
PROJECT MANUAL

**CAFETERIA HVAC UNIT CONVERSIONS
BID #123.23.B3**

ISSUE DATE:	Wednesday, May 31, 2023
SEALED BID FOR:	Cafeteria HVAC Unit Conversions
BID NUMBER:	123.23.B3
PRE-BID DATE:	Tuesday, June 6, 2023 at 10:00 AM
PRE-BID ACCESS:	Join on your computer or mobile app Click here to join the meeting Or call in (audio only) +1 301-960-8312,,367571307# United States, Silver Spring Phone Conference ID: 367 571 307#
SITE VISITS:	Wednesday, June 7, 2023 at 12:00 PM <ul style="list-style-type: none">Meet at Glenelg HS. Afterwards, visit River Hill HS, and Dayton Oaks ES. Friday, June 9, 2023 at 12:00 PM <ul style="list-style-type: none">Meet at Oakland Mills HS. Afterwards, visit Harper's Choice MS, Mayfield Woods MS, and Hollifield Station ES.
LAST DATE & TIME FOR QUESTIONS:	Monday, June 12, 2023 at 1:00 PM in writing Submit To: Kristal Burgess at Kristal_Burgess@hcpss.org
RESPOND DATE:	Wednesday, June 21, 2023
RESPOND TIME:	1:00 P.M. to BidsandProposals@hcpss.org.
PURCHASING SPECIALIST:	Ms. Kristal Burgess phone: 410-313-6723 fax: 410-313-6789 email: Kristal_Burgess@hcpss.org

Engineer/Architect:
Henry Adams, LLC
600 Baltimore Ave.
Towson, MD 21204



Office of Purchasing
10910 Clarksville Pike
Ellicott City, Maryland 21042-6198
(410) 313-6723, fax (410) 313-6789

SECTION 00200

NOTICE TO BIDDERS – INVITATION TO BID #123.23.B3

CAFETERIA HVAC UNIT CONVERSIONS

The Howard County Public School System requests your quote to: Provide the conversion of 13 constant air volume air-handling units serving 11 school cafeterias to single-zone variable air volume operation with hot water reheat and demand-controlled ventilation. The upgrades are intended to reduce indoor air relative humidity during cooling operation as described in the contract documents (drawings and specifications) prepared by Henry Adams, LLC dated May 25, 2023. This project is Federally funded and will require bidders to utilize Davis-Bacon Act prevailing wage to determine the total cost of the project in addition to (MBE) Minority Business Enterprise compliance and other associated state requirements.

This is a project that will be constructed during the summer of 2024.

Bid documents may be obtained on **Wednesday, May 31, 2023** at the Howard County Department of Education, Purchasing Office website <https://purchasing.hcpss.org/business-opportunities>. It is the responsibility of the bidder to print documents/drawings to scale.

PRE-BID MEETING:

A Pre-bid teleconference to be attended by all bidders will be held on Tuesday, June 6, 2023 at 10:00 AM. Directions to join conference are as follows; **Join on your computer or mobile app** [Click here to join the meeting](#) **Or call in (audio only) +1 301-960-8312,,367571307#** United States, Silver Spring Phone Conference ID: 367 571 307# Howard County Public School System staff will explain the scope of work and answer any questions about the bidding specifications that will assist in the preparation of bids. Attendance is not mandatory, however, it is highly recommended.

SITE VISITS:

A site visit will be offered at Glenelg High School, 14025 Burntwoods Road, Glenelg, MD 21737 on Wednesday, June 7, 2023 at 12:00 PM. Immediately afterwards, site visits will be offered at River Hill High School, 12101 Clarksville Pike, Clarksville, MD 21029; and Dayton Oaks Elementary School, 4691 Ten Oaks Road, Dayton, MD 21036.

A site visit will also be offered at Oakland Mills High School, 9410 Kilimanjaro Road, Columbia, MD 21045 on Friday, June 9, 2023 at 12:00 PM. Immediately afterwards, site visits will be offered at Harper's Choice Middle School, 5450 Beaverkill Road, Columbia, MD 21044; Mayfield Woods Middle School, 7950 Red Barn Way, Elkridge, MD 21075; and Hollifield Station Elementary School, 8701 Stonehouse Drive, Ellicott City, MD 21043.

The Engineer and HCPSS Project Manager will explain the scope of the project and answer questions about the bidding documents that will assist in the preparations of bids. Attendance is not mandatory but strongly recommended and will assist the Owner in evaluating bids to determine if the bid can be considered responsive and/or responsible. **All interested bidders should meet outside the front entrance of the school prior to the scheduled time and then will be escorted by school staff to the site.**

QUESTIONS:

All questions shall be directed, in writing, no later than 1:00 PM, Monday, June 12, 2023 to Kristal Burgess, Procurement Specialist, Kristal.Burgess@hcpss.org. The Howard County Public School System is under no obligation to respond to any questions that are received after the cutoff date and time.

Only answers provided via addenda issued by the HCPSS will be binding. Under no circumstances are bidders, including third party vendors or their staff, to contact any other HCPSS Staff, employees or any related constituency for purposes associated with this solicitation, including but not limited to, obtaining or providing information. Bidders failing to comply with this requirement may be disqualified.

BIDS SUBMISSION:

Bids MUST be submitted electronically via email in their entirety (all pages) in PDF format no later than Wednesday, June 21, 2023 at 1:00 P.M. to BidsandProposals@hcpss.org. Proposals that contain either more than one file, or files larger than 75MB, shall be inserted into an e-folder and compressed in a zip file. To ensure delivery, if file size cumulatively exceed 75MB, it is recommended that bidders submit separate emails labeled No.1, No.2, etc. Do not copy the Procurement Specialist with your proposals. Proposals must only be sent to the Bids and Proposals e-mail address.

Email subject lines, Folder names and File names shall include: The “Bid Title, Bid Number, 123.23.B3 and Company Name”. In the body of the email please include Bidder’s contact person’s email and cell phone number for contacting purposes if/when necessary.

BID OPENING:

Bid opening will not be open to the public. Sealed bids will be opened electronically by the Purchasing Officer after the due date and time. The Purchasing Officer shall provide the bid results via a bid tab to be posted on the school system website within a reasonable time after the bid opening for all bidders to review.

ADDENDA:

It is the potential bidder’s sole responsibility to regularly visit the HCPSS Purchasing website <https://purchasing.hcpss.org/business-opportunities> to download and acknowledge receipt of all Addenda. It is highly recommended that bidders ascertain if they have received all the addenda issued prior to submitting their proposal. Failure of any bidder to acknowledge any such Addenda or interpretation may not relieve such bidder from obligation under his/her proposal as submitted.

The Howard County Public School System reserves the right to waive any informalities in, or to reject any or all bids.

Certified Minority Business Enterprises are encouraged to respond to this solicitation notice.

The contractor or supplier who provides materials, supplies, equipment and/or services for this project shall attempt to achieve the specific overall MBE goal of 23% percent established for this project with no sub goals.

The bidder or offeror is required to submit with its bid or proposal a completed Attachment A - Certified MBE Utilization and Fair Solicitation Affidavit and Attachment B - MBE Participation Schedule, as described in the solicitation documents. Each bid or offer submitted, including a submittal from a certified MBE in response to this solicitation, shall be accompanied by a completed Attachment A - Certified MBE Utilization and Fair Solicitation Affidavit and a completed Attachment B - MBE Participation Schedule. These two attachments must be accurate and consistent with each other. Attachment A and Attachment B shall be submitted with the sealed bid price at the place, date, and time specified in the solicitation document. The bidder or offeror must check one of the three boxes on Attachment A, which relates to the level of MBE participation achieved for the project.

All prime contractors, including certified MBE firms, when submitting bids or proposals as general or prime contractors, are required to attempt to achieve this goal from certified MBE firms. Bidders are encouraged to review Section 00730 of the bidding documents for the full Minority Business Enterprise Procedures.

The bidder must check one of the three boxes on Attachment A, which relates to the level of MBE participation achieved for the project. The bidder’s signature indicates that in the event that they did not meet the MBE goal or sub-goals, if applicable, that: 1) They are therefore requesting a waiver, and 2) Documentation of their good faith efforts will be provided to the school system staff within 10 days of being notified that they are the apparent low bidder.

Contractors are required to register on eMaryland Marketplace Advantage at [eMaryland Marketplace Advantage \(eMMA\)](#) within five days following notice of award. Maryland law requires local and state

agencies to post award notices on eMaryland Marketplace Advantage This cannot be done without the contractor's self-registration in the system. Registration is free. Failure to comply with this requirement may be considered grounds for default. It is recommended that any interested bidder register with eMaryland Marketplace Advantage regardless of the award outcome for this procurement as it is a valuable resource for bid notification for municipalities throughout Maryland.

Kristal Burgess
Procurement Specialist



Office of Purchasing
10910 Clarksville Pike
Ellicott City, Maryland 21042-6198
(410) 313-6723, fax (410) 313-6789

NO BID REPLY FORM

Sealed Bid for: **Cafeteria HVAC Unit Conversions**

Bid Number: **Bid #123.23.B3**

Bidder: _____

To assist us in obtaining good competition on our request for bids, we ask that each firm that has received an invitation, but does not wish to bid, state their reason(s) below.

Unfortunately, we must offer a "No Bid" at this time because:

_____ 1. We do not wish to bid under the terms and conditions of the Bid document. Our objections are:

_____ 2. We do not feel we can be competitive.

_____ 3. We cannot submit a bid because of the marketing or franchising policies of the manufacturing company.

_____ 4. We do not wish to sell to The Howard County Public School System. Our objections are:

_____ 5. We do not sell the item(s)/service(s) requested in the specific specifications.

_____ 6. Other: _____

CHECK LIST

BID RESPONSES

The following forms must be included within the Bid Response.

- ☐ Section 003000 – Form of Proposal
- ☐ Bid Bond
- ☐ Company W9
- ☐ Attachment A – Certified Minority Business Enterprise Utilization and Fair Solicitation Affidavit
- ☐ Attachment B – MBE Participation Schedule

eMaryland MARKETPLACE ADVANTAGE (eMMA)REGISTRATION

Contractors are required to register on eMaryland Marketplace Advantage at <https://procurement.maryland.gov> within five days following notice of award. Maryland law requires local and state agencies to post award notices on eMaryland Marketplace Advantage This cannot be done without the contractor's self-registration in the system. Registration is free. Failure to comply with this requirement may be considered grounds for default. It is recommended that any interested bidder register with eMaryland Marketplace Advantage regardless of the award outcome for this procurement as it is a valuable resource for bid notification for municipalities throughout Maryland.

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END OF SECTION

AIA[®] Document A701[™] – 2018

Instructions to Bidders

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

THE OWNER:
(Name, legal status, address, and other information)

THE ARCHITECT:
(Name, legal status, address, and other information)

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ADDITIONS AND DELETIONS:

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

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

FEDERAL, STATE, AND LOCAL LAWS MAY IMPOSE REQUIREMENTS ON PUBLIC PROCUREMENT CONTRACTS. CONSULT LOCAL AUTHORITIES OR AN ATTORNEY TO VERIFY REQUIREMENTS APPLICABLE TO THIS PROCUREMENT BEFORE COMPLETING THIS FORM.

It is intended that AIA Document G612[™]–2017, Owner's Instructions to the Architect, Parts A and B will be completed prior to using this document.

ARTICLE 1 DEFINITIONS

§ 1.1 Bidding Documents include the Bidding Requirements and the proposed Contract Documents. The Bidding Requirements consist of the Advertisement or Invitation 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 execution of the Contract.

§ 1.2 Definitions set forth in the General Conditions of the Contract for Construction, AIA Document A201-2007 Edition and as modified by Howard county Public School System or other Contract Documents as applicable to the Bidding Documents.

§ 1.3 Addenda are written or graphic instruments issued by the Architect prior to the execution of the Contract which modify or interpret the Bidding Documents by additions, deletions, clarifications or corrections.

§ 1.4 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.

§ 1.5 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.

§ 1.6 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.

§ 1.7 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.

§ 1.8 A Bidder is a person or entity who submits a Bid and who meets the requirements set forth in the Bidding Documents.

§ 1.9 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.

ARTICLE 2 BIDDER'S REPRESENTATIONS

§ 2.1 The Bidder by making a Bid represents that:

§ 2.1.1 The Bidder has read and understands the Bidding Documents or Contract Documents, to the extent that such documentation relates to the Work for which the Bid is submitted, and for other portions of the Project, if any, being bid concurrently or presently under construction.

§ 2.1.2 The Bid is made in compliance with the Bidding Documents.

§ 2.1.3 The Bidder has visited the site, become familiar with local conditions under which the Work is to be performed and has correlated the Bidder's personal observations with the requirements of the proposed Contract Documents.

§ 2.1.4 The Bid is based upon the materials, equipment and systems required by the Bidding Documents without exception.

ARTICLE 3 BIDDING DOCUMENTS

§ 3.1 COPIES

§ 3.1.1 Bidders may obtain complete sets of the Bidding Documents from the issuing office designated in the Advertisement or Invitation to Bid in the number and for the deposit sum, if any, stated therein.

(Paragraphs deleted)

The deposit will be refunded to Bidders who submit a bona fide Bid and return the Bidding Documents in good condition within ten days after receipt of Bids. The cost of replacement of missing or damaged documents will be deducted from the deposit. A Bidder receiving a Contract award may retain the Bidding Documents and the Bidder's deposit will be refunded.

§ 3.1.2 Bidding Documents will not be issued directly to Sub-bidders unless specifically offered in the Advertisement or Invitation to Bid, or in supplementary instructions to bidders.

§ 3.1.3 Bidders shall use complete sets of Bidding Documents in preparing Bids; neither the Owner nor Architect assumes responsibility for errors or misinterpretations resulting from the use of incomplete sets of Bidding Documents.

§ 3.1.4 The Owner and Architect may make copies of the Bidding Documents available on the above terms for the purpose of obtaining Bids on the Work. No license or grant of use is conferred by issuance of copies of the Bidding Documents.

(Paragraph deleted)

§ 3.2 INTERPRETATION OR CORRECTION OF BIDDING DOCUMENTS

§ 3.2.1 The Bidder shall carefully study and compare the Bidding Documents with each other, and with other work being bid concurrently or presently under construction to the extent that it relates to the Work for which the Bid is submitted, shall examine the site and local conditions, and shall at once report to the Architect errors, inconsistencies or ambiguities discovered.

§ 3.2.2 Bidders and Sub-bidders requiring clarification or interpretation of the Bidding Documents shall make a written request which shall reach the Construction Manager and Architect at least seven business days prior to the date for receipt of Bids.

(Paragraphs deleted)

§ 3.2.3 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.

§ 3.3 SUBSTITUTIONS

(Paragraph deleted)

§3.3.1 Bids shall be based upon the materials, systems and equipment required by the bidding documents without exception. Proposed substitute products or manufacturers shall be submitted in accordance with the following provisions:

- a. No substitutions will be considered prior to receipt of bids. The Contract award will be made solely on the basis of Base bid, Alternate Bids with regard to proposed substitutions and deducts when requested.
- b. Bidders may propose substitutions for the materials, systems and equipment specified or whom by listing them in the space provided on the Form of Proposal, along with any stipulated cost adjustment (add. deduct or no change) in the Base Bid or Alternate bids. Proposed substitutions may be accepted with the award of the contract or later by the Owner.
- c. Provide all necessary backup data for proposed substitutions at time of bid for review by Owner.
- d. The Architect will evaluate all substitutions based on compliance with the environmental goals stated in the specifications. All proposed substitutions shall document and demonstrate meeting or exceeding LEED certification requirements through product data, MSDS sheets and other supporting literature that highlight conformance. Any substitution that does not have this information highlighted will be rejected.

§ 3.3.2 It is the responsibility of the bidder to provide documentation with the bid at the date and time set forth for submission. The burden of proof that proposed substitutes are in fact equal or better falls on the bidder and proof must be to the satisfaction of HCPSS. The HCPSS shall be the sole authority as to whether proposed substitute items meet specifications or are an approved equal. The HCPSS decision of approving or disapproving of a proposed equal shall be final.

(Paragraphs deleted)

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

(Paragraphs deleted)

§ 3.4 ADDENDA

§ 3.4.1 Addenda will be

(Paragraphs deleted)

posted on the school system website.

§ 3.4.2 Copies of Addenda will be made available for inspection wherever Bidding Documents are on file for that purpose.

§ 3.4.3 Addenda will be issued no later than two days prior to the date for receipt of Bids except an Addendum withdrawing the request for Bids or one which includes postponement of the date for receipt of Bids.

§ 3.4.4 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.

ARTICLE 4 BIDDING PROCEDURES

§ 4.1 PREPARATION OF BIDS

§ 4.1.1 Bids shall be submitted on the forms included with the Bidding Documents. Submit Form of Proposal (Bids) in triplicate.

§ 4.1.2 All blanks on the bid form shall be legibly executed in a non-erasable medium. If blanks do not apply insert " O " in spaces.

§ 4.1.3 Sums shall be expressed in both words and figures. In case of discrepancy, the amount written in words shall govern.

§ 4.1.4 All requested Alternates shall be bid. If no change in the Base Bid is required, enter "No Change."

§ 4.1.5 Each copy of the Bid shall state the legal name of the Bidder and the nature of legal form of the Bidder. The Bidder shall provide evidence of legal authority to perform within the jurisdiction of the Work. Each copy shall be signed by the person or persons legally authorized to bind the Bidder to a contract. A Bid by a corporation shall further give the state of incorporation and have the corporate seal affixed. A Bid submitted by an agent shall have a current power of attorney attached certifying the agent's authority to bind the Bidder.

(Paragraphs deleted)

§4.1.6 All addenda shall be acknowledged on the Form of Proposal

§ 4.2 BID SECURITY

§ 4.2.1 Each Bid shall be accompanied by a bid security in the form and amount required if so stipulated in the Instructions to Bidders. 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.

4.2.2 Bonds shall be written by a bonding company that must be licensed with Maryland Insurance Administration to do business in the state of Maryland and otherwise acceptable to the Howard County Public School System. The Contractor shall use Bond Form provided by the Owner AIA 310 Bid Bond, in order to satisfy the Bond requirements referenced in this Article and the attorney-in-fact who executes the bond on behalf of the surety shall affix to the bond a certified and current copy of the power of attorney in an amount not less than required.

4.2.3 The bonding company furnishing the Bid Bond shall provide upon request to the Purchasing Department, the following statement, signed by an authorized representative for the bonding company: **As surety for (Name of**

Contractor), (Name of Bonding Company), hereby agrees to furnish the 100% Performance, Labor and Materials Bonds, as required by the specifications for the (Name of Project), on behalf of the Contractor, in the event that such firm be the successful bidder for this project. Failure to provide this statement may be cause to reject submitted bid.

§ 4.2.4 Bid Bond shall be in the amount of 5% of the Base Bid.

(Paragraph deleted)

§ 4.2.5 The apparent low bidder, upon notification, shall provide to the Owner/ Purchasing Office within 24 hours three (3) references of successfully completed projects from General Contractors and/or Construction Managers and/or Owners. Failure to provide these references will be cause to reject the submitted bid.

(Paragraphs deleted)

§ 4.2.6 The Owner will have the right to retain the bid security of Bidders to whom an award is being considered until either

- (a) the Contract has been executed and bonds, if required, have been furnished, or
- (b) the specified time has elapsed so that Bids may be withdrawn or
- (c) all Bids have been rejected.

§ 4.2.7 To protect the public interest the Owner may request a D & B (Dun & Bradstreet ®) report on the apparent low bidder. D & B rating less than A shall be cause for rejection of bid by Owner.

§ 4.2.8 Owner reserves the right to request from apparent low bidder financial statements for the firm for up to 3 fiscal years..

§ 4.3 SUBMISSION OF BIDS

§ 4.3.1

(Paragraphs deleted)

All copies of the Bid, the bid security, if any, and any other documents required to be submitted with the Bid shall be enclosed in a sealed opaque envelope. The envelope shall be addressed to the party receiving the Bids and shall be identified with the Project name, the Bidder's name and address and, if applicable, the designated portion of the Work for which the Bid is submitted. 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.

§ 4.3.2 Bids shall be deposited at the designated location prior to the time and date for receipt of Bids. Bids received after the time and date for receipt of Bids will be returned unopened.

§ 4.3.3 The Bidder shall assume full responsibility for timely delivery at the location designated for receipt of Bids.

§ 4.3.4 Oral, telephonic, telegraphic, facsimile or other electronically transmitted bids will not be considered.

(Paragraph deleted)

§ 4.4 MODIFICATION OR WITHDRAWAL OF BID

§ 4.4.1 A Bid may not be modified, withdrawn or canceled 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.

§ 4.4.2 Prior to the time and date designated for receipt of Bids, a Bid submitted may be modified or withdrawn by notice to the party receiving Bids at the place designated for receipt of Bids. Such notice shall be in writing over the signature of the Bidder. Written confirmation over the signature of the Bidder shall be received, and date and time stamped by the receiving party on or before the date and time set for receipt of Bids. A change shall be so worded as not to reveal the amount of the original Bid.

§ 4.4.3 Withdrawn Bids may be resubmitted up to the date and time designated for

(Paragraphs deleted)

the receipt of Bids provided that they are then fully in conformance with these Instructions to Bidders.

§ 4.4.4 Bid security, if required, shall be in an amount sufficient for the Bid as resubmitted.

ARTICLE 5 CONSIDERATION OF BIDS

§ 5.1 OPENING OF BIDS

At the discretion of the Owner, if stipulated in the Advertisement or Invitation to Bid, 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.

§ 5.2 REJECTION OF BIDS

The Owner shall have the right to reject any or all Bids. A Bid 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.

§ 5.3 ACCEPTANCE OF BID (AWARD)

§ 5.3.1 It is the intent of the Owner to award a Contract to the lowest qualified Bidder provided the Bid has been submitted in accordance with the requirements of the Bidding Documents and does not exceed the funds available. The Owner shall have the right to waive informalities and irregularities in a Bid received and to accept the Bid, Alternate Bids, and proposed Substitutions which, in the Owner's judgment, is in the Owner's own best interests.

§ 5.3.2 The Owner shall have the right to accept Alternates in any order or combination, unless otherwise specifically provided in the Bidding Documents, and to determine the low Bidder on the basis of the sum of the Base Bid and Alternates accepted.

ARTICLE 6 POST-BID INFORMATION

(Paragraphs deleted)

§ 6.3 SUBMITTALS

§ 6.3.1 The Bidder shall, as soon as practicable or as stipulated in the Bidding Documents, after notification of selection for the award of a Contract, furnish to the Owner through the Architect in writing:

.1

(Paragraphs deleted)

names of persons or entities (including those who are to furnish materials or equipment fabricated to a special design) proposed for the principal portions of the Work.

§ 6.3.2 Prior to the execution of the Contract, the Architect will notify the Bidder in writing if either the Owner or Architect, after due investigation, has reasonable objection to a person or entity proposed by the Bidder. If the Owner or Architect has reasonable objection to a proposed person or entity, the Bidder may, at the Bidder's option, (1) withdraw the Bid or (2) submit an acceptable substitute person or entity with an adjustment in the Base Bid or Alternate Bid to cover the difference in cost occasioned by such substitution. The Owner may accept the adjusted bid price or disqualify the Bidder. In the event of either withdrawal or disqualification, bid security will not be forfeited.

(Paragraphs deleted)

§ 6.3.3 Persons and entities proposed by the Bidder and to whom the Owner and Architect have made no reasonable objection must be used on the Work for which they were proposed and shall not be changed except with the written consent of the Owner and Architect.

ARTICLE 7 PERFORMANCE BOND AND PAYMENT BOND

(Paragraph deleted)

§7.1 PERFORMANCE BOND AND PAYMENT BOND

§ 7.1.1 The Contractor shall furnish a Performance Bond and Labor and Materials Payment Bond covering the faithful performance of the Contract and the payment of all obligations arising thereunder and complying with the requirements of

Maryland Law. Both bonds shall be in the amount of one hundred percent (100%) of the Contract amount and shall name the Howard County Board of Education as Obligee.

§ 7.1.2 Bonds shall be written by a bonding company that must be licensed with MD Insurance Administration to do business in the State of Maryland and otherwise acceptable to the Howard County Public School System. The Contractor shall use Bond Forms provided by the Owner AIA Document A312 - 2010 Performance Bond and AIA Document A312 - 2010 Labor and Material Payment Bond, in order to satisfy the Bond requirements referenced in this Article.

§ 7.1.3 Owner reserves the right to request from Contractor financial statements for the firm for up to prior 3 fiscal years.

§ 7.1.4 To protect the public interest the Owner may request a D & B report on the Contractor. Should the D & B rating fall below the awarded rating, Contractor shall advise Owner of his corrective measures.

§ 7.1.5 Firms issuing said bonds must be licensed to write bonds in the State of Maryland. The Contractor shall pay the premiums for required bonds. Obtainage of the required bonds by Contractor shall be a condition precedent to effectuation of the Contract between Owner and Contractor. If additional work is authorized, the amounts of the bonds shall be increased to cover the value of the increased Contract sum. All bonds shall conform to the requirements of the Maryland Little Miller Act. All bonds shall be subject to Owner's approval.

(Paragraphs deleted)

§ 7.1.6 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 permit a copy to be made.

§ 7.1.7 If the furnishing of such bonds is stipulated in the Bidding Documents, the cost shall be included in the Bid. If the furnishing of such bonds is required after receipt of bids and before execution of the Contract, the cost of such bonds shall be added to the Bid in determining the Contract Sum.

§ 7.2 TIME OF DELIVERY AND FORM OF BONDS

§ 7.2.1 The Bidder shall deliver the required bonds to the Owner with the executed contract and dated with the date of contract. If the Work is to be commenced prior thereto in response to a letter of intent, the Bidder shall, prior to commencement of the Work, submit evidence satisfactory to the Owner that such bonds will be furnished and delivered in accordance with this Section 7.2.1.

§ 7.2.2 Unless otherwise provided, the bonds shall be written on AIA Document A312-2010, Performance Bond and Labor and Material Payment Bond. Both bonds shall be written in the amount of the Contract Sum.

(Paragraph deleted)

§ 7.2.4 The Bidder shall require the attorney-in-fact who executes the required bonds on behalf of the surety to affix thereto a certified and current copy of the power of attorney effective as of the date of execution of the contract..

ARTICLE 8 FORM OF AGREEMENT BETWEEN OWNER AND CONTRACTOR

Unless otherwise required in the Bidding Documents, the Agreement for the Work will be written on AIA Document A101-2007 edition as modified by Howard County Public School System, Standard Form of Agreement Between Owner and Contractor Where the Basis of Payment Is a Stipulated Sum.

(Table deleted)(Paragraphs deleted)(Paragraphs deleted)

SECTION 003000
FORM OF PROPOSAL

**Cafeteria HVAC Unit Conversions
BID #123.23.B3**

Date: _____ Owner: _____

Board of Education
of Howard County Maryland
10910 Clarksville Pike
Ellicott City, MD 21042
Tel (410) 313-6723

Contractor: _____

Engineer/Architect: Henry Adams, LLC
600 Baltimore Ave.
Towson, MD 21204

The undersigned, having carefully examined the Bid Announcement and Bid Documents proposes to furnish all specified materials and specified equipment in strict accordance with the aforesaid documents for the Lump Sums as follows:

BASE BID

1. Complete installed cost for the Cafeteria HVAC Unit Conversions and all appurtenances, as indicated on the drawings, specifications and addenda.

TOTAL PROJECT COST \$ _____

Please indicate below your Total Base Bid amount in words:

_____ and ---- /100 Dollars.

NOTE: Bid Form shall reflect bids for the project as shown in the Contract Specifications and addenda. Substitutions shall be included in the section "Proposed Substitutions."

* Note: References to Architect will also include Engineer in all bid documents.

EQUIPMENT AND MANUFACTURERS

All bidders on the project are hereby required to name at time of bid the manufacturer name to be provided as part of their bid in accordance with the contract documents.

Variable Frequency Drives

Manufacturer: _____

PROPOSED SUBSTITUTIONS

Proposed substitutions shall be submitted in accordance with Instructions to Bidders, see Section 00100 Instructions to Bidders, Article 3, Bidding Documents, 3.3 Substitutions. Bids will be considered on systems, processes, or products of manufacturers other than those cited if accompanied by detailed technical specifications for each item, catalogs, test reports, brochures, and other descriptive literature and supporting data, sufficient in detail to permit evaluation of the proposed substitution without further reference.

Proposed Substitutions	Price Change
_____	\$ _____
_____	\$ _____
_____	\$ _____

SUBCONTRACTORS: Bidders are hereby required to name the subcontractors as part of their bid package.

Name of Company	Type of Work
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

REFERENCES

Bidders are hereby required to list three references for whom similar work has previously been performed within the last three years:

Name: _____

Address of Site: _____

Nature of Job: _____

Person to contact: _____

Telephone: _____

Name: _____

Address of Site: _____

Nature of Job: _____

Person to contact: _____

Telephone: _____

Name: _____

Address of Site: _____

Nature of Job: _____

Person to contact: _____

Telephone: _____

COMPANY INFORMATION

Name of company _____ years in business

Street Address

City _____ State _____ Zip _____

Telephone # _____ Fax # _____

CONTRACT ADMINISTRATOR

Name _____ Title _____

Address _____ Phone _____

Cell phone _____ e-mail _____

ADDENDA

Receipt of the following addenda is acknowledged:

Addendum No. _____ Dated _____ Addendum No. _____ Dated _____

Addendum No. _____ Dated _____ Addendum No. _____ Dated _____

Addendum No. _____ Dated _____ Addendum No. _____ Dated _____

WARRANTY TO THE LUMP SUM

The undersigned affirms that the above base bid and alternates represents the entire cost of the project in accordance with the bid documents and that no claim will be made on account of any increase in wage, scales, material prices, taxes, fasts, cost indexes or any other rate affecting the construction industry and/or this project.

If the undersigned received written notice of the acceptance, at his designated address, within sixty (60) days after bid opening (or later if bid has not been withdrawn), the undersigned agrees to execute and deliver a contract and bonds in accordance with the bid as accepted, within seven (7) days after receiving notice, or forfeit the amount of the bid bond.

AFFIDAVIT

Special Instructions: An authorized representative of the bidder shall complete the following affidavit in accordance with these bid documents and insert answer to paragraphs 1 and 3.

Statutory Affidavit and Non-Collusion Certification

I, _____, being duly sworn, depose and state:

1. I am the _____ (officer) and duly authorized

Representative of the firm named _____ whose address

is _____ and that I possess the authority to make this

affidavit and certification on behalf of myself and the firm for which I am acting.

2. Except as described in Paragraph 3 below, neither I, nor to the best of my knowledge, the above firm, nor any of its officers, directors, or partners, employees, agents, or employees of agents who are directly involved in obtaining or performing contracts with any public bodies has:

- (a.) Been convicted of bribery, attempted bribery, or conspiracy to bribe, under the laws of any state of the federal government;
- (b.) Been convicted under the laws of the state, another state, or the United States of: a criminal offense incident to obtaining, attempting to obtain, or performing a public or private contract; or fraud, embezzlement, theft, forgery, falsification or destruction of records, or receiving stolen property;
- (c.) Been convicted of a criminal violation of an antitrust statute of the State of Maryland, another state, or the United States;
- (d.) Been convicted of a violation of the Racketeer Influenced and Corrupt Organization Act, or the Mail Fraud Act, for acts in connection with the submission of bids or proposals for a public or private contract;
- (e.) Been convicted of any felony offenses connected with obtaining, holding, or maintaining a minority business enterprise certification, as prohibited by Section 14-308 of the State Finance and Procurement Article;
- (f.) Been convicted of conspiracy to commit any act or omission that would constitute grounds for conviction under any of the laws or statutes described in Paragraph (a) through (e) above; or
- (g.) Been found civilly liable under an antitrust statute of this State, another state, or the United States for acts or omissions in connection with the submission of bids or proposals for a

public or private contract.

3. **The only conviction, plea, or admission by any officer, director, partner, or employee of this firm to involvement in any of the conduct described in Paragraph 2 above is as follows:**

If none, write "None" below. If involvement, list the date, count, or charge, official or administrative body, the individuals, their position with the firm and the sentence or disposition of the charge.

(you may attach an explanation as necessary)

4. I affirm that this firm will not knowingly enter into a contract with a public body under which a person or business debarred or suspended under Maryland State Finance and Procurement Title 16, subtitle 3, Annotated Code of Maryland, as amended, will provide, directly or indirectly, supplies, services, architectural services, construction-related services, leases of real property, or construction.
5. I affirm that this proposal or bid to the Board of Education of Howard County Maryland is genuine and not collusive or a sham; that said bidder has not colluded, conspired, connived and agreed, directly or indirectly, with any bidder or person to put in a sham bid or to refrain from bidding and is not in any manner, directly or indirectly, sought by agreement of collusion or communication or conference, with any person to fix the bid prices of the affidavit or any other bidder, or to fix any overhead, profit or cost element of said bid price, or that if any bidder, or to secure an advantage against the Board of Education of Howard County Maryland or any other person interested in the proposed contract; and that all statements in the proposal or bid are true. I acknowledge that, if the representations set forth in this affidavit are not true and correct, the Board of Education of Howard County Maryland may terminate any contract awarded and take any other appropriate action.
6. I affirm that this firm will not knowingly employ an individual to work at a school if the individual is a Registered Sexual Offender, pursuant to section 11-722 (C) of the Criminal Procedure Article of the Annotate Code of Maryland. A firm or person who violates this section is guilty of a misdemeanor and on conviction is subject to imprisonment not exceeding 5 years or a fine not exceeding \$5,000 or both.

The statements contained in this affidavit shall be incorporated into the awarded contract as material provisions and shall be effective throughout the life of the contract. The firm has a continuing obligation through the life of the contract to submit a revised affidavit should the firm discover information, or events occur, which render the contents of this affidavit erroneous or incomplete or which would result in the firm providing a different response. The firm's failure to submit a revised affidavit within three (3) working days of either its awareness of any error, change of circumstances, incompleteness, etc., or request by the owner shall constitute breach of contract. Upon submission of a revised affidavit, the owner has the right to take such actions as may be necessary, in the judgment of the owner, to maintain and enforce the provisions of the affidavit, including termination of the contract.

I DO SOLEMNLY DECLARE AND AFFIRM under the penalties of penalties that the contents of these affidavits (Statutory and Non-Collusion) are true and correct, that I am executing this Affidavit in compliance with Section 16-311 of the State Finance and Procurement Article, Annotated Code of Maryland, and the Non-Collusion Certification in compliance with requirements of the Board of Education of Howard County Maryland, and that I am executing and submitting this Form of Proposal on behalf of

and with full authority by the bidder named below.

(Signature of Bidder)

(Date)

(Print Name of Bidder)

(Title of Bidder)

SUBSCRIBED AND SWORN to before me on this _____ day of _____, 2023.

NOTARY PUBLIC

Name _____

Seal:

My Commission Expires _____

(Legal Name of Company)

(Address)

(City)

(State)

(Zip)

(Telephone)

(Fax)

(E-mail address)

Contractor's License Number # _____

We are/I am licensed to do business in the State of Maryland as a:

() Corporation

() Partnership

() Individual

() Other

eMaryland Marketplace Advantage (eMMA)#: _____

**CERTIFIED MINORITY BUSINESS ENTERPRISE
UTILIZATION AND FAIR SOLICITATION AFFIDAVIT**

NOTE: You must include this document with your bid or offer. If you do not submit the form with your bid or offer, the procurement officer shall deem your bid non-responsive or your offer not reasonably susceptible of being selected for award.

* * * * *

Part I.

I acknowledge the:

- Overall certified MBE subcontract participation goal of 23 %. and
- The subgoals, if applicable, of:
 - 0 % for certified African American-owned businesses and
 - 0 % for certified Women-owned businesses.

I have made a good-faith effort to achieve this goal. If awarded the contract, I will continue to attempt to increase MBE participation during the project.

Part II.

Check ONE Box

NOTE: FAILURE TO CHECK ONE OF BOXES 1, 2, or 3 BELOW WILL RENDER A BID NON-RESPONSIVE OR AN OFFER NOT REASONABLY SUSCEPTIBLE OF BEING SELECTED FOR AWARD

NOTE: INCONSISTENCY BETWEEN THE ASSERTIONS ON THIS FORM AND THE INFORMATION PROVIDED ON THE *MBE PARTICIPATION SCHEDULE* (ATTACHMENT B) MAY RENDER A BID NON-RESPONSIVE OR AN OFFER NOT REASONABLY SUSCEPTIBLE OF BEING SELECTED FOR AWARD

- 1 ☐ I have met the overall MBE goal and MBE subgoals for this project. I submit with this Affidavit [Attachment A] the *MBE Participation Schedule* [Attachment B], which details how I will reach that goal.
- or**
- 2 ☐ After having made a good-faith effort to achieve the overall MBE goal and MBE subgoals for this project, I can achieve partial success only. I submit with this Affidavit [Attachment A] the *MBE Participation Schedule* [Attachment B], which details the MBE participation I have achieved.

I request a partial waiver as follows:

- Waiver of overall MBE subcontract participation goal: _____ %
- Waiver of MBE subcontract participation subgoals, if applicable:
 - _____ % for certified African American-owned businesses and
 - _____ % for certified Asian American-owned businesses.

Within 10 days of being informed that I am the apparent awardee, I will submit *MBE Waiver Documentation* [Attachment F] (with supporting documentation).

Attachment A (page 2 of 2)
or

- 3 ☐ After having made a good faith effort to achieve the overall MBE goal and MBE subgoals for this project, I am unable to achieve any portion of the goal or subgoals. I submit with this Affidavit [Attachment A] the *MBE Participation Schedule* [Attachment B].

I request a full waiver.

Within 10 days of being informed that I am the apparent awardee, I will submit *MBE Waiver Documentation* [Attachment F] (with supporting documentation).

Part III.

I understand that if I am the apparent awardee or conditional awardee, I must submit **within 10 working days** after receiving notice of the potential award or within 10 days after the date of conditional award – whichever is earlier – the:

- *Outreach Efforts Compliance Statement* (Attachment C)
- *Subcontractor Project Participation Statement* (Attachment D)
- *Minority Subcontractors Unavailability Certificate* (Attachment E) (if applicable)
- Any other documentation the Procurement Officer requires to ascertain my responsibility in connection with the MBE participation goal and subgoals

I acknowledge that if I fail to timely return complete documents, the Procurement Officer may determine that I am not responsible and therefore not eligible for contract award. If the contract has been awarded, the award is voidable.

