - 2. Provide erosion-control measures to prevent erosion or displacement of bulk materials, discharge of soil-bearing water runoff, and airborne dust reaching adjacent properties, water conveyance systems, or walkways.
 - 3. Accompany each delivery of bulk fertilizers, lime, and soil amendments with appropriate certificates.

1.6 FIELD CONDITIONS

- A. Contractor shall notify A/E, in writing, when Work on this Project has progressed sufficiently to commence work of seeding. Thereafter, seeding operations shall be conducted under favorable weather conditions during next season or seasons, which are normal for such work as determined by accepted practice in locality of Project. At option and on full responsibility of Contractor, seeding operations may be conducted under unseasonable conditions without additional compensation.

1.7 SCHEDULING

- A. Planting Restrictions: Plant during one of following periods. Coordinate planting periods with maintenance periods to provide required maintenance from date of Substantial Completion.
 - 1. Spring Planting: May 1, beginning date.
 - 2. Fall Planting: October 1, ending date.
 - 3. Summer Planting: June 15 through September 1, when water is available.
- B. Weather Limitations: Proceed with planting only when existing and forecasted weather conditions permit planting to be preformed when beneficial and optimum results may be obtained. Apply products during favorable weather conditions according to manufacturer's written instructions.
- C. Irrigation: Do not begin seeding operations until some type irrigation system is in place and operating to provide uniform coverage of all areas to receive seed.

1.8 LAWN MAINTENANCE

- A. Begin maintenance immediately after each area is planted and continue until acceptable lawn is established, but for not less than following periods:
 - 1. Seeded Lawns: 60 days after date of Contract Completion.

PART 2 - PRODUCTS

2.1 SEED

- A. Grass Seed: Fresh, clean, dry, new-crop seed complying with AOSA's "Journal of Seed Technology; Rules for Testing Seeds" for purity and germination tolerances.
- B. Lawn Seed Species: Seed of grass species as follows, with not less than 85 percent germination, not less than 98 percent pure seed, not more than 0.05 percent weed seed and 0.0 percent noxious weeds.
 - 1. Sown Seed: Proportioned by weight as follows:

- a. 95 percent Tall Fescue (*Festuca arundinacea*)
 - 1) Three Varieties (30/30/25 blend.)
- b. 5 percent perennial rye grass (*Lolium perenne*)

2.2 TOPSOIL

- A. Topsoil (Planting Soil): ASTM D 5268, pH range of 5.5 to 7, a minimum of 6 percent organic material content; free of stones 1/2 inch or larger in any dimension and other extraneous materials harmful to plant growth.
 - 1. Topsoil Source (Undisturbed): Amend existing in-place surface soil to produce topsoil. Verify suitability of surface soil to produce topsoil. Clean surface soil of roots, plants, sod, stones, clay lumps, and other extraneous materials harmful to plant growth.
 - a. Surface soil may be supplemented with imported or manufactured topsoil from off-site sources. Obtain topsoil displaced from naturally well-drained construction or mining sites where topsoil occurs at least 4 inches (100 mm) deep; do not obtain from bogs or marshes.

2.3 INORGANIC SOIL AMENDMENTS

- A. General: Use any of the following soil amendments as recommended by "topsoil analysis" to produce topsoil suitable for lawn growth.
 - 1. Lime: ASTM C 602, agricultural limestone containing a minimum of 80 percent calcium carbonate equivalent and as follows:
 - a. Class: T, with a minimum of 99 percent passing through No. 8 (2.36-mm) sieve and a minimum of 75 percent passing through No. 60 (0.25-mm) sieve.
 - b. Provide lime in form of dolomitic limestone.
 - 2. Sulfur: Granular, biodegradable, containing a minimum of 90 percent sulfur, with a minimum of 99 percent passing through No. 6 (3.35-mm) sieve and a maximum of 10 percent passing through No. 40 (0.425-mm) sieve.
 - 3. Iron Sulfate: Granulated ferrous sulfate containing a minimum of 20 percent iron and 10 percent sulfur.
 - 4. Aluminum Sulfate: Commercial grade, unadulterated.
 - 5. Perlite: Horticultural perlite, soil amendment grade.
 - 6. Agricultural Gypsum: Finely ground, containing a minimum of 90 percent calcium sulfate.
 - 7. Sand: Clean, washed, natural or manufactured, free of toxic materials.
 - 8. Diatomaceous Earth: Calcined, diatomaceous earth, 90 percent silica, with approximately 140 percent water absorption capacity by weight.
 - 9. Zeolites: Mineral clinoptilolite with at least 60 percent water absorption by weight.

2.4 ORGANIC SOIL AMENDMENTS (DO NOT USE)

2.5 FERTILIZER

- A. Fertilizer: Commercial fertilizer shall be used for initial preparation and shall conform to applicable state fertilizer laws. Use of organic lawn fertilizer shall be used for surface application after grass is up. Fertilizer shall be uniform in composition, dry and free flowing, and shall be delivered to site in original, unopened containers, each bearing manufacturer's guaranteed analysis. Fertilizer, which becomes caked or otherwise damaged, making it unsuitable for use, will not be acceptable. Commercial-grade complete fertilizer of neutral character, consisting of fast and slow release nitrogen, 50 percent derived from natural organic sources of urea formaldehyde, phosphorous, and potassium.
 - 1. Amounts shall be as recommended in soil reports from a qualified soil – testing laboratory.