I acknowledge that the MBE subcontractors/suppliers listed in the *MBE Participation Schedule* and any additional MBE subcontractor/suppliers identified in the *Subcontractor Project Participation Statement* will be used to accomplish the percentage of MBE participation that I intend to achieve.

In the solicitation of subcontract quotations or offers, MBE subcontractors were provided the same information and amount of time to respond as were non-MBE subcontractors.

The solicitation process was conducted in such a manner so as to not place MBE subcontractors at a competitive disadvantage to non-MBE subcontractors.

**I solemnly affirm under the penalties of perjury that this Affidavit
is true to the best of my knowledge, information, and belief.**

Bidder/Offeror Name

Address

Address (continued)

Affiant Signature

Printed Name & Title

Date

1. Prime Contractor's Name			2. Prime Contractor's Address/Telephone Number		
3. Project/School Name			4. Project/School Location		
5. LEA Name:. PSC Number:			6. Base Bid Amount \$ _____ Acceptance Alternates \$ _____ Total \$ _____		
7a. Minority Firm Name: _____ Minority Firm Address: _____ MDOT Firm Certification Number: _____ <input type="checkbox"/> African American <input type="checkbox"/> Asian American <input type="checkbox"/> Native American <input type="checkbox"/> Women <input type="checkbox"/> Hispanic <input type="checkbox"/> Disabled					
Subcontractor Firm (Select One)	Allowable Percentage	Percentage of Total Contract	Subcontractor Dollar Amount	Participation Amount	
MDOT Certified Firm	100%		\$ _____	\$ _____	
MDOT Certified Prime Contractor	50% of established goal OR 100% of one subgroup contract subgoal		\$ _____	\$ _____	
MDOT Certified Supplier, Wholesaler and Regular Dealer	60%		\$ _____	\$ _____	
7b Minority Firm Name: _____ Minority Firm Address: _____ MDOT Firm Certification Number: _____ <input type="checkbox"/> African American <input type="checkbox"/> Asian American <input type="checkbox"/> Native American <input type="checkbox"/> Women <input type="checkbox"/> Hispanic <input type="checkbox"/> Disabled					
Subcontractor Firm (Select One)	Allowable Percentage	Percentage of Total Contract	Subcontractor Dollar Amount	Participation Amount	
MDOT Certified Firm	100%		\$ _____	\$ _____	
MDOT Certified Prime Contractor	50% of established goal OR 100% of one subgroup contract subgoal		\$ _____	\$ _____	
MDOT Certified Supplier, Wholesaler and Regular Dealer	60%		\$ _____	\$ _____	
7c Minority Firm Name: _____ Minority Firm Address: _____ MDOT Firm Certification Number: _____ <input type="checkbox"/> African American <input type="checkbox"/> Asian American <input type="checkbox"/> Native American <input type="checkbox"/> Women <input type="checkbox"/> Hispanic <input type="checkbox"/> Disabled					
Subcontractor Firm (Select One)	Allowable Percentage	Percentage of Total Contract	Subcontractor Dollar Amount	Participation Amount	
MDOT Certified Firm	100%		\$ _____	\$ _____	
MDOT Certified Prime Contractor	50% of established goal OR 100% of one subgroup contract subgoal		\$ _____	\$ _____	
MDOT Certified Supplier, Wholesaler and Regular Dealer	60%		\$ _____	\$ _____	
8. MBE Total Amount			9. Total MBE Percent of Entire Contract		
10. Form Prepared by: Name: _____ Title: _____ Date: _____			11. Reviewed and Accepted by Board of Edu. MBE Liaison Name: _____ Title: _____ Date: _____		

Total MBE Participation:	\$ _____	_____	%
Total African-American Participation:	\$ _____	_____	%
Total Women Owned MBE Participation:	\$ _____	_____	%
Total Other Participation:	\$ _____	_____	%

AIA® Document A310™ – 2010

Bid Bond

CONTRACTOR:

(Name, legal status and address)

(Row deleted)

As Principal, hereinafter called the Principal, and
a corporation duly organized under the laws of the State of as Surety, hereinafter called the
Surety, are held and firmly bound unto

As Oblige, hereinafter called the Oblige, in the sum of Dollars (\$)
\$, for the payment of which sum well and truly
to be made, the said Principal and the said Surety, bind ourselves, or heirs, executors,
administrators, successors and assigns jointly and severally firmly by these presents.

OWNER
Howard County Public School System
10910 Clarksville Pike
Ellicott City, MD, 21042

WHEREAS the Principal has submitted a bid for

PROJECT:

(Name, location or address, and Project number, if any)

NOW, Therefore, if the Oblige shall accept the bid of Principal and the Principal shall enter
into a Contract with the Oblige in accordance with the term of such bid, and give such
bond or bonds as may be specified in the bidding or Contract Documents with good and
sufficient surety for the faithful performance of such Contract and for the prompt payment
of labor and material furnished in the prosecution thereof, or in the event of failure of the
Principal to enter such Contract and give such bond or bonds, if the Principal shall pay to
Oblige the difference not to exceed the penalty thereof between the amount specified in
said bid and such larger amount for which the Oblige may in good faith contract with
another party to perform the Work covered by said bid, then this obligation shall be null
and void, otherwise to remain in full force and effect.

(Paragraph deleted)

ADDITIONS AND DELETIONS:

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

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

Any singular reference to Contractor,
Surety, Owner or other party shall be
considered plural where applicable.

Init.

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User Notes:

(1129211223)

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 2021
(In words, indicate day, month and year)

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

_____ and the Contractor:
(Name, address and other information)

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

The Architect:
(Name, address and other information)

The Owner and Contractor agree as follows.
TABLE OF ARTICLES

- 1 THE CONTRACT DOCUMENTS
- 2 THE WORK OF THIS CONTRACT
- 3 DATE OF COMMENCEMENT AND SUBSTANTIAL COMPLETION
- 4 CONTRACT SUM
- 5 PAYMENTS
- 6 DISPUTE RESOLUTION
- 7 TERMINATION OR SUSPENSION
- 8 MISCELLANEOUS PROVISIONS
- 9 ENUMERATION OF CONTRACT DOCUMENTS
- 10 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

ADDITIONS AND DELETIONS:

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

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

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

Init.

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User Notes:

(1416974200)

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.

Contract Package:

Alternate No.:

ARTICLE 3 DATE OF COMMENCEMENT AND SUBSTANTIAL COMPLETION

§ 3.1 The date of commencement of the Work shall

(Paragraphs deleted)

be the date of this Agreement unless a different date is stated below or provision is made for the date to be fixed in a notice to proceed issued by the Owner.

(Paragraphs deleted)

§ 3.2 The Contract Time shall be measured from the date of commencement, that shown on the Progress Schedule.

§ 3.3 The Contractor shall achieve Substantial Completion of the entire Work not later than The respective dates applicable to this Contract as indicated on the Progress Schedule. The fully developed Progress Schedule issued by Architect/Owner, and hereby fully incorporated into this Agreement, contains

Portion of Work

100 % Complete

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

. Liquidated Damages in the sum of one thousand (\$1000.00) for each calendar day shall be assessed for any delays in achieving Substantial Completion, except as noted in Article 8 of the General Conditions of the Contract for Construction. "Substantial Completion" as defined in Article 9.8 of the General Conditions of the Contract for Construction. In addition to Liquidated Damages for delay, as provided above, the Owner shall be entitled to such other damages for breach of contract as more fully provided in the General Conditions for Contract for Construction.

(Paragraph deleted)

(Table deleted)

(Paragraphs deleted)

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 including Alternates and Substitutions the Contract Sum shall be:

\$... .. (\$),

subject to additions and deductions as provided in the Contract Documents.

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

Alternate Numbers:

N/A

Init.

(State the numbers or other identification of accepted alternates. If the bidding or proposal documents permit the Owner to accept other alternates subsequent to the execution of this Agreement, attach a schedule of such other alternates showing the amount for each and the date when that amount expires.)

(Table deleted)

(Paragraphs deleted)

(Table deleted)

(Paragraph deleted)

§ 4.3 Unit prices, if any:

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

Item

As listed in the Form of Proposal;

(Paragraphs deleted)

(Table deleted)

(Paragraphs deleted)

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:

Contractor shall submit to the Architect on the last day of each month a draft of a Standard Monthly Contractors Requisition for Payment, on AIA Document G702 – 1992 and AIA Document G703 – 1992

(Paragraphs deleted)

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

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

- .1 Take that portion of the Contract Sum properly allocable to completed Work as determined by multiplying the percentage completion of each portion of the Work by the share of the Contract Sum allocated to that portion of the Work in the schedule of values, less retainage of ten percent (10 %)
- .2 Portion of the Contract Sum properly allocable to materials and equipment delivered and suitably stored at the site for subsequent incorporation in the completed construction (or, if approved in advance by the Owner, suitably stored off the site at a location agreed upon in writing), less retainage of ten percent (10 %);

(Paragraphs deleted)

§ 5.1.7 Deleted

(Paragraphs deleted)

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

As described in the General Conditions for the Contract of Construction.

Init.

§ 5.1.9 Deleted

§ 5.2 FINAL PAYMENT

§ 5.2.1 1 Final payment, constituting the entire unpaid balance of the Contract Sum, shall be made by the Owner to the Contractor in accordance with Paragraph 9.10 of the General Conditions for Contract.

§ 5.2.2 Deleted

(Paragraphs deleted)

ARTICLE 6 DISPUTE RESOLUTION

§ 6.1

(Paragraphs deleted)

As specified in Contract Documents

(Paragraphs deleted)

§ 6.2 Deleted

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 A201-2007 and modifications made by Howard County Public School System.

(Paragraphs deleted)

§ 7.2 The Work may be suspended by the Owner as provided in Article 14 of AIA Document A201-2007 and modifications made by Howard County Public School System.

ARTICLE 8 MISCELLANEOUS PROVISIONS

§ 8.1 Where reference is made in this Agreement to a provision of AIA Document A201-2007 and modifications made by Howard County Public School System or another Contract Document, the reference refers to that provision as amended or supplemented by other provisions of the Contract Documents.

(Paragraphs deleted)

§ 8.4 The Contractor's representative:

(Name, address and other information)

§ 8.5 The Contractor's representative shall not be changed without ten days' written notice to the Owner

(Paragraphs deleted)

§ 8.6 Delete:

Init.

(Paragraphs deleted)

ARTICLE 9 ENUMERATION OF CONTRACT DOCUMENTS

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

§ 9.1.1 The Agreement is the executed Standard Form of Agreement Between Owner and Contractor, AIA Document A101-1997 and modifications made by Howard County Public School System.

§ 9.1.2 The General Conditions are the 2007 edition of the General Conditions of the Contract for Construction, AIA Document A201-2007 and modifications made by Howard County Public School System.

§ 9.1.3 Delete

§ 9.1.4 The Specifications:

(Paragraph deleted)

The Specifications are those contained in the Project Manual, and are as follows:

Title of Specifications exhibit: As listed in Table of Contents of Project Manual dated:

§ 9.1.5 The Drawings:

The Drawings are as follows, and are dated _____ unless a different date is shown below:

(Table deleted)

Title of Drawings exhibit: As listed in the Schedule of Drawings of the Contract Title of Drawings exhibit:

(Table deleted)

§ 9.1.6 The Addenda, if any:

Number

Date

Pages

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

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

(Paragraph deleted)

As listed in the Project Manual.

ARTICLE 10 INSURANCE AND BONDS

The Contractor shall purchase and maintain insurance and provide bonds as set forth in Article 11 of AIA Document A201-2007.

Type of insurance or bond

As listed in the Project Manual

(Paragraphs deleted)

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This Agreement is entered into as of the day and year first written above and is executed in at least four original copies of which one is to be delivered to the Contractor, one each to the Construction Manager and Architect for use in the administration of the Contract, and the remainder to the Owner.

OWNER

Board of Education of Howard County

(A Body Politic and Corporate)

CONTRACTOR

(Signature)

Chao Wu, Chair (SEAL)

(Signature)

(Printed name and title)

(SEAL)

Approved by:

Michael J. Martirano, Ed. D., Superintendent of Schools

Init.

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SECTION 00601
INSURANCE REQUIREMENTS

1 - General Insurance Requirements:

1.1 - The Contractor shall not commence Work until he has obtained at his own expense all of the insurance as required hereunder and such insurance has been approved by the Board of Education of Howard County Maryland; nor shall the Contractor allow any Subcontractor to commence Work on his subcontract until all similar insurance required of the Subcontractor has been so obtained and approved by the Contractor. Approval of insurance required of the Contractor will be granted only after submission to the Board of Education of Howard County Maryland of original, signed certificates of insurance or, alternately, at the Board of Education of Howard County Maryland's request, certified copies of the required insurance policies.

1.2 - The Contractor shall require all Subcontractors to maintain during the term of this agreement, commercial general liability insurance, business automobile liability insurance, and Workers' Compensation and employers' liability insurance, in the same manner as specified for the Contractor. The Contractor shall furnish Subcontractors' certificates of insurance to the Board of Education of Howard County Maryland immediately upon request.

1.3 - All insurance required hereunder shall include the following provision: "It is agreed that this policy is not subject to cancellation, non-renewal, material change, or reduction in coverage until sixty (60) days prior written notice has been given to the Board of Education of Howard County Maryland."

The phrases "endeavor to" and "... but failure to mail such notice shall impose no obligation or liability of any kind upon the company, its agents or representatives" are to be eliminated from the cancellation provision of standard ACORD certificates of insurance.

1.4 - No acceptance and/or approval of any insurance by the Board of Education of Howard County Maryland shall be construed as relieving or excusing the Contractor, or the Surety, or his bonds, from any liability or obligation imposed upon either or both of them by the provisions of the Contract Documents.

1.5 - The Board of Education of Howard County Maryland and its elected or appointed officials, agents and employees are to be named as an additional insured under all coverages except Workers compensation and business automobile liability, and the certificate of insurance, or the certified policy, if requested, must so state this. Coverage afforded under this paragraph shall be primary as respects the Board of Education of Howard County Maryland, its agents and employees.

1.6 - The Contractor shall be responsible for the Work performed under the Contract Documents and every part thereof, and for all materials, tools, equipment, appliances, and property of any and all description used in connection with the Work. The Contractor assumes all risk for direct and indirect damage or injury to the property or persons used or employed on or in connection with the Work contracted for, and of all damage or injury to any person or property wherever located, resulting from the action, omission, commission or operation under the contract, or in connection in any way whatsoever with the contracted Work, until final acceptance of the Work by the Board of Education of Howard County Maryland.

1.7 - Insurance coverage required in these specifications shall be in force throughout the contract term. Should the Contractor fail to provide acceptable evidence of current insurance within seven days of written notice at any time during the contract term, the Board of Education of Howard County Maryland shall have the absolute right to terminate the contract without any further obligation to the Contractor, and the Contractor shall be liable to the Board of Education of Howard County Maryland for the entire additional cost of procuring performance and the cost of performing the incomplete portion of the contract at time of termination.

1.8 - Contractual and other liability insurance provided under this contract shall not contain a supervision, inspection or engineering services exclusion that would preclude the Board of Education of Howard County Maryland from supervising or inspecting the project as to the end result. The Contractor shall assume all

on-the-job responsibilities as to the control of persons directly employed by it and of the Subcontractors and any persons employed by the Subcontractor.

1.9 - Nothing contained in the specifications shall be construed as creating any contractual relationship between any Subcontractor and the Board of Education of Howard County Maryland. The Contractor shall be fully responsible to the Board of Education of Howard County Maryland for the acts and omissions of the Subcontractors and of persons employed by them as it is for acts and omissions of persons directly employed by it.

1.10 - Precaution shall be exercised by the Contractor at all times for the protection of persons, (including employees) and property. All existing structures, utilities, roads, services, trees and shrubbery shall be protected against damage or interruption of service at all times by the Contractor and its Subcontractors during the term of the contract, and the Contractor shall be held responsible for any damage to property occurring by reason of its operation on the property.

1.11 - If the Contractor does not meet the insurance requirements of the specifications, alternate insurance coverage, satisfactory to the Board of Education of Howard County Maryland, may be considered. Written requests for consideration of alternate coverages must be received by the Board of Education of Howard County Maryland at least ten Working days prior to the date set for receipt of bids or proposals. If the Board of Education of Howard County Maryland denies the request for alternate coverages, the specified coverages will be required to be submitted.

1.12 - All required insurance coverages must be acquired from insurers allowed to do business in the State of Maryland and acceptable to the Board of Education of Howard County Maryland. The insurers must also have a policyholders' rating of "A-" or better, and a financial size of "Class VII" or better in the latest edition of Best's Insurance Reports, unless the Board of Education of Howard County Maryland grants specific approval for an exception.

1.13 - The Board of Education of Howard County Maryland will consider any deductible amounts as part of its review of the financial stability the Contractor. Any deductibles shall be disclosed by the Contractor, and deductible amounts are the responsibility of the Contractor.

2 - Contractor's Liability Insurance - "Occurrence" Basis:

2.1 - The Contractor shall purchase the following insurance coverages:

2.1.1 - Commercial general liability with a minimum limit of \$1,000,000 per occurrence, \$1,000,000 annual aggregate including all of the following:

- i. General aggregate limit is to apply per project;
- ii. Premises/operations;
- iii. Actions of independent Contractors;
- iv. Products/completed operations to be maintained for two years after completion of the Work;
- v. Contractual liability including protection for the Contractor from claims arising out of liability assumed under this contract;
- vi. Personal injury liability including coverage for offenses related to employment;
- vii. Explosion, collapse, or underground (XCU) hazards (confirmation of underground hazard coverage must be confirmed by either certificate of insurance or in writing by Contractor's agent, broker or insurer);

2.1.2 - Business automobile liability including coverage for any owned, hired, or non-owned motor vehicles and automobile contractual liability with a limit of \$1,000,000 per accident; uninsured motorist coverage at minimum statutory limits.

2.1.3 - Workers compensation with statutory benefits as required by Maryland law or the U. S. Longshoremen's and Harbor Workers' Compensation Act, or other laws as required by labor union agreements, including standard other states coverage; employers' liability coverage with limits of \$100,000 per accident, \$100,000 per employee for disease, and a \$500,000 disease policy limit.

2.1.4 - Total limit requirements of 2.1.1, 2.1.2 and 2.1.3 may be met by a combination of primary and umbrella excess liability coverage.

3 - Commercial General or Other Required Liability Insurance - "Claims Made" Basis

3.1 - If commercial general or other liability insurance purchased by the Contractor has been issued on a "claims made" basis, the Contractor must comply with the following additional conditions:

- i. Agree to provide certificates of insurance evidencing the above coverages for a period of two years after final payment for the contract. Such certificates shall evidence a retroactive date, no later than the beginning of the Contractors' or Subcontractors' Work under this contract, or
- ii. Purchase an extended (minimum two years) reporting period endorsement for the policy or policies in force during the term of this contract and evidence the purchase of this extended reporting period endorsement by means of a certificate of insurance or a copy of the endorsement itself.

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Payment Bond

CONTRACTOR:

(Name, legal status and address)

SURETY:

(Name, legal status and principal place of business)

OWNER:

(Name, legal status and address)

CONSTRUCTION CONTRACT

Date:

Amount: \$

Description:

(Name and location)

BOND

Date:

(Not earlier than Construction Contract Date)

Amount: \$

Modifications to this Bond: ☐ None ☐ See Section 18

CONTRACTOR AS PRINCIPAL

Company (Corporate Seal)

:

Signature

:

Name

and Title:

(Any additional signatures appear on the last page of this Payment Bond.)

SURETY

Company (Corporate Seal)

:

(Row deleted)

Signature

:

Name

and Title:

ADDITIONS AND DELETIONS:

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Any singular reference to Contractor, Surety, Owner or other party shall be considered plural where applicable.

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(1748452473)

Drawings and Specifications prepared by:
(Architect name and address)

§ 1 The Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors and assigns to the Owner to pay for labor, materials and equipment furnished for use in the performance of the Construction Contract, which is incorporated herein by reference, subject to the following terms.

§ 2 If the Contractor promptly makes payment of all sums due to Claimants, and defends, indemnifies and holds harmless the Owner from claims, demands, liens or suits by any person or entity seeking payment for labor, materials or equipment furnished for use in the performance of the Construction Contract, then the Surety and the Contractor shall have no obligation under this Bond.

Which contract is by reference made a part hereof, and is hereinafter referred to as the Contract.

LABOR AND MATERIAL PAYMENT BOND

Now therefore, the condition of this obligation is such that, if Principal shall promptly make payment to all claimants as hereinafter defined. For all labor and material used or presumably required for use in the performance of the Contract, then this obligation shall be void: otherwise it shall remain in full force and effect, subject, however, to the following conditions:

1. A claimant is defined as one having a direct contract with the principal or with a Subcontractor of the Principal for labor, material, or both, used or reasonably required for use in the performance of the Contract, labor and material being construed to include that part of water, gas, power, light, heat, oil, gasoline, telephone service or rental of equipment directly applicable to the Contract.
2. The above named Principal and Surety hereby jointly and severally agree with the Owner that every claimant as herein defined, who has not been paid in full before the expiration of a period of ninety (90) days after the date which the last of such claimant's work or labor was done or performed, or materials were furnished by such claimant, prosecute the suit for final judgment for such sum or sums as may be justly due claimant, and have execution thereon. The Owner shall not be liable for the payment of any costs or expenses of any such suit.
3. No suit or action shall be commenced hereunder by any claimant:
 - a) Unless claimant, other than on having a direct contract with the Principal, shall have given written notice to any two of the following: the Principal, the Owner, or the Surety above named, within ninety(90) days after such claimant did or performed the last of the work or labor, or furnished the last of the materials for which said claim is made, stating with substantial accuracy the amount claimed and the name of the party to whom the materials were furnished, or for whom the work or labor was done or performed. Such notice shall be served by mailing the same by registered mail or certified mail, postage prepaid, in an envelope addressed to the Principal, Owner or Surety, at any place where an office is regularly maintained for the transaction of business, or served in any manner in which legal process may be served in the state in which the aforesaid project is located, save that such service need not be made by a public officer.
 - b) After the expiration of one (1) year following the date on which Principal ceased Work on seaside Contract, it being understood, however, that if any limitation embodied in this bond is prohibited by any law controlling the construction hereof such limitation shall be deemed to be amended so as to be equal to the minimum period of limitation permitted by such law.
 - c) Other than in a state court of competent jurisdiction in and for the county or other political subdivision of the state in which the Project, or any part thereof, is situated, or in the United

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States District Court for the district in which the Project, or any part thereof, is situated, and not elsewhere.

4. The amount of this bond shall be reduced by and to the extent of any payment or payments made in good faith hereunder, inclusive of the payment by Surety of mechanics' liens with may be filed of record against said improvement, whether or not claim for the amount of such lien be presented under and against this bond.

(Space is provided below for additional signatures of added parties, other than those appearing on the cover page.)

CONTRACTOR AS PRINCIPAL

Company: _____ (Corporate Seal)

SURETY

Company: _____ (Corporate Seal)

Signature: _____

Name and
Title:

Signature: _____

Name and
Title:

Address:

Address:

(Table deleted)(Paragraphs deleted)

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Performance Bond

CONTRACTOR:
(Name, legal status and address)

SURETY:
(Name, legal status and principal place
of business)

OWNER:
(Name, legal status and address)

CONSTRUCTION CONTRACT

Date:
Amount: \$
Description:
(Name and location)

BOND
Date:
(Not earlier than Construction Contract Date)

Amount: \$
Modifications to this Bond: ☐ **NONE** ☐ **SEE SECTION 16**

CONTRACTOR AS PRINCIPAL
COMPAN (CORPORATE SEAL)
Y:

SIGNATU
RE:

NAME
AND
TITLE:

SURETY
COMPAN (CORPORATE SEAL)
Y:

SIGNATU
RE:

NAME
AND
TITLE:

IN ACCORDANCE WITH DRAWINGS AND SPECIFICATIONS PREPARED BY:
(HERE INSERT FULL NAME AND ADDRESS OR LEGAL TITLE OF ARCHITECT)

(Table deleted)

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User Notes:

(1316254543)

§ 1 The Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors and assigns to the Owner for the performance of the Construction Contract, which is incorporated herein by reference.

Which contract is by reference made a part hereof, and is hereinafter referred to as the Contract.

PERFORMANCE BOND

NOW THEREFORE, THE CONDITION OF THIS OBLIGATION is such that, if Contractor shall promptly and faithfully perform said Contract, then this obligation shall be null and void; otherwise it shall remain in full force and effect.

The surety hereby waives notice of any alteration of extension of time made by the Owner.

Whenever Contractor shall be, and declare by Owner to be in default under the Contract, the Owner having performed Owner's obligations thereunder, the Surety may promptly remedy the default, or shall promptly

1. Complete the contract in accordance with its terms and conditions, or
2. Obtain a bid or bids for competing the Contract in accordance with its terms and conditions, and upon determination by Surety of the lowest responsible bidder, or, if the Owner elects, upon determination by the Owner and the Surety jointly of the lowest responsible bidder, arrange for a contract between such bidder and Owner, and make available as Work progresses (even though there should be a default or a succession of defaults under the contract or contracts of completion arranged under this paragraph) sufficient funds to pay the cost of completion less the balance of the contract price; but not exceeding, including other costs and damages for which the Surety may be liable hereunder, the amount set forth in the first paragraph hereof. The term "balance of the contract price," as used in this paragraph, shall mean the total amount payable by Owner to Contractor under the Contract and any amendments thereto, less the amount properly paid by Owner to Contractor.

Any suit under this bond must be instituted before the expiration of two (2) years from the date on which final payment under the Contract falls due.

No right of action shall accrue on this bond to or for the use of any person or corporation other than the Owner named herein or the heirs, executors, administrators or successors of the Owner.

Signed and sealed this day of

(Witness)

(Principal)

(Seal)

(Witness)

(Title)

(Table deleted) (Paragraphs deleted)

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AIA® Document A201® – 2007

General Conditions of the Contract for Construction

for the following PROJECT:

(Name and location or address)

THE OWNER:

(Name and address)

THE ARCHITECT:

(Name and address)

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

§ 1.1.3 THE WORK

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

§ 1.1.4 THE PROJECT

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

§ 1.1.5 THE DRAWINGS

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

§ 1.1.6 THE SPECIFICATIONS

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

§ 1.1.7 INSTRUMENTS OF SERVICE

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

§ 1.1.8 INITIAL DECISION MAKER

The Initial Decision Maker is the person identified in the Agreement to render initial decisions on Claims in accordance with Section 15.2 and certify termination of the Agreement under Section 14.2.2.

§ 1.2 CORRELATION AND INTENT OF THE CONTRACT DOCUMENTS

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

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§ 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. Wherever in the Specifications there appears a reference to a "Contractor" or the "Subcontractor" or a reference to a Contractor, installer or supplier of a particular trade, or for a particular type of Work, such reference, regardless of the language hereof shall be deemed a reference to the Contractor and shall not be construed as relieving the Contractor from the duty to perform all of the Work and other obligations provided under the Contract.

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

§ 1.3 CAPITALIZATION

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

§ 1.4 INTERPRETATION

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

§ 1.5 OWNERSHIP AND USE OF DRAWINGS, SPECIFICATIONS AND OTHER INSTRUMENTS OF SERVICE

§ 1.5.1 The Drawings, Specifications and other documents, including those in electronic form, prepared by the Architect and the Architect's consultants are Instruments of Service through which the Work to be executed by the Contractor is described. The Contractor may retain one record set. Neither the Contractor nor any Subcontractor, Sub-subcontractor or material or equipment supplier shall own or claim a copyright in the Drawings.. Unless otherwise indicated, the Architect shall be deemed the author of the Specifications and other documents prepared by the Architect. All copies of Instruments of Service, except the Contractor's record set, shall be returned or suitably accounted for to the Architect, on request, upon completion of the Work. The Drawings, Specifications and other documents prepared by the Architect and the Architect's consultants, and copies thereof furnished to the Contractor, are for use solely with respect to this Project. They are not to be used by the Contractor or any Subcontractor, Sub-subcontractor or material or equipment supplier on other projects or for additions to this Project outside the scope of the Work without the specific written consent of the Owner, Architect and the Architect's consultants. The Contractor, Subcontractors, Sub-subcontractors and material or equipment suppliers are authorized to use and reproduce applicable portions of the Drawings, Specifications and other documents prepared by the Architect and the Architect's consultants appropriate to and for use in the execution of their Work under the Contract Documents. All copies made under this authorization shall bear the statutory copyright notice, if any, shown on the Drawings, Specifications and other documents prepared by the Architect and the Architect's consultants. Submittal or distribution to meet official regulatory requirements or for other purposes in connection with this Project is not to be construed as publication in derogation of the Owners copyrights or other reserved rights. The Drawings, Specifications, and other documents are and shall always be the property of the Owner, and the Owner shall retain all common law, statutory, and other reserved rights in addition to copyright.

§ 1.5.2 The Contractor, Subcontractors, Sub-subcontractors and material or equipment suppliers are authorized to use and reproduce the Instruments of Service provided to them 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 material or equipment suppliers may not use the Instruments of Service on other projects or for additions to this Project outside the scope of the Work without the specific written consent of the Owner, Architect and the Architect's consultants.

§ 1.6 TRANSMISSION OF DATA IN DIGITAL FORM

If the parties intend to transmit Instruments of Service or any other information or documentation in digital form, they shall endeavor to establish necessary protocols governing such transmissions, unless otherwise already provided in the Agreement or the Contract Documents.

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ARTICLE 2 OWNER

§ 2.1 GENERAL

§ 2.1.1 The Owner is the Board of Education of Howard County Maryland 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 Contractor understands that the Board of Education of Howard County, Maryland, is a public agency, and no mechanics' liens are permitted against its property.

§ 2.2 INFORMATION AND SERVICES REQUIRED OF THE OWNER

§ 2.2.1 Deleted

§ 2.2.2 Except for permits and fees, including those required under Section 3.7.1, which are the responsibility of the Contractor under the Contract Documents, the Owner shall secure and pay for necessary approvals, easements, assessments and charges required for construction,

§ 2.2.3 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 to the extent reasonably required for execution of the Work and requested by the Contractor in writing within one (1) month of the date of Contract. The Owner does not warrant or undertake responsibility for the location of utilities or the accuracy of tests concerning the soil, surface, and subsurface conditions.

§ 2.2.4 Information or services under the Owner's control shall, be furnished by the Owner after receipt from the Contractor of a written request for such information or services..

(Paragraph deleted)

§ 2.2.5 Unless otherwise provided in the Contract Documents, the Contractor will be furnished, free of charge, Three (3) sets of copies of Drawings and Project Manuals as are reasonably necessary for execution of the Work.

§ 2.3 OWNER'S RIGHT TO STOP THE WORK

§ 2.3.1 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. This right shall be in addition to an not in restriction or derogation of the Owners' rights under Section 4.3.4 and under Article 14 of the General Conditions.

§ 2.3.2 If unforeseen conditions occur or are encountered which may substantially impair the quality of the Work unless the Work is suspended, the Owner may suspend the Work by notice in writing to the Contractor. In the event of such a suspension, Contractor shall be entitled only to payment for work actually completed up to and including the date on which the work was suspended by the Owner. In any event where the Contractor reasonably determines that a suspension is required in such circumstances, the Contractor shall promptly notify in writing the Owner and Architect of such determination. In the event the Owner agrees to suspend the work, the Contractor shall only be entitled to payment for work actually completed up to and including the date on which the work was suspended.

§ 2.4 OWNER'S RIGHT TO CARRY OUT THE WORK

§ 2.4.1 If the Contractor defaults or neglects to carry out the Work in accordance with the Contract Documents and fails within a seven-day period after receipt of written notice from the Owner to commence and continue correction of such default or neglect with diligence and promptness, the Owner may, upon written notice to the Contractor at the

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conclusion of the above referenced seven day period without prejudice to other remedies the Owner may have, correct such deficiencies. In such case an appropriate Change Order shall be issued deducting from payments then or thereafter due the Contractor the reasonable cost of correcting such deficiencies, including Owner's expenses and compensation for the Architect's additional services made necessary by such default, neglect or failure. , upon written notice to the Contractor at the conclusion of the above referenced seven-day period, without prejudice to other remedies the Owner may have, correct such deficiencies. In such case an appropriate Change Order shall be issued deducting from payments then or thereafter due the Contractor the cost of correcting such deficiencies, including compensation for the Architect's and their respective consultants' additional services and expenses made necessary by such default, neglect or failure. At the election of the Owner, the first written notice to the Contractor to correct defective work may also contain written notice that if the defective work or other specified cause for termination is not corrected, cured, or remedied to Owner's satisfaction, then Owner may issue a written notice to Contractor at the end of the above reference seven (7) day period terminating the Contractor's employment under the Contract pursuant to Article 14 of these General Conditions. In the event the Owner elects to terminate the Contractor's employment under this Contract, the Contractor shall only be entitled to payment for work under the Agreement actually completed by the Contractor up to the date of Contractor's termination, less deductions for: (1) the cost of correcting any deficient or defective work, including compensation for the Architect and their respective consultant's additional services and expenses made necessary by the Contractor's defective work, default, neglect, or failure to perform under this Contract; (2) damages incurred by the Owner as a result of the Contractor's breach, including but not limited to costs to finish the work and damages for delay, if any, in completing the work under the Contract; and (3) actual reasonable attorney's fees incurred by the Owner in obtaining legal advice, counsel, and/or representation relating to the issues of Contractor's breach of contract, defective work, default neglect, or failure to perform and Owner's legal options relating thereto as well as any other reasonable attorney's fees due to Owner under other provisions of this Contract; and (4) such other amounts due and owing to Owner under the terms and conditions of the Contract documents. In the event the Contractor is terminated pursuant to Article 14.2, the Contractor shall not be entitled to any remaining funds under the Contract after the date of termination except as specifically provided above, and subject to the availability of funds after all work is completed. All remaining unpaid funds in the Contract as of the Contractor's termination date shall be the sole and exclusive property of the Owner, and the Contractor shall be paid by the Owner at the conclusion of all work under the Contract as provided above, but only to the extent that there are funds remaining after all payments have been made to complete the work under the Contract and to compensate the Owner as provided above in the four (4) enumerated deductions in this Article 2.4.1. If payments then or thereafter due the Contractor are not sufficient to cover such amounts, the Contractor shall pay the difference to the Owner.

ARTICLE 3 CONTRACTOR

§ 3.1 GENERAL

§ 3.1.1 . 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 term "Contractor" means the Contractor or the Contractor's authorized representative. When separate contracts are awarded for different portions of the Project or other work on the site, the term Contractor in the Contract Documents in each case shall mean the contractor who executes each separate Contractor Agreement.

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

§ 3.1.3 The Contractor shall not be relieved of 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 The Contractor warrants that it has made itself familiar with the Project site and obtained all information required by the Contractor concerning the conditions of the Project site including but not limited to soil, surface, and subsurface conditions, legal descriptions and surveys of the Project site, and the location of utilities and the improvements to be constructed. The Contractor shall continue to carefully study and compare the Contract Documents with each other and with information obtained by Contractor by his own investigation and tests and shall at once report to the Owner and Architect errors, inconsistencies, or omissions discovered. These obligations are for

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the purpose of facilitating construction by the Contractor and are not for the purpose of discovering errors, omissions, or inconsistencies in the Contract Documents; however, any errors, inconsistencies or omissions discovered by the Contractor shall be reported promptly to the Architect as a request for information in such form as the Architect may require. If the Contractor performs any construction activity with either actual knowledge or constructive knowledge that it involves an error, inconsistency, or omission in the Contract Documents, the Contractor shall assume liability for such performance and costs for correction.

§ 3.2.2 Any design errors or omissions noted by the Contractor during this review shall be reported promptly to the Architect, but 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. The Contractor is not required to ascertain that the Contract Documents are in accordance with applicable laws, statutes, ordinances, building codes, and rules and regulations, but any nonconformity discovered by or made known to the Contractor shall be reported promptly to the Architect. If the Contractor performs any construction activity with either actual knowledge or constructive knowledge that it involves an error, inconsistency, or omission in the Contract Documents, the Contractor shall assume liability for such performance and costs for correction.

§ 3.2.3 Any design errors or omissions noted by the Contractor during this review shall be reported promptly to the Architect, but 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. The Contractor is not required to ascertain that the Contract Documents are in accordance with applicable laws, statutes, ordinances, building codes, and rules and regulations, but any nonconformity discovered by or made known to the Contractor shall be reported promptly to the Architect. If the Contractor performs any construction activity with either actual knowledge or constructive knowledge that it involves an error, inconsistency, or omission in the Contract Documents, the Contractor shall assume liability for such performance and costs for correction.

§ 3.2.4 Delete.

§ 3.3 SUPERVISION AND CONSTRUCTION PROCEDURES

§ 3.3.1 The Contractor shall supervise and direct the Work, using the Contractor's best skill and attention. The Contractor shall be solely responsible for and have control over construction means, methods, techniques, sequences and procedures and for coordinating all portions of the Work under the Contract, . The Contractor shall be fully and solely responsible for the jobsite safety of such 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 not be relieved of obligations to perform the Work in accordance with the Contract Documents by activities or duties of the Architect in their administration of the Contract, or by tests, inspections or approvals required or performed by persons other than the Contractor.

§ 3.3.4 All inspections required by law shall be obtained by the Contractor, including but not limited to those required by law to be obtained by the Owner, and no failure of the Owner to obtain such inspection shall constitute a waiver of Contractor's obligation hereunder. The Contractor shall notify the Owner of any application for inspection required to be executed by the Owner.

§ 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, 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 Delete

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

§3.4.4 By law, all school sites are drug, alcohol, and tobacco free, and Contractor shall ensure that all workers on the job site comply with the said law.

§ 3.5 WARRANTY

§ 3.5.1 The Contractor warrants to the Owner that materials and equipment furnished under the Contract will be of excellent quality and new unless otherwise required or permitted by the Contract Documents, that the Work shall be performed in an excellent manner and shall be free from defects, and that the Work shall conform to the requirements of the Contract Documents. Work not conforming to these requirements, including substitutions not properly approved and authorized, shall be considered defective. The Contractor shall furnish satisfactory evidence as to the kind and quality of materials and equipment.

§ 3.6 TAXES

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

§ 3.7 PERMITS, FEES, NOTICES, AND COMPLIANCE WITH LAWS

§ 3.7.1 Unless otherwise provided in the Contract Documents, the Contractor shall secure and pay for the building permit and other permits and governmental fees, licenses and inspections necessary for proper execution and completion of the Work which are customarily secured after execution of the Contract and which are legally required when bids are received. The Owner will not reimburse the Contractor for the cost of elective permits, which the Contractor chooses to secure in conjunction with its means and methods of executing the work, or for any offsite permits.

§ 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 The Contractor shall review the Contract Documents to ascertain that the Contract Documents are to the best of the Contractor's knowledge in accordance with applicable laws, statutes, ordinances, building codes, and rules and regulations. The Contractor shall promptly notify the Architect and Owner in writing, of any variance therewith, and necessary changes shall be accomplished by appropriate Modification.

§ 3.7.4 If the Contractor performs Work contrary to laws, statutes, ordinances, building codes, and rules and regulations, the Contractor shall assume appropriate responsibility for such Work and shall bear the costs attributable to correction.

(Paragraph deleted)

§ 3.8 Deleted

(Paragraphs deleted)

§ 3.9 SUPERINTENDENT

§ 3.9.1 The Contractor shall employ a competent superintendent and necessary assistants who shall be in attendance at the Project site during performance of the Work. The superintendent shall represent the Contractor, and communications given to the superintendent shall be as binding as if given to the Contractor. Project conference meeting minutes shall constitute Owner's request in writing. The Owner shall have the right to require the Contractor

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to replace any superintendent whose performance the Owner deems to be unsatisfactory, and the Contractor's failure to do so within seven (7) days of having received written notice from the Owner as to the Superintendent's unsatisfactory performance shall constitute a breach of Article 14.2.1, thereby giving the Owner the right to terminate the Contractor's employment under this Contract.

§ 3.9.2 The Contractor, as soon as practicable after award of the Contract, shall furnish in writing to the Owner through the Architect the name and qualifications of a proposed superintendent.

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

§ 3.10 CONTRACTOR'S CONSTRUCTION SCHEDULES

§ 3.10.1 The Contractor, promptly after being awarded the Contract, shall promptly prepare and submit for the Owner's and Architect's approval a proposed Contractor's construction schedule for the Work. The schedule shall not exceed time limits current under the Contract Documents, shall be revised at appropriate intervals as required by the conditions of the Work and Project, but shall not extend the original completion date and shall be related to the entire Project to the extent required by the Contract Documents, and shall provide for expeditious and practicable execution of the Work.

§ 3.10.2 The Contractor shall prepare and keep current, for the Architect's/Owners' review, a schedule of submittals which is coordinated with the Contractor's construction schedule and allows the Architect reasonable time to review submittals.

(Paragraph deleted)

§ 3.11 DOCUMENTS AND SAMPLES AT THE SITE

The Contractor shall maintain at the site for the Owner one record copy of the Drawings, Specifications, Addenda, Change Orders and other Modifications, in good order and marked currently to record field changes and selections made during construction, and one record copy of approved Shop Drawings, Product Data, Samples and similar required submittals. These shall be available to the Architect and shall be delivered to the Architect for submittal to the Owner in good condition upon completion of the Work and before final payment is made and shall be executed by the Contractor certifying that they have been kept in accordance with the provisions of this subparagraph and accurately reflect the construction of the Work as built.

§ 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. The purpose of their submittal is to demonstrate for those portions of the Work for which submittals are required by the Contract Documents the way by which the Contractor proposes to conform to the information given and the design concept expressed in the Contract Documents. Informational submittals upon which the Architect is not expected to take responsive action may be so identified in the Contract Documents. Submittals which are not required by the Contract Documents may be returned by the Architect without action.

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

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

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

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

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

§ 3.12.10 The Contractor shall not be required to provide professional services which constitute the practice of architecture or engineering unless such services are specifically required by the Contract Documents for a portion of the Work or unless the Contractor needs to provide such services in order to carry out the Contractor's responsibilities for construction means, methods, techniques, sequences and procedures. The Contractor shall not be required to provide professional services in violation of applicable law. If professional design services or certifications by a design professional related to systems, materials or equipment are specifically required of the Contractor by the Contract Documents, the Owner and the Architect will specify all performance and design criteria that such services must satisfy. The Contractor shall cause such services or certifications to be provided by a properly licensed design professional, whose signature and seal shall appear on all drawings, calculations, specifications, certifications, Shop Drawings and other submittals prepared by such professional. Shop Drawings and other submittals related to the Work designed or certified by such professional, if prepared by others, shall bear such professional's written approval when submitted to the Architect. The Owner and the Architect shall be entitled to rely upon the adequacy, accuracy and completeness of the services, certifications or approvals performed by such design professionals. Pursuant to this Section 3.12.10, the Architect will review, approve or take other appropriate action on submittals only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents.

§ 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, and lawful orders of public authorities and the Contract Documents and shall not unreasonably encumber the site with materials or equipment.

§ 3.14 CUTTING AND PATCHING

§ 3.14.1 The Contractor shall be responsible for cutting, fitting or patching required to complete the Work or to make its parts fit together properly.

§ 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 such construction by the Owner or a separate contractor

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except with written consent of the Owner and of such separate contractor; such consent shall not be unreasonably withheld. The Contractor shall not unreasonably withhold from the Owner or a separate contractor the Contractor's 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 or rubbish caused by operations under the Contract. At completion of the Work, the Contractor shall remove from and about the Project waste materials, rubbish, the Contractor's tools, construction equipment, machinery and surplus materials.

(Paragraph deleted)

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

§ 3.16 ACCESS TO WORK

The Contractor shall provide the Owner and Architect and Owner engaged Testing Agencies 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 such defense or loss when a particular design, process or product of a particular manufacturer or manufacturers is required by the Contract Documents, or where the copyright violations are contained in Drawings, Specifications or other documents prepared by the Owner or Architect. However, if the Contractor has reason to believe that the required design, process or product is an infringement of a copyright or a patent, the Contractor shall be responsible for such loss unless such information is promptly furnished to the Architect.

§ 3.18 INDEMNIFICATION

§ 3.18.1 To the fullest extent permitted by law and to the extent claims, damages, losses or expenses are not covered by Project Management Protective Liability insurance purchased by the Contractor. 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 reasonable attorneys' fees and litigation expenses incurred by the Owner, and arising out of or resulting from performance of the Work, defective work, default, neglect, and or failure to perform under the Contract. Such obligation shall not be construed to negate, abridge, or reduce other rights or obligations of indemnity which would otherwise exist as to a party or person described in this Section 3.18.

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

ARTICLE 4 ARCHITECT

§ 4.1 GENERAL

§ 4.1.1 The Architect is the person lawfully licensed to practice architecture or an entity lawfully practicing architecture identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. The term "Architect" means the Architect or the Engineer or the Architect's or Engineer's 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

§ 4.1.3 If the employment of the Architect is terminated, the Owner shall employ a new Architect whose status under the Contract Documents shall be that of the former Architect.

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§ 4.2 ADMINISTRATION OF THE CONTRACT

(Paragraph deleted)

§ 4.2.1. The Architect will provide administration of the Contract as described in the Contract Documents, and will be an Owner's representative (1) during construction, (2) until final payment is due and (3) with the Owner's concurrence, from time to time during the one or two year period for correction of Work described in Section 12.2. The Architect will have authority to act on behalf of the Owner only to the extent provided in the Contract Documents, unless otherwise modified in writing in accordance with other provisions of the Contract.

§ 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, except as provided in Section 3.3.1.

§ 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 report to the Owner (1) known deviations from the Contract Documents and from the most recent construction schedule submitted by the Contractor, and (2) 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 FACILITATING CONTRACT ADMINISTRATION

Except as otherwise provided in the Contract Documents or when direct communications have been specially authorized, the Owner and Contractor shall endeavor to communicate with each other through the Architect about matters arising out of or relating to the Contract. Communications by and with separate contractors shall be through the Owner.

§ 4.2.5 Based on the Architect's/Owner'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 13.5.2 and 13.5.3, whether or not such 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, material and equipment 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, and 3.12. The Architect's review shall not constitute approval of safety precautions or, unless otherwise specifically stated by the Architect, 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.

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§ 4.2.8 The Architect will prepare Change Orders and Construction Change Directives, and may authorize 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.

§ 4.2.9 The Architect will conduct inspections to determine the date or dates of Substantial Completion and the date of final completion, will receive, review for completeness and forward to the Owner, records, written warranties and related documents required by the Contract and assembled by the Contractor, and will issue a final Certificate for Payment upon compliance with the requirements of the Contract Documents.

§ 4.2.10 Delete

§ 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 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 initial decisions, the Architect will endeavor to secure faithful performance by the Contractor

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

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

ARTICLE 5 SUBCONTRACTORS

§ 5.1 DEFINITIONS

§ 5.1.1 A Subcontractor is a person or entity who has a direct contract with the Contractor to perform a portion of the Work at the site. The term "Subcontractor" is referred to throughout the Contract Documents as if singular in number and means a Subcontractor or an authorized representative of the Subcontractor. The term "Subcontractor" does not include a separate contractor or subcontractors of a separate contractor. . Under no circumstances shall the Contractor subcontract any portion of the work under the Contract Documents to any person or entity in which the Contractor (including any officer and/or stockholder of the Contractor) has an ownership interest. Under no circumstances shall the Contractor assign or otherwise contract with another person or entity to assume the Contractor's obligations and duties as Contractor under these Contract Documents

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

§ 5.2 AWARD OF SUBCONTRACTS AND OTHER CONTRACTS FOR PORTIONS OF THE WORK

§ 5.2.1 Within thirty (30) days of the award of the Contract, the Contractor shall furnish in writing to the Owner through the Architect the names of persons or entities (including those who are to furnish materials or equipment fabricated to a special design) proposed for each principal portion of the Work. The Architect will promptly reply to the Contractor in writing stating whether or not the Owner or the Architect, after due investigation, has reasonable objection to any such proposed person or entity. Failure of the Owner or Architect to reply promptly shall constitute notice of no reasonable objection. Subcontractors, required to be named on the Bidding Documents, shall be used on the Work for which they are proposed, unless reasonable objection is indicated by the Owner, or the Architect.

§ 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.

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§ 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 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 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 change a Subcontractor, person or entity previously selected without approval of the Owner.

§ 5.3 SUBCONTRACTUAL RELATIONS

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

§ 5.4 CONTINGENT ASSIGNMENT OF SUBCONTRACTS

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

- .1 assignment is effective only after termination of the Contract by the Owner for cause pursuant to Section 14.2, or stoppage of the Work pursuant to Article 2.3, and only for those subcontract agreements which the Owner accepts by notifying the Subcontractor and Contractor in writing;

(Paragraphs deleted)

§5.5 PAYMENTS TO SUBCONTRACTORS

§5.5.1 The Contractor shall pay each subcontractor upon receipt of payment from the Owner, an amount equal to the percentage of completion allowed to the Contractor on account of each Subcontractor's work less the percentage retained for payments to the Contractor. The Contractor shall also require each Subcontractor to make similar payments to its Sub-subcontractors.

§5.5.2 If the Owner fails to approve a Requisition for Payment for a cause which the Owner determines is the fault of the Contractor and not the fault of a particular Subcontractor, or if the Contractor fails to make a payment which is properly due to a particular Subcontractor, the Owner may pay each Subcontractor directly less the amount to be retained under the Subcontract. Any amount so paid by the Owner shall be repaid to the Owner by the Contractor in the manner set forth in Subparagraph 2.4

§5.5.3 The Owner shall have no obligation to pay or see to the payment of any monies to any Subcontractor. Nothing contained in Article 5.5 shall be deemed to create any rights in any Subcontractor against the Owner.

ARTICLE 6 CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS

§ 6.1 OWNER'S RIGHT TO PERFORM CONSTRUCTION AND TO AWARD SEPARATE CONTRACTS

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§ 6.1.1 The Owner reserves the right to perform construction or operations related to the Project with the Owner's own forces, and to award separate contracts in connection with other portions of the Project or other construction or operations on the site under Conditions of the Contract identical or substantially similar to these including those portions related to insurance and waiver of subrogation. If the Contractor claims that delay or additional cost is involved because of such action by the Owner, the Contractor shall make such Claim as provided in Article 15.

§ 6.1.2 When 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 other separate contractors and the Owner in reviewing their construction schedules. The Contractor shall make any revisions to the 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.

(Paragraph deleted)

§ 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 report to the Architect apparent discrepancies or defects in such other construction that would render it unsuitable for such proper execution and results. Failure of the Contractor so to report 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, except as to defects not then reasonably discoverable.

§ 6.2.3 The Owner shall be reimbursed by the Contractor for costs incurred by the Owner which are payable to a separate contractor because of delays, improperly timed activities or defective construction of the Contractor.

§ 6.2.4 The Contractor shall promptly remedy damage caused by the Contractor to completed or partially completed construction or to property of the Owner or separate contractors as provided in Section 10.2.5.

(Paragraph deleted)

§ 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 not relieve the Contractor of obligations under the contract. .

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

§ 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 an amount of the adjustment, if any, in the Contract Sum; and
- .3 the extent of an adjustment, if any, in the Contract Time.

§ 7.2.2 Methods used in determining adjustments to the Contract Sum may include those listed in Section 7.3.3.

§ 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

§ 7.3.4 If unit prices are stated in the Contract Documents or subsequently agreed upon, and if quantities originally contemplated are materially changed in a proposed Change Order or Construction Change Directive so that application of such unit prices to quantities of Work proposed will cause substantial inequity to the Owner or Contractor, the applicable unit prices shall be equitably adjusted.

§ 7.3.5 Upon receipt of a Construction Change Directive, the Contractor shall promptly proceed with the change in the Work involved and advise the 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.

(Paragraphs deleted)

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

§ 7.4 CHANGE ORDERS

§ 7.4.1 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 change in the Work; and/ or
- .2 an amount of the adjustment, if any, in the Contract Sum; and/or
- .3 the extent of an adjustment, if any, in the Contract Time.

§ 7.4.2 Methods used in determining adjustments to the Contract Sum may include those listed in Section 7.3.3.

§ 7.5 MINOR CHANGES IN THE WORK

§ 7.5.1 The Architect with concurrence from the Owner will have authority to order minor changes in the Work not involving adjustment in the Contract Sum or extension of the Contract Time and not inconsistent with the intent of the purposes of the building and the Contract Documents. Such changes shall be effected by written order and shall be binding on the Owner and Contractor. The Contractor shall carry out such written orders promptly.

ARTICLE 8 TIME

§ 8.1 DEFINITIONS

§ 8.1.1 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.

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

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

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

§ 8.2 PROGRESS AND COMPLETION

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

§ 8.2.2 The Contractor shall not knowingly, except by agreement or instruction of the Owner in writing, prematurely commence operations on the site or elsewhere prior to the effective date of insurance required by Article 11 to be furnished by the Contractor and Owner. The date of commencement of the Work shall not be changed by the effective date of such insurance. Unless the date of commencement is established by the Contract Documents or a notice to proceed given by the Owner, the Contractor shall notify the Owner in writing not less than five days or other agreed period before commencing the Work. .

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

§ 8.2.4 Should the progress of the Work be delayed by any fault, neglect, act or omission of the Contractor or any person or firm employed by him or should it be necessary to complete the Work within the time permitted for the Contractor's work, the Contractor shall, at its own cost and expense, work such overtime as may be necessary to make up for all time lost and to avoid delay in completion of the Work. The Contractor shall compensate the Owner for and hold him harmless against any and all costs, expenses, reasonable attorney's fees, losses, liability, and damages that the Owner may sustain or incur by reason of such delay.

§ 8.3 DELAYS AND EXTENSIONS OF TIME

(Paragraph deleted)

§ 8.3.1. Requests for extension of completion time due to conditions over which the Contractor has no control, will be reviewed by the Owner after written application is made to the Architect for a time extension. Any request for any extension of time is to be made within 21 days of occurrence of conditions which, in the opinion of the Contractor

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warrant such an extension, with reasons clearly stated and detailed proof given for all delays beyond the Contractor's control. No time extension will be allowed except by written and specific approval of the Owner. Delays beyond the Contractor's control may include: an act or neglect of the Owner's own forces, Architect, any of the other Contractors, or an employee of any of them, or by changes ordered in the Work, or by labor disputes, fire, unusual delay in deliveries, unavoidable casualties, or other causes beyond the Contractor's control, or by delay authorized by the Owner.

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

(Paragraph deleted)

ARTICLE 9 PAYMENTS AND COMPLETION

§ 9.1 CONTRACT SUM

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

§ 9.2 SCHEDULE OF VALUES

§ 9.2.1 Before the first Requisition for Payment, the Contractor shall submit to the Architect a schedule of values allocated to various portions of the Work, prepared in such form and supported by such data to substantiate its accuracy as the Architect may require. This schedule, unless objected to by the Architect, shall be used as a basis for reviewing the Contractor's Requisitions for Payment.

§ 9.3 REQUISITION FOR PAYMENT

§ 9.3.1 The Contractor shall prepare and submit three original copies to the Architect on the 25th day of each month itemized "Requisition for Payment" (IAC PSCP Form 306.4 Standard Contractor's Requisition for Payment and such other forms as may be designated by Owner) for operations completed in accordance with the Schedule of Values for the value of the work completed or anticipated to be completed through the last day of such month, including the value of material suitably stored at the Project Site or other approved locations as provided in Subparagraph 9.3.2, less the aggregate of any previous payments and retainages and less retainages required by the Contract Documents. No change in the Contract Sum shall be made by Contractor on any Requisition for Payment without an approved Change Order. Faxed Requisitions for payment will NOT be accepted.

At least ten days before the date established for each progress payment, the Contractor shall submit to the Architect an itemized Application for Payment for operations completed in accordance with the schedule of values. Such application shall be notarized, if required, and supported by such data substantiating the Contractor's right to payment as the Owner or Architect may require, such as copies of requisitions from Subcontractors and material suppliers, and reflecting retainage if provided for in the Contract Documents.

(Paragraphs deleted)

§ 9.3.2 As provided in Section 7.3.8, such Requisitions may include requests for payment on account of changes in the Work which have been properly authorized by interim determinations of the Architect, but not yet included in Change Orders.

§ 9.3.3 Such Requisitions may not include requests for payment for portions of the Work for which the Contractor does not intend to pay to a Subcontractor or material supplier.

9.3.4 Upon completion of fifty percent (50%) of the work and provided that the Contract work is on schedule and the Contractor's performance is deemed by the Owner to be satisfactory, the Owner may at his discretion decline to withhold further retainage on the remainder of the work to be billed. If Project schedules are not pursued diligently, or if the Contractor's work is at any time deemed by the Owner to be unsatisfactory, the withholding of the further retainage up to ten percent (10%) of the Contract value may be reinstated by the Owner at its discretion. If the Contractor intends to request a reduction of retainage as stated above, the Contractor must submit a request 30 days prior to invoicing the Owner for a reduction. A consent of surety to a reduction of retention along with a justification of the progress on the job in relation to the overall Project must be submitted. A complete labor and material schedule of values for all aspects of the work must also be submitted with the request for approval.

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§ 9.3.5 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. . When the Requisition for Payment includes material or equipment stored off the Project site, the Contractor shall include with the requisition a certified statement including

1. Description of items,
2. Bill of Sale,
3. Location of storage facility and delivery receipt,
4. Items are currently covered by all contractual requirements, including liability and fire insurance,
5. Items, or any part thereof will not be installed in other construction projects other than work under this Contract.

§ 9.3.6 The Contractor warrants that title to all Work covered by a Requisition for Payment shall pass to the Owner no later than the time of payment. The Contractor further warrants that upon submittal of a Requisition for Payment all Work for which Certificates for Payment have been previously issued and payments received from the Owner shall, to the best of the Contractor's knowledge, information and belief, be free and clear of liens, claims, security interests or encumbrances in favor of the Contractor, Subcontractors, material suppliers, or other persons or entities making a claim by reason of having provided labor, materials and equipment relating to the Work. Contractor shall indemnify and hold Owner harmless from any liens, claims, security interests, or encumbrances claimed by Contractor, Subcontractors, material suppliers, or other persons or entities making a claim by reason of having provided labor, materials and/or equipment relating to the Work and from all costs and expenses, including reasonable attorney's fees, incurred by Owner in connection therewith.

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

§ 9.3.8 Deleted

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

§ 9.4 CERTIFICATES FOR PAYMENT

§ 9.4.1 The Architect will, within seven days after receipt of the Contractor's Requisition for Payment, either issue to the Owner a Certificate for Payment, with a copy to the Contractor, for such amount as the Architect determines is properly due, or notify the Contractor and Owner in writing of the Architect's reasons for withholding certification in whole or in part as provided in Section 9.5.1.

§ 9.4.2 The Architect shall endeavor to obtain approval by the Owner, and Contractor of the draft Requisition for Payment. If approval is obtained, the Architect shall notify the Owner, and Contractor, and shall issue a Project Certificate of Payment. The Contractor shall then submit five (5) copies of the agreed upon Requisition for Payment to the Architect which shall be signed by the Contractor, Owner, and Architect, and shall be notarized. If approval is not obtained of the draft Requisition for Payment, the Architect shall notify the Contractor of non-approval. The Architect shall issue a Project Certificate for Payment to the Owner with a copy to the Contractor for such amounts as the Architect, and Owner determine are properly due.. The Contractor shall then submit a Requisition for Payment pursuant to such Project Certificate for Payment, if any, in five (5) copies based on the Architect's determination. The issuance of a Certificate for Payment will constitute a representation by the Architect to the Owner,

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based on the Architect's evaluation of the Work and the data comprising the Application for Payment, that the Work has progressed to the point indicated and that, to the best of the Architect's knowledge, information and belief, the quality of the Work is in accordance with the Contract Documents. 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. The issuance of a Certificate for Payment will further constitute a representation that the Contractor is entitled to payment in the amount certified. 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 material 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.

9.4.3 In any event, where the Owner, and Architect do not certify payment or withhold certification to any extent, the Contractor shall nonetheless continue to perform the Work fully.

§ 9.5 DECISIONS TO WITHHOLD CERTIFICATION

(Paragraphs deleted)

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

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

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

(Paragraph deleted)

§ 9.6 PROGRESS PAYMENTS

(Paragraphs deleted)

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

§ 9.6.2 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.

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

§ 9.6.4 Contractor payments to material and equipment suppliers shall be treated in a manner similar to that provided in Sections 9.6.1, 9.6.2 and 9.6.3.

§ 9.6.5 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.

§ 9.6.6 Under no circumstances shall the Contractor assign to any person or entity the Contractor's right to receive payment under the Contract Documents, unless the Contractor has received express, prior written consent of the Owner, which consent specifically identifies the identity of such assignee. Nothing contained in these Contract Documents shall require the Owner to approve such an assignment of payments by the Contractor to a third party.

§ 9.6.7 Neither the Owner nor Architect shall have an obligation to pay or to see to the payment of money to a Subcontractor except as may otherwise be required by law.

§ 9.7 FAILURE OF PAYMENT

§ 9.7.1 If the Architect should fail to issue notice of approval or disapproval within fourteen (14) days of Owner's receipt of the Contractor's draft Requisition for Payment, or if, through no fault of the Contractor, the Architect does not issue a Project Certificate for Payment within seven (14) days after receipt of the Owner's approval or disapproval of the draft Requisition for Payment, the Contractor may file a claim against the Owner for payment as provided in Article 15.

§ 9.8 SUBSTANTIAL COMPLETION

(Paragraph deleted)

§ 9.8.1 Substantial Completion is the stage in the progress of the Work when the Work or designated portion thereof is sufficiently complete in accordance with the Contract Documents so the Owner can occupy or utilize the Work for its intended use; i.e., when the Owner is granted a "Use and Occupancy Permit" by Howard County and other Authorities having jurisdiction.

§ 9.8.2 When the Architect, and Owner agree that the project has reached "Substantial Completion" as set forth in Paragraph 9.8.1 and is on schedule, and it appears that there are no complications or problems in completing the job, the retainage may be reduced to five percent (5%) at the Owner's discretion.

9.8.3 Except as stated in Paragraph 9.8.2 after the payment due the Contractor at Substantial Completion has been made by the Owner, no other payment shall be made until the Project has been fully completed and the Contract fully performed.

(Paragraph deleted)

§ 9.8.4 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.

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

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

§ 9.8.7 The Certificate of Substantial Completion shall be submitted to the Owner and Contractor for their written acceptance of responsibilities assigned to them in such Certificate. Upon such acceptance and consent of surety, if any, the Owner shall make payment of retainage applying to such 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.

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

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

§ 9.10 FINAL COMPLETION AND FINAL PAYMENT

§ 9.10.1 Upon receipt of written notice that the Work is ready for final inspection and acceptance and upon receipt of a final Requisition for Payment, the Architect will promptly make such inspection and, 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 terms and conditions of the Contract Documents and that the entire balance found to be due the Contractor and noted in the final Certificate is due and payable. The Architect's final Certificate for Payment will constitute a further representation that conditions listed in Section 9.10.2 as precedent to the Contractor's being entitled to final payment have been fulfilled.

§ 9.10.2 Neither final payment nor any remaining retained percentage shall become due until the Contractor submits to the Architect

- (1) an affidavit that payrolls, bills for materials and equipment, and other indebtedness connected with the Work for which the Owner or the Owner's property might be responsible or encumbered (less amounts withheld by Owner) have been paid or otherwise satisfied,
- (2) a certificate evidencing that insurance required by the Contract Documents to remain in force after final payment is currently in effect and will not be canceled or allowed to expire until at least 30 days' prior written notice has been given to the Owner,
- (3) a written statement that the Contractor knows of no substantial reason that the insurance will not be renewable to cover the period required by the Contract Documents,
- (4) consent of surety, if any, to final payment with AIA Form; and
- (5), if required by the Owner, other data establishing payment or satisfaction of obligations, such as receipts, releases and waivers of liens, claims, security interests or encumbrances arising out of the Contract, to the extent and in such form as may be designated by the Owner and release of liens on the "Contractor's Affidavit of Release of Liens and Payment of Debts and Claims" AIA Form;

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(6) all records, Drawings and Specifications, Addenda, Change Orders, and other modifications maintained at the site under the Subparagraph 3.11 all warranties, instructions, and maintenance manuals required.

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 or claim. If such lien or claim 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 such lien or claim, including all costs and reasonable attorneys' fees incurred by Owner. Final payment to the Contractor shall not become due until all close-out documents have been properly submitted to and received by the Architect through the Construction Manager and certified to the Architect and delivered by the Architect to the Owner and all warranty work has been fully 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 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 surety to payment of the balance due for that portion of the Work fully completed and accepted shall be submitted by the Contractor to the Architect prior to certification of such payment. Such payment shall be made under terms and conditions governing final payment, except that it shall not constitute a waiver of claims.

§ 9.10.4

(Paragraphs deleted)

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

The making of final payment shall, after the Date of Substantial Completion of the Project, constitute a waiver of all claims by the Owner except those arising from:

1. Unsettled claims,
2. Faulty or defective work appearing after Substantial Completion of work,
3. Failure of the work to comply with the requirements of the Contract Documents,
4. Terms of any special warranties required by the Contract Documents; and
5. Reasonable attorney's fees, court costs, and litigation expenses incurred by the Owner in prosecuting any such claims against the Contractor or in defending against any claims against the Owner arising out of the Contract and the work thereunder.

ARTICLE 10 PROTECTION OF PERSONS AND PROPERTY

§ 10.1 SAFETY PRECAUTIONS AND PROGRAMS

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

§ 10.2 SAFETY OF PERSONS AND PROPERTY, INJURY OR DAMAGE TO PERSON OR PROPERTY

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

- .1 employees on the Work and other persons who may be affected thereby;
- .2 the Work and materials and equipment to be incorporated therein, whether in storage on or off the site, under care, custody or control of the Contractor or the Contractor's Subcontractors or Sub-subcontractors; 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.

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§ 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 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 owners and users of adjacent sites and utilities.

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

§ 10.2.5 The Contractor shall promptly remedy damage and loss (other than damage or loss insured under property insurance required by the Contract Documents) to property referred to in Sections 10.2.1.2 and 10.2.1.3 caused in whole or in part by the Contractor, a Subcontractor, a Sub-subcontractor, or anyone directly or indirectly employed by any of them, or by anyone for whose acts they may be liable and for which the Contractor is responsible under Sections 10.2., except damage or loss attributable to acts or omissions of the Owner or Architect or anyone directly or indirectly employed by either of them, or by anyone for whose acts either of them may be liable, and not attributable to the fault or negligence of the Contractor. The foregoing obligations of the Contractor are in addition to the Contractor's obligations under Section 3.18.

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

§ 10.2.7 The Contractor shall not load or permit any part of the construction site to be loaded so as to endanger its safety or the safety of persons or property. The Contractor shall protect adjoining properties, streets, walkways, sidewalks, and paths.

10.2.8 The Contractor shall protect excavation and structures from damage by rain, water, ground water, or water from any other source. The Contractor shall use tarpaulins, pumps, or other temporary protection to afford protection.

10.2.9 The Contractor shall provide constant protection to maintain work, materials, apparatus, and fixtures free from injury and damage by rain, snow, wind, storms, frost, or heat and shall cover work likely to be damaged at the end of each day's work.

10.2.10 The Contractor shall remove work damaged due to failure to provide specified protection and replace such removed work at no additional cost to the Owner.

10.2.11 Material Safety Data Sheets: Contractor shall provide Material and Data Safety Sheets on all items prior to commencement of Work. The Contractor shall designate a common location on the construction site where all independent contractors or employers shall have a chemical information list before the commencement of work.

§ 10.2.8 INJURY OR DAMAGE TO PERSON OR PROPERTY

(Paragraph deleted)

§ 10.3 HAZARDOUS MATERIALS

§ 10.3.1 The Contractor is responsible for compliance with any requirements included in the Contract Documents regarding hazardous materials. 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 report the condition to the Owner and Architect in writing.

§ 10.3.2 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 verify that it has been 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 such 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. The Contract Time shall be extended appropriately.

§ 10.3.3 The Owner shall not be responsible under this Section 10.3 for materials or substances the Contractor brings to the site unless such materials or substances are required by the Contract Documents.

(Paragraphs deleted)

§ 10.4 EMERGENCIES

(Paragraph deleted)

§ 10.4.1 In any case of an emergency, the Contractor shall immediately notify the Architect and the Owner by the most expeditious means available, followed by a Fax, or written notice, explaining the situation and actions taken.

§ 10.4.2 Additional compensation or extension of time will not be considered or permitted for emergencies arising from delay, damage, or loss as stipulated in 8.2.4 and 10.2.5 or other applicable provisions.

ARTICLE 11 INSURANCE AND BONDS

§ 11.2 GENERAL INSURANCE REQUIREMENTS

§11.2.1 The Contractor shall not commence Work until the Contractor has obtained at the Contractor's own expense all of the insurance as required under this Contract and until such insurance has been approved by the Owner. The Contractor shall not allow any Subcontractor to commence work on any subcontract until all insurance required of the Subcontractor has been so obtained and approved by the Contractor. Approval of insurance required of the Contractor will be granted only after submission to the Owner of original certificates of insurance signed by authorized representatives of the insurers or, at the Owners request, certified copies of the required insurance policies. **Additionally, the Contractor must submit with the original certificates or certified policies, the enclosed Contractor's Insurance Checklist form (See Construction Insurance Check List attached to and incorporated into this Contract as Exhibit A.) completed by the Contractor and each of the Contractor's Insurance Agents or Contractor's Insurers (one form for each agent or insurer if multiple agents or insurers write the Contractor's coverages).**

§11.2.2 Insurance as required under this Contract shall be in force throughout the term of this Contract and for two years after final acceptance of the Project by Owner. Original certificated signed by authorized representatives of the insurers or, at the Owner's request, certificated copies of insurance policies, evidencing that the required insurance is in effect, shall be maintained with the Owner throughout the term of the Contract and for two years after final acceptance of the Project by Owner.

§11.2.3 The Contractor shall require all Subcontractors to maintain during the term of the Contract commercial general liability insurance, business auto liability insurance, and workers compensation and employers liability insurance and umbrella excess or excess liability insurance to the same extent required of Contractor in Sections 11.3.1.1 through 11.3.1.4 of this Contract unless any such requirement is expressly waived or amended by the Owner in writing. The Contractor shall furnish Subcontractor's certificates of insurance to the Owner immediately upon request.

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§11.2.4 All insurance policies required under this Contract shall be endorsed to provide that the policy is not subject to cancellation, non-renewal, or material reduction in coverage until sixty (60) days prior written notice has been given to the Owner. Therefore, the phrases "endeavor to" and "...but failure to mail such notice shall impose no obligation or liability of any kind upon the company, its agents or representatives" are to be eliminated from the cancellation provision of standard ACORD certificates of insurance.

§11.2.5 Acceptance and/or approval of any insurance by the Owner shall not be construed as relieving or excusing the Contractor or the Contractor's Surety from any liability or obligation imposed upon either or both of them by the provisions of this Contract or the Contract documents.

§11.2.6 If the contractor does not meet the insurance requirements of this Contract, the Contractor shall be in default under this Contract, and all default remedies shall be available to the Owner; moreover, no Work shall commence without such insurance, and, if Work has commenced, it shall cease immediately until the insurance requirements have been met or unless the Owner orders in writing that Work shall commence with specified alternate insurance as determined in the sole and absolute discretion of the Owner and set forth in the written order to commence or return to work signed by the Owner. The Contractor may forward a written request to the Owner for a waiver in writing of the insurance requirement(s) not met or for approval in writing of alternate insurance coverage, self-insurance, or group self-insurance arrangements. If the Owner denies the request, the Contractor shall comply with the insurance requirements as specified in this Contract or be held in default under this Contract. The Owner shall have the sole and absolute discretion to grant or deny such a request for a waiver, and the Owner's decision shall be final and binding upon all parties and shall not be subject to appeal or review.

§11.2.7 All required insurance coverages must be underwritten by insurers licensed to do business in the State of Maryland and acceptable to the Owner. The insurers must also have a policyholders' rating of "A" or better, and a financial size of "Class VII" or better in the latest evaluation by A.M. Best company, unless Owner grants specific written approval for an exception. The Owner hereby grants specific approval for the acquisition of workers compensation and employers liability insurance from the Injured Workers Insurance Fund of Maryland.

§11.2.8 Any deductibles or retentions in excess of \$10,000 shall be disclosed by the Contractor and shall be subject to Owner's written approval. Any deductible or retention amounts elected by the Contractor or imposed by the Contractor's insurer(s) shall be the sole responsibility of the Contractor.

§11.2.9 Any and all return premiums and/or dividends for insurance or coverage directly charged to the Owner by the Contractor in connection with this Contract shall belong to and be payable to the Owner.

§11.2.10 If the Owner is damaged by the failure or neglect of the Contractor to purchase and maintain insurance as described and required in this Contract, then the Contractor shall be in default under this Contract, shall bear all liability for all damages incurred, and shall be subject to the remedies under Article 14.

§ 11.2.11 Owner's Liability Insurance

§11.2.11.1 Owner shall be responsible for purchasing and maintaining the Owner's usual liability insurance, or solely at the Owner's option, the Owner may self-insure the Owner's liability exposures.

§11.3 Contractor's Liability Insurance

§ 11.3.1 The Contractor shall purchase and maintain the following insurance coverages which will insure against claims which may arise out of or result from the Contractor's 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. Insurance shall be written for not less than the limits specified below or required by law, whichever is greater.

§11.3.2 Commercial general liability insurance or its equivalent for bodily injury, personal injury and property damage including loss of use, with minimum limits of:

\$ 1,000,000 each occurrence;

\$ 1,000,000 personal and advertising injury;

\$ 2,000,000 general aggregate; and

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\$ 2,000,000 products/completed operations
aggregate.

This insurance shall include coverage for all of the following:

- i. General aggregate limit applying on a per project basis;
- ii. Liability arising from premises and operations;
- iii. Liability arising from the actions of independent contractors;
- iv. Liability arising from products and completed operations with such coverage to be maintained for two years after final acceptance of the project by the Owner;
- v. Contractual liability including protection for the Contractor from bodily injury and property damage claims arising out of liability assumed under this Contract; and
- vi. Liability arising from the explosion, collapse, or underground (XCU) hazards.

(Paragraph deleted)

§11.3.3 Business auto liability insurance or its equivalent with a minimum limit of \$1,000,000 per accident and including coverage for all of the following:

- i. Liability arising out of the ownership, maintenance, or use of any auto; and
- ii. Automobile contractual liability.

§11.3.4 Workers compensation insurance or its equivalent with statutory benefits as required by any state or Federal law, including standard "other states" coverage; employers liability insurance or its equivalent with minimum limits of:

- \$ 100,000 each accident for bodily injury by accident
- \$ 100,000 each employee for bodily injury by disease; and
- \$ 500,000 policy limit for bodily injury by disease.

(Paragraphs deleted)

§11.3.5 Contractor's pollution liability insurance or its equivalent for bodily injury, property damage, including loss of use, and clean-up costs on and off the Project site, with minimum limits of:

- \$ 1,000,000 each pollution incident; and
- \$ 1,000,000 annual aggregate.

The insurance shall include coverage for all of the following:

- i. Liability arising from activities of the Contractor or of others for whom the Contractor is legally obligated whether on or off the Project site; and
- ii. Contractual liability including protection for the Contractor from claims for bodily injury, property damage, and clean-up costs arising out of liability assumed under this Contract.

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11.3.6 Umbrella excess liability or excess liability insurance or its equivalent with minimum limits of:

- \$ 5,000,000 occurrence;
- \$ 5,000,000 aggregate for other than products/completed operations and auto liability; and
- \$ 5,000,000 products/completed operations aggregate

and including all of the following coverages on the applicable schedule of underlying insurance:

- i. Commercial general liability;
- ii. Business auto liability; and
- iii. Employer's liability.

§11.3.7 Owner and Owner's elected and appointed officials, officers, consultants, agents and employees shall be named as additional insureds on the Contractor's commercial general liability insurance and umbrella excess or excess liability insurance policies with respect to liability arising out of the Contractor's products, installation, and/or services provided under this Contract. Such coverage shall extend to cover the additional insured(s) for liability arising out of the following:

- i. On-going operations;
- ii. Owner's general supervision of installation and/or services as provided by the Contractor and/or its agents and subcontractors pursuant to this Contract; and
- iii. Products and completed operations.