2.6 MULCHES

- A. Wood Cellulose Fiber Mulch: Shall not contain growth or germination – inhibiting factors and shall be dyed an appropriate color to facilitate placement during application. Composition on air-dry weight basis: 9 to 15 percent moisture pH from 4.5 to 6.0.
 - 1. Application: 70 percent of mulch mixture.

- B. Paper Fiber Mulch: Biodegradable, cellulose-fiber mulch, nontoxic and free of plant-growth or germination inhibitors; with a maximum moisture content of 15 percent and a pH range of 4.5 to 6.5.
- C. Straw Mulch: Provide air-dry, clean, mildew, weed, and seed-free, salt hay or threshed straw of wheat, rye, oats, or barley.
- D. Asphalt Emulsion: ASTM D 977, Grade SS-1; nontoxic and free of plant-growth or germination inhibitors.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas to receive lawns and grass for compliance with requirements and other conditions affecting performance.
 - 1. Verify that no foreign or deleterious material or liquid such as paint, paint washout, concrete slurry, concrete layers or chunks, cement, plaster, oils, gasoline, diesel fuel, paint thinner, turpentine, tar, roofing compound, or acid has been deposited in soil within a planting area.
 - 2. Do not mix or place soils and soil amendments in frozen, wet, or muddy conditions.
 - 3. Suspend soil spreading, grading, and tilling operations during periods of excessive soil moisture until the moisture content reaches acceptable levels to attain the required results.
 - 4. Uniformly moisten excessively dry soil that is not workable and which is too dusty.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.
- C. If contamination by foreign or deleterious material or liquid is present in soil within a planting area, remove the soil and contamination as directed by Architect and replace with new planting soil.

3.2 PREPARATION

- A. Protect structures, utilities, sidewalks, pavements, and other facilities, trees, shrubs, and plantings from damage caused by planting operations.
 - 1. Protect adjacent and adjoining areas from hydroseeding and hydromulching overspray.
 - 2. Protect grade stakes set by others until directed to remove them.

3.3 LAWN PREPARATION

- A. Limit lawn subgrade preparation to areas to be planted.
- B. Unchanged Subgrades (7 months or greater): If lawns are to be planted in areas unaltered or undisturbed by excavating, grading, or surface-soil stripping operations, prepare surface soil as follows:
 - 1. Remove existing grass, vegetation, and turf. Do not mix into surface soil.
 - 2. Loosen surface soil to a depth of at least 6 inches. Apply soil amendments and fertilizers according to planting soil mix proportions and mix thoroughly into top 4 inches of soil. Till soil to a homogeneous mixture of fine texture.
 - a. Apply fertilizer and soil amendments directly to surface soil before loosening per results of topsoil analysis.
 - 3. Remove stones larger than 1/2 inch in any dimension and sticks, roots, trash, and other extraneous matter.
 - 4. Legally dispose of waste material, including grass, vegetation, and turf, off Owner's property.
- C. Moisten prepared lawn areas before planting if soil is dry. Water thoroughly and allow surface to dry before planting. Do not create muddy soil.

3.4 SEEDING

- A. Sow seed with spreader or billion seeding machine. Do not broadcast or drop seed when wind velocity exceeds 5 mph. Evenly distribute seed by sowing equal quantities in two directions at right angles to each other.
 - 1. Do not use wet seed or seed that is moldy or otherwise damaged.
 - 2. Do not seed against existing trees. Limit extent of seed to outside edge of planting saucer.
- B. Sow seed at a total rate of 5 to 8 lb/1000 sq. ft.
- C. Rake seed lightly into top 1/8 inch of soil, roll lightly, and water with fine spray.
- D. Protect seeded areas with slopes not exceeding 1:6 by spreading straw mulch. Spread uniformly at a minimum rate of 2 tons/acre to form a continuous blanket 1-1/2 inches in loose depth over seeded areas. Spread by hand, blower, or other suitable equipment.
 - 1. Anchor straw mulch by crimping into soil with suitable mechanical equipment.

3.5 LAWN RENOVATION

- A. Renovate existing lawn.
- B. Renovate existing lawn damaged by Contractor's operations, such as storage of materials or equipment and movement of vehicles.
 - 1. Reestablish lawn where settlement or washouts occur or where minor regrading is required.
 - 2. Provide new topsoil as required.
- C. Remove sod and vegetation from diseased or unsatisfactory lawn areas; do not bury in soil.
- D. Remove topsoil containing foreign materials resulting from Contractor's operations, including oil drippings, fuel spills, stone, gravel, and other construction materials, and replace with new topsoil.
- E. Mow, dethatch, core aerate, and rake existing lawn.
- F. Remove weeds before seeding. Where weeds are extensive, apply selective herbicides as required. Do not use pre-emergence herbicides.
- G. Remove waste and foreign materials, including weeds, soil cores, grass, vegetation, and turf, and legally dispose of them off Owner's property.
- H. Till stripped, bare, and compacted areas thoroughly to a soil depth of 6 inches.
- I. Apply soil amendments and initial fertilizers required for establishing new lawns and mix thoroughly into top 4 inches of existing soil. Provide new planting soil to fill low spots and meet finish grades.
- J. Apply seed and protect with straw mulch as required for new lawns.
- K. Water newly planted areas and keep moist until new lawn is established.

3.6 CLEANUP AND PROTECTION

- A. Promptly remove soil and debris, created by lawn work, from paved areas. Clean wheels of vehicles before leaving site to avoid tracking soil onto roads, walks, or other paved areas.
- B. Erect temporary fencing or barricades and warning signs as required to protect newly planted areas from traffic. Maintain fencing and barricades throughout initial maintenance period and remove after lawn is established.

END OF SECTION 32 92 00