The commercial general liability policy and the umbrella excess liability or excess liability policies must include additional insured language, which shall afford liability coverage for all of the exposures listed above in i., ii., and iii., as follows:

"This policy is amended to include as insureds Owner and Owner's elected and appointed officials, officers, consultants, agents, and employees, but only for liability arising out of "your product" and "your work" for Owner by or for you."

Special Note: ISO forms CG 2009 and CG 2010 entitled "Additional Insured – Owners, Lessees or Contractors – Scheduled Person or Organization" (previously Forms A and B respectively) and CG 2033 entitled "Additional Insured – Owners, Lessees or Contractors – Automatic Status When Required in Construction Agreement with You" are **NOT ACCEPTABLE**. A manuscript endorsement with the above wording is required.

(Paragraph deleted)

§ 11.3.8 Insurance or self-insurance provided to the Owner and Owner's elected and appointed officials, officers, consultants, agents and employees under the Contractor's liability insurance or self-insurance required in this Contract, including, but not limited to, umbrella and excess liability or excess liability policies, shall apply separately to each insured against whom claim is made or suit is brought, except with respect to the limits of insurance or self-insurance. (Any cross suits or cross liability exclusion shall be deleted from Contractor's liability insurance policies required herein.)

§11.3.9 Any insurance or self-insurance required to be provided by the Owner and Owner's elected and appointed officials, officers, consultants, agents, and employees shall be primary, and any other insurance, self-insurance, coverage or indemnity available to the Owner and Owner's elected and appointed officials, officers, consultants, agents, and employees shall be excess of and non-contributory with insurance or self-insurance provided to the Owner and Owner's elected and appointed officials, officers, consultants, agents, and employees.

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(Paragraph deleted)

§11.3.10 If any liability insurance purchased by the Contractor has been issued on a "claims made" basis, the Contractor shall comply with the following additional conditions:

- i. The Contractor shall agree to provide certificates of insurance evidencing the above coverages for a period of two years after final payment for the Contract. Such certificates shall evidence a retroactive date no later than the beginning of the Work under this Contract; or
- ii. The Contractor shall purchase an extended (minimum two years) reporting period endorsement for each such "claims made" policy in force as of the date of final acceptance of the project by the Owner and evidence the purchase of this extended reporting period endorsement by means of a certificate of insurance or a copy of the endorsement itself. Such certificate or copy of the endorsement shall evidence a retroactive date no later than the beginning of the Work under this Contract.

(Paragraph deleted)

§ 11.4 Builders Risk Insurance (Owner to Purchase)

§ 11.4.1 The Owner shall purchase and maintain builders risk insurance on a replacement cost basis with a limit at least equal to the initial Contract Sum. This insurance shall be maintained until final acceptance of the Project by the Owner or until no person or entity other than the Owner has an insurable interest in the covered property, whichever is earlier. This builders risk insurance shall include the interests of the Owner, Subcontractors and Sub-subcontractors in the Project.

(Paragraphs deleted)

§11.4.2 Insurance shall be on an "all-risk" or equivalent policy form and shall insure against the perils of fire, extended coverage, theft, vandalism, malicious mischief, collapse and windstorm. Coverage is to apply for debris removal, including demolition occasioned by a covered loss. This insurance shall cover reasonable compensation for Architect's and Contractor's services and expenses required as a result of such covered loss. Coverage for other perils such as flood and earthquake or for loss caused by the enforcement of any applicable ordinance or law shall not be required unless otherwise provided in the Contract.

§ 11.4.3 This builders risk insurance shall cover all of the following types of property:

- i. All structures to be constructed, under construction, and/or already constructed;
- ii. All materials, equipment, machinery and supplies which are to be incorporated into the Project;
- iii. Temporary structures of any nature whatsoever; and
- iv. Underground property, including but not limited to, foundations, pump stations, pumps, pipes, drains, tanks and connections.

(Paragraph deleted)

§11.4.4 The Contractor shall be responsible for payment of any deductibles applicable under this builders risk insurance, boiler and machinery insurance, or other property insurance applicable to the Project.

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§ 11.4.5 Unless otherwise provided in the Contract Documents, this builders risk insurance shall cover materials to be incorporated into the Project, which are either on or off the site, and also such materials in transit.

(Paragraph deleted)

§ 11.4.6 This builders risk insurance shall insure (or shall be amended to insure) against loss or damage caused by the boiler and machinery perils with limits and scope of coverage that are deemed by the Owner to be satisfactory. This insurance shall also include the interests of the Owner, Contractor, Subcontractors, and Sub-subcontractors in the Project.

(Paragraph deleted)

§ 11.4.7 The Owner and Contractor waive all rights against each other and against the Construction Manager, Owner's other Contractors and own forces described in Article 6, if any, and the subcontractors, sub-subcontractors, (elected and appointed officials, officers, directors, trustees, agents, employees and consultants) of any of them for property damage to or loss of use of the Work to the extent that such property damage or loss of use is covered by this builders risk insurance, boiler and machinery insurance, or other property insurance applicable to the Work. The policies shall provide such waivers of subrogation by endorsement or otherwise.

(Paragraph deleted)

§ 11.4.8 Any loss covered under this builders risk insurance, boiler and machinery insurance, or other property insurance applicable to the Work shall be payable to the Owner as fiduciary for the insureds, as their interests may appear, subject to any mortgagee clause. 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.

(Paragraph deleted)

§ 11.4.9 Owner, as fiduciary, shall have the power to adjust and settle a loss with insurers.

(Paragraphs deleted)

§ 11.4.10 Partial occupancy or use in accordance with the provisions of the Contract that pertain to partial occupancy or use shall not commence until the builders risk insurer has granted permission by endorsement or otherwise for the Owner to partially occupy or use any completed or partially completed portion of the Work at any stage of construction. The Owner and Contractor shall take reasonable steps to obtain such permission.

(Paragraphs deleted)

§ 11.4.11 The insurance required by this Paragraph 11.4 is not intended to cover machinery, tools, or equipment owned or rented by the Contractor or its Subcontractors, which are utilized in the performance of the Work but not incorporated into the permanent improvements. The Contractor and its Subcontractors shall, at their own expense, purchase and maintain property insurance coverage for owned, leased, or rented machinery, tools or equipment. The Contractor and its Subcontractors hereby waive all rights against the Owner and its elected and appointed

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officials, officers, agents, employees, and consultants for property damage to or loss of use of such machinery, tools, or equipment. The policies shall provide such waivers of subrogation by endorsement or otherwise.

§11.5 Miscellaneous Insurance

§11.5.1 The Contractor shall comply with the provisions of Federal law governing Social Security and with State and/or Federal laws regarding Unemployment Insurance, and all other State and/or Federal laws regarding insurance, as may be now and hereafter in force. The Contractor shall bear exclusive and sole liability for and will hold the Owner harmless against any and all demands for any required payments, taxes, or withholdings (including any interest or penalties assessed thereon) for the Contractor's (or any of its Subcontractor's) failure or refusal to comply with any such laws. Failure to comply shall be deemed a default subject to the remedies of Article 14.2.

§ 11.6 PERFORMANCE BOND AND PAYMENT BOND

§ 11.6.1 The Contractor shall furnish a Performance Bond and Labor and Materials Payment Bond covering the faithful performance of the Contract and the payment of all obligations arising thereunder and complying with the requirements of Maryland Law. Both bonds shall be in the amount of one hundred percent (100%) of the Contract amount and shall name the Howard County Board of Education as Obligee.

§ 11.6.2

Bonds shall be written by a bonding company that must be licensed with the Maryland Insurance Administration to do business in the State of Maryland and otherwise acceptable to the Howard County Public School System. The Contractor shall use Bond Forms provided by the Owner AIA 312 Performance Bond and AIA 312 Labor and Material Payment Bond, in order to satisfy the Bond requirements referenced in this Article.

§ 11.6.3 Firms issuing said bonds must be licensed to write bonds in the State of Maryland. The Contractor shall pay the premiums for required bonds. Obtainage of the required bonds by Contractor shall be a condition precedent to effectuation of the Contract between Owner and Contractor. If additional work is authorized, the amounts of the bonds shall be increased to cover the value of the increased Contract sum. All bonds shall conform to the requirements of the Maryland Little Miller Act. All bonds shall be subject to Owner's approval.

§ 11.3.4 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 permit a copy to be made.

(Paragraphs deleted)

§ 11.3.5 Owner reserves the right to request from Contractor financial statements for the Contractor for up to 3 prior fiscal years.

§ 11.3.6 To protect the public interest the Owner will request a D & B report on the Contractor at any time during the term of the project. Should the D & B rating fall below the awarded rating, Contractor shall advise Owner of their corrective measures.

ARTICLE 12 UNCOVERING AND CORRECTION OF WORK

§ 12.1 UNCOVERING OF WORK

§ 12.1.1 If any portion of the Work is covered contrary to the request of the Architect, or the requirements specifically expressed in the Contract Documents, it must, if required in writing by either, the Owner or any other government agency, be uncovered for their observation and shall be replaced at the Contractor's expense without change in the Contract Time If a portion of the Work is covered contrary to the Architect's request or to requirements specifically

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expressed in the Contract Documents, it must, if required 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, costs of uncovering and replacement shall, by appropriate Change Order, be at the Owner's expense. If such Work is not in accordance with the Contract Documents, such costs and the cost of correction shall be at the Contractor's expense.

§ 12.2 CORRECTION OF WORK

§12.2.1 Defective work shall include but not be limited to Work which may be caused by deterioration or failure to perform due to premature wear (not occasioned by abuse) or inherent defects in materials, workmanship of manufacturer or fabrication or improper execution of work

§12.2.2 Cost of correcting such rejected work also includes all contingent damages arising there from including damages to other work (whether installed by the Contractor or another) and to other property of the Owner.

§12.2.3 Such warranties as provided herein do not deprive the Owner of the Owner's right to prosecute any claim for breach of contract and/or any other claim for appropriate relief and damages.

§12.2.4 Any defective or nonconforming work during this period causing a hazard to life, safety, property, or use causing the Owner a financial loss shall be corrected immediately without regard to normal working hours. The Owner will immediately endeavor to provide telephone notice to the Contractor on the next normal working day.

§ 12.2.5 The Owner shall direct, if endeavors to contact the Contractor fail, certain telephone notification to Subcontractors in order to expedite emergency repairs. The Contractor shall not be relieved of responsibility by the procedure, and the Contractor shall supervise and direct correction of defects as required by the Contract Documents.

§12.2.6 The manufacturer of a product may be specifically mentioned as a party to a warranty. Then in such cases, it shall be the Contractor's obligation to produce the required warranty of the manufacturer and submit it to the Architect for examination and approval. Inclusion of a manufacturer as a party to a warranty does not relieve the Contractor from the requirements of the Contract Documents.

§12.2.7 Warranties on operating systems, equipment, or components placed in operation prior to Substantial Completion or acceptance shall begin on the date of Substantial Completion.

§ 12.2.1 BEFORE OR AFTER SUBSTANTIAL COMPLETION

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

§ 12.2.2 AFTER SUBSTANTIAL COMPLETION

§ 12.2.2.1 In addition to the Contractor's obligations under Section 3.5, if, within one year after the date of Substantial Completion of the Work or designated portion thereof or after the date for commencement of warranties established under Section 9.9.1, or by terms of an applicable special warranty required by the Contract Documents, any of the Work is found to be not in accordance with the requirements of the Contract Documents, the Contractor shall correct it promptly after receipt of written notice from the Owner to do so unless the Owner has previously given the Contractor a written acceptance of such condition. The Owner shall give such notice promptly after discovery of the condition.

During the one-year period for correction of Work, if the Owner fails to notify the Contractor and give the Contractor an opportunity to make the correction, the Owner waives the rights to require correction by the Contractor and to make a claim for breach of warranty. If the Contractor fails to correct nonconforming Work within a reasonable time during that period after receipt of notice from the Owner or Architect, the Owner may correct it in accordance with Section 2.4.

§ 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.

(Paragraphs deleted)

§ 12.2.2.4 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.

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

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

§ 12.3 ACCEPTANCE OF NONCONFORMING WORK

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

ARTICLE 13 MISCELLANEOUS PROVISIONS

§ 13.1 GOVERNING LAW

The Contract shall be governed by the laws of the State of Maryland and shall be construed in accordance with such laws.

§ 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 such 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 such assignment.

§ 13.3 WRITTEN NOTICE

§13.3.1 Written notice shall be deemed to have been duly served if delivered in person to the individual, to a member of the firm or entity, or to an officer of the corporation for which it was intended; or if delivered at, or sent by registered or certified mail or by courier service providing proof of delivery to, the last business address known to the party giving notice.

Init.

§13.3.2 All Contractor proposals, approvals, instruction, requests, claims, demands, and other notices shall be made in writing on Contractor's stationery; meeting minutes and FAX transmissions will not be considered written notice from Contractor.

§ 13.4 RIGHTS AND REMEDIES

§ 13.4.1 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.

(Paragraph deleted)

§13.4.2 In any claim and/or litigation filed by the Owner against the Contractor to enforce any provision of this Contract, the Owner shall be entitled to all reasonable attorney's fees, expenses, damages, litigation expenses, and court costs incurred in and/or resulting from any such claim and/or litigation. In any claim and/or litigation brought by the Contractor against the Owner and/or its agents, the Contractor shall bear the Owner's court costs, expenses, and reasonable attorney's fees incurred, unless the Court specifically determines as a matter of fact and law that the Owner, knowingly, willfully, and intentionally breached a provision of this Contract giving rise to Contractor's claim and resulting damages

§ 13.4.3 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 there under, except as may be specifically agreed in writing.

§ 13.5 TESTS AND INSPECTIONS

§ 13.5.1 Tests, inspections and approvals of portions of the Work shall be made as required by the Contract Documents and by applicable laws, statutes, ordinances, codes, rules and regulations or lawful orders 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.

§ 13.5.2 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 13.5.1, 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 13.5.3, shall be at the Owner's expense.

§ 13.5.3 If such procedures for testing, inspection or approval under Sections 13.5.1 and 13.5.2 reveal failure of the portions of the Work to comply with requirements established by the Contract Documents, all costs made necessary by such failure including those of repeated procedures and compensation for the Architect's services and expenses shall be at the Contractor's expense.

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

§ 13.5.5 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.

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

Init.

§ 13.6 INTEREST

§ 13.6.1 No interest shall be paid by the Owner to the Contractor.

§ 13.7 TIME LIMITS ON CLAIMS, COMMENCEMENT OF STATUTORY LIMITATION PERIOD

§ 13.7.1 Contractor recognized and agrees that Owner is a governmental agency and that the statute of limitations is not applicable to claims and/or litigation filed by the Owner. Limitations as to time for filing of any claims, disputes, and/or litigation by the Contractor, or any person or entity claiming by, through, or on behalf of the Contractor, shall be as specified in Article 15.

13.8 BUY AMERICAN STEEL

§13.8.1 Contractor shall comply with the Buy American Steel Act Sections 17-301 to 17-306 of the Finance and Procurement Article of the Annotated Code of Maryland.

§13.8.2 Contractor shall be required to use or supply the domestic steel products unless the cost is unreasonable or inconsistent with the public interest.

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 or a Subcontractor, Sub-subcontractor or their agents or employees or any other persons or entities performing portions of the Work under direct or indirect contract with the Contractor, 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;

(Paragraphs deleted)

§ 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' written notice to the Owner and Architect, terminate the Contract and recover from the Owner payment for Work executed.

(Paragraph deleted)

§ 14.2 TERMINATION BY THE OWNER FOR CAUSE

§ 14.2.1 The Owner may terminate the Contractor's employment under this Contract if the Contractor:

- .1 persistently or repeatedly refuses or fails to supply enough properly skilled workers or proper materials;
- .2 fails to make payment to Subcontractors for materials or labor in accordance with the respective agreements between the Contractor and the Subcontractors;
- .3 persistently disregards laws, ordinances, or rules, regulations or orders of a public authority having jurisdiction; or
- .4 otherwise is guilty of substantial breach of a provision of the Contract Documents such as, but not limited to:
 - (1) Failure to maintain progress in accordance with project schedule;
 - (2) Prevents other Contractors from meeting their scheduled progress;
 - (3) Performs work in a negligent or defective manner or in a manner contrary to the Contractor Documents;
 - (4) Failure to provide and maintain the required insurance coverage and the required bonds;
 - (5) Filing of bankruptcy proceedings by or against the Contractor and/or the filing of an assignment for the benefit of Contractor's creditors; and/or
 - (6) Breach of any provision of the Contract Documents.

Init.

§ 14.2.2 When any of the above reasons exist, 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' written notice, terminate employment of the Contractor and may, subject to any prior rights of the surety:

- .1 take possession of the site and 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.

.4 When the Owner terminated the Contractor for one of the reasons stated in Subparagraph 14.2.1 and invokes the Performance Bond to complete the Work, the surety shall not without the written consent of the Owner, retain the Contractor for the Work, and the Contractor shall not without written consent of the Owner perform any of 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. In the event the Owner elects to terminate the Contractor's employment under this Contract, the Contractor shall only be entitled to be paid for work under the Contract actually completed by the Contractor up to the date of Contractor's termination less deductions for

(1) the cost of correcting any deficient or defective work, including compensation for the Construction Manager and Architect and their respective consultants' additional services and expenses made necessary by the Contractor's defective work, default, neglect, or failure to perform under this Contract;

(2) damages incurred by the Owner as a result of the Contractor's breach, including but not limited to the costs to finish the work and damages for delay, if any, in completing the work under the Contract;

(3) actual reasonable attorney's fees incurred by the Owner in obtaining legal advice, counsel, and/or representation relating to the issues of Contractor's breach of contract, defective work, default, neglect, or failure to perform and Owner's legal options relating thereto as well as any other reasonable attorney's fees due to Owner under other provisions of this Contract; and

(4) such other amounts due and owing to Owner under the terms and conditions of the Contract documents. In the event the Contractor is terminated pursuant to Article 14.2, the Contractor shall not be entitled to any remaining funds under the Contract, except as specifically provided above and subject to the availability of funds after all work is completed.

All remaining unpaid funds in the Contract as of the date of Contractor's termination shall be the sole and exclusive property of the Owner, and the Contractor shall be paid by the Owner at the conclusion of all work under the Contract as provided above, but only to the extent that there are funds remaining after all payments have been made first to complete the work under the Contract and to compensate the Owner as provided above in the (4) enumerated deductions in this Article 14.2.3. Any funds still remaining after payment for all work and after payment of the Contractor as provided above shall be the sole and exclusive property of the Owner.

§ 14.2.4 If the unpaid balance of the Contract Sum exceeds costs of finishing the Work, including compensation for the Architect's services and expenses made necessary thereby, and payment of the four (4) enumerated deductions in Article 14.2.3 other damages incurred by the Owner and not expressly waived, such excess shall be the sole and exclusive property of the Owner. 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 if any, for work completed by the Contractor less the deductibles provided in Paragraph 14.2.3) shall be determined by the Owner, and this obligation for payment shall survive termination of the Contract.

§ 14.3 SUSPENSION BY THE OWNER FOR CONVENIENCE

Init.

§ 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.

(Paragraphs deleted)

§ 14.4 TERMINATION BY THE OWNER FOR CONVENIENCE

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

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

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

§ 14.4.3 In case of such termination for the Owner's convenience, the Contractor shall be entitled to receive payment for Work executed, and costs incurred by reason of such termination, along with reasonable overhead and profit on the Work not executed.

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, adjustment or interpretation of Contract terms, payment of money, extension of 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 (and any person or entity claiming by, through, or on behalf of Contractor) arising out of or relating to the Contract. Claims must be initiated by written notice, on Contractor's stationary. Meeting minutes and Fax transmissions from the Contractor will not be considered written notice. The responsibility to substantiate Claims shall rest with the party making the Claim.

§ 15.1.2 Decision of Architect. Any claim, dispute, or other matter in question between the Contractor and the Owner shall be made in writing to the Architect except those relating to artistic effect as provided in Subparagraph 4.2.13 and those which have been waived by the making or acceptance of final payment as provided in Article 9. The Architect shall provide each party with ample opportunity to present its evidence with respect to the claim made, and the Architect shall render his decision on the claim not less than ten (10) days after the close of evidence before the Architect. The decision of the Architect may be appealed by litigation in the Circuit Court of Howard County as provided below. However, no litigation of any such claim, dispute or other matter may be made until the earlier of (1) the date on which the Architect has rendered a written decision, or (2) the eleventh day after the parties have presented their evidence to the Architect or have been given a reasonable opportunity to do so, if the Architect has not rendered a written decision by that date. With respect to all claims and/or disputes, the final written decision of the Architect shall be final and binding on the parties and on those claiming by, through, and/or on behalf of any such party, person, or entity who had the right to do so, and failed to do so, unless the final written decision of the Architect as to any such claim and/or dispute is appealed to the Circuit Court for Howard County by a party within thirty (30) days after having received the Architect's final written decision. In any such appeal of the Architect's final written decision, it shall be presumed that the Architect's decision is correct, and the Architect's decision shall be treated and regarded in the same manner in which an arbitrator's award would be treated and regarded by a Maryland court under Maryland's Uniform Arbitration Act, subject, however, to the procedural requirements specified in the Contract documents. The failure to appeal the Architect's final written decision within the aforementioned thirty (30) day period shall result in the said decision becoming final and binding on all parties as provided above. The Circuit Court for Howard County, Maryland, shall be the sole and exclusive jurisdiction for appealing any final written decision of the Architect. If the Architect renders a decision after litigation proceedings have been filed, such decision may be entered as evidence but will not supersede any litigation proceedings unless the decision is acceptable to all parties concerned.

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§ 15.1.3 Time Limits on Claims. Claims by either party must 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. Claims must be initiated by written notice to the Architect and the other party.

§ 15.1.4 Continuing Contract Performance. Pending final resolution of a Claim except as otherwise agreed in writing, the Contractor shall proceed diligently with performance of the Contract and the Owner shall continue to make payments in accordance with the Contract Documents. Except the Owner may withhold payment to the extent reasonably necessary to secure or compensate for a claim. This Article 15.1.4 shall not apply if the Owner has terminated the Contractor's employment pursuant to

§ 15.1.5 Claims for Concealed or Unknown Conditions. If conditions are encountered at the site which are (1) subsurface or otherwise concealed physical conditions which differ materially from those indicated in the Contract Documents or (2) unknown physical conditions of an unusual nature, which 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, then notice by the observing party shall be given to the other party promptly before conditions are disturbed and in no event later than 21 days after first observance of the conditions. The Architect will promptly investigate such conditions and, if they differ materially and cause an increase or decrease in the Contractor's cost of, or time required for, performance of any part of the Work, will recommend an equitable adjustment in the Contract Sum or Contract Time, or both. If the Architect 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 so notify the Owner and Contractor in writing, stating the reasons. Claims by either party in opposition to such determination must be made within 21 days after the Architect has given notice of the decision. If the conditions encountered are materially different, the Contract Sum and Contract Time shall be equitably adjusted, but if the Owner and Contractor cannot agree on an adjustment in the Contract Sum or Contract Time, the adjustment shall be referred to the Architect for initial determination, subject to further proceedings pursuant to Section 4.4.

(Paragraphs deleted)

§ 15.1.6

(Paragraphs deleted)

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

§ 15.1.7 If the Contractor believes additional cost is involved for reasons including but not limited to (1) a written interpretation from the Architect, (2) an order by the Owner to stop the Work where the Contractor was not at fault, (3) a written order for a minor change in the Work issued by the Architect, (4) failure of payment by the Owner, (5) termination of the Contract by the Owner, (6) Owner's suspension or (7) other reasonable grounds, Claim shall be filed in accordance with this Section 15.1

§ 15.1.8 Claims for Additional Time

§ 15.1.8.1 If the Contractor wishes to make Claim for an increase in the Contract Time, written notice shall be made in writing to the Architect not more than twenty-one (21) days after the commencement of the delay, otherwise it shall be waived.

§ 15.1.8.2 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. . In establishing the time of construction completion, the weather conditions as recorded by the National Oceanic Atmospheric Administration (NOAA) at the National Climatic Data Center, Ashville, North Carolina over the past five (5) years will be taken into consideration. No extension of time, due to weather conditions, will be considered unless accompanied by NOAA documentary evidence showing by comparison that such weather is abnormal to the statistical mean of the past five (5) years and that such abnormality caused the delay.

§ 15.1.8.3 Injury or Damage to Person or Property. If either party to the Contract 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,

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written notice of such 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.

§ 15.2 RESOLUTION OF CLAIMS AND DISPUTES

§ 15.2.1 Litigation

§ 15.2.1 Any Claim arising out of or related to the Contract. Any controversy or Claim arising out of or related to the Contract, or the breach thereof, shall be resolved finally by litigation in the Circuit Court of Howard County, Maryland, provided, however, that the provisions of this Article 15.2.1 authorizing litigation in court shall not be exercised by any party until the provisions of Article 15.1.2 shall have been complied with and exhausted. No party shall be entitled to litigate any dispute and/or claim unless and until that party has fully complied with the provisions of Article 15.1.1. The failure of any party to adhere to and comply with the provisions of Article 15.1.1 shall serve as a bar to that party's litigating a claim and/or dispute in court.

§ 15.2.2 Claims and Timely Assertion of Claims. Since the Owner is a public body, politic and corporate, its claims shall not be barred by any contractual period of limitations or by any statute of limitations. Claims by the Contractor shall be filed as provided in Article 15 (Claims and Disputes), and the time limits prescribed in Article 15 shall serve as a limitation upon filing of any and all claims and/or litigation by the Contractor and/or any person or entity claiming by, through, or on behalf of the Contractor.

15.3 Policies of Employment.

(Paragraphs deleted)

§15.3.1 The Contractor shall maintain policies on employment as follows:

1. The Contractor and all Subcontractors shall not discriminate against any employee or applicant for employment because of race, religion, color, sex, national origin or age. The Contractor shall take affirmative action to ensure that applicants are employed and that employees are treated during employment without regard to their race, religion, sex, national origin, or age. Such action shall include but not be limited to the following:

Employment, upgrading demotion or transfer, recruitment or recruitment advertising layoff or termination rates or pay or other forms of compensation and selection for training including apprenticeship.

The Contractor shall post in conspicuous places available to employees and applicants for employment notices setting forth the policies of non-discrimination.

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

§15.3.3 Minority Business Enterprise (MBE) Requirements are a part of the Conditions of the Contract, including Exhibits A, B, and C included with Form of Proposal.

ARTICLE 16 CONTRACTOR PERFORMANCE EVALUATION SCORECARD

Upon completion of a project or at any time during the project, the awarded contractor shall receive a performance evaluation scorecard rating the contractor's performance on the project. The evaluation scorecard will become part of the contractor's permanent file. A sample Contractor Performance/Evaluation Scorecard is included with the bid documents.

The evaluation scorecard shall include the following performance indicators; Quality of Work, Responsiveness, Professionalism, Resources, Schedule Management, Quality Control, Deficiency Resolution, Submittal Management, Training, Appearance, Security, Safety, Utility Conservation, Disruptions, Quality of Materials, Emergency

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Response, Hazardous Materials, Innovation, Teamwork, Cost Management, Billing, Compliance.

A contractor shall have up to 3 weeks after notification to appeal, challenge or otherwise dispute the scorecard results. After the 3-week period, the scorecard shall be considered final and accepted by the contractor.

A contractor receiving a 70% or less overall evaluation scorecard rating for a project may be disqualified for bidding on any future projects with the HCPSS for a period of three (3) years and/or for the remaining contract term including renewal options.

EXHIBIT A

1. Commercial General Liability

Insurer (precise name as per policy, not group name)
Best's Rating and Financial Size

Each Occurrence Limit
Personal and Advertising Injury Limit
General Aggregate Limit
Products/Completed Operations Aggregate Limit

Occurrence Basis	yes	no
General Aggregate Limit applies Per Project	yes	no
Premises/Operations	yes	no
Actions of Independent Contractors	yes	no
Products/Completed Operations	yes	no
Contractual Liability	yes	no
Explosion, Collapse or Underground (XCU) Hazards	yes	no

Owner included as an additional insured	yes	no
Individuals related to Owner included as additional insureds	yes	no
Manuscript additional insured wording per insurance requirements	yes	no
If no, additional insured coverage extends to cover liability arising out of:		
Owner's general supervision	yes	no
Products and completed operations	yes	no
Specimen of additional insured wording attached if other than manuscript wording in the insurance requirements	yes	no
No cross suits or cross liability exclusion	yes	no
Coverage for additional insureds is primary to Owner's coverage	yes	no
60 days notice of cancellation, nonrenewal, etc.	yes	no
Amount of Retention or Deductible		
Specify if Retention or Deductible applies per occurrence or claim		

2. Business Auto Liability

Insurer (precise name as per policy, not group name)
Best's Rating and Financial Size
Each Accident Limit
Any Auto (or Hired and Non-owned Autos, if no owned autos)

yes no

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Contractual Liability	yes	no
60 days notice of cancellation, nonrenewal, etc.	yes	no
Amount of Retention or Deductible		
Specify if Retention or Deductible applies per accident or claim		

3. Workers Compensation and Employers Liability

Insurer (precise name as per policy, not group name)		
Best's Rating and Financial Size		
Statutory benefits as required by state or Federal law	yes	no
"Other States" coverage	yes	no
Employers liability	yes	no
Each accident limit		
Each employee limit-disease		
Policy limit-disease		
60 days notice of cancellation, etc.	yes	no
Amount of Retention or Deductible		
Specify if Retention or Deductible applies per accident or claim		

4. Contractors Pollution Liability

Insurer (precise name as per policy, not group name)		
Best's Rating and Financial Size		
Each Pollution Incident Limit		
Annual Aggregate Limit		
Other Limit(s)		
Coverage Form:	Claims Made	Occurrence
Covers Operations of Both Contractor and Subcontractors	yes	no
Contractual Liability	yes	no
60 days notice of cancellation, nonrenewal, etc.	yes	no
Amount of Retention or Deductible		
Specify if Retention or Deductible applies per occurrence or claim		

5. Umbrella Excess or Excess Liability

Insurer (precise name as per policy, not group name)		
Best's Rating and Financial Size		
Coverage Form:	Umbrella and Excess	Straight Excess
Each Occurrence Limit		
General Aggregate Limit (for other than products/completed operations and auto liability)		
Products/Completed Operations Aggregate Limit		

Underlying Schedule of Insurance includes:

Commercial General Liability	yes	no
Business Auto Liability	yes	no
Employers Liability	yes	no

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Owner included as an additional insured	yes	no
Individuals related to Owner included as additional insureds	yes	no
Manuscript additional insured wording per insurance requirements	yes	no
If no, additional insured coverage extends to cover liability arising out of:		
Owner's general supervision	yes	no
Products and completed operations	yes	no
Specimen of additional insured wording attached if other than manuscript wording in the insurance requirements	yes	no
No cross suits or cross liability exclusion	yes	no
Coverage for additional insureds is primary to Owner's coverage	yes	no
60 days notice of cancellation, nonrenewal, etc.	yes	no
Amount of Retention		
Retention applies per occurrence	yes	no

INSURANCE AGENT'S OR INSURER'S STATEMENT

I have reviewed the Contract's insurance requirements with the contractor named below. I hereby verify the above responses.

Name of Agent or Insurer:

Agency or Insurer Name:

Authorized Signature and Date:

Phone #:

Fax #:

E-mail:

CONTRACTOR'S STATEMENT

If awarded the contract, I will comply with the Contract's insurance requirements. I further agree to maintain property insurance on the machinery, tools and equipment which are owned, rented or leased by my firm and which are utilized in the performance of the services rendered under this Contract.

Contractor's Name:

Authorized Signature and Date:

Phone #:

Fax #:

E-mail:

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EXHIBIT A
CHANGE ORDER REQUEST FORMAT

PROJECT NAME: _____ DATE: _____

GENERAL CONTRACTOR: _____

SUBCONTRACTOR: _____

SUB-SUBCONTRACTOR: _____

C.O.R. ITEM OR WORK: _____

I. DIRECT PAYROLL LESS FRINGES, INSURANCE, TAXES*: _____

II. FRINGES, TAX, INSURANCE BURDEN ____ % OF PAYROLL: _____

III. TOTAL MATERIAL COSTS**: _____

IV. MATERIAL SALES TAX: _____

V. EQUIPMENT RENTALS (ATTACH COPY OF INVOICE): _____

VI. CONTRACTOR-OWNED EQUIPMENT**: _____

VII. PROFIT AND OVERHEAD 20% OF LINES I & III: _____

VIII. 8% OF LINE V (ONLY WITH INVOICE COPY): _____

IX. TOTAL ALL LINES: _____

X. SUBCONTRACTORS COSTS (ATTACH BREAKDOWN): _____

XI. 8% PROFIT & OVERHEAD ON SUBCONTRACTORS: _____

XII. TOTAL LINES IX, X, & XI: _____

XIII. BOND ____ % OF LINE XII: _____

XIV. TOTAL COST OF WORK: _____

*Provide Itemization of Labor Hours and Worker Classification

**Provide Itemization.

Change Order Request Format is Required for each Portion of Change Order Request Submission.

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User Notes:

EXHIBIT A

DESCRIPTION

All change orders shall be submitted in the change order request format (see Exhibit A) as set forth below:

1. Attach an itemization of labor hours. A certified payroll affidavit may be required to substantiate labor rates. The cost of foreman and superintendents may be added only when the change order makes necessary the hiring of additional supervisory personnel or makes their employment for time in addition to that required by the basic contract.
2. Labor burden percentage costs shall include all fringes, taxes, insurance, liabilities, workmen's compensation, unemployment, and any additional cost associated as labor burdens. Labor burden percentage rates are subject to approval of the Owner and is not subject to profit and overhead.
3. Attach an itemization of all materials used listing unit prices and extended prices.
4. Attach an itemization of equipment used and rental rates. If equipment is a rental, attach copy of the rental invoice. Rental equipment and contractor-owned equipment costs shall include all costs associated with the equipment, i.e. transportation, set-up, gas, and oil. Rental rates shall not exceed rates established by local rental companies and "MEANS DATA" rates.
5. Profit and overhead shall be considered full reimbursement for any additional expenses caused by the change order work. The Contractor shall agree to 20% profit and overhead markup on work by his own forces and 8% profit and overhead mark up on Subcontractors work. Allowances for overhead shall include but not limited to the costs for use of, small tools and consumables; trucks and trucking costs; maintenance and/or operations of Contractor's regular established office, branch office, and other facilities; resident and/or non-actively engaged supervision; time keepers; clerk; stenographer; watchmen; cost of correspondence; increased item of warranty under the change.
6. Profit and overhead at 8% may be added to equipment which is rented.
7. Only the actual added costs of the bond may be added to the change order amount. No further markup shall be allowed.
8. Change order requests shall not be considered unless they are submitted in proper format with all required and requested supporting documentation. All portions of the change shall use the change order request format.
9. For all work to be performed by a Subcontractor/Subcontractors, the Contractor shall furnish the Subcontractors itemized proposal which shall contain original signatures by an authorized representative of the Subcontracting firm. If requested by the Owner or Architect, proposals from suppliers or other supporting data to substantiate the Contractor's or Subcontractor's cost shall be furnished.
10. On changes resulting in a credit to the Owner, the credit shall be the net cost without profit overhead and profit.
11. Change order costs shall not exceed unit pricing as provided if applicable by Contract Documents.

Init.



Office of Purchasing
10910 Clarksville Pike, Ellicott City, Maryland 21042-6198
(410) 313-6644, fax (410) 313-6789

Terms and Conditions

1.1 CONTRACT AWARD

It is the intent of The Board of Education of Howard County on behalf of the Howard County Public School System (hereinafter "HCPSS" or the "Board") to award to the lowest responsive and responsible Bidder(s) meeting specifications. HCPSS retains the right to award in aggregate, item-by-item, group-by-group, in full or in part, make multiple awards, partial awards, to increase or decrease quantities where quantities are shown and may reject any bid which indicates any omission, contains alteration of form or additions, or imposes conditions, or offers alternate items and may make any award which is deemed in the best interest of the HCPSS or to make no award at all at its sole discretion.

The HCPSS shall be the sole authority as to whether Bidder's offer meets specifications or are an approved equal and further reserves the right to reject any or all proposals or waive any informality which may appear to be in its best interest. HCPSS further reserves the right to consider information other than price when evaluating bids. A contract may be awarded to the provider(s) whose proposal best meets HCPSS requirements and needs at the time of award and whose fee structure is in the best interest of HCPSS.

HCPSS reserves the right to make an award with or without negotiations or to request best and final offers or to make award with or without further review.

In the event of tie bids where all factors are equal, award shall be made to one of the tie bidders in the following order of preference: Howard County based Bidder, the out of county Bidder but incorporated in Maryland, and then the out of state based Bidder. In the event a tie bid still exists, the Director of Procurement and Materials Management or their designee, shall conduct a coin toss for selection of the potential Award Bidder(s) or seek a geographical, proportional or divided award of contract, whichever is in the best interest of HCPSS.

1.2 CONTRACT DOCUMENTS

Contract Documents consist of all solicitation documents, the specifications and scope of work and any applicable addenda, and any additional documentation issued. All of these materials and documents associated with this solicitation will be included in the Contract(s) which the Board of Education awards as a result of this solicitation and will become the contract. The offeror, by submitting its proposal, agrees that if awarded the contract that it will be bound under the contract to all the Terms and Conditions of the Contract Documents for any future goods and/or services awarded under this contract.

If Offeror's proposal is accepted and awarded, it will become incorporated and an integral part of the contract. However, Bidder's terms and conditions and any exceptions to HCPSS terms and conditions, unless expressly accepted by HCPSS, shall be excluded from the contract documents.

1.3 ORDER OF PRECEDENCE

In the event of an inconsistency among provisions of this Request for Proposal, the inconsistency shall be resolved by the following order of precedence:

- 2.3.1 Section III: Specifications
- 2.3.2 Section II: Terms and Conditions
- 2.3.3 Section I: General Information
- 2.3.4 Appendices

1.4 WAIVER OF RIGHT TO BID ON OTHER CONTRACTS

The Offeror agrees that it and its parent, its affiliates and subsidiaries, if any, waive the right to bid on any procurement contracts, of any tier, resulting from the goods and/or services to be provided under this agreement.

1.5 INITIATION OF WORK

The Offeror shall not commence performance of the services until it receives a formal written notice to proceed from HCPSS.

1.6 BILLING AND PAYMENT

The awarded Contractor shall submit invoices to the Howard County Public School System, (Name of Department), 10910 Clarksville Pike, Ellicott City, MD 21042, Attn: (Name of Contact), at the completion of each job. To expedite payments, invoices must contain the following information:

- a) Purchase Order Number
- b) Name of school or office
- c) Description of work along with quantities
- d) Start date and completion date
- e) Itemized breakdown of project costs to include labor and materials.
- f) Total due

Invoices that do not contain the above information may be rejected.

Timely invoicing is required. Awarded Bidder(s) must submit invoices for services and/or goods no later than sixty (60) days following services rendered or receipt of goods. Awarded Bidder(s) expressly waives its right to payment if invoices are not submitted by the end of each fiscal school year (June 30th) or within sixty (60) days following services rendered, receipt of goods, or completion of project milestones, whichever is later, however, not to exceed 365 calendar days.

1.7 INSURANCE

The Offeror has in force, or shall obtain, and will maintain insurance for the full term of the contract (including any executed renewals) in not less than the amounts specified and accordance with the requirements contained in APPENDIX H, INSURANCE REQUIREMENTS.

1.8 SUBCONTRACTING OR ASSIGNMENT

It is mutually understood and agreed that Awarded Bidder(s) shall not assign, transfer, convey, sublet, or otherwise dispose of their contract or their rights, title or interest, therein, or their power to execute such contract in whole or in part to any other person, firm, or corporation, without the previous written consent of the HCPSS' Purchasing Director, but in no case shall such consent relieve the contractor from their obligation, or change the terms of the contract or purchase order.

Assignment or subcontracting without the written approval of HCPSS will be cause for termination.

In the event that some or all of the services and/or goods under this solicitation are permitted to be subcontracted, the bidder shall identify all proposed subcontractor/sub-consultant who will be furnishing services and/or under the terms of this solicitation. Subcontractor/sub-consultants shall conform in all respects to the applicable provisions specified for the prime contractor and shall be subject to approval by HCPSS. If a subcontractor/sub-consultant is determined to be unacceptable by HCPSS, the contractor shall substitute an acceptable subcontractor/sub-consultant with no change in any contract unit prices or overall contract sum. If a firm fails, within a timely manner, to propose another subcontractor/sub-consultant to which HCPSS has no objection, HCPSS reserves the right to reject the proposal. The bidder will use only those subcontractor/sub-consultants approved by HCPSS. All subcontractor/sub-consultants shall comply with all federal and state laws and regulation which are applicable to the services covered by the subcontractor and shall include all terms and conditions set forth herein which apply with equal force to the subcontractor/sub-consultant, as if they were the contractor referred to herein. The Awarded Bidder(s) is responsible for the contract performance, whether or not subcontractor/sub-consultants are used.

1.9 CHANGES, ALTERATIONS OR MODIFICATIONS IN THE SERVICES

HCPSS shall have the right, at their discretion, to change, alter, or modify the services provided for in this agreement and such changes, alterations, or modifications may be made even though it will result in an increase or decrease in the services of the Awarded Bidder(s) or in the contract cost thereof.

If such changes cause an increase or decrease in the Awarded Bidder's cost of, or time required for, performance of any service under this contract, whether or not changed by an order or amendment, an equitable adjustment shall be made and the contract shall be modified in writing accordingly. Any claim of the Awarded Bidder(s) for adjustment under this clause must be asserted in writing within thirty (30) days from the date of receipt by the Awarded Bidder(s) of the notification of change unless the project manager or his duly authorized representative grants a further period of time before the date of final payment under the contract.

No services for which an additional cost or fee will be charged by the Awarded Bidder(s) shall be furnished without prior written authorization of HCPSS.

1.10 DELAYS AND EXTENSIONS OF TIME

The Awarded Bidder(s) shall execute the work continuously and diligently and no charges or claims for damages shall be made by the Awarded Bidder(s) for any delays, acceleration, or hindrance, from any cause whatsoever, during the progress of any portion of the services specified in the contract documents. Any and all time extensions and/or changes/substitutions of products, materials, equipment, and/or supplies must be requested in writing by the Awarded Bidder(s) before the extension and/or change takes place, and must be approved in writing by HCPSS. Such delays, acceleration, or hindrances, if any, may be compensated for by an extension of time for such reasonable period as HCPSS may decide. Time extensions may be granted only for excusable delays such as delays beyond the control and without the fault or negligence of the awarded bidder(s).

1.11 PRICE ADJUSTMENTS

HCPSS will only consider adjustments on labor rates based only upon federal minimum wage increases and decreases in the Consumer Price Index (CPI-W), Baltimore Region, as published by the Bureau of Labor Standards. Requested increases above a 5% cap will not be considered. In order to receive consideration for a price increase, the Contractor must submit to The Howard County Public School System, sixty (60) days prior to the contract expiration date, a statement of any change in the hourly rate wage actually to be paid to its employees during the renewal term.

Adjustments will be calculated by comparing the current index with the previous year's index so as to determine the change in index points. The point change will then be divided by the price index to obtain the percentage of change. The percentage of change will then be multiplied by .75 to obtain the adjustment to be applied to the current prices.

The HCPSS will also consider adjustments based on fees outside of the control of the Contractor, such as manufacturer price increases. However, such increases will be a "pass through" to the Howard County Public School System with no markup allowed. For such changes to be considered by the Howard County Public School System, documentation from the manufacturer (or any other applicable party) assessing a cost increase must accompany a written request from the Contractor. The Howard County Public School System will then review the request and advise the Contractor of approval or disapproval of the price change request. Price increase requests will not be considered if not accompanied with the proper information.

1.12 REMEDIES AND TERMINATION

- a. **Correction of Errors, Defects, and Omissions** - The Awarded Bidder(s) agrees to perform work as may be necessary to correct errors, defects, and omissions in the services required under the contract documents without undue delays and without cost to HCPSS. The acceptance of the work set forth herein by HCPSS shall not relieve the Awarded Bidder(s) of this responsibility.
- b. **Set-Off** - HCPSS may deduct from and set-off against any amounts due and payable to the awarded bidder(s) any back-charges or damages sustained by HCPSS by virtue of any breach of this agreement by the awarded bidder(s) to perform the services or any part of the services in a satisfactory manner. Nothing herein shall be construed to relieve the Awarded Bidder(s) of liability

for additional construction and design or other costs, expenses, and damages resulting from a failure to satisfactorily perform the services. Nothing herein shall limit the liability of the Awarded Bidder(s) for damages and HCPSS may affirmatively collect damages from the awarded bidder(s).

- c. **Termination for Cause** - If the Awarded Bidder(s) fails to fulfill its obligations under this contract properly and on time, otherwise violates any provision of the contract, HCPSS may terminate the contract by providing thirty (30) days' written notice to the Awarded Bidder(s). The notice shall specify the acts of omissions relied on as cause for termination. All finished or unfinished supplies and services provided by the Awarded Bidder(s), shall at HCPSS's option, become HCPSS property. HCPSS shall pay fair and equitable compensation for satisfactory performance of services or goods delivered prior to the receipt of notice of termination, less the amount of damages caused by Awarded Bidder's breach.

If the damages are more than the compensation payable to the Awarded Bidder(s), the Awarded Bidder(s) will remain liable after termination and HCPSS can affirmatively collect damages.

- d. **Termination for Convenience** - HCPSS may terminate all or any part of the work required under this contract for the convenience of HCPSS by providing ninety (90) days' written notice. In the event of such termination, HCPSS shall determine the costs the Awarded Bidder has incurred to the date of termination. The Awarded Bidder(s) shall not be reimbursed for any anticipatory profits which have not been earned up to the date of termination. The Awarded Bidder(s) agrees that the Awarded Bidder(s) does not have the right to termination for convenience.
- e. **Termination for Non-Appropriation of Funds:** HCPSS may terminate this contract, in whole or in part, due to insufficient funding with thirty (30) days' written notice to the awarded bidder(s). HCPSS shall pay for all of the purchases and services, if any, incurred up to the date of the termination notice.
- f. **Obligations of Awarded Bidder(s) upon Termination** - Upon notice of termination as provided above, the Awarded Bidder(s) shall:
- a) Take immediate action to orderly discontinue its work and demobilize its work force to minimize the occurrence of costs.
 - b) Take such action as may be necessary to protect the property of HCPSS, place no further orders or subcontract, and assign to HCPSS in the manner and to the extent directed by HCPSS all of the right, title and if ordered by HCPSS, possession and interest of Awarded Bidder(s) under the orders or subcontracts terminated.
 - c) Deliver to HCPSS all materials, equipment, data, drawings, specifications, reports, estimates, and such other information accumulated by the Awarded Bidder(s) which has been or will be reimbursed under this agreement after taking into account any damages that may be payable to HCPSS. Title to such items shall be transferred to HCPSS.
- g. **Remedies Not Exclusive** - The rights and remedies contained in this general condition are in addition to any other right or remedy provided by law, and the exercise of any of them is not a waiver of any other right or remedy provided by law.

1.13 RESPONSIBILITIES AND WARRANTIES

- a. The Awarded Bidder(s) (also referred to herein as "Contractor") shall perform the services and/or provide the goods with that standard of care, skill, and diligence normally provided by a Contractor, or professional in the performance of services and/or goods similar to the services and/or goods hereunder.
- b. Notwithstanding any review, approval, acceptance, or payment for the services by HCPSS, the Contractor shall be responsible for professional and technical accuracy of its work furnished by the Contractor under this agreement.
- c. HCPSS's review, approval, or acceptance of, nor payment for, any of the services required under this contract shall NOT be construed to operate as a waiver of any rights under this contract or of any

cause of action arising out of the performance of this contract, and the Contractor shall be and remain liable to HCPSS in accordance with applicable law for all damages to HCPSS caused by the Contractor's negligent performance of any or the services furnished under this contract.

- d. Contractor warrants that it is qualified to do business in the State of Maryland and that it will take such action as, from time-to-time hereafter, may be necessary to remain so qualified.
- e. Contractor warrants that it is not in arrears with respect to the payment of any monies due and owing the county or state, of any department or agency thereof, including but not limited to the payment of taxes and employee benefits, and that it shall not become so in arrears during the term of this agreement.
- f. Contractor warrants that it shall comply with all federal, state, and local law, ordinances and legally enforceable rules and regulations applicable to its activities and obligations under this agreement.
- g. Contractor warrants that it shall procure, at its expense, all licenses, permits, insurance, and governmental approval, if any, necessary to the performance of its obligations under this agreement.
- h. Contractor agrees that the equipment or supplies furnished under this award and or contract shall be covered by the most favorable commercial warranties the Contractor gives to any customer for such equipment or supplies and that the right and remedies provided herein are in addition to and do not limit any rights afforded to the HCPSS by any other clauses of the contract. All equipment shall in the very least carry a standard factory warranty against defects in parts and workmanship for the time period stated in the product warranty specifications and/or for one (1) year from date of acceptance. If the manufacturer warrants equipment for a period longer than one (1) year, the Contractor shall pass through this time to HCPSS.
- i. Contractor warrants that the facts and matters set forth hereafter in the "Contract Affidavit" which is attached to this agreement and made a part hereof are true and correct.

1.14 PROTESTS AND DISPUTES

Except as otherwise provided in these contractual documents, any claim, dispute, or other matter in question concerning a question of fact shall initially be referred to the Procurement Specialist.

Any claim, dispute, or other matter in question concerning a question of fact referred to the Project Manager that is not disposed of by agreement shall be referred to the Director of Procurement and Materials Management, HCPSS, who shall reduce his decision to writing and mail or otherwise furnish a copy to the Contractor. The decision of HCPSS shall be final and conclusive.

1.15 GOVERNING LAW AND VENUE

The Contract Documents shall be governed by the laws of the State of Maryland and nothing in these Contract Documents shall be interpreted to preclude HCPSS from seeking, after completion or termination of the agreement, any and all remedies provided by law. Any lawsuit arising out of the Contract Documents shall be filed in the appropriate state court of competent jurisdiction located in Howard County, Maryland.

1.16 WAIVER OF JURY TRIAL

The Awarded Bidder(s) and the Board hereby waive trial by jury in any action or proceeding to which the Board and/or Awarded Bidder(s) are parties arising out of or in any way pertaining to the Contract Documents. It is agreed and understood that this waiver constitutes a waiver of trial by jury of all claims against all parties to such actions or proceedings, including claims against parties who are not parties to the Contract Documents. This waiver is knowingly, willingly and voluntarily made by the Board and the Awarded Bidder(s) and the Awarded Bidder(s) hereby represent and warrant that no representations of fact or opinion have been made by and individual to induce this waiver of trial by jury or to in any way modify or nullify its effect. The parties further represent and warrant that they have been represented or have had the opportunity to be represented, in the signing of the Contract Documents and in the making of this waiver by legal counsel, selected of their own free will, and that they have had the opportunity to

discuss this waiver with legal counsel.

1.17 EXAMINATION OF RECORDS

The Contractor agrees that the auditor of HCPSS or any of their duly authorized representatives shall, have five (5) years after the final renewal expiration date under this contract, have access to and the right to examine any directly pertinent books, documents, papers, and records of the Contractor involving transactions related to this contract.

1.18 DISSEMINATION OF INFORMATION

During the term of this agreement, the Contractor shall not release any information related to the services or performance of the services under this agreement nor publish any final reports or documents without the prior written approval of the HCPSS contract manager.

1.19 COOPERATIVE PURCHASING CLAUSE

In accordance with State Finance and Procurement Article, Sect. 13-110, Maryland Annotated Code, HCPSS reserves the right to extend the terms of any contract resulting from this proposal to public bodies, subdivisions, school districts, community colleges, colleges, and universities including nonpublic schools. The Contractor agrees to notify HCPSS of those entities that request to use any contract resulting from this proposal and provide usage information to HCPSS, if requested.

Howard County Public School System assumes no authority, liability, or obligation, on behalf of any other public or non-public entity that may enter into a cooperative agreement associated with the contract resulting from this proposal. All purchases and payment transactions will be made directly between the contractor and the requesting entity.

1.20 NON-HIRING OF OFFICIALS AND EMPLOYEES

No official or employee of HCPSS whose duties as such official or employee include matters relating to or affecting the subject matter of this contract, shall during the pendency and term of this contract and while serving as an official or employee of HCPSS become or be an employee of the contractor or any entity that is a subcontractor on this contract.

1.21 ACCESS TO PUBLIC RECORDS ACT NOTICE

- a. The Board of Education of Howard County is subject to the Maryland Public Information Act, State Government Article § 10-611, et. seq. As a result, the Board may be required to disclose, upon request, certain public records.
- b. All information submitted as part of this proposal is subject to release under the Maryland Public Information Act (MPIA). If you would like the Howard County Public School System to consider redactions in the event that your proposal is subject to a MPIA request, submit a proposed MPIA copy including justifications for each redaction and under what specific exemption that justification is qualified for redaction.
- c. Transparency in the use of public funding is fundamental to HCPSS operations. Prior to the award of bids and contracts, the Board of Education of Howard County reviews and approves cost to be incurred by the school system – therefore, offerors should be aware that submission to this RFP may subject your pricing offer to release in a public forum. Additionally, pricing and payments made by HCPSS under the resulting Contract may also become subject to release as public information. HCPSS may consider both the ability to obtain necessary pricing from future offerors as well as the potential to cause harm to the competitive position of offerors in determining release of pricing detail.
- d. Copyrighted submittals are unacceptable and will be disqualified as non-responsive. All submittals become the property of HCPSS.

1.22 CONTINGENT FEE PROHIBITION

The Contractor warrants that they have not employed or retained any person, partnership, corporation, or other entity, other than a bona fide employee or agent working for the Contractor, to solicit or secure this agreement, and that they have not paid or agreed to pay any person, partnership, corporation, or other entity, other than a bona fide employee or agent, any fee or any other consideration contingent on the making of this agreement.

For breach or violation of this warranty, HCPSS shall have the right to terminate this agreement without

liability, or, at its discretion, to deduct from the contract price or consideration, or percentage, brokerage fee, gift or contingent fee.

1.23 OWNERSHIP AND USE

All materials, including but not limited to training documents, program and software, diagnostic equipment and energy information systems furnished by Offeror to HCPSS in connection to this Program shall remain the property of the School System. No materials will be returned to the Contractor at the end of the contract period including any that are copyrighted. HCPSS shall have the right to continue using all and any control equipment and document materials for as long as the School System desires to do so.

All documents, materials or data developed as a result of this contract shall be the property of HCPSS. Therefore HCPSS has the right to use and reproduce any documents, materials, and data, including confidential information, used in or developed as a result of this contract. HCPSS may use this information for its own purposes, or use it for reporting to state or federal agencies. The awarded bidder(s) must keep confidential and warrants that it has title to or right of use of all documents, material, or data used or developed in connection with this contract.

1.24 ADHERENCE TO SCHOOL SYSTEM POLICIES AND STATE AND FEDERAL REGULATIONS

The Offeror and any Sub-Offeror personnel assigned to this project must be cognizant and abide by the Board of Education of Howard County Policies and operating procedures at all times. Health and safety policies and procedures will not be compromised. Proposed programs must not violate or conflict with the Board policies and Implementation Procedures. Moreover, the Contractor shall be cognizant and enforce all federal and state regulations and policies and all proposals and subsequent work shall adhere to known regulations and policies.

1.25 SEX OFFENDER NOTIFICATION

Maryland law requires certain sex offenders to register with the local law enforcement agency; See *Maryland Annotated Code*, Criminal Procedure Article, §11-704. One of the purposes of this law is to inform school systems when a Registered Sex Offender is residing or working in the area. When the sex offender registers, the local police are required to notify the Superintendent of Schools, and the Superintendent, in turn, is required to send a notice to school principals.

As a contractor/consultant working for HCPSS we require that you do not employ Registered Sex Offenders to work on projects for our school system if they, as a result, are required to perform delivery, installation, repair, construction or any other kind of services **on HCPSS property**. Further, Maryland Law requires that any person who enters into a contract with a county board of education "may not knowingly employ an individual to work at a school" if the individual is a registered sex offender; See §11-722 Criminal Procedure Article. An employer who violates this requirement is guilty of a misdemeanor and if convicted may be subject to up to five years imprisonment and/or a \$5,000 fine.

Each contractor shall regularly screen their workforces to ensure that a Registered Sex Offender does not perform work at a county public school and also ensure that a subcontractor and independent contractor conducts screening of its personnel who may work at a school. The term "work force" is intended to refer to all of the contractor's direct employees and subcontractors and/or independent contractors it uses to perform the work. Violations of this provision may cause HCPSS to take action against the contractor up to and including immediate termination of the contract for cause.

Additionally, § 6-113 of the Education Article further requires that a contractor or subcontractor for a local school system may not knowingly assign an employee to work on school property with direct, unsupervised, and uncontrolled access to children, if the employee has been convicted of, or pled guilty or nolo contendere to, a crime involving a sexual offense, child sexual abuse and crimes of violence. The Contractor shall submit to HCPSS a listing of any employees assigned to perform under this agreement and certify that the necessary criminal history records checks have been conducted and that all assigned employees comply with the requirements.

1.26 CRIMINAL HISTORY BACKGROUND CHECKS

All employees, agents, or representatives of the Awarded Bidder(s) who will be performing work on any phase of the contract arising out of this Bid may be subject to a criminal history background check by

HCPSS. Such persons, if requested by the school system, must provide fingerprints and other required information in accordance with HCPSS requirements to facilitate such a check, as well as pay for the necessary fees to obtain such a check from the federal or state government. At the completion of a background check, the school system may, at its sole discretion, decide that a particular employee, agent, or representative of the Contractor be barred from school system property.

1.27 ETHICS

The Board of Education of Howard County has adopted an Ethics policy. Required by state statute, these Ethics regulations cover members of the Board of Education, the Superintendent, and all employees; and it specifies limits of participation of these individuals with entities doing business with The Howard County Public School System. For a copy of the regulations, please contact the Purchasing Office, Howard County Department of Education (410) 313-6644.

In accordance with Board Policy 2070-Ethics, offerors are hereby notified that the giving or offering of a gift or series of gifts to a Board official or employee is improper and may result in disqualification from future work on the grounds that the Offeror is no longer a responsible Offeror. All bidders are placed on notice that all questions/interpretations concerning the Board Ethics Policy may be submitted to the Ethics Review Panel.

1.28 DEBARMENT STATUS

By submitting their proposal, the offeror(s), certify that they are not currently debarred by the State of Maryland or another governmental entity from submitting bids or proposals on contracts for the type of products or services covered by this solicitation, nor are they an agent of any person or entity that is currently so debarred.

1.29 TOBACCO FREE AND ALCOHOL/DRUG FREE ENVIRONMENT

The Board of Education of Howard County maintains a tobacco, alcohol/drug free environment. The sale or use of tobacco, alcohol or drugs, in any form, or related product, is prohibited in school buildings and grounds at all times. Persons found violating this policy will be requested to remove the product and themselves from school premises. Repeated use or sale of tobacco on HCPSS property, or any use or sale of alcohol, misuse of other drugs, or any use of illegal drugs by a contract employee while servicing this contract or while on HCPSS property will result in a prohibition of that employee from servicing the HCPSS contract. Repeated instances of violations by contract employees may result in termination of the contract for cause.

1.30 INDEMNIFICATION

The Awarded Bidder(s) shall be responsible for any loss, personal injury, expense, death and/or any other damage which may occur by reason of its acts, negligence, willfulness, or failure to perform any of its obligations under this agreement. Furthermore, any acts on the part of any agent, director, partner, servant or employee of the Awarded Bidder(s) are deemed to be the Awarded Bidder's acts.

Awarded Bidder agrees to indemnify and hold harmless the Howard County Public School System and its Board, employees, agents, representatives, and students from any claim, damage, liability, expense, and/or loss, including defense costs and attorney fees, arising directly or indirectly out of the Awarded Bidder's performance under the Contract Documents. The indemnification obligation of the Awarded Bidder shall include but shall not be limited to injuries to individuals and property of individuals who are not parties to the contract. In addition, the indemnification obligation of the Awarded Bidder shall cover the acts or omissions of any permitted subcontractors hired by the Awarded Bidder. Furthermore, the indemnification obligation of the Awarded Bidder shall survive termination of the contract for any reason.

1.31 PERMITS, CODES AND LAWS

All work shall be in accordance with all State, County, Federal, and Governmental rules, regulations, and laws. The contractor is responsible for assuring that all of their employee and services provided under the contract follow and comply with any such requirements pertaining and applicable to the service being provided under this contract. All costs to comply with these requirements shall be paid by the contractor and included in the contractors Bid price.

1.32 eMARYLAND MARKETPLACE ADVANTAGE REGISTRATION

Awarded bidders are required to register on eMaryland Marketplace Advantage at <https://procurement.maryland.gov> within five days following notice of award. Maryland law requires local and state agencies to post award notices on eMaryland Marketplace Advantage. This cannot be done without the awarded bidder's self-registration in the system. Registration is free. Failure to comply with this requirement may be considered grounds for default. It is recommended that any interested bidder register with eMaryland Marketplace Advantage regardless of the award outcome for this procurement as it is a valuable resource for bid notification for municipalities throughout Maryland. If you have any questions or need assistance, contact the help desk at emma.helpdesk@maryland.gov or call (410) 767-1492.

1.33 RIGHT TO STOP WORK

If HCPSS determines, either directly or indirectly, that the Contractor's performance is not within the specifications, terms or conditions of this bid and/or that the quality of the job is unacceptable, HCPSS has the right to stop work. The stoppage of work shall continue until the default has been corrected and/or corrective steps have been taken to the satisfaction of HCPSS. HCPSS also reserves the right to e-bid this contract if it is decided that performance is not within the specifications as set out.

1.34 NON-DISCRIMINATION

In the execution of the obligations and responsibilities hereunder, included, but not limited to hiring or employment made possible by or relating to the Contract Documents, or the provisions of goods and services provided, the Awarded Bidder(s) shall not discriminate against persons on the basis of religion, ancestry or national origin, sex, age, marital status, sexual orientation, gender identity, disability, or genetic information. For more information, contact the Equity Assurance Office of the Howard County Public School System at 10910 Route 108, Ellicott City, MD 21042 or call 410-313-6654. HCPSS is fully committed to the Americans with Disabilities Act (ADA) which guarantees non-discrimination and equal access for persons with disabilities in employment, public accommodations, transportation, and all County programs, activities, and services. HCPSS government contractors, subcontractors, vendors, and/or suppliers are subject to this ADA policy. All individuals having any County contractual agreement must make the same commitment. Your acceptance of the awarded contract acknowledges your commitment and compliance with ADA.

1.35 INDEPENDENT CONTRACTOR

It is expressly understood and agreed that this Agreement is not intended and shall not be construed to create the relationship of agent, servant, employee, partner, joint venture, or association between the parties. The Awarded Bidder(s) will not be entitled to and expressly disclaims any right to worker's compensation, retirement, insurance, or other benefits afforded to employees of HCPSS.

1.36 CONTRACTOR PERFORMANCE/EVALUATION SCORECARD

Upon completion of a project/service or at any time during the project/service, the awarded contractor shall receive a performance evaluation scorecard rating the contractor's performance on the project/service, see Appendix G. The evaluation scorecard will become part of the contractor's permanent file. A sample Contractor Performance/Evaluation Scorecard is included with the bid documents.

The evaluation scorecard shall include the following performance indicators: Quality of Work, Responsiveness, Professionalism, Resources, Schedule Management, Quality Control, Deficiency Resolution, Submittal Management, Training, Appearance, Security, Safety, Utility Conservation, Disruptions, Quality of Materials, Emergency Response, Hazardous Materials, Innovation, Teamwork, Cost Management, Billing, Compliance. A contractor shall have up to 3 weeks after notification to appeal, challenge or otherwise dispute the scorecard results. After the 3-week period, the scorecard shall be considered final and accepted by the contractor.

A contractor receiving a 70% or less overall evaluation scorecard rating for a project/service may be disqualified for bidding on any future project/service with the HCPSS for a period of three (3) years and/or for the remaining contract term including renewal options.

1.37 ANTI-BRIBERY

Awarded bidder(s) warrants that neither it nor any of its officers, directors, or partners nor any of its employees who are directly involved in obtaining or performing contracts with any public body has been convicted of bribery, attempted bribery, or conspiracy to bribe under the laws of any state or of the federal government.

1.38 MULTIPLE PROPOSALS

No bidder will be allowed to offer more than one proposal for a solicitation regardless of the availability of several items or services that they feel may perform the same function or meet the specifications as described in the solicitation. If a bidder should submit more than one proposal for a solicitation, all solicitations may be rejected at the discretion of HCPSS.

Upon completion of a project or at any time during the project, the awarded contractor shall receive a performance evaluation scorecard rating the contractor's performance on the project. The evaluation scorecard will become part of the contractor's permanent file. A sample Contractor Performance/Evaluation Scorecard is included with the bid documents.

The evaluation scorecard shall include the following performance indicators; Quality of Work, Responsiveness, Professionalism, Resources, Schedule Management, Quality Control, Deficiency Resolution, Submittal Management, Training, Appearance, Security, Safety, Utility Conservation, Disruptions, Quality of Materials, Emergency Response, Hazardous Materials, Innovation, Teamwork, Cost Management, Billing, Compliance.

A contractor shall have up to 3 weeks after notification to appeal, challenge or otherwise dispute the scorecard results. After the 3-week period, the scorecard shall be considered final and accepted by the contractor.

A contractor receiving a 70% or less overall evaluation scorecard rating for a project may be disqualified for bidding on any future projects with the HCPSS for a period of three (3) years and/or for the remaining contract term including renewal options.

Name of Contractor: _____

Name of Project: _____ Contract/Bid Number: _____

Reviewed by: _____ Department: _____

Please take a moment to tell us about this contractor's performance. We will summarize all the information we obtain about each contractor and provide it to them. Supporting documentation shall be required to support any scores noted on the performance evaluation scorecard.

HOW SATISFIED. Please tell us **how satisfied** you are with the **performance** of the contractor named above. Circle a 10 if you are highly satisfied with their performance on a measure. Circle a 1 if you are highly dissatisfied with their performance on a measure. Circle a number in between to show different degrees of satisfaction. Circle **N/A** for any performance indicators that do not apply to the project. There are no right or wrong answers; just tell us how you feel.

A contractor receiving a 70% or less overall evaluation scorecard rating for a project may be disqualified for bidding on any future projects with the HCPSS for a period of three (3) years and/or for the remaining contract term including renewal options. The contractor shall be notified of their performance status after each project.

Satisfaction with the contractor's performance:

Highly
Dissatisfied

Highly
Satisfied

1. **Quality of Work.** The contractor's ability to do the job right the first time.

1 2 3 4 5 6 7 8 9 10 N/A

2. **Responsiveness.** The contractor's ability to adapt to changes and meet unusual needs.

1 2 3 4 5 6 7 8 9 10 N/A

3. **Professionalism.** The courtesy and standards of conduct maintained by the contractor and his or her employees.

1 2 3 4 5 6 7 8 9 10 N/A

4. **Resources.** The contractor's ability to provide his or her employees with the tools, parts, and supplies needed to do the job.

1 2 3 4 5 6 7 8 9 10 N/A

5. **Schedule Management.** The contractor's ability to show up when scheduled and complete the work on time.

1 2 3 4 5 6 7 8 9 10 N/A

6. **Quality Control.** The contractor's ability to identify problems and deficiencies before you do.

1 2 3 4 5 6 7 8 9 10 N/A

7. Deficiency Resolution. The contractor's ability to rapidly correct deficiencies in his or her work.	1	2	3	4	5	6	7	8	9	10	N/A
8. Submittal Management. The contractor's ability to provide submittals in a timely and efficient manner.	1	2	3	4	5	6	7	8	9	10	N/A
9. Training. The contractor's ability to provide employees well-trained in all aspects of their jobs.	1	2	3	4	5	6	7	8	9	10	N/A
10. Appearance. The contractor's ability to keep uniforms, tools, and vehicles clean so as to portray a positive image.	1	2	3	4	5	6	7	8	9	10	N/A
11. Security. The contractor's ability to safeguard your facilities and assets.	1	2	3	4	5	6	7	8	9	10	N/A
12. Safety. The contractor's ability to keep the workplace safe and comply with OSHA requirements.	1	2	3	4	5	6	7	8	9	10	N/A
13. Utility Conservation. The contractor's ability to use only the water, gas, electricity, and air conditioning needed to do the job.	1	2	3	4	5	6	7	8	9	10	N/A
14. Disruptions. The contractor's ability to keep interruptions to the operations of your firm or agency to a minimum.	1	2	3	4	5	6	7	8	9	10	N/A
16. Quality of Materials. The contractor's ability to use high quality parts and supplies.	1	2	3	4	5	6	7	8	9	10	N/A
17. Emergency Response. The contractor's ability to rapidly restore normal operations after an emergency, power outage, or severe weather.	1	2	3	4	5	6	7	8	9	10	N/A
18. Hazardous Materials. The contractor's ability to properly handle hazardous materials.	1	2	3	4	5	6	7	8	9	10	N/A
19. Innovation. The contractor's ability to use new materials and adopt new methods to increase effectiveness.	1	2	3	4	5	6	7	8	9	10	N/A
20. Teamwork. The contractor's ability to be a team player in order to assist in accomplishing the objectives of your firm or agency.	1	2	3	4	5	6	7	8	9	10	N/A
21. Cost Management. The reasonableness of the contractor's costs, especially for contract changes.	1	2	3	4	5	6	7	8	9	10	N/A
22. Billing. The contractor's ability to present correct and properly documented invoices.	1	2	3	4	5	6	7	8	9	10	N/A
23. Compliance. The contractor complied with all rules, requests, regulations and requirements. This includes compliance with instructions Regarding interactions with students, staff and others.	1	2	3	4	5	6	7	8	9	10	N/A

SAMPLE

Thank you for your prompt assistance.

SECTION 00730

MINORITY BUSINESS ENTERPRISE (MBE) REQUIREMENTS

1.0 PURPOSE

The purpose of the Procedures is to fulfill the intent of the law by setting goals for minority business enterprise participation in every contract that includes State funding through the Public School Construction Program. Local Educational Agencies (LEAs) shall attempt to achieve the result that a minimum of 29 percent of the total dollar value of all construction contracts is made directly or indirectly with certified minority business enterprises when State Public School Construction Program (PSCP) funds are utilized, with a minimum of 0 percent from certified African American-owned businesses, a minimum of 0 percent from certified Asian American-owned businesses, and the balance from any certified minority business enterprises. All general contractors, including certified MBE firms, when bidding as general or prime contractors are required to attempt to achieve the MBE subcontracting goals from certified MBE firms.

2.0 EFFECTIVE DATE

These procedures have been adopted for use in Howard County and supersede previously utilized MBE procedures, and will take effect on or after September 18, 2008.

3.0 DEFINITIONS

1. **Certification** means the determination that a legal entity is a minority business enterprise consistent with the intent of Subtitle 3 of the State Finance and Procurement Article.
2. **Certified Minority Business Enterprise** means a minority business that holds a certification issued by the Maryland State Department of Transportation (MDOT).
3. **Corporation**, as defined by MDOT, is an artificial person or legal entity created by or under the authority of the laws of any state of the United States, the District of Columbia or a territory or commonwealth of the United States and formed for the purpose of transacting business in the widest sense of that term, including not only trade and commerce, but also manufacturing, mining, banking, insurance, transportation and other forms of commercial or industry activity where the purpose of the organization is profit. For eligibility for certification, disadvantaged and/or minority individuals must own at least 51 percent of the voting stock and at least 51 percent of the aggregate of all classes of stock that have been issued by the corporation. (Note: stock held in trust is not considered as stock held by the disadvantaged businesspersons when computing the business person(s) ownership.)
4. **Managerial Control**, as defined by MDOT, means that a disadvantaged or minority owner(s) has the demonstrable ability to make independent and unilateral business decisions needed to guide the future and destiny of a business.

Control may be demonstrated in many ways. For a minority owner to demonstrate control, the following examples are put forth, but are not intended to be all inclusive:

- a. Articles of Incorporation, Corporate Bylaws, Partnership Agreements and other agreements shall be free of restrictive language which would dilute the minority owner's control thereby preventing the minority owner from making those decisions which affect the destiny of a business;
 - b. The minority owner shall be able to show clearly through production of documents the areas of the disadvantaged business owner's control, such as, but not limited to:
 - 1) Authority to sign payroll checks and letters of credit;
 - 2) Authority to negotiate and sign for insurance and/or bonds;
 - 3) Authority to negotiate for banking services, such as establishing lines of credit; and
 - 4) Authority to negotiate and sign for contracts.
 - c. Agreements for support services that do not lessen the minority owner's control of the company are permitted as long as the disadvantaged or minority business owner's authority to manage the company is not restricted or impaired.
5. **Minority Business Enterprise (MBE)** means any legal entity, except a joint venture, that is (a) organized to engage in commercial transactions, and (b) at least 51 percent owned and controlled by one or more individuals who are socially and economically disadvantaged including:
 - African Americans;
 - American Indian/Native Americans;
 - Asians;
 - Hispanics;
 - Physically or mentally disabled individuals;
 - Women; or
 - A non-profit entity organized to promote the interests of physically or mentally disabled individuals.
6. **Minority Business Enterprise Liaison** means the employee of the school system designated to administer the Minority Business Enterprise Procedures for State funded public school construction projects.
7. **Operational Control**, as defined by MDOT, means that the disadvantaged or minority owner(s) must possess knowledge necessary to evaluate technical aspects of the business entity. The primary consideration in determining operational control and the extent to which the disadvantaged or minority owner(s) actually operates a business will rest upon the specialties of the industry of which the business is a part. The minority owner should have a working knowledge of the technical requirements needed to operate in his/her industry. Specifically, in the construction industry and especially among small (one to five person firms) contractors, it is reasonable to expect the disadvantaged or minority owner(s) to be knowledgeable of all aspects of the business. Accordingly, in order to clarify the level of operational involvement which a minority owner must have in a business for it to be considered eligible, the following examples are put forth, but are not intended to be all inclusive:
 - a. The minority owner should have experience in the industry for which certification is being sought; and
 - b. The minority owner should demonstrate that basic decisions pertaining to the daily operations of the business are independently made. This does not necessarily preclude the disadvantaged or minority owner(s) from seeking paid or unpaid advice and assistance. It does mean that the minority owner currently

must possess the knowledge to weigh all advice given and to make an independent determination.

8. **Ownership**, as defined by MDOT, means that:
 - a. The minority owner(s) of the firm shall not be subject to any formal or informal restrictions, which limit the customary discretion of the owner(s). There shall be no restrictions through, for example, charter requirements, by-law provisions, partnership agreements, franchise or distributor agreements or any other agreements that prevent the minority owner(s), without the cooperation or vote of any non-minority, from making a business decision of the firm.
 - b. This means that the disadvantaged or minority persons, in order to acquire their ownership interests in the firm, have made real and substantial contributions of capital, expertise or other tangible personal assets derived from independently owned holdings without benefit of a transfer of assets, gift or inheritance from non-minority persons. Examples of insufficient contributions include a promise to contribute capital, a note payable to the firm or its owners who are not minority persons or the mere participation as an employee rather than as a manager. If the ownership interest held by a disadvantaged or minority person is subject to formal or informal restrictions, such as options, security interests, agreements, etc., held by a non-minority person or business entity, the options, security interests, agreements, etc., held by the non-minority person or business entity must not significantly impair the disadvantaged or minority person's ownership interest.
9. **Partnership** means an unincorporated association of two or more persons to carry on as co-owners of a business for profit. For a partnership to be deemed eligible for certification under the MDOT Program, the disadvantaged or minority person's interest must be at least 51 percent of the partnership capital.
10. **Socially and Economically Disadvantaged** means a citizen or lawfully admitted permanent resident of the United States who is socially disadvantaged and economically disadvantaged. The law establishes the level of personal net worth at \$1,500,000, above which an individual may not be found to be socially and economically disadvantaged.
11. **Sole Proprietorship**, as defined by MDOT, is a for-profit business owned and operated by a disadvantaged or minority person in his or her individual capacity. For a sole proprietorship to be deemed eligible for certification under the DBE/MBE Program, the disadvantaged or minority person must be the sole proprietor.

4.0 MBE GOAL SETTING PROCEDURES

1. The MBE program requires that all race-neutral measures be considered before making use of race-based measures. Using a combination of race-neutral and race-based measures for each specific school construction project will help ensure that certified MBE firms are afforded the opportunity to submit bids and be utilized to the greatest extent possible.
2. Race-neutral measures include any action taken by the LEA to make it easier for all contractors, including MBEs, to compete successfully for public school construction project contracts.
3. Race-based measures include setting an overall MBE goal and MBE subgoals, if applicable, based upon race, gender, ethnicity, etc., for a specific project.

4. The overall MBE goal and the subgoals, if applicable, should be set for each specific project, considering but not limited to, the following factors:
 - a. The extent to which the work to be performed can reasonably be segmented to allow for MBEs to participate in the project;
 - b. A determination of the number of certified MBEs that potentially could perform the identified work;
 - c. The geographic location of the project in relationship to the identified certified MBEs;
 - d. Information obtained from other State departments/agencies related to establishing a MBE goal and/or subgoals for similar construction projects or work in the jurisdiction;
 - e. Information obtained from other State departments/agencies related to MBE participation in similar construction projects or work in the jurisdiction; and
 - f. Any other activities or information that may be identified as useful and productive.
5. The Superintendent or designee shall establish one or more procurement review groups (PRG). The PRG must include at a minimum the MBE liaison and the procurement officer (PO) or a representative from the procurement office. The PRG could also include a capital improvement project manager, the project architect, the cost estimator, the construction manager, and/or other individuals selected by the superintendent or designee.
 - a. The PRG should communicate and/or meet as needed to consider the MBE subcontracting goal and subgoals, if applicable, for individual projects or groups of projects.
 - b. The PRG should consider the factors cited in 4 above when establishing the MBE goal and subgoals, if applicable, for each project or segmented piece of a project that are reasonable and attainable.
 - c. The PRG must complete and submit a written analysis for each state funded school construction project with an estimated cost that is expected to exceed \$200,000.
 - i.. For state-funded projects that require review of construction documents (CD), the written analysis shall be submitted with the CD documents to the department of general services, and will be reviewed by DGS for submission, appropriate signatures, and correspondence between the goal and subgoals, if applicable, indicated in the analysis and those of the procurement documents.
 - ii. For state-funded projects that do not require review of construction documents, the written analysis shall be submitted to the public school construction program, and will be reviewed by the PSCTP for submission and appropriate signatures.
 - iii. For locally funded projects that are anticipated to be requested for state approval of planning and funding, the written analysis shall be submitted with the CD documents to the Maryland state department of education, and will be reviewed by MSDE for submission, appropriate signatures, and correspondence between the goal and subgoals, if applicable, indicated in the analysis and those of the procurement documents. Submission of this document is a pre-condition for recommendation for state approval of planning and funding when submitted in an annual CIP.

- d. For projects estimated to cost between \$50,000 and \$200,000 the same analysis form is to be completed and submitted. This could be a responsibility of the PRG, but could be performed by others as well.
 - i. For state-funded projects that require review of construction documents (CD), the written analysis shall be submitted with the CD documents to the department of general services, and will be reviewed by DGS for submission, appropriate signatures, and correspondence between the goal and subgoals, if applicable, indicated in the analysis and those of the procurement documents.
 - ii. For state-funded projects that do not require review of construction documents, the written analysis shall be submitted to the public school construction program, and will be reviewed by the PSCP for submission and appropriate signatures.
 - e. If the project cost is estimated to exceed \$200,000 then a copy of the written analysis shall also be sent to GOMA at the same time that the written analysis is submitted to the DGS or the PSCP.
 - f. The PRG should consult with local counsel for the board of education as needed.
5. It is recognized that by utilizing the factors cited in 4 above, the MBE goal and/or subgoals, if applicable, for a specific project or portion thereof may be significantly higher than the overall goals of the program (29% overall, with 0% from African American-owned businesses and 0% from Asian American-owned businesses). It is also recognized and possible that there will be MBE goals set that are lower than those stated above or even that no MBE goal and/or subgoals will be set for a specific project or the segmented piece of the project.
 6. Assistance in reviewing the factors cited in 4 above and setting a goal and/or subgoals, if applicable, for specific projects or a segmented piece of a project can be obtained by contacting the Public School Construction Program and/or the Governor's Office of Minority Affairs.

5.0 IMPLEMENTING PROCEDURES - Over \$50,000

For construction projects estimated to cost in excess of \$50,000, the following procedures will be utilized:

1. All advertisements, solicitations, and solicitation documents shall include the following statements:
 - a. "Certified Minority Business Enterprises are encouraged to respond to this solicitation notice."
 - b. "The contractor or supplier who provides materials, supplies, equipment and/or services for this construction project shall attempt to achieve the specific overall MBE goal of ____ percent established for this project. All prime contractors, including certified MBE firms, when submitting bids or proposals as general or prime contractors, are required to attempt to achieve this goal from certified MBE firms."
 - c. If subgoals have been established for this project then one of the following should be included:
 - 1) "The subgoals established for this project are ____ percent from African American-owned businesses and ____ percent from Asian American-owned businesses."

- 2) "The subgoal established for this project is ____ percent from African American-owned businesses."
 - 3) "The subgoal established for this project is ____ percent from Asian American-owned businesses."
 - d. "The bidder or offeror is required to submit with its bid or proposal a completed Attachment A - Certified MBE Utilization and Fair Solicitation Affidavit and Attachment B - MBE Participation Schedule, as described in the solicitation documents.
 - e. If there is no overall MBE goal or MBE subgoals established for the project, then only 1.A. above is to be included.
2. Other Advertisement and Outreach Requirements
- a. To encourage greater MBE participation the staff of the school system should send out notices of potential projects to MBEs or solicit bids or proposals directly from minority business enterprise contractors that are certified.
 - b. A copy of the solicitation notice, preferably electronically, shall be sent to the Governor's Office of Minority Affairs at the same time the advertisement for the solicitation is released.
 - c. Upon request for a specific project, the school system shall provide one set of drawings and specifications (and addenda when issued) to minority business enterprise associations recognized by the Governor's Office of Minority Affairs. They will be available free of charge to be picked up at a location designated by the LEA. A review of the bid or proposal activity by an association's members may be initiated to justify continuation of this service.
 - d. When a pre-bid or pre-proposal conference is held, the MBE Liaison or designated representative shall explain the MBE goal and subgoals, if applicable; the MBE provisions of the solicitation; the documentation required at the time of submission; its relationship to the responsiveness of the bidder or offeror; how to complete the required attachments, particularly A, B, and C; and additional information and supporting documentation that may be required after the bid or proposal opening. All contractors who attend the pre-bid or pre-proposal conference should receive a list or information explaining how to obtain a listing of certified MBE firms who could perform the work or have expressed an interest in performing the school construction work required for the specific project in the jurisdiction.
 - e. The names of prime contractors obtaining drawings and specifications will be shared with certified MBEs and MBE associations, upon request.
 - f. The MBE liaison, in conjunction with the procurement officer or project staff, should respond to all applicable questions and concerns relating to the project's MBE requirements completely and in a timely fashion to ensure that all potential contractors and subcontractors can compete effectively.
3. All Solicitation Documents Shall Include the Following:
- a. "Certified Minority Business Enterprises are encouraged to respond to this solicitation notice".
 - b. "The contractor or supplier who provides materials, supplies, equipment and/or services for this construction project shall attempt to achieve the result that a minimum of ____ percent of the total contract value is with certified Minority Business Enterprises, with a minimum of ____ percent from certified African American-owned businesses, a minimum of ____ percent from certified Asian American-owned businesses, and the balance from any certified Minority Business Enterprises. All contractors, including certified MBE firms, when submitting bids or proposals as prime contractors, are required to attempt to

achieve the MBE goal and subgoals, if applicable, from certified MBEs". Note: see 6.1.C. above for variations that may be required.

- c. Each bid or offer submitted, including a submittal from a certified MBE in response to this solicitation, shall be accompanied by a completed Attachment A - Certified MBE Utilization and Fair Solicitation Affidavit and a completed Attachment B - MBE Participation Schedule. These two attachments must be accurate and consistent with each other.
 - 1) Attachment A and Attachment B shall be submitted with the sealed bid price or proposal at a place, date, and time specified in the solicitation document.
 - 2) As an alternative, and at the discretion of the school system, Attachment A could be submitted with the sealed bid price or proposal at a place, date, and time specified in the solicitation document. The sealed bids or proposals received by the time specified could be held, unopened for a maximum of 30 minutes. Within that time (30 minutes) each bidder or offeror must submit Attachment B, in a separate sealed envelope. The sealed price envelopes from each bidder or offeror who submits both the sealed bid or proposal and the envelope with Attachment B will then be opened and reviewed and recorded as a viable submission. Any contractor that fails to submit the second envelope, with Attachment B, prior to the specified time allowed (30 minutes) after the submittal of the sealed bid or proposal will be deemed non-responsive and the sealed bid or proposal will not be opened or considered.
- d. The submittal of a completed and signed Attachment A - Certified MBE Utilization and Fair Solicitation Affidavit and a completed and signed Attachment B - MBE Participation Schedule indicates the bidder's or offeror's recognition and commitment to attempt to achieve the MBE goal and/or MBE subgoals, if applicable, for the specific project.
 - 1) The bidder or offeror recognizes that their efforts made to initiate contact, to solicit, and to include MBE firms in this project will be reviewed carefully and evaluated based upon the actions taken by them prior to and up to 10 days before the bid or proposal opening. Follow-up actions taken by the bidder or offeror within the 10 days prior to the bid opening will also be considered.
 - 2) Based upon this review and evaluation it will be determined, by the MBE liaison, procurement officer, or a designated person, if a good faith effort was made by the apparent low bidder or apparent successful offeror.
- e. The bidder or offeror must check one of the three boxes on Attachment A, which relates to the level of MBE participation achieved for the project. The bidder's or offeror's signature indicates that in the event that they did not meet the MBE goal or subgoals, if applicable, that:
 - 1) They are therefore requesting a waiver, and
 - 2) Documentation of their good faith efforts will be provided to the school system staff within 10 days of being notified that they are the apparent low bidder or apparent successful offeror.
- f. The bidder or offeror must submit Attachment B (as and when described above), which lists and provides information related to each certified MBE firm that the bidder or offeror will utilize on this project. A completed and accurate Attachment B is required. All of the work specified to be performed by each MBE firm, the contact information, MDOT certification number, minority code, the dollar values, and percentages must be correct.
- g. Attachment B should be completed and submitted with all calculations utilizing the base bid or offer only. A revised Attachment B should be submitted by the

successful bidder or offeror once a determination is made as to the acceptance and/or rejection of any alternates.

- h. If a request for a waiver has been made, the appropriate box on Attachment A has been checked and the attachment signed, then the LEA should obtain and review the apparent low bidder's or successful offeror's supporting documentation of the good faith efforts to justify the granting of the waiver, prior to submitting the contract award for approval to the board of education.
- i. The following documentation shall be considered as part of the contract, and shall be furnished by the apparent low bidder or successful offeror to the MBE Liaison or designated person, within ten (10) working days from notification that the firm is the apparent low bidder or successful offeror:
 - 1) A completed Attachment D - Minority Business Enterprise Subcontractor Project Participation Statement shall be completed and signed by the prime contractor and each MBE firm listed on Attachment B - MBE Participation Schedule and Attachment C - Outreach Efforts Compliance Statement shall be signed and completed by the bidder or offeror.
 - 2) Notification for purposes of this procedure means the earliest of the following methods of communication: orally in person, orally by telephone, orally by a telephone message, a faxed communication, a letter by date received or an electronic communication.
 - 3) The ten (10) working days do not include the day the notification is received, weekends or holidays (State or Federal), but the material submitted must be received by the close of business on the tenth day.
 - 4) The requirement to submit the above-listed documentation within the time frame specified will be considered by the IAC in its review of the request for contract award for the project. Failure to submit the required documentation within the time frame specified may result in a delay of the approval of the award of the contract, or the materials being returned without the approval of the award of the contract.

4. Waiver Procedures

- a. If the apparent low bidder or successful offeror has determined that they are unable to meet the overall MBE goal or subgoals, if applicable, for the project at the time of submission of a bid or offer, they must check either of the two boxes on Attachment A. The signature recognizes and acknowledges that a request for a waiver is being made. The apparent low bidder or successful offeror will therefore be required to submit information and substantiating documentation that will be reviewed to justify the granting of a waiver.
- b. If the apparent low bidder or successful offeror is unable to achieve the overall MBE contract goal and/or the MBE subgoals, if applicable, from certified African American-owned businesses and/or from certified Asian American-owned businesses, the apparent low bidder or successful offeror shall submit, within 10 working days from notification that the firm is the apparent low bidder or successful offeror, a completed Attachment C - Outreach Efforts Compliance Statement, Attachment E - Minority Subcontractors Unavailability Certificate, and Attachment F - MBE Waiver Documentation which shall include the following:
 - 1) A detailed statement of the efforts made by the bidder or offeror to identify and select portions of the work proposed to be performed by subcontractors in order to increase the likelihood of achieving the stated goal;
 - 2) A detailed statement of the efforts made by the bidder or offeror prior to and up to at least ten (10) days before the bid or proposal opening to solicit minority business enterprises through written notices that describe the categories of work for which subcontracting is being solicited, the type of

work to be performed and specific instructions on how to submit a bid or proposal;

- 3) Follow-up actions taken by the bidder or offeror within the 10 days prior to the bid or proposal opening will also be considered.
 - 4) A detailed statement of the bidder's or offeror's efforts to make personal contact with MBE firms identified for item (2) above;
 - 5) A record of the name, address, telephone number and dates contacted for each MBE identified under items (2) and (3) above;
 - 6) A description of the information provided to MBEs regarding the drawings, specifications and the anticipated time schedule for portions of the work to be performed;
 - 7) Information on activities to assist minority business enterprises to fulfill bonding requirements or to obtain a waiver of these requirements;
 - 8) Information on activities to publicize contracting opportunities to minority business enterprises, attendance at pre-bid or pre-proposal meetings or other meetings scheduled by the MBE Liaison or designated representative; and
 - 9) As to each MBE that placed a subcontract quotation or offer which the apparent low bidder or successful offeror considers not to be acceptable, a detailed statement of reasons for this conclusion.
- c. In addition to any waiver documentation the apparent low bidder or successful offeror shall submit one completed Attachment D - Minority Business Enterprise Subcontractor Project Participation statement for each MBE firm that will participate in the project consistent with the information previously provided at the time of the submission of Attachment B or the revised Attachment B.
- d. A waiver of an MBE contract goal or subgoal, if applicable, may be granted by the school system only upon receipt of Attachment C - Outreach Efforts Compliance Statement, Attachment E - Minority Subcontractors Unavailability Certificate, and Attachment F - MBE Waiver Documentation as described above in items 1) through 9)
- 1) The MBE Liaison will review and accept or reject the minority business enterprise material that is submitted, and could obtain legal advice or assistance from their attorney.
 - 2) The MBE waiver request may not be considered unless all of the documentation specified above has been submitted in a timely fashion by the apparent low bidder or successful offeror.
 - 3) Assistance in the review of a request for a waiver (the documentation and justifications) may be requested from the Public School Construction Program and/or the Governor's Office of Minority Affairs.
 - 4) If a determination is made that the apparent low bidder or successful offeror did make a good faith effort, based upon a review of the documentation submitted, then the waiver must be granted. The award of contract shall then be made. The material and information submitted, including the LEA's review and analysis notes and conclusion shall be retained in the project file.
 - 5) If a determination is made that the apparent low bidder or successful offeror did not make a good faith effort, based upon a review of the documentation submitted, then the waiver should not be granted. The material and information submitted, including the LEA's review and analysis notes and conclusion, shall be retained in the project file. The award of contract shall then be made to the next lowest bidder or offeror, who meets the contractual requirements, including the MBE requirements.
 - 6) When a waiver is granted, a copy of Attachment F - MBE Waiver Documentation, accepted and signed by a school system representative and with the reasons for the determination, shall be forwarded to the Governor's

Office of Minority Affairs and the Public School Construction Program within ten (10) days after approval of the contract award by the board of education. Failure to submit the required documentation within the time frame specified may result in delayed approval of the award of contract by the IAC.

5. All Contracts Shall Include The Following:

- a. "The contractor shall perform the contract in accordance with the representations made in Attachment A - Certified Minority Business Enterprise Utilization and Fair Solicitation Affidavit and Attachment B - MBE Participation Schedule, submitted as part of the bid or proposal".
- b. "Failure to perform the contract as specified and presented in the bid or proposal submission without prior written consent of the owner shall constitute a violation of a material term of the contract".
 - 1) The contractor shall structure his/her operations for the performance of the contract to attempt to achieve the MBE goals as stated in the solicitation document.
 - 2) The contractor agrees to use his/her best efforts to carry out these requirements consistent with the efficient and effective performance of the contract.
 - 3) The contractor must ensure that all certified MBEs shall have the maximum practical opportunity to compete for additional subcontract work under the contract, even after the award of the contract.
 - 4) The contractor shall submit monthly to the MBE Liaison or the school system's designated representative a report listing any unpaid invoices, over 30 days old, received from any certified MBE subcontractor, the amount of each invoice and the reason payment has not been made.
 - 5) The contractor shall included in its agreements with its certified MBE subcontractors, a requirement that those subcontractors submit monthly to the MBE Liaison or appropriate representative a report that identifies the prime contract and lists all payments received from the contractor in the preceding 30 days, as well as any outstanding invoices, and the amount of those invoices.
 - 6) The contractor shall cooperate in any reviews of the contractor's procedures and practices with respect to minority business enterprises, which the MBE Liaison, the Public School Construction Program, and/or the Governor's Office of Minority Affairs may, from time to time, conduct.
 - 7) The contractor shall maintain such records as are necessary to confirm compliance with its MBE participation obligations. These records must indicate the identity of certified minority and non-minority subcontractors employed on the contract, the type of work performed by each, and the actual dollar value of work performed. Subcontract agreements documenting the work performed by all MBE participants must be retained by the contractor and furnished to the MBE Liaison and or appropriate representative on request.
 - 8) All records concerning MBE participation must be retained by the contractor for a period of five years after final completion of the contract, and will be available for inspection by the MBE Liaison, representatives from the Public School Construction Program and/or other designated official entities.
 - 9) At the option of the MBE Liaison or appropriate agency representative, upon completion of the contract and before final payment and/or release of retainage, the contractor shall submit a final report in affidavit form and under penalty of perjury, of all payments made to, or withheld from MBE subcontractors.

- 10) If at any time after submission of a bid or proposal and before execution of a contract, the apparent successful bidder or offeror determines that a certified MBE listed on Attachment B - MBE Participation Schedule has become or will become unavailable, then the apparent successful bidder or offeror shall immediately notify the procurement officer and provide such officer with a reason(s) why the change has occurred. Any desired change in Attachment B - MBE Participation Schedule shall be approved in advance by the procurement officer and shall indicate the contractor's efforts to substitute another certified MBE subcontractor to perform the work. Desired changes occurring after the date of contract execution may occur only upon written approval by the LEA.
- 11) A business that presents itself as a minority business may participate in a project but the contract value may not be counted toward the MBE goal or subgoals, if applicable, until the business is certified by MDOT. If it is not certified at the time of contract award it may not be counted toward the goal or subgoals, if applicable, at that time. Only the funds paid after MDOT certification can be counted toward meeting the MBE goal or subgoals, if applicable. If a certified MBE fails to meet the standards specified in State Finance and Procurement Article.14-301, Annotated Code of Maryland, the payments made to the MBE can be recorded and counted under a contract entered into when the MBE was eligible and certified. Ineligibility of an MBE to participate in the MBE program may not be the sole cause of the termination of the MBE contractual relationship for the remainder of the term of the contract.
- 12) Contractors are encouraged to seek additional MBE participation in their contracts during the life of the project. Any additional MBE participation from certified MBEs should be reported to the MBE liaison and should be included in subsequent monthly requisitions for payment.
- 13) The contractor shall complete the Standard Monthly Contractor's Requisition for Payment (IAC/PSCP Form 306.4), specifically page 3 of 16, *Minority Business Enterprise Participation*, with each requisition submitted for payment. This submittal should accurately reflect the payments to be made that month to MBEs, and the cumulative total for the period specified. Any and all MBE firms that are identified on Attachment B – MBE Participation Schedule should be included on page 3 of the first and all subsequent requisitions for payment. Any MBEs identified during the life of the project should be added as soon as the contractor engages them.
- 14) At the completion of the project the contractor shall prepare a written summary of the final certified MBE participation in the contract as compared to the proposed participation at the time of contract award. This should include the name of each certified MBE, the amount that was anticipated to be paid at the time of contract award, the amount actually paid, and an explanation of any differences that have occurred. Special attention should be given to any situations where the final payments to any MBE was below the level of commitment at the time of contract award.

6. Projects Utilizing a Construction Manager Delivery Method

This section of the procedure has been prepared based upon the utilization of Construction Manager Agency method of delivery. If another alternative method of project delivery is being considered, then these procedures would need to be adapted in consultation with the PSCP before proceeding.

- a. For projects that are being designed and solicited utilizing a Construction Manager Agency delivery method with multiple prime contracts, the school

system can structure its procedures to attain the overall MBE goal and subgoals, if applicable, for the project as presented below:

- b. The MBE liaison and other school system staff should work with the project's construction manager, cost estimator, and architect, along with any other individuals who could provide assistance, to determine the overall MBE utilization strategy for the work required, appropriate bid packages, and an appropriate overall MBE goal and subgoals, if applicable, for each specific bid or proposal package.
- c. The overall MBE goal and subgoals, if applicable, for the project shall represent the aggregate of the individual goals and subgoals, if applicable, set for each bid or proposal package.
- d. In setting the specific goals and subgoals, if applicable, for each solicitation package consideration should be given to the potential for MBE participation to the maximum extent possible. The information and procedures provided in section 4.0 MBE Goal Setting Procedures should be consulted and followed for these types of projects.
- e. Prior to submitting the construction documents for State review and authorization to solicit bids or proposals, the school system's representative will prepare a complete list of the individual solicitation packages and indicate the MBE goal and subgoals, if applicable, for each solicitation package. This would include the overall MBE goal and subgoals, if applicable, established in the solicitation documents, the estimated cost for each solicitation package, and the estimated MBE dollar amounts for each solicitation package. A copy of this list should be submitted with the construction documents. The list should be retained as a record by the school system for comparison to the actual contracts awarded with MBE participation, and the final actual MBE participation at the completion of the project.
- f. Contractors submitting bids or proposals for solicitation packages that do not include a MBE goal and subgoals, if applicable, would not be required to submit any of the MBE attachments that are otherwise required nor would they be required to indicate that they are requesting a waiver. The school system representative would, however, request information from the contractor at the completion of the project to determine if any certified MBE firms had participated in the contract.
- g. All other submittals of MBE materials and reporting requirements are applicable for the project, including the submittal of attachments a and b as described above in section 6.0. this includes the documentation for a request for a waiver, if applicable and appropriate.

6.0 RECORDS AND REPORTS

1. The MBE Liaison shall maintain such records as are necessary to confirm compliance with its Minority Business Enterprise Procedures and activities. The records shall be maintained until the project is audited by the Public School Construction Program. These records shall include by project:
 - a. The contractor report submitted at the completion of the project;
 - b. The identity of the minority contractors employed on the project;
 - c. The type of work performed;
 - d. The actual dollar value of the work, services, supplies or equipment; and
 - e. The MBE percentage of the total contract.
2. The MBE Liaison will maintain a record of all waivers approved for each project or solicitation package where the prime contractor was unable to achieve the established overall goal or subgoals, if applicable. The MBE Liaison will, however, report to the PSCP all MBE participation by MDOT certified firms who are prime

contractors, subcontractors, suppliers, or otherwise making an economically viable contribution to each project. This information shall be reported to PSCP within ten (10) days after approval of the award of the contract by the board of education.

3. The LEA shall submit the "Certified Minority Business Enterprise Participation Standard Monthly Contractor's Requisition for Payment" (IAC/PSCP Form 306.4 page 3 of 16, located in the Administrative Procedures Guide), which is Attachment G in this procedure, to the PSCP Director of Fiscal Services as part of the regular monthly request for payment for the project.
4. The LEA shall submit the "Close-Out Cost Summary" (IAC/PSCP Form 306.6 located in the Administrative Procedures Guide), which is Attachment H of this procedure, along with the "Certified Minority Business Enterprise Participation Standard Monthly Contractor's Requisition for Payment" (IAC/PSCP Form 306.4) to the PSCP Director of Fiscal Services within 180 days of completion of the project.
5. Each fiscal year end, PSCP Fiscal Services will create a report "Payments Made To Contractors during The Fiscal Year" and maintain such records as are necessary to confirm compliance with its minority business enterprise procedures and activities.
6. Each fiscal year end, PSCP Fiscal Services will create a report "Projects Completed During the Fiscal Year" and maintain such records as are necessary to confirm compliance with its Minority Business Enterprise Procedures and activities. This report will compare the overall MBE goal and subgoals, if applicable, for each specific project with the MBE participation anticipated at the time of contract award and the actual MBE participation at the completion of the project.

7.0 MONITORING

1. The LEA's procurement personnel or project staff shall verify that the certified MBE's listed in the MBE participation schedule are actually performing the work.
2. The LEA's procurement personnel shall ensure that MBE subcontractors are receiving compensation as set forth in the MBE participation schedule by ensuring that the contractor submits monthly reports, listing any unpaid invoices over 30 days old received from any certified MBE subcontractor, the amount of each invoice, and the reason payment has not been made.
3. The MBE Liaison and/or the Public School Construction Program will conduct reviews as deemed necessary to confirm compliance with the minority business enterprise participation requirements.
4. The MBE Liaison will maintain appropriate records, and shall assist the Public School Construction Program in on-site or post-audit reviews upon request.
5. Auditors from the Public School Construction Program will have access to and the ability to audit MBE participation for specific projects, information retained by the LEA, and/or submitted to the IAC in reports/forms filed by the LEA as referenced above.

PROJECT: _____

PSC#: _____

Attachment A (page 1 of 2)

**CERTIFIED MINORITY BUSINESS ENTERPRISE
UTILIZATION AND FAIR SOLICITATION AFFIDAVIT**

NOTE: You must include this document with your bid or offer. If you do not submit the form with your bid or offer, the procurement officer shall deem your bid non-responsive or your offer not reasonably susceptible of being selected for award.

* * * * *

Part I.

I acknowledge the:

- Overall certified MBE subcontract participation goal of 23%. and
- The subgoals, if applicable, of:
 - 0 % for certified African American-owned businesses and
 - 0 % for certified Women-owned businesses.

I have made a good-faith effort to achieve this goal. If awarded the contract, I will continue to attempt to increase MBE participation during the project.

Part II.

Check ONE Box

NOTE: FAILURE TO CHECK ONE OF BOXES 1, 2, or 3 BELOW WILL RENDER A BID NON-RESPONSIVE OR AN OFFER NOT REASONABLY SUSCEPTIBLE OF BEING SELECTED FOR AWARD

NOTE: INCONSISTENCY BETWEEN THE ASSERTIONS ON THIS FORM AND THE INFORMATION PROVIDED ON THE *MBE PARTICIPATION SCHEDULE* (ATTACHMENT B) MAY RENDER A BID NON-RESPONSIVE OR AN OFFER NOT REASONABLY SUSCEPTIBLE OF BEING SELECTED FOR AWARD

- 1 ☐ I have met the overall MBE goal and MBE subgoals for this project. I submit with this Affidavit [Attachment A] the *MBE Participation Schedule* [Attachment B], which details how I will reach that goal.
- or**
- 2 ☐ After having made a good-faith effort to achieve the overall MBE goal and MBE subgoals for this project, I can achieve partial success only. I submit with this Affidavit [Attachment A] the *MBE Participation Schedule* [Attachment B], which details the MBE participation I have achieved.

I request a partial waiver as follows:

- Waiver of overall MBE subcontract participation goal: _____ %
- Waiver of MBE subcontract participation subgoals, if applicable:
 - _____ % for certified African American-owned businesses and
 - _____ % for certified Woman-owned businesses.

Within 10 days of being informed that I am the apparent awardee, I will submit *MBE Waiver Documentation* [Attachment F] (with supporting documentation).

or

- 3 ☐ After having made a good faith effort to achieve the overall MBE goal and MBE subgoals for this project, I am unable to achieve any portion of the goal or subgoals. I submit with this Affidavit [Attachment A] the *MBE Participation Schedule* [Attachment B].

I request a full waiver.

Within 10 days of being informed that I am the apparent awardee, I will submit *MBE Waiver Documentation* [Attachment F] (with supporting documentation).

Part III.

I understand that if I am the apparent awardee or conditional awardee, I must submit **within 10 working days** after receiving notice of the potential award or within 10 days after the date of conditional award – whichever is earlier – the:

- *Outreach Efforts Compliance Statement* (Attachment C)
- *Subcontractor Project Participation Statement* (Attachment D)
- *Minority Subcontractors Unavailability Certificate* (Attachment E) (if applicable)
- Any other documentation the Procurement Officer requires to ascertain my responsibility in connection with the MBE participation goal and subgoals

I acknowledge that if I fail to timely return complete documents, the Procurement Officer may determine that I am not responsible and therefore not eligible for contract award. If the contract has been awarded, the award is voidable.

I acknowledge that the MBE subcontractors/suppliers listed in the *MBE Participation Schedule* and any additional MBE subcontractor/suppliers identified in the *Subcontractor Project Participation Statement* will be used to accomplish the percentage of MBE participation that I intend to achieve.

In the solicitation of subcontract quotations or offers, MBE subcontractors were provided the same information and amount of time to respond as were non-MBE subcontractors.

The solicitation process was conducted in such a manner so as to not place MBE subcontractors at a competitive disadvantage to non-MBE subcontractors.

I solemnly affirm under the penalties of perjury that this Affidavit is true to the best of my knowledge, information, and belief.

Bidder/Offeror Name

Address

Address (continued)

Affiant Signature

Printed Name & Title

Date

October 2017

1. Prime Contractor's Name			2. Prime Contractor's Address/Telephone Number		
3. Project/School Name			4. Project/School Location		
5. LEA Name:. PSC Number:			6. Base Bid Amount \$ _____ Acceptance Alternates \$ _____ Total \$ _____		
7a. Minority Firm Name: _____ Minority Firm Address: _____ MDOT Firm Certification Number: _____ <input type="checkbox"/> African American <input type="checkbox"/> Asian American <input type="checkbox"/> Native American <input type="checkbox"/> Women <input type="checkbox"/> Hispanic <input type="checkbox"/> Disabled <div style="text-align: right; padding-right: 50px;"> Telephone Number: _____ NAICS Code: _____ </div>					
Subcontractor Firm (Select One)	Allowable Percentage	Percentage of Total Contract	Subcontractor Dollar Amount	Participation Amount	
MDOT Certified Firm	100%		\$ _____	\$ _____	
MDOT Certified Prime Contractor	50% of established goal OR 100% of one subgroup contract subgoal		\$ _____	\$ _____	
MDOT Certified Supplier, Wholesaler and Regular Dealer	60%		\$ _____	\$ _____	
7b Minority Firm Name: _____ Minority Firm Address: _____ MDOT Firm Certification Number: _____ <input type="checkbox"/> African American <input type="checkbox"/> Asian American <input type="checkbox"/> Native American <input type="checkbox"/> Women <input type="checkbox"/> Hispanic <input type="checkbox"/> Disabled <div style="text-align: right; padding-right: 50px;"> Telephone Number: _____ NAICS Code: _____ </div>					
Subcontractor Firm (Select One)	Allowable Percentage	Percentage of Total Contract	Subcontractor Dollar Amount	Participation Amount	
MDOT Certified Firm	100%		\$ _____	\$ _____	
MDOT Certified Prime Contractor	50% of established goal OR 100% of one subgroup contract subgoal		\$ _____	\$ _____	
MDOT Certified Supplier, Wholesaler and Regular Dealer	60%		\$ _____	\$ _____	
7c Minority Firm Name: _____ Minority Firm Address: _____ MDOT Firm Certification Number: _____ <input type="checkbox"/> African American <input type="checkbox"/> Asian American <input type="checkbox"/> Native American <input type="checkbox"/> Women <input type="checkbox"/> Hispanic <input type="checkbox"/> Disabled <div style="text-align: right; padding-right: 50px;"> Telephone Number: _____ NAICS Code: _____ </div>					
Subcontractor Firm (Select One)	Allowable Percentage	Percentage of Total Contract	Subcontractor Dollar Amount	Participation Amount	
MDOT Certified Firm	100%		\$ _____	\$ _____	
MDOT Certified Prime Contractor	50% of established goal OR 100% of one subgroup contract subgoal		\$ _____	\$ _____	
MDOT Certified Supplier, Wholesaler and Regular Dealer	60%		\$ _____	\$ _____	
8. MBE Total Amount			9. Total MBE Percent of Entire Contract		
10. Form Prepared by: Name: _____ Title: _____ Date: _____			11. Reviewed and Accepted by Board of Edu. MBE Liaison Name: _____ Title: _____ Date: _____		

Total MBE Participation:	\$ _____	_____ %	
Total African-American Participation:	\$ _____	_____ %	
Total Women Owned MBE Participation:	\$ _____	_____ %	
Total Other Participation:	\$ _____	_____ %	

Outreach Efforts Compliance Statement

****Complete and submit this form within 10 business days of notification of apparent award

In conjunction with the bid or offer submitted in response to the solicitation for <<*project name*>>
/ <<*Solicitation No.*>>, I affirm the following:

1. Bidder/Offeror identified opportunities to subcontract in these specific work categories (extend list as needed):
 - a. _____
 - b. _____
 - c. _____
 - d. _____
 - e. _____
 - f. _____
2. Attached to this form are copies of written solicitations (with bidding instructions) used to solicit certified MBEs for these subcontract opportunities.
3. Bidder/Offeror made the following attempts to contact personally the solicited certified MBEs (extend list as needed):
 - a. _____
 - b. _____
 - c. _____
4. Select ONE of the following:
 - a. ☐ This contract does not involve bonding requirements.**OR**
 - b. ☐ Bidder/Offeror assisted certified MBEs to fulfill or seek waiver of bonding requirements (*describe efforts*).
5. Select ONE of the following:
 - a. ☐ Bidder/Offeror did/did not attend the pre-bid/proposal conference.**OR**
 - b. ☐ No pre-bid/proposal conference was held.

_____	By: _____
Bidder/Offeror Printed Name	Signature: _____
	Title: _____
	Date: _____
Address: _____	

MINORITY BUSINESS ENTERPRISES SUBCONTRACTOR PROJECT PARTICIPATION STATEMENT

PROJECT/ SCHOOL NAME: _____

PROJECT/ SCHOOL LOCATION: _____

LEA: _____

NAME OF PRIME CONTRACTOR: _____

NAME OF MBE SUBCONTRACTOR: _____

MDOT Certification Number

NAICS Code

1. Work/Services to be performed by MBE Subcontractor: _____

2. Subcontract Amount: \$ _____ Participation Amount \$ _____

3. Bonds - Amount and type required of Subcontractor if any: _____

4. MBE Anticipated or Actual Commencement Date: _____ Completion Date: _____

5. This MBE subcontract represents the following percentage of the total contract cost: _____

6. This is an African American Firm: Yes _____ No _____

7. This is an Asian American Firm: Yes _____ No _____

8. This is a Native American, Hispanic or Disabled Firm: Yes _____ No _____

(Circle One)

The undersigned subcontractor and prime contractor will enter into a contract for the work/service indicated above upon the prime contractor's execution of a contract for the above referenced project with the Board of Education. The undersigned subcontractor is a MDOT certified Minority Business Enterprise. The terms and conditions stated above are consistent with our agreements.

Signature of Subcontractor: _____

Date: _____

The term and conditions stated above are consistent with our agreements.

Signature of Prime Contractor: _____

Date: _____

MINORITY SUBCONTRACTOR UNAVAILABILITY CERTIFICATE

1. It is hereby certified that the firm of _____
(Name of Minority firm)
located at _____
(Number) (Street)

(City) (State) (Zip)
was offered an opportunity to bid on the _____ school project
in _____ County by _____
(Name of Prime Contractor's Firm)

2. _____ (Minority Firm), is either unavailable for the
work/service or unable to prepare a bid for this project for the following reason(s):

Signature of Minority Firm's MBE Representative

Title

Date

MDOT Certification #

Telephone #

3. To be completed by the prime contractor if Section 2 of this form is not completed by the minority firm.

To the best of my knowledge and belief, said Certified Minority Business Enterprise is either unavailable for the work/service for this project, is unable to prepare a bid, or did not respond to a request for a price proposal and has not completed the above portion of this submittal.

Signature of Prime Contractor

Title

Date

Attachment F

MBE WAIVER DOCUMENTATION

Project Name: _____ PSC No. _____

Base Contract Amount \$ _____

Plus Accepted Alternates \$ _____

Equals Total Contract Amount \$ _____

I have previously requested that a waiver be granted to the overall MBE goal for this project of ____ percent, with a minimum of ____ percent from certified African American-owned businesses, a minimum of ____ percent from certified Asian American-owned businesses, and the balance from all certified minority business enterprises, if applicable. This would include the total dollar value of all materials, supplies, equipment, and services, including construction services directly or indirectly, from Minority Business Enterprises (MBE) which are currently certified by the Maryland Department of Transportation (MDOT).

I _____, hereby certify that my position is
(Name of Company Representative)

_____, and I am the duly authorized representative of
(Position Title)

_____.
(Company Name)

I further certify that I have submitted a *Schedule for Participation of Certified Minority Business Enterprises* which reflects the percentage and dollar value of certified Minority Business Enterprise participation which my company expects to achieve for this contract. Therefore, the request for the waiver is as follows:

Summary MBE Participation Schedule from Attachment B

Minority Group	MBE GOAL		Actual MBE Participation		Request For Waiver	
	Dollar Value of Total Contract*	Percent of Total Contract	Dollar Value	Percent of Total Contract	Dollar Value	Percent of Total Contract
a. Sub Goal African American						
b. Sub Goal Asian American						
c. Other * in Sub Goal group a/b above						
TOTALS						

* with accepted/rejected alternates

To support this request for a waiver, I include the following information as attachments which I certify to be true to the best of my knowledge.

1. A detailed statement of the efforts made by the contractor to identify and select portions of the work proposed to be performed by subcontractors in order to increase the likelihood of achieving the stated goal;
2. A detailed statement of the efforts made by the contractor prior to and up to 10 days before the bid opening to solicit minority business enterprises through written notices that describe the categories of work for which subcontracting is being solicited, the type of work to be performed, and specific instructions on how to submit a bid;
3. A detailed statement of the contractor's efforts to make personal contact with MBE firms identified for Item 2. above;
4. A record of the name, address, telephone number, and dates contacted for each MBE identified under items 2. and 3. above;
5. A description of the information provided to MBE's regarding the plans, specifications and the anticipated time schedule for portions of the work to be performed;
6. Information on activities to assist minority business enterprises to fulfill bonding requirements, or to obtain a waiver of these requirements;
7. Information on activities to publicize contracting opportunities to minority business enterprises, attendance at pre-bid meetings, or other meetings scheduled by the MBE Liaison or designated representative;
8. As to each MBE that placed a subcontract quotation or offer which the apparent low bidder or successful offeror considers not to be acceptable, a detailed statement of reasons for this conclusion; and
9. A list of minority subcontractors found to be unavailable. This shall be accompanied by a Minority Subcontractor Unavailability Certificate signed by the minority business enterprise or from the apparent low bidder or successful offeror indicating that the minority business did not provide the written certification.

Signature _____
(Company Representative Name)

Date _____

Sworn and subscribed before me this _____ day.

of _____ in the year _____ Notary Public _____

Reviewed and accepted by the _____ County Board of Education MBE Liaison.

(County Name)

Signature _____
(County Representative Name)

Date _____

MBE Request For Waiver Master Form (July 2002)

CERTIFIED MINORITY BUSINESS ENTERPRISE PARTICIPATION
STANDARD MONTHLY CONTRACTOR'S REQUISITION FOR PAYMENT

LEA:
FACILITY NAME:
SCOPE OF WORK:
DATE:
PSC NO:
REQ NO:

Table with 7 columns: Name of MBE Sub-Contractor, MDOT Certification Number and Classification, TOTAL MBE Contract Amount, Amount to be Paid THIS Requisition, TOTAL Paid to Date, MBE has Received FINAL Payment?, If amount paid is LESS than TOTAL MBE Contract Amount, EXPLAIN VARIANCE. Includes a TOTAL row at the bottom.

MDOT Certification Number and Classification can be located at http://mbe.state.md.us/directory/

- MBE Classification:
African American = AA
Hispanic American = H
Native American = N
Asian American = A
Women = W
African American/Women = AAW
Hispanic American/Women = HW
Native American/Women = NW
Asian American/Women = AW

I certify that the figures and information presented above represent accurate and true statements, that timely payments have been and will be made to suppliers and subcontractors on this project as requisitioned payments are received, and in accordance with our contracts.

Name of Contractor Firm
Authorized Contractor Signature/Date
Contractor Federal Tax ID #
Contractor MBE Classification # (if applicable)

**CERTIFIED MINORITY BUSINESS ENTERPRISE PARTICIPATION
STANDARD MONTHLY CONTRACTOR'S REQUISITION FOR PAYMENT**

Name of LEA MBE Liaison (Printed)

Signature of LEA MBE Liaison/Date

CERTIFIED MINORITY BUSINESS ENTERPRISE PARTICIPATION STANDARD MONTHLY CONTRACTOR'S REQUISITION FOR PAYMENT

Instructions for Completion of IAC/PSCP Form 306.4 Page 3

THIS FORM TO BE COMPLETED BY PRIME CONTRACTOR ONLY

1. **LEA** – Enter full name of LEA.
2. **Facility Name** – Enter full name of school/facility.
3. **Scope of Work** – Enter type of work being performed (i.e. New, Renovation, Roof, HVAC, ASP – Flooring, QZAB – Media Center, etc.).
4. **Date** – Date of Requisition.
5. **PSC NO** – Enter full PSC Number as assigned by PSCP.
6. **REQ NO** – Enter the number of the corresponding Requisition for Payment.
7. **Name of MBE Sub-Contractor** – Enter full name of MBE Sub-Contractor.
8. **MDOT Certification Number & Classification** – Enter the 5 digit MDOT Certification number and corresponding MDOT Classification for each MBE Sub-Contractor. MDOT Classifications and the MDOT website are listed at the bottom of this form.
9. **TOTAL MBE Contract Amount** – Enter ORIGINAL Total MBE Contract Amount as stated on MBE Attachments B and D. This amount should NOT be altered with change order amounts, changes to scope of work, etc. which may affect contract amount.
10. **Amount to be Paid This Requisition** – Enter the amount to be paid to the MBE Sub-Contractor for work applicable to this requisition.
11. **TOTAL Paid to Date** – Enter the TOTAL amount paid to date to the MBE Sub-Contractor – this amount should NOT include the amount being paid on this requisition, only the total of prior payments.
12. **MBE has Received FINAL Payment** – Enter “YES” if the MBE Sub-Contractor has been paid in full. Enter “NO” if the MBE Sub-Contractor has NOT been paid in full.
13. **If amount paid is LESS than TOTAL MBE Contract Amount, EXPLAIN VARIANCE** – Enter a brief reason for the MBE Sub-Contractor NOT being paid equal to or greater than the ORIGINAL Total MBE Contract Amount as stated on this form and MBE Attachments B & D. Additional documentation may be required to be submitted for variance explanations.
14. **Name of Contractor Firm** – Enter full name of Prime Contractor.
15. **Authorized Contractor Signature/Date** – The authorized individual employed by the Prime Contractor who filled this form out should date and sign here.
16. **Contractor Federal Tax ID #** – Enter the Federal Tax ID Number of the Prime Contractor.
17. **Contractor MBE Classification #** - Enter the MDOT MBE Classification Number if the Prime Contractor is a MDOT certified MBE Company.
18. **Name of LEA MBE Liaison** – PRINT the name of the LEA MBE Liaison (or other LEA authorized employee) responsible for VERIFYING ALL INFORMATION filled out by the Prime Contractor on this form.
19. **Signature of LEA MBE Liaison/Date** – Signature of the person VERIFYING ALL INFORMATION filled out by the Prime Contractor on this form (signature of person stated in Step #18.)

"General Decision Number: MD20230035 05/26/2023

Superseded General Decision Number: MD20220035

State: Maryland

Construction Type: Building

County: Howard County in Maryland.

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	02/03/2023
3	04/07/2023
4	05/05/2023
5	05/26/2023

ASBE0024-007 04/01/2021

	Rates	Fringes
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ASBESTOS WORKER/HEAT & FROST

INSULATOR.....	\$ 39.27	18.67+a
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Includes the application of all insulating materials, protective coverings, coatings and finishes to all types of mechanical systems

a. PAID HOLIDAYS: New Year's Day, Martin Luther King Day, Memorial Day, Independence Day, Labor Day, Veterans' Day, Thanksgiving Day, the day after Thanksgiving and Christmas Day provided the employee works the regular work day before and after the paid holiday.

BRMD0001-011 04/30/2023

	Rates	Fringes
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BRICKLAYER (Excluding
Pointing, Caulking and
Cleaning).....

\$ 36.50	13.47
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CARP0197-006 05/01/2022

	Rates	Fringes
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CARPENTER (Including Drywall
Hanging, Form Work, Metal
Stud Installation and
Scaffold Building, Excluding
Acoustical).....

\$ 31.40	13.86
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CARP0219-002 05/01/2022

	Rates	Fringes
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MILLWRIGHT.....

\$ 34.90	16.71
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CARP0474-002 05/01/2022

	Rates	Fringes
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PILEDRIVERMAN.....

\$ 34.62	16.36
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ELEC0024-012 12/04/2022

	Rates	Fringes
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ELECTRICIAN (Including low
voltage wiring for and
installation of alarms; HVAC
controls).....

\$ 43.50	5.25%+17.19
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ELEC0024-013 05/29/2022

	Rates	Fringes
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ELECTRICIAN (Communication
and Sound Equipment).....\$ 30.90 4.75%+14.45

PAID HOLIDAYS: New Year's Day, Memorial Day, Fourth of July,
Labor Day, Veterans Day, Thanksgiving Day, Day after
Thanksgiving, Christmas Day

* ENGI0037-028 04/01/2023

	Rates	Fringes
OPERATOR: Bobcat/Skid		
Steer/Skid Loader.....	\$ 31.43	13.92+a
OPERATOR: Bulldozer.....	\$ 33.38	13.92+a
OPERATOR: Forklift.....	\$ 33.38	13.92+a
OPERATOR: Gradall.....	\$ 33.38	13.92+a
OPERATOR: Loader (Front End)		
1 1/4 yards and over.....	\$ 33.38	13.92+a
1 Yard and Under.....	\$ 31.43	13.92+a
OPERATOR: Roller excluding		
Asphalt.....	\$ 27.80	13.92+a

a. PAID HOLIDAYS: New Year's Day, Memorial Day, Independence
Day, Labor Day, Veterans' Day, Thanksgiving Day and
Christmas Day.

IRON0005-020 06/01/2021

	Rates	Fringes
GLAZIER.....	\$ 31.17	24.16
IRONWORKER (Fence		
Erection-Chain Link/Cyclone).....	\$ 31.17	24.16
IRONWORKER, ORNAMENTAL,		
REINFORCING AND STRUCTURAL.....	\$ 31.17	24.16
IRONWORKER, SHEETING.....	\$ 31.17	24.16

LAB00710-004 04/01/2022

	Rates	Fringes
LABORER: Mason Tender -		
Cement/Concrete.....	\$ 21.06	6.06

PAIN0051-024 06/01/2022

	Rates	Fringes
PAINTER		
Brush, Roller, Spray,		
Drywall Finisher/Taper and		
Paperhanger.....	\$ 26.61	11.41
Industrial.....	\$ 33.05	12.48

PLAS0891-005 07/01/2021

	Rates	Fringes
PLASTERER (Including		
Fireproofing).....	\$ 30.53	7.93

PLAS0891-006 02/01/2020

	Rates	Fringes
CEMENT MASON/CONCRETE FINISHER...	\$ 28.82	11.68

PLUM0486-014 12/16/2022		

	Rates	Fringes
PIPEFITTER (Including HVAC Pipe Installation).....	\$ 44.66	23.38

ROOF0030-033 07/01/2022		

	Rates	Fringes
ROOFER, Excludes Installation of Metal Roofs.....	\$ 28.45	13.71

SFMD0669-001 04/01/2023		

	Rates	Fringes
SPRINKLER FITTER (Fire Sprinklers).....	\$ 40.46	25.22

SHEE0100-026 05/01/2022		

	Rates	Fringes
SHEET METAL WORKER, Includes HVAC Duct Installation (Excludes Metal Roof Installation).....	\$ 36.58	22.31

* SUMD2010-083 04/30/2010		

	Rates	Fringes
ABATEMENT WORKER: ASBESTOS (Removal from Mechanical Systems).....	\$ 12.60 **	3.91
CARPENTER (Acoustical Ceiling Installation Only).....	\$ 16.00 **	2.60
ELEVATOR MECHANIC.....	\$ 29.66	9.34
LABORER: Common or General.....	\$ 11.63 **	1.41
LABORER: Grade Checker.....	\$ 16.00 **	2.90
LABORER: Landscape.....	\$ 10.00 **	0.00
LABORER: Mason Tender - Brick...	\$ 14.76 **	7.73
LABORER: Mason Tender - Stone...	\$ 14.03 **	0.00
LABORER: Mortar Mixer.....	\$ 16.61	9.08
LABORER: Pipelayer.....	\$ 13.70 **	4.11
LABORER: Mason Tender (For Pointing, Caulking and Cleaning).....	\$ 12.93 **	0.00

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MASON - STONE.....	\$ 29.82	10.05
OPERATOR: Asphalt Roller.....	\$ 21.35	5.38
OPERATOR: Backhoe.....	\$ 22.78	5.94
OPERATOR: Boom.....	\$ 21.44	8.29
OPERATOR: Crane.....	\$ 20.75	3.11
OPERATOR: Excavator.....	\$ 16.95	5.69
OPERATOR: Grader/Blade.....	\$ 14.50 **	4.35
OPERATOR: Paver (Asphalt, Aggregate, and Concrete).....	\$ 16.73	5.02
PLUMBER.....	\$ 28.22	11.12
POINTER, CAULKER, CLEANER, Includes pointing, caulking, cleaning of existing masonry, brick, stone and cement structures (restoration work); excludes pointing, caulking, cleaning of new or replacement masonry, brick, stone or cement.....	\$ 19.75	0.00
SHEET METAL WORKER (Metal Roofs Installation).....	\$ 17.00	2.55
TILE FINISHER.....	\$ 17.32	0.00
TILE SETTER.....	\$ 21.38	4.65
TRUCK DRIVER: Dump Truck.....	\$ 15.40 **	1.96
TRUCK DRIVER: Tractor Haul Truck.....	\$ 17.87	9.98

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

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** Workers in this classification may be entitled to a higher
minimum wage under Executive Order 14026 (\$16.20) or 13658
(\$12.15). Please see the Note at the top of the wage
determination for more information.

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"

This content is from the eCFR and is authoritative but unofficial.

Title 29 - Labor

Subtitle A - Office of the Secretary of Labor

Part 5 - Labor Standards Provisions Applicable to Contracts Covering Federally Financed and Assisted Construction (Also Labor Standards Provisions Applicable to Nonconstruction Contracts Subject to the Contract Work Hours and Safety Standards Act)

Subpart A - Davis-Bacon and Related Acts Provisions and Procedures

Source: 48 FR 19540, Apr. 29, 1983, unless otherwise noted.

Authority: 5 U.S.C. 301; R.S. 161, 64 Stat. 1267; Reorganization Plan No. 14 of 1950, 5 U.S.C. appendix; 40 U.S.C. 3141 *et seq.*; 40 U.S.C. 3145; 40 U.S.C. 3148; 40 U.S.C. 3701 *et seq.*; and the laws listed in 5.1(a) of this part; Secretary's Order No. 01-2014 (Dec. 19, 2014), 79 FR 77527 (Dec. 24, 2014); 28 U.S.C. 2461 note (Federal Civil Penalties Inflation Adjustment Act of 1990); Pub. L. 114-74 at sec. 701, 129 Stat 584.

Source: 48 FR 19541, Apr. 29, 1983, unless otherwise noted.

Editorial Note: Nomenclature changes to subpart A of part 5 appear at 61 FR 19984, May 3, 1996.

§ 5.5 Contract provisions and related matters.

- (a) The Agency head shall cause or require the contracting officer to insert in full in any contract in excess of \$2,000 which is entered into for the actual construction, alteration and/or repair, including painting and decorating, of a public building or public work, or building or work financed in whole or in part from Federal funds or in accordance with guarantees of a Federal agency or financed from funds obtained by pledge of any contract of a Federal agency to make a loan, grant or annual contribution (except where a different meaning is expressly indicated), and which is subject to the labor standards provisions of any of the acts listed in § 5.1, the following clauses (or any modifications thereof to meet the particular needs of the agency, *Provided*, That such modifications are first approved by the Department of Labor):

(1) *Minimum wages.*

- (i) 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. 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)(1)(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). 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-1321) 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.

(ii)

- (A) 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.
- (B) 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, 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.
- (C) 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.
- (D) 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.

- (iii) 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.

- (iv) 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 (write in name of 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 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.**
 - (i) 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.
 - (ii)
 - (A) 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).

- (B) 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.
- (C) 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.
- (D) 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.
- (iii) 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.

(4) ***Apprentices and trainees -***

- (i) ***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.
- (ii) ***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 who 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.

- (iii) **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 11246, as amended, and 29 CFR part 30.
- (5) **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.
- (6) **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.
- (7) **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.
- (8) **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.
- (9) **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.
- (10) **Certification of eligibility.**
 - (i) 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).

- (ii) 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).
 - (iii) The penalty for making false statements is prescribed in the U.S. Criminal Code, 18 U.S.C. 1001.
- (b) **Contract Work Hours and Safety Standards Act.** The Agency Head shall cause or require the contracting officer to insert the following clauses set forth in paragraphs (b)(1), (2), (3), and (4) of this section in full in any contract in an amount in excess of \$100,000 and subject to the overtime provisions of the Contract Work Hours and Safety Standards Act. These clauses shall be inserted in addition to the clauses required by § 5.5(a) or § 4.6 of part 4 of this title. As used in this paragraph, 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 \$31 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.
 - (4) **Subcontracts.** The contractor or subcontractor shall insert in any subcontracts the clauses set forth in paragraph (b)(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 (b)(1) through (4) of this section.
- (c) In addition to the clauses contained in paragraph (b), in any contract subject only to the Contract Work Hours and Safety Standards Act and not to any of the other statutes cited in § 5.1, the Agency Head shall cause or require the contracting officer to insert a clause requiring that the contractor or subcontractor shall maintain payrolls and basic payroll records during the course of the work and shall preserve them for a period of three years from the completion of the contract for all laborers and mechanics, including

guards and watchmen, working on the contract. Such records shall contain the name and address of each such employee, social security number, correct classifications, hourly rates of wages paid, daily and weekly number of hours worked, deductions made, and actual wages paid. Further, the Agency Head shall cause or require the contracting officer to insert in any such contract a clause providing that the records to be maintained under this paragraph shall be made available by the contractor or subcontractor for inspection, copying, or transcription by authorized representatives of the (write the name of agency) and the Department of Labor, and the contractor or subcontractor will permit such representatives to interview employees during working hours on the job.

(The information collection, recordkeeping, and reporting requirements contained in the following paragraphs of this section were approved by the Office of Management and Budget:

Paragraph	OMB Control No.
(a)(1)(ii)(B)	1235-0023
(a)(1)(ii)(C)	1235-0023
(a)(1)(iv)	1235-0023
(a)(3)(i)	1235-0023
(a)(3)(ii)(A)	1235-0023
	1235-0008
(c)	1235-0023

[48 FR 19540, Apr. 29, 1983, as amended at 51 FR 12265, Apr. 9, 1986; 55 FR 50150, Dec. 4, 1990; 57 FR 28776, June 26, 1992; 58 FR 58955, Nov. 5, 1993; 61 FR 40716, Aug. 5, 1996; 65 FR 69693, Nov. 20, 2000; 73 FR 77511, Dec. 19, 2008; 81 FR 43450, July 1, 2016; 82 FR 2225, 2226, Jan. 9, 2017; 83 FR 12, Jan 2, 2018; 84 FR 218, Jan. 23, 2019; 87 FR 2334, Jan. 14, 2022; 88 FR 2215, Jan. 13, 2023]



CAFETERIA UNIT CONVERSIONS

HCPSS BID No. 123.23.B3

HENRY ADAMS – MEP/FP ENGINEERS

HENRY ADAMS
CONSULTING ENGINEERS

SPECIFICATIONS

**Construction Documents
Submission**

May 25, 2023

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SECTION 011000 - 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. Section Includes:

- 1. Project information.
- 2. Work covered by Contract Documents.
- 3. Coordination with occupants.
- 4. Work restrictions.
- 5. Specification and Drawing conventions.

- B. Related Requirements:

- 1. Section 015000 "Temporary Facilities and Controls" for limitations and procedures governing temporary use of Owner's facilities.

1.3 PROJECT INFORMATION

- A. Project Identification: Cafeteria HVAC Unit Conversions.

- 1. Project Locations: Multiple schools/locations within Howard County. Refer to section 1.4.A.1 for schools within project.

- B. Owner: Howard County Public Schools.

- C. Mechanical and Electrical Engineer: Henry Adams, LLC (410) 296-6500.

1.4 WORK COVERED BY CONTRACT DOCUMENTS

- A. The Work of Project is defined by the Contract Documents and consists of the following:

- 1. Installation of new electric duct heaters or hot water heating coils for Cafeteria Air Handling Units at the following schools:
 - a. Glenelg High School
 - b. Dayton Oaks Elementary School
 - c. Elkridge Landing Middle School
 - d. Fulton Elementary School
 - e. Gorman Crossing Elementary School

- f. Harper's Choice Middle School
 - g. Hollifield Station Elementary School
 - h. Mayfield Woods Middle School
 - i. Oakland Mills High School
 - j. River Hill High School
 - k. Veterans Elementary School
- 2. Replacement of fan motors for air handling units at multiple schools. Variable frequency drives to be provided for new motors.
- 3. Upgrade and reprogramming of existing AHU controls.
- B. General: Contractor shall have full use of Project site for construction operations during construction period. Contractor's use of Project site is limited only by County's right to perform work or to retain other contractors on portions of Project.
- C. Use of Site: Limit use of Project site to areas within the Contract limits indicated. Do not disturb portions of Project site beyond areas in which the Work is required.
 - 1. Driveways, Walkways and Entrances: Keep driveways loading areas, and entrances serving premises clear and available to County, County's employees, and emergency vehicles at all times. Do not use these areas for parking or for storage of materials.
 - a. Schedule deliveries to minimize use of driveways and entrances by construction operations.
 - b. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on-site.
- D. Condition of Existing Building: Maintain portions of existing building affected by construction operations in a weathertight condition throughout construction period. Repair damage caused by construction operations.
- E. 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.
- F. Construction Schedule:
 - 1. Pre-Bid Meeting: June 6, 2023, 10:00 a.m.
 - 2. Bids Due: June 21, 2023, 1:00 p.m.
 - 3. Contract Award: August 17, 2023
 - 4. Begin Construction: June 17, 2024
 - 5. Substantial Completion: August 16, 2024
 - 6. Punchlist Completed: August 23, 2024
 - 7. Closeout Documents: September 6, 2024

1.5 COORDINATION WITH OCCUPANTS

- A. Full County Occupancy: County will occupy site and existing adjacent building(s) during entire construction period. Cooperate with Contracting Officer's Representative (COR) during construction operations to minimize conflicts and facilitate County usage. Perform the Work so as not to interfere with County's day-to-day 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 COR and approval of authorities having jurisdiction.
2. Notify COR not less than 72 hours in advance of activities that will affect County's operations.

1.6 WORK RESTRICTIONS

- A. Work Restrictions, General: Comply with restrictions on construction operations.
 1. Comply with limitations on use of public streets and with other requirements of authorities having jurisdiction.
- B. On-Site Work Hours: Limit work in the existing building to normal business working hours of 7 a.m. to 4 p.m., Monday through Friday, unless otherwise indicated.
- C. Existing Utility Interruptions: Do not interrupt utilities serving facilities occupied by County or others unless permitted under the following conditions and then only after providing temporary utility services according to requirements indicated:
 1. Notify COR not less than two days in advance of proposed utility interruptions.
 2. Obtain COR's written permission before proceeding with utility interruptions.
- D. Noise, Vibration, and Odors: Coordinate operations that may result in high levels of noise and vibration, odors, or other disruption to County occupancy with COR.
 1. Notify COR not less than two days in advance of proposed disruptive operations.
 2. Obtain COR's written permission before proceeding with disruptive operations.
- E. Nonsmoking Building: Smoking is not permitted within the building or within 25 feet of entrances, operable windows, or outdoor-air intakes.
- F. Restricted Substances: Use of tobacco products and other controlled substances on Project site is not permitted.
- G. Employee Identification: Provide identification tags for Contractor personnel working on Project site. Require personnel to use identification tags at all times.
- H. Employee Screening: Comply with County's requirements for drug and background screening of Contractor personnel working on Project site.
 1. Maintain list of approved screened personnel with COR.

1.7 SPECIFICATION AND DRAWING CONVENTIONS

- A. 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. Imperative mood and streamlined language are generally used in the Specifications. 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.

2. Specification requirements are to be performed by Contractor unless specifically stated otherwise.
- B. Division 01 General Requirements: Requirements of Sections in Division 01 apply to the Work of all Sections in the Specifications.
- 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 abbreviations published as part of the U.S. National CAD Standard and scheduled on Drawings.
 3. Keynoting: Materials and products are identified by reference keynotes referencing Specification Section numbers found in this Project Manual.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 011000

SECTION 012500 - SUBSTITUTION PROCEDURES

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. Section includes administrative and procedural requirements for substitutions.
- B. Related Requirements:
 - 1. Section 016000 "Product Requirements" for requirements for submitting comparable product submittals for products by listed manufacturers.

1.3 DEFINITIONS

- A. Substitutions: Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents and proposed by Contractor.
 - 1. Substitutions for Cause: Changes proposed by Contractor that are required due to changed Project conditions, such as unavailability of product, regulatory changes, or unavailability of required warranty terms.
 - 2. Substitutions for Convenience: Changes proposed by Contractor or County that are not required in order to meet other Project requirements but may offer advantage to Contractor or County.

1.4 ACTION 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: Coordinate with County for required forms.
 - 2. Documentation: Show compliance with requirements for substitutions and the following, as applicable:
 - a. Statement indicating why specified product or fabrication or installation method cannot be provided, if applicable.
 - b. Coordination of information, including a list of changes or revisions needed to other parts of the Work and to construction performed by County and separate contractors that will be necessary to accommodate proposed substitution.

- c. Detailed comparison of significant qualities of proposed substitutions with those of the Work specified. Include annotated copy of applicable Specification Section. 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.
 - d. Product Data, including drawings and descriptions of products and fabrication and installation procedures.
 - e. Samples, where applicable or requested.
 - f. Certificates and qualification data, where applicable or requested.
 - g. List of similar installations for completed projects, with project names and addresses as well as names and addresses of COR (Contracting Officer's Representative) and Countys.
 - h. Material test reports from a qualified testing agency, indicating and interpreting test results for compliance with requirements indicated.
 - i. Research reports evidencing compliance with building code in effect for Project, from ICC-ES.
 - j. Detailed comparison of Contractor's construction schedule using proposed substitutions with products specified for the Work, including effect on the overall Contract Time. If specified product or method of construction cannot be provided within the Contract Time, include letter from manufacturer, on manufacturer's letterhead, stating date of receipt of purchase order, lack of availability, or delays in delivery.
 - k. Cost information, including a proposal of change, if any, in the Contract Sum.
 - l. Contractor's certification that proposed substitution complies with requirements in the Contract Documents, except as indicated in substitution request, is compatible with related materials and is appropriate for applications indicated.
 - m. 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. COR's Action: If necessary, COR will request additional information or documentation for evaluation within seven days of receipt of a request for substitution. COR will notify Contractor of acceptance or rejection of proposed substitution within 15 days of receipt of request, or seven days of receipt of additional information or documentation, whichever is later.
- a. Forms of Acceptance: Change Order, Construction Change Directive, or COR's Supplemental Instructions for minor changes in the Work.
 - b. Use product specified if COR does not issue a decision on use of a proposed substitution within time allocated.

1.5 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.

1.6 PROCEDURES

- A. Coordination: Revise or adjust affected work as necessary to integrate work of the approved substitutions.

1.7 SUBSTITUTIONS

- A. Substitutions for Cause: Submit requests for substitution immediately on discovery of need for change, but not later than 15 days prior to time required for preparation and review of related submittals.
1. Conditions: COR will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, COR will return requests without action, except to record noncompliance with these requirements:
- a. Requested substitution is consistent with the Contract Documents and will produce indicated results.
 - b. Substitution request is fully documented and properly submitted.
 - c. Requested substitution will not adversely affect Contractor's construction schedule.
 - d. Requested substitution has received necessary approvals of authorities having jurisdiction.
 - e. Requested substitution is compatible with other portions of the Work.
 - f. Requested substitution has been coordinated with other portions of the Work.
 - g. Requested substitution provides specified warranty.
 - h. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.
- B. Substitutions for Convenience: Not allowed.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 012500

SECTION 012600 - CONTRACT MODIFICATION PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for handling and processing Contract modifications.
- B. Related Requirements:
 - 1. Section 012500 "Substitution Procedures" for administrative procedures for handling requests for substitutions made after the Contract award.

1.3 MINOR CHANGES IN THE WORK

- A. Contracting Officer's Representative (COR) will issue supplemental instructions authorizing minor changes in the Work, not involving adjustment to the Contract Sum or the Contract Time, on AIA Document G710.

1.4 PROPOSAL REQUESTS

- A. County-Initiated Proposal Requests: COR will issue a detailed description of proposed changes in the Work that may require adjustment to the Contract Sum or the Contract Time. If necessary, the description will include supplemental or revised Drawings and Specifications.
 - 1. Work Change Proposal Requests issued by COR are not instructions either to stop work in progress or to execute the proposed change.
 - 2. Within time specified in Proposal Request after receipt of Proposal Request, submit a quotation estimating cost adjustments to the Contract Sum and the Contract Time necessary to execute the 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 the change.
 - d. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
 - e. Quotation Form: Use forms acceptable to COR.

- B. Contractor-Initiated Proposals: If latent or changed conditions require modifications to the Contract, Contractor may initiate a claim by submitting a request for a change to COR.
1. Include a statement outlining reasons for the change and the effect of the change on the Work. Provide a complete description of the proposed change. Indicate the effect of the proposed change on the Contract Sum and the 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 the change.
 5. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
 6. Comply with requirements in Section 012500 "Substitution Procedures" if the proposed change requires substitution of one product or system for product or system specified.
 7. Proposal Request Form: Use form acceptable to COR.

1.5 CHANGE ORDER PROCEDURES

- A. On County's approval of a Work Change Proposal Request, COR will issue a Change Order for signatures of County and Contractor on AIA Document G701.

1.6 CONSTRUCTION CHANGE DIRECTIVE

- A. Construction Change Directive: COR may issue a Construction Change Directive on AIA Document G714. Construction Change Directive instructs Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order.
1. Construction Change Directive contains a complete description of change in the Work. It also designates method to be followed to determine change in the Contract Sum or the Contract Time.
- B. Documentation: Maintain detailed records on a time and material basis of work required by the Construction Change Directive.
1. After completion of change, submit an itemized account and supporting data necessary to substantiate cost and time adjustments to the Contract.

1.7 WORK CHANGE DIRECTIVE

- A. Work Change Directive: COR may issue a Work Change Directive on AIA Document C-940. Work Change Directive instructs Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order.
1. Work Change Directive contains a complete description of change in the Work. It also designates method to be followed to determine change in the Contract Sum or the Contract Time.

- B. Documentation: Maintain detailed records on a time and material basis of work required by the Work Change Directive.
 - 1. After completion of change, submit an itemized account and supporting data necessary to substantiate cost and time adjustments to the Contract.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 012600

SECTION 012900 - PAYMENT PROCEDURES

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. Section includes administrative and procedural requirements necessary to prepare and process Applications for Payment.
- B. Related Requirements:
 - 1. Section 012600 "Contract Modification Procedures" for administrative procedures for handling changes to the Contract.
 - 2. Section 013200 "Construction Progress Documentation" for administrative requirements governing the preparation and submittal of the Contractor's construction schedule.

1.3 DEFINITIONS

- A. Schedule of Values: A statement furnished by Contractor allocating portions of the Contract Sum to various portions of the Work and used as the basis for reviewing Contractor's Applications for Payment.

1.4 SCHEDULE OF VALUES

- A. Coordination: Coordinate preparation of the schedule of values with preparation of Contractor's construction schedule.
 - 1. Coordinate line items in the schedule of values with items required to be indicated as separate activities in Contractor's construction schedule.
 - 2. Submit the schedule of values to Contracting Officer's Representative (COR) at earliest possible date, but no later than seven days before the date scheduled for submittal of initial Applications for Payment.
 - 3. Subschedules for Phased Work: Where the Work is separated into phases requiring separately phased payments, provide subschedules showing values coordinated with each phase of payment.
 - 4. Subschedules for Separate Elements of Work: Where the Contractor's construction schedule defines separate elements of the Work, provide subschedules showing values coordinated with each element.
 - 5. Subschedules for Separate Design Contracts: Where the County has retained design professionals under separate contracts who will each provide certification of payment requests, provide subschedules showing values coordinated with the scope of each design services contract, as described in Section 011000 "Summary."

- B. Format and Content: Use Project Manual table of contents as a guide to establish line items for the schedule of values. Provide at least one line item for each Specification Section.
1. Identification: Include the following Project identification on the schedule of values:
 - a. Project name and location.
 - b. Name of COR.
 - c. COR's Project number.
 - d. Contractor's name and address.
 - e. Date of submittal.
 2. Arrange schedule of values consistent with format of AIA Document G703.
 3. Arrange the schedule of values in tabular form, with separate columns to indicate the following for each item listed:
 - a. Related Specification Section or Division.
 - b. Description of the Work.
 - c. Name of subcontractor.
 - d. Name of manufacturer or fabricator.
 - e. Name of supplier.
 - f. Change Orders (numbers) that affect value.
 - g. Dollar value of the following, as a percentage of the Contract Sum to nearest one-hundredth percent, adjusted to total 100 percent. Round dollar amounts to whole dollars, with total equal to Contract Sum.
 - 1) Labor.
 - 2) Materials.
 - 3) Equipment.
 4. Provide a breakdown of the Contract Sum in enough detail to facilitate continued evaluation of Applications for Payment and progress reports. Provide multiple line items for principal subcontract amounts in excess of five percent of the Contract Sum.
 5. Provide a separate line item in the schedule of values for each part of the 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.
 6. Allowances: Provide a separate line item in the schedule of values for each allowance. Show line-item value of unit-cost allowances, as a product of the unit cost, multiplied by measured quantity. Use information indicated in the Contract Documents to determine quantities.
 7. Purchase Contracts: Provide a separate line item in the schedule of values for each purchase contract. Show line-item value of purchase contract. Indicate County payments or deposits, if any, and balance to be paid by Contractor.
 8. Overhead Costs: Include total cost and proportionate share of general overhead and profit for each line item.
 9. Overhead Costs: Show cost of temporary facilities and other major cost items that are not direct cost of actual work-in-place as separate line items.
 10. Closeout Costs: Include separate line items under Contractor and principal subcontracts for Project closeout requirements in an amount totaling five percent of the Contract Sum and subcontract amount.

11. Schedule of Values Revisions: Revise the schedule of values when Change Orders or Construction Change Directives result in a change in the Contract Sum. Include at least one separate line item for each Change Order and Construction Change Directive.

1.5 APPLICATIONS FOR PAYMENT

- A. Each Application for Payment following the initial Application for Payment shall be consistent with previous applications and payments as certified by COR and paid for by County.
- B. Payment Application Times: The date for each progress payment is indicated in the Agreement between County and Contractor. The period of construction work covered by each Application for Payment is the period indicated in the Agreement.
- C. Payment Application Times: Submit Application for Payment to COR by the 5th day of the month. The period covered by each Application for Payment is one month, ending on the last day of the month.
 1. Submit draft copy of Application for Payment seven days prior to due date for review by COR.
- D. Application for Payment Forms: Use AIA Document G702 and AIA Document G703 as form for Applications for Payment.
 1. Other Application for Payment forms proposed by the Contractor shall be acceptable to COR and County. Submit forms for approval with initial submittal of schedule of values.
- E. Application Preparation: Complete every entry on form. Notarize and execute by a person authorized to sign legal documents on behalf of Contractor. COR will return incomplete applications without action.
 1. Entries shall match data on the schedule of values and Contractor's construction schedule. Use updated schedules if revisions were made.
 2. Include amounts for work completed following previous Application for Payment, whether or not payment has been received. Include only amounts for work completed at time of Application for Payment.
 3. Include amounts of Change Orders and Construction Change Directives issued before last day of construction period covered by application.
 4. Indicate separate amounts for work being carried out under County-requested project acceleration.
- F. 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 certificate of insurance, evidence of transfer of title to County, and consent of surety to payment for stored materials.
 2. 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.
 3. Provide summary documentation for stored materials indicating the following:
 - a. Value of materials previously stored and remaining stored as of date of previous Applications 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.
- G. Transmittal: Submit three signed and notarized original copies of each Application for Payment to COR by a method ensuring receipt within 24 hours. One copy shall include waivers of lien and similar attachments if required.
 - 1. Transmit each copy with a transmittal form listing attachments and recording appropriate information about application.
- H. Waivers of Mechanic's Lien: With each Application for Payment, submit waivers of mechanic's lien from subcontractors, sub-subcontractors, and suppliers for construction period covered by the previous application.
 - 1. Submit partial waivers on each item for amount requested in previous application, after deduction for retainage, on each item.
 - 2. When an application shows completion of an item, submit conditional final or full waivers.
 - 3. County reserves the right to designate which entities involved in the Work must submit waivers.
 - 4. Submit final Application for Payment with or preceded by conditional final waivers from every entity involved with performance of the Work covered by the application who is lawfully entitled to a lien.
 - 5. Waiver Forms: Submit executed waivers of lien on forms acceptable to County.
- I. Initial Application for Payment: Administrative actions and submittals that must precede or coincide with submittal of first Application for Payment include the following:
 - 1. List of subcontractors.
 - 2. Schedule of values.
 - 3. Contractor's construction schedule (preliminary if not final).
 - 4. Combined Contractor's construction schedule (preliminary if not final) incorporating Work of multiple contracts, with indication of acceptance of schedule by each Contractor.
 - 5. Products list (preliminary if not final).
 - 6. Sustainable design action plans, including preliminary project materials cost data.
 - 7. Submittal schedule (preliminary if not final).
 - 8. List of Contractor's staff assignments.
 - 9. List of Contractor's principal consultants.
 - 10. Copies of building permits.
 - 11. Copies of authorizations and licenses from authorities having jurisdiction for performance of the Work.
 - 12. Initial progress report.
 - 13. Report of preconstruction conference.
 - 14. Certificates of insurance and insurance policies.
 - 15. Performance and payment bonds.
 - 16. Data needed to acquire County's insurance.
- J. Application for Payment at Substantial Completion: After COR issues the Certificate of Substantial Completion, submit an Application for Payment showing 100 percent completion for portion of the Work claimed as substantially complete.
 - 1. Include documentation supporting claim that the Work is substantially complete and a statement showing an accounting of changes to the Contract Sum.

2. This application shall reflect Certificate(s) of Substantial Completion issued previously for County occupancy of designated portions of the Work.
- K. Final Payment Application: After completing Project closeout requirements, submit final Application for Payment with releases and supporting documentation not previously submitted and accepted, including, but not limited, to the following:
1. Evidence of completion of Project closeout requirements.
 2. Insurance certificates for products and completed operations where required and proof that taxes, fees, and similar obligations were paid.
 3. Updated final statement, accounting for final changes to the Contract Sum.
 4. AIA Document G706.
 5. AIA Document G706A.
 6. AIA Document G707.
 7. Evidence that claims have been settled.
 8. Final meter readings for utilities, a measured record of stored fuel, and similar data as of date of Substantial Completion or when County took possession of and assumed responsibility for corresponding elements of the Work.
 9. Final liquidated damages settlement statement.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 012900

SECTION 013100 - PROJECT MANAGEMENT AND COORDINATION

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. Section includes administrative provisions for coordinating construction operations on Project including, but not limited to, the following:
 - 1. General coordination procedures.
 - 2. Coordination drawings.
 - 3. RFIs.
 - 4. Digital project management procedures.
 - 5. Project meetings.
- B. Each contractor shall participate in coordination requirements. Certain areas of responsibility are assigned to a specific contractor.
- C. Related Requirements:
 - 1. Section 013200 "Construction Progress Documentation" for preparing and submitting Contractor's construction schedule.
 - 2. Section 017300 "Execution" for procedures for coordinating general installation and field-engineering services, including establishment of benchmarks and control points.
 - 3. Section 017700 "Closeout Procedures" for coordinating closeout of the Contract.

1.3 DEFINITIONS

- A. BIM: Building Information Modeling.
- B. RFI: Request for Information. Request from County, Contracting Officer's Representative (COR), or Contractor seeking information required by or clarifications of the Contract Documents.

1.4 INFORMATIONAL SUBMITTALS

- A. Subcontract List: Prepare a written summary identifying individuals or firms proposed for each portion of the Work, including those who are to furnish products or equipment fabricated to a special design. Include the following information in tabular form:
 - 1. Name, address, telephone number, and email address 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 cellular telephone numbers and e-mail addresses. Provide names, addresses, and telephone numbers of individuals assigned as alternates in the absence of individuals assigned to Project.
 - 1. Post copies of list in project meeting room, in temporary field office, and in prominent location in each built facility. Keep list current at all times.

1.5 GENERAL COORDINATION PROCEDURES

- A. Coordination: Coordinate construction operations included in different Sections of the Specifications to ensure efficient and orderly installation of each part of the Work. Coordinate construction operations included in different Sections that depend on each other for proper installation, connection, and operation.
 - 1. Schedule construction operations in sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
 - 2. Coordinate installation of different components to ensure maximum performance and accessibility for required maintenance, service, and repair.
 - 3. Make adequate provisions to accommodate items scheduled for later installation.
- B. Coordination: Each contractor shall coordinate its construction operations with those of other contractors and entities to ensure efficient and orderly installation of each part of the Work. Each contractor shall coordinate its own operations with operations included in different Sections that depend on each other for proper installation, connection, and operation.
 - 1. Schedule construction operations in sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
 - 2. Coordinate installation of different components with other contractors to ensure maximum performance and accessibility for required maintenance, service, and repair.
 - 3. Make adequate provisions to accommodate items scheduled for later installation.
- C. Prepare memoranda for distribution to each party involved, outlining special procedures required for coordination. Include such items as required notices, reports, and list of attendees at meetings.
 - 1. Prepare similar memoranda for County and separate contractors if coordination of their Work is required.
- D. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities to avoid conflicts and to ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:
 - 1. Preparation of Contractor's construction schedule.
 - 2. Preparation of the schedule of values.
 - 3. Installation and removal of temporary facilities and controls.
 - 4. Delivery and processing of submittals.
 - 5. Progress meetings.
 - 6. Preinstallation conferences.
 - 7. Project closeout activities.

8. Startup and adjustment of systems.

1.6 REQUEST FOR INFORMATION (RFI)

- A. General: Immediately on discovery of the need for additional information, clarification, or interpretation of the Contract Documents, Contractor shall prepare and submit an RFI in the form specified.
 1. COR will return without response those RFIs submitted to COR by other entities controlled by Contractor.
 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 the RFI: Include a detailed, legible description of item needing information or interpretation and the following:
 1. Project name.
 2. Project number.
 3. Date.
 4. Name of Contractor.
 5. Name of COR.
 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 suggested resolution impacts the Contract Time or the Contract Sum, Contractor shall state impact in the 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: AIA Document G716.
 1. Attachments shall be electronic files in PDF format.
- D. COR's Action: COR will review each RFI, determine action required, and respond. Allow seven working days for COR's response for each RFI. RFIs received by COR after 1:00 p.m. will be considered as received the following working day.
 1. The following Contractor-generated RFIs will be returned without action:
 - a. Requests for approval of submittals.
 - b. Requests for approval of substitutions.
 - c. Requests for approval of Contractor's means and methods.
 - d. Requests for coordination information already indicated in the Contract Documents.
 - e. Requests for adjustments in the Contract Time or the Contract Sum.
 - f. Requests for interpretation of COR's actions on submittals.
 - g. Incomplete RFIs or inaccurately prepared RFIs.

2. COR's action may include a request for additional information, in which case COR's time for response will date from time of receipt by COR of additional information.
 3. COR's action on RFIs that may result in a change to the Contract Time or the Contract Sum may be eligible for Contractor to submit Change Proposal according to Section 012600 "Contract Modification Procedures."
 - a. If Contractor believes the RFI response warrants change in the Contract Time or the Contract Sum, notify COR in writing within 10 days of receipt of the RFI response.
- E. RFI Log: Prepare, maintain, and submit a tabular log of RFIs organized by the RFI number. Submit log weekly. Include the following:
1. Project name.
 2. Name and address of Contractor.
 3. Name and address of COR.
 4. RFI number including RFIs that were returned without action or withdrawn.
 5. RFI description.
 6. Date the RFI was submitted.
 7. Date COR's response was received.
 8. Identification of related Minor Change in the Work, Construction Change Directive, and Proposal Request, as appropriate.
 9. Identification of related Field Order, Work Change Directive, and Proposal Request, as appropriate.
- F. On receipt of COR's action, update the RFI log and immediately distribute the RFI response to affected parties. Review response and notify COR within seven days if Contractor disagrees with response.

1.7 DIGITAL PROJECT MANAGEMENT PROCEDURES

- A. Use of COR's Digital Data Files: Digital data files of COR's CAD drawings will be provided by COR for Contractor's use during construction.
1. Digital data files may be used by Contractor in preparing coordination drawings, Shop Drawings, and Project record Drawings.
 2. COR makes no representations as to the accuracy or completeness of digital data files as they relate to Contract Drawings.
 3. Digital Drawing Software Program: Contract Drawings are available in CAD 2019.
 4. Contractor shall execute a data licensing agreement in the form of AIA Document C106 Digital Data Licensing Agreement.
 - a. Subcontractors, and other parties granted access by Contractor to COR's digital data files shall execute a data licensing agreement in the form of AIA Document C106.
- B. PDF Document Preparation: Where PDFs are required to be submitted to COR, prepare as follows:
1. Assemble complete submittal package into a single indexed file incorporating submittal requirements of a single Specification Section and transmittal form with links enabling navigation to each item.
 2. Name file with submittal number or other unique identifier, including revision identifier.

3. Certifications: Where digitally submitted certificates and certifications are required, provide a digital signature with digital certificate on where indicated.

1.8 PROJECT MEETINGS

- A. General: Schedule and conduct meetings and conferences 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 County and COR of scheduled meeting dates and times a minimum of 10 working days prior to meeting.
 2. Agenda: Prepare the meeting agenda. Distribute the agenda to all invited attendees.
 3. Minutes: Entity responsible for conducting meeting will record significant discussions and agreements achieved. Distribute the meeting minutes to everyone concerned, including County and COR, within three days of the meeting.
- B. Preconstruction Conference: Schedule and conduct a preconstruction conference before starting construction, at a time convenient to County and COR, but no later than 15 days after execution of the Agreement.
 1. Attendees: Authorized representatives of County COR, and their consultants; Contractor and its superintendent; major subcontractors; suppliers; and other concerned parties shall attend the conference. Participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
 2. Minutes: Entity responsible for conducting meeting will record and distribute meeting minutes.
- C. Preinstallation Conferences: Conduct a preinstallation conference at Project site before each construction activity when required by other sections and when required for coordination with other construction.
 1. Record significant conference discussions, agreements, and disagreements, including required corrective measures and actions.
 2. Reporting: Distribute minutes of the meeting to each party present and to other parties requiring information.
 3. Do not proceed with installation if the conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of the Work and reconvene the conference at earliest feasible date.
- D. Project Closeout Conference: Schedule and conduct a project closeout conference, at a time convenient to County and COR, but no later than 90 days prior to the scheduled date of Substantial Completion.
 1. Conduct the conference to review requirements and responsibilities related to Project closeout.
 2. Minutes: Entity conducting meeting will record and distribute meeting minutes.
- E. Progress Meetings: Conduct progress meetings at biweekly intervals.
 1. Coordinate dates of meetings with preparation of payment requests.

- F. Coordination Meetings: Conduct Project coordination meetings at biweekly intervals. Project coordination meetings are in addition to specific meetings held for other purposes, such as progress meetings and preinstallation conferences.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 013100

SECTION 013200 - CONSTRUCTION PROGRESS DOCUMENTATION

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. Section includes administrative and procedural requirements for documenting the progress of construction during performance of the Work, including the 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. Unusual event reports.

1.3 DEFINITIONS

- A. Activity: A discrete part of a project that can be identified for planning, scheduling, monitoring, and controlling the construction Project. Activities included in a construction schedule consume time and resources.
 - 1. Critical Activity: An activity on the critical path that must start and finish on the planned early start and finish times.
 - 2. Predecessor Activity: An activity that precedes another activity in the network.
 - 3. Successor Activity: An activity that follows another activity in the network.
- B. Cost Loading: The allocation of the schedule of values for completing an activity as scheduled. The sum of costs for all activities must equal the total Contract Sum.
- C. CPM: Critical path method, which is a method of planning and scheduling a construction project where activities are arranged based on activity relationships. Network calculations determine when activities can be performed and the critical path of Project.
- D. Critical Path: The longest connected chain of interdependent activities through the network schedule that establishes the minimum overall Project duration and contains no float.
- E. Event: The starting or ending point of an activity.
- F. Float: The measure of leeway in starting and completing an activity.
 - 1. Float time belongs to County.
 - 2. Free float is the amount of time an activity can be delayed without adversely affecting the early start of the successor activity.

3. Total float is the measure of leeway in starting or completing an activity without adversely affecting the planned Project completion date.

- G. Resource Loading: The allocation of manpower and equipment necessary for completing an activity as scheduled.

1.4 INFORMATIONAL SUBMITTALS

- A. Format for Submittals: Submit required submittals in the following format:

1. Working electronic copy of schedule file, where indicated.
2. PDF file.
3. Two paper copies, of sufficient size to display entire period or schedule, as required.

- B. Startup construction schedule.

1. Submittal of cost-loaded, startup construction schedule will not constitute approval of schedule of values for cost-loaded activities.

- C. Startup Network Diagram: Of size required to display entire network for entire construction period. Show logic ties for activities.

- D. Contractor's Construction Schedule: Initial schedule, of size required to display entire schedule for entire construction period.

1. Submit a working digital copy of schedule, using software indicated, and labeled to comply with requirements for submittals.

- E. CPM Reports: Concurrent with CPM schedule, submit each of the following reports. Format for each activity in reports shall contain activity number, activity description, cost and resource loading, original duration, remaining duration, early start date, early finish date, late start date, late finish date, and total float in calendar days.

1. Activity Report: List of activities sorted by activity number and then early start date, or actual start date if known.
2. Logic Report: List of preceding and succeeding activities for each activity, sorted in ascending order by activity number and then by early start date, or actual start date if known.
3. Total Float Report: List of activities sorted in ascending order of total float.
4. Earnings Report: Compilation of Contractor's total earnings from the Notice to Proceed until most recent Application for Payment.

- F. Construction Schedule Updating Reports: Submit with Applications for Payment.

- G. Daily Construction Reports: Submit at weekly intervals.

- H. Material Location Reports: Submit at weekly intervals.

- I. Site Condition Reports: Submit at time of discovery of differing conditions.

- J. Unusual Event Reports: Submit at time of unusual event.

- K. Qualification Data: For scheduling consultant.

1.5 COORDINATION

- A. Coordinate Contractor's Construction Schedule with the schedule of values, list of subcontracts, submittal schedule, progress reports, payment requests, and other required schedules and reports.
 - 1. Secure time commitments for performing critical elements of the Work from entities involved.
 - 2. Coordinate each construction activity in the network with other activities and schedule them in proper sequence.

1.6 CONTRACTOR'S CONSTRUCTION SCHEDULE, GENERAL

- A. Computer Scheduling Software: Prepare schedules using current version of a program that has been developed specifically to manage construction schedules.
 - 1. Use Microsoft Project, for current Windows operating system.
- B. Scheduling Consultant: Engage a consultant to provide planning, evaluation, and reporting using CPM scheduling.
 - 1. In-House Option: County may waive requirement to retain a consultant if Contractor employs skilled personnel with experience in CPM scheduling and reporting techniques. Submit qualifications.
 - 2. Meetings: Scheduling consultant shall attend all meetings related to Project progress, alleged delays, and time impact.
- C. Time Frame: Extend schedule from date established for the Notice to Proceed to date of final completion.
 - 1. Contract completion date shall not be changed by submission of a schedule that shows an early completion date, unless specifically authorized by Change Order.
- D. Activities: Treat each floor or separate area as a separate numbered activity for each main element of the Work. Comply with the following:
 - 1. Activity Duration: Define activities so no activity is longer than 20 days, unless specifically allowed by Contracting Officer's Representative (COR).
 - 2. Procurement Activities: Include procurement process activities for the following long lead items and major items, requiring a cycle of more than 60 days, as separate activities in schedule. Procurement cycle activities include, but are not limited to, submittals, approvals, purchasing, fabrication, and delivery.
 - 3. Submittal Review Time: Include review and resubmittal times indicated in Section 013300 "Submittal Procedures" in schedule. Coordinate submittal review times in Contractor's Construction Schedule with submittal schedule.
 - 4. Startup and Testing Time: Include no fewer than 15 days for startup and testing.
 - 5. Commissioning Time: Include no fewer than 15 days for commissioning.
 - 6. Substantial Completion: Indicate completion in advance of date established for Substantial Completion, and allow time for COR's administrative procedures necessary for certification of Substantial Completion.
 - 7. Punch List and Final Completion: Include not more than 30 days for completion of punch list items and final completion.

- E. Constraints: Include constraints and work restrictions indicated in the Contract Documents and as follows in schedule, and show how the sequence of the Work is affected.
1. Phasing: Arrange list of activities on schedule by phase.
 2. Work under More Than One Contract: Include a separate activity for each contract.
 3. Work by County: Include a separate activity for each portion of the Work performed by County.
 4. Products Ordered in Advance: Include a separate activity for each product. Include delivery date indicated in Section 011000 "Summary." Delivery dates indicated stipulate the earliest possible delivery date.
 5. County-Furnished Products: Include a separate activity for each product. Include delivery date indicated in Section 011000 "Summary." Delivery dates indicated stipulate the earliest possible delivery date.
 6. Work Restrictions: Show the effect of the following items on the schedule:
 - a. Coordination with existing construction.
 - b. Limitations of continued occupancies.
 - c. Uninterruptible services.
 - d. Partial occupancy before Substantial Completion.
 - e. Use-of-premises restrictions.
 - f. Provisions for future construction.
 - g. Seasonal variations.
 - h. Environmental control.
 7. Work Stages: Indicate important stages of construction for each major portion of the Work, including, but not limited to, the following:
 - a. Subcontract awards.
 - b. Submittals.
 - c. Purchases.
 - d. Mockups.
 - e. Fabrication.
 - f. Sample testing.
 - g. Deliveries.
 - h. Installation.
 - i. Tests and inspections.
 - j. Adjusting.
 - k. Curing.
 - l. Building flush-out.
 - m. Startup and placement into final use and operation.
 8. Construction Areas: Identify each major area of construction for each major portion of the Work. Indicate where each construction activity within a major area must be sequenced or integrated with other construction activities to provide for the following:
 - a. Structural completion.
 - b. Temporary enclosure and space conditioning.
 - c. Permanent space enclosure.
 - d. Completion of mechanical installation.
 - e. Completion of electrical installation.
 - f. Substantial Completion.
- F. Milestones: Include milestones indicated in the Contract Documents in schedule, including, but not limited to, the Notice to Proceed, Substantial Completion, and final completion, and the following interim milestones:

1. Temporary enclosure and space conditioning.
 - G. Cost Correlation: Superimpose a cost correlation timeline, indicating planned and actual costs. On the line, show planned and actual dollar volume of the Work performed as of planned and actual dates used for preparation of payment requests.
 1. See Section 012900 "Payment Procedures" for cost reporting and payment procedures.
 - H. Upcoming Work Summary: Prepare summary report indicating activities scheduled to occur or commence prior to submittal of next schedule update. Summarize the following issues:
 1. Unresolved issues.
 2. Unanswered Requests for Information.
 3. Rejected or unreturned submittals.
 4. Notations on returned submittals.
 5. Pending modifications affecting the Work and the Contract Time.
 - I. 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 the 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 the Work progresses, indicate final completion percentage for each activity.
 - J. Recovery Schedule: When periodic update indicates the Work is 14 or more calendar days behind the current approved schedule, submit a separate recovery schedule indicating means by which Contractor intends to regain compliance with the schedule. Indicate changes to working hours, working days, crew sizes, equipment required to achieve compliance, and date by which recovery will be accomplished.
 - K. Distribution: Distribute copies of approved schedule to COR, 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 the same parties and post in the same locations. Delete parties from distribution when they have completed their assigned portion of the Work and are no longer involved in performance of construction activities.
- 1.7 GANTT-CHART SCHEDULE REQUIREMENTS
- A. Gantt-Chart Schedule: Submit a comprehensive, fully developed, horizontal, Gantt-chart-type, Contractor's Construction Schedule within 30 days of date established for the Notice to Proceed.
 1. Base schedule on the startup construction schedule and additional information received since the start of Project.

- 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 three months or longer to complete, indicate an estimated completion percentage in 10 percent increments within time bar.

1.8 CPM SCHEDULE REQUIREMENTS

- A. General: Prepare network diagrams using AON (activity-on-node) format.
- B. Startup Network Diagram: Submit diagram within 14 days of date established for the Notice to Proceed. Outline significant construction activities for the first 90 days of construction. Include skeleton diagram for the remainder of the Work and a cash requirement prediction based on indicated activities.
- C. CPM Schedule: Prepare Contractor's Construction Schedule using a cost- and resource-loaded, time-scaled CPM network analysis diagram for the Work.
 - 1. Develop network diagram in sufficient time to submit CPM schedule so it can be accepted for use no later than 60 days after date established for the Notice to Proceed.
 - a. Failure to include any work item required for performance of this Contract shall not excuse Contractor from completing all work within applicable completion dates.
 - 2. Conduct educational workshops to train and inform key Project personnel, including subcontractors' personnel, in proper methods of providing data and using CPM schedule information.
 - 3. Establish procedures for monitoring and updating CPM schedule and for reporting progress. Coordinate procedures with progress meeting and payment request dates.
 - 4. Use "one workday" as the unit of time for individual activities. Indicate nonworking days and holidays incorporated into the schedule to coordinate with the Contract Time.
- D. CPM Schedule Preparation: Prepare a list of all activities required to complete the Work. Using the startup network diagram, prepare a skeleton network to identify probable critical paths.
 - 1. Activities: Indicate the estimated time duration, sequence requirements, and relationship of each activity in relation to other activities. Include estimated time frames for the following activities:
 - a. Preparation and processing of submittals.
 - b. Mobilization and demobilization.
 - c. Purchase of materials.
 - d. Delivery.
 - e. Fabrication.
 - f. Utility interruptions.
 - g. Installation.
 - h. Work by County that may affect or be affected by Contractor's activities.
 - i. Testing and inspection.
 - j. Commissioning.
 - k. Punch list and final completion.
 - l. Activities occurring following final completion.

2. Critical Path Activities: Identify critical path activities, including those for interim completion dates. Scheduled start and completion dates shall be consistent with Contract milestone dates.
3. Processing: Process data to produce output data on a computer-drawn, time-scaled network. Revise data, reorganize activity sequences, and reproduce as often as necessary to produce the CPM schedule within the limitations of the Contract Time.
4. Format: Mark the critical path. Locate the critical path near center of network; locate paths with most float near the edges.
 - a. Subnetworks on separate sheets are permissible for activities clearly off the critical path.
5. Cost- and Resource-Loading of CPM Schedule: Assign cost to construction activities on the CPM schedule. Do not assign costs to submittal activities. Obtain COR's approval prior to assigning costs to fabrication and delivery activities. Assign costs under main subcontracts for testing and commissioning activities, operation and maintenance manuals, punch list activities, Project record documents, and demonstration and training (if applicable), in the amount of 5 percent of the Contract Sum.
 - a. Each activity cost shall reflect an appropriate value subject to approval by COR.
 - b. Total cost assigned to activities shall equal the total Contract Sum.
- E. Contract Modifications: For each proposed contract modification and concurrent with its submission, prepare a time-impact analysis using a network fragment to demonstrate the effect of the proposed change on the overall Project schedule.
- F. Initial Issue of Schedule: Prepare initial network diagram from a sorted activity list indicating straight "early start-total float." Identify critical activities. Prepare tabulated reports showing the following:
 1. Contractor or subcontractor and the Work or activity.
 2. Description of activity.
 3. Main events of activity.
 4. Immediately preceding and succeeding activities.
 5. Early and late start dates.
 6. Early and late finish dates.
 7. Activity duration in workdays.
 8. Total float or slack time.
 9. Average size of workforce.
 10. Dollar value of activity (coordinated with the schedule of values).
- G. Schedule Updating: Concurrent with making revisions to schedule, prepare tabulated reports showing the following:
 1. Identification of activities that have changed.
 2. Changes in early and late start dates.
 3. Changes in early and late finish dates.
 4. Changes in activity durations in workdays.
 5. Changes in the critical path.
 6. Changes in total float or slack time.
 7. Changes in the Contract Time.
- H. Value Summaries: Prepare two cumulative value lists, sorted by finish dates.

1. In first list, tabulate activity number, early finish date, dollar value, and cumulative dollar value.
2. In second list, tabulate activity number, late finish date, dollar value, and cumulative dollar value.
3. In subsequent issues of both lists, substitute actual finish dates for activities completed as of list date.
4. Prepare list for ease of comparison with payment requests; coordinate timing with progress meetings.
 - a. In both value summary lists, tabulate "actual percent complete" and "cumulative value completed" with total at bottom.
 - b. Submit value summary printouts one week before each regularly scheduled progress meeting.

1.9 REPORTS

- A. Daily Construction Reports: Prepare a daily construction report recording the following information concerning events at Project site:
1. List of subcontractors at Project site.
 2. List of separate contractors at Project site.
 3. Approximate count of personnel at Project site.
 4. Equipment at Project site.
 5. Material deliveries.
 6. High and low temperatures and general weather conditions, including presence of rain or snow.
 7. Testing and inspection.
 8. Accidents.
 9. Meetings and significant decisions.
 10. Unusual events.
 11. Stoppages, delays, shortages, and losses.
 12. Meter readings and similar recordings.
 13. Emergency procedures.
 14. Orders and requests of authorities having jurisdiction.
 15. Change Orders received and implemented.
 16. Construction Change Directives received and implemented.
 17. Services connected and disconnected.
 18. Equipment or system tests and startups.
 19. Partial completions and occupancies.
 20. 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. Material stored following previous report and remaining in storage.

- C. Site Condition Reports: Immediately on discovery of a difference between site conditions and the Contract Documents, prepare and submit a detailed report. Submit with a Request for Information. Include a detailed description of the differing conditions, together with recommendations for changing the Contract Documents.
- D. Unusual Event Reports: When an event of an unusual and significant nature occurs at Project site, whether or not related directly to the Work, prepare and submit a special report. List chain of events, persons participating, responses by Contractor's personnel, evaluation of results or effects, and similar pertinent information. Advise County in advance when these events are known or predictable.
 - 1. Submit unusual event reports directly to County within one day of an occurrence. Distribute copies of report to parties affected by the occurrence.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 013200

SECTION 013300 - SUBMITTAL PROCEDURES

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. Section Includes:

- 1. Submittal schedule requirements.
 - 2. Administrative and procedural requirements for submittals.

- B. Related Requirements:

- 1. Section 012900 "Payment Procedures" for submitting Applications for Payment and the schedule of values.
 - 2. Section 013100 "Project Management and Coordination" for submitting coordination drawings and subcontract list and for requirements for web-based Project software.
 - 3. Section 013200 "Construction Progress Documentation" for submitting schedules and reports, including Contractor's construction schedule.
 - 4. Section 014000 "Quality Requirements" for submitting test and inspection reports, and schedule of tests and inspections.
 - 5. Section 017700 "Closeout Procedures" for submitting closeout submittals and maintenance material submittals.
 - 6. Section 017823 "Operation and Maintenance Data" for submitting operation and maintenance manuals.
 - 7. Section 017839 "Project Record Documents" for submitting record Drawings, record Specifications, and record Product Data.
 - 8. Section 018200 "Demonstration and Training" for submitting video recordings of demonstration of equipment and training of County's personnel.

1.3 DEFINITIONS

- A. Action Submittals: Written and graphic information and physical samples that require Contracting Officer's Representative's (COR) 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 COR's responsive action. Submittals may be rejected for not complying with requirements. Informational submittals are those submittals indicated in individual Specification Sections as "informational submittals."

1.4 SUBMITTAL SCHEDULE

- A. Submittal Schedule: Submit, as an action submittal, a list of submittals, arranged in chronological order by dates required by construction schedule. Include time required for review, ordering, manufacturing, fabrication, and delivery when establishing dates. Include additional time required for making corrections or revisions to submittals noted by COR and additional time for handling and reviewing submittals required by those corrections.
1. Coordinate submittal schedule with list of subcontracts, the schedule of values, and Contractor's construction schedule.
 2. Initial Submittal: Submit concurrently with startup construction schedule. Include submittals required during the first 60 days of construction. List those submittals required to maintain orderly progress of the Work and those required early because of long lead time for manufacture or fabrication.
 3. Final Submittal: Submit concurrently with the first complete submittal of Contractor's construction schedule.
 - a. Submit revised submittal schedule to reflect changes in current status and timing for submittals.
 4. Format: Arrange the following information in a tabular format:
 - a. Scheduled date for first submittal.
 - b. Specification Section number and title.
 - c. Submittal Category: Action; informational.
 - d. Name of subcontractor.
 - e. Description of the Work covered.
 - f. Scheduled date for COR's final release or approval.
 - g. Scheduled dates for purchasing.
 - h. Scheduled date of fabrication.
 - i. Scheduled dates for installation.
 - j. Activity or event number.

1.5 SUBMITTAL FORMATS

- A. Submittal Information: Include the following information in each submittal:
1. Project name.
 2. Date.
 3. Name of COR.
 4. Name of Construction Manager.
 5. Name of Contractor.
 6. Name of firm or entity that prepared submittal.
 7. Names of subcontractor, manufacturer, and supplier.
 8. Unique submittal number, including revision identifier. Include Specification Section number with sequential alphanumeric identifier; and alphanumeric suffix for resubmittals.
 9. Category and type of submittal.
 10. Submittal purpose and description.
 11. Number and title of Specification Section, with paragraph number and generic name for each of multiple items.
 12. Drawing number and detail references, as appropriate.
 13. Indication of full or partial submittal.
 14. Location(s) where product is to be installed, as appropriate.

15. Other necessary identification.
16. Remarks.
17. Signature of transmitter.

- B. Options: Identify options requiring selection by COR.
- C. PDF Submittals: Prepare submittals as PDF package, incorporating complete information into each PDF file. Name PDF file with submittal number.

1.6 SUBMITTAL PROCEDURES

- A. Prepare and submit submittals required by individual Specification Sections. Types of submittals are indicated in individual Specification Sections.
1. Email: Prepare submittals as PDF package, and transmit to COR by sending via email. Include PDF transmittal form. Include information in email subject line as requested by COR.
 - a. COR will return annotated file. Annotate and retain one copy of file as a digital Project Record Document file.
 2. Web-Based Project Software: Prepare submittals in PDF form, and upload to web-based Project software website. Enter required data in web-based software site to fully identify submittal.
- 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 the Work are indicated on approved submittal schedule.
 3. Submit action submittals and informational submittals required by the same Specification Section as separate packages under separate transmittals.
 4. Coordinate transmittal of submittals for related parts of the Work specified in different Sections so processing will not be delayed because of need to review submittals concurrently for coordination.
 - a. COR reserves the 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 COR's receipt of submittal. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing, including resubmittals.
1. Initial Review: Allow 15 days for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required. COR will advise Contractor when a submittal being processed must be delayed for coordination.
 2. Intermediate Review: If intermediate submittal is necessary, process it in same manner as initial submittal.
 3. Resubmittal Review: Allow 15 days for review of each resubmittal.

4. Sequential Review: Where sequential review of submittals by COR's consultants, County, or other parties is indicated, allow 21 days for initial review of each submittal.
5. Concurrent Consultant Review: Where the Contract Documents indicate that submittals may be transmitted simultaneously to COR and to COR's consultants, allow 15 days for review of each submittal. Submittal will be returned to COR before being returned to Contractor.
 - a. Submit one copy of submittal to concurrent reviewer in addition to specified number of copies to COR.
- D. 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 COR's action stamp.
- E. 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.
- F. Use for Construction: Retain complete copies of submittals on Project site. Use only final action submittals that are marked with approval notation from COR's action stamp.

1.7 SUBMITTAL REQUIREMENTS

- A. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.
 1. If information must be specially prepared for submittal because standard published data are unsuitable for use, submit as Shop Drawings, not as Product Data.
 2. Mark each copy of each submittal to show which products and options are applicable.
 3. Include the following information, as applicable:
 - a. Manufacturer's catalog cuts.
 - b. Manufacturer's product specifications.
 - c. Standard color charts.
 - d. Statement of compliance with specified referenced standards.
 - e. Testing by recognized testing agency.
 - f. Application of testing agency labels and seals.
 - g. Notation of coordination requirements.
 - h. Availability and delivery time information.
 4. For equipment, include the following in addition to the above, as applicable:
 - a. Wiring diagrams that show factory-installed wiring.
 - b. Printed performance curves.
 - c. Operational range diagrams.
 - d. Clearances required to other construction, if not indicated on accompanying Shop Drawings.

5. Submit Product Data before Shop Drawings, and before or concurrent with Samples.
- B. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data.
1. Preparation: Fully illustrate requirements in the Contract Documents. Include the following information, as applicable:
 - a. Identification of products.
 - b. Schedules.
 - c. Compliance with specified standards.
 - d. Notation of coordination requirements.
 - e. Notation of dimensions established by field measurement.
 - f. Relationship and attachment to adjoining construction clearly indicated.
 - g. Seal and signature of professional engineer if specified.
 2. Paper Sheet Size: Except for templates, patterns, and similar full-size Drawings, submit Shop Drawings on sheets at least 8-1/2 by 11 inches , but no larger than 30 by 42 inches .
 - a. Three opaque copies of each submittal. COR will retain one copy; remainder will be returned.
- C. Product Schedule: As required in individual Specification Sections, prepare a written summary indicating types of products required for the Work and their intended location. Include the following information in tabular form:
1. Type of product. Include unique identifier for each product indicated in the Contract Documents or assigned by Contractor if none is indicated.
 2. Manufacturer and product name, and model number if applicable.
 3. Number and name of room or space.
 4. Location within room or space.
- D. Qualification Data: Prepare written information that demonstrates capabilities and experience of firm or person. Include lists of completed projects with project names and addresses, contact information of COR and County, and other information specified.
- E. Design Data: Prepare and submit written and graphic information indicating compliance with indicated performance and design criteria in individual Specification Sections. Include list of assumptions and summary of loads. Include load diagrams if applicable. Provide name and version of software, if any, used for calculations. Number each page of submittal.
- F. Certificates:
1. Certificates and Certifications 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. Installer Certificates: Submit written statements on manufacturer's letterhead certifying that Installer complies with requirements in the Contract Documents and, where required, is authorized by manufacturer for this specific Project.
 3. Manufacturer Certificates: Submit written statements on manufacturer's letterhead certifying that manufacturer complies with requirements in the Contract Documents. Include evidence of manufacturing experience where required.

4. Material Certificates: Submit written statements on manufacturer's letterhead certifying that material complies with requirements in the Contract Documents.
5. Product Certificates: Submit written statements on manufacturer's letterhead certifying that product complies with requirements in the Contract Documents.
6. Welding Certificates: Prepare written certification that welding procedures and personnel comply with requirements in the Contract Documents. Submit record of Welding Procedure Specification and Procedure Qualification Record on AWS forms. Include names of firms and personnel certified.

G. Test and Research Reports:

1. Compatibility Test Reports: Submit 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.
2. Field Test Reports: Submit written reports 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 in the Contract Documents.
3. Material Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements in the Contract Documents.
4. Preconstruction Test Reports: Submit 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 in the Contract Documents.
5. Product Test Reports: Submit written reports indicating that current product produced by manufacturer complies with requirements in the Contract Documents. 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.
6. Research Reports: Submit written evidence, from a model code organization acceptable to authorities having jurisdiction, that product complies with building code in effect for Project. Include the following information:
 - a. Name of evaluation organization.
 - b. Date of evaluation.
 - c. Time period when report is in effect.
 - d. Product and manufacturers' names.
 - e. Description of product.
 - f. Test procedures and results.
 - g. Limitations of use.

1.8 CONTRACTOR'S REVIEW

- A. Action Submittals and Informational Submittals: Review each submittal and check for coordination with other Work of the Contract and for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to COR.
- B. Contractor's Approval: Indicate Contractor's approval for each submittal with a uniform approval stamp. Include name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents.

1. COR will not review submittals received from Contractor that do not have Contractor's review and approval.

1.9 COR'S REVIEW

- A. Action Submittals: COR will review each submittal, indicate corrections or revisions required, and return it.
 1. PDF Submittals: COR will indicate, via markup on each submittal, the appropriate action.
 2. Paper Submittals: COR will stamp each submittal with an action stamp and will mark stamp appropriately to indicate action.
 3. Submittals by Web-Based Project Software: COR will indicate, on Project software website, the appropriate action.
- B. Informational Submittals: COR will review each submittal and will not return it, or will return it if it does not comply with requirements. COR will forward each submittal to appropriate party.
- C. Partial submittals prepared for a portion of the Work will be reviewed when use of partial submittals has received prior approval from COR.
- D. Incomplete submittals are unacceptable, will be considered nonresponsive, and will be returned for resubmittal without review.
- E. COR will return without review submittals received from sources other than Contractor.
- F. Submittals not required by the Contract Documents will be returned by COR without action.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 013300

SECTION 014000 - QUALITY REQUIREMENTS

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. Section includes administrative and procedural requirements for quality assurance and quality control.
- B. Testing and inspection services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with the Contract Document requirements.
 - 1. Specific quality-assurance and quality-control requirements for individual work results are specified in their respective Specification Sections. Requirements in individual Sections may also cover production of standard products.
 - 2. Specified tests, inspections, and related actions do not limit Contractor's other quality-assurance and quality-control procedures that facilitate compliance with the Contract Document requirements.
 - 3. Requirements for Contractor to provide quality-assurance and quality-control services required by Contracting Officer's Representative (COR), County, or authorities having jurisdiction are not limited by provisions of this Section.
 - 4. Specific test and inspection requirements are not specified in this Section.

1.3 DEFINITIONS

- A. Experienced: When used with an entity or individual, "experienced" unless otherwise further described means having successfully completed a minimum of five previous projects similar in nature, size, and extent to this Project; being familiar with special requirements indicated; and having complied with requirements of authorities having jurisdiction.
- B. Field Quality-Control Tests: Tests and inspections that are performed on-site for installation of the Work and for completed Work.
- C. Installer/Applicator/Erector: Contractor or another entity engaged by Contractor as an employee, Subcontractor, or Sub-subcontractor, to perform a particular construction operation, including installation, erection, application, assembly, and similar operations.
 - 1. Use of trade-specific terminology in referring to a trade or entity does not require that certain construction activities be performed by accredited or unionized individuals, or that requirements specified apply exclusively to specific trade(s).
- D. Preconstruction Testing: Tests and inspections performed specifically for Project before products and materials are incorporated into the Work, to verify performance or compliance with specified criteria.

- E. Product Tests: Tests and inspections that are performed by a nationally recognized testing laboratory (NRTL) according to 29 CFR 1910.7, by a testing agency accredited according to NIST's National Voluntary Laboratory Accreditation Program (NVLAP), or by a testing agency qualified to conduct product testing and acceptable to authorities having jurisdiction, to establish product performance and compliance with specified requirements.
- F. Source Quality-Control Tests: Tests and inspections that are performed at the source; for example, plant, mill, factory, or shop.
- G. Testing Agency: An entity engaged to perform specific tests, inspections, or both. Testing laboratory shall mean the same as testing agency.
- H. Quality-Assurance Services: Activities, actions, and procedures performed before and during execution of the Work to guard against defects and deficiencies and substantiate that proposed construction will comply with requirements.
- I. Quality-Control Services: Tests, inspections, procedures, and related actions during and after execution of the Work to evaluate that actual products incorporated into the Work and completed construction comply with requirements. Contractor's quality-control services do not include contract administration activities performed by COR.

1.4 CONFLICTING REQUIREMENTS

- A. Conflicting Standards and Other Requirements: If compliance with two or more standards or requirements are specified and the standards or requirements establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement. Refer conflicting requirements that are different, but apparently equal, to COR for direction before proceeding.
- B. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of requirements. Refer uncertainties to COR for a decision before proceeding.

1.5 INFORMATIONAL SUBMITTALS

- A. Contractor's Quality-Control Plan: For quality-assurance and quality-control activities and responsibilities.
- B. Qualification Data: For Contractor's quality-control personnel.
- C. Testing Agency Qualifications: For testing agencies specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include proof of qualifications in the form of a recent report on the inspection of the testing agency by a recognized authority.
- D. Schedule of Tests and Inspections: Prepare in tabular form and include the following:
 - 1. Specification Section number and title.
 - 2. Entity responsible for performing tests and inspections.
 - 3. Description of test and inspection.

4. Identification of applicable standards.
5. Identification of test and inspection methods.
6. Number of tests and inspections required.
7. Time schedule or time span for tests and inspections.
8. Requirements for obtaining samples.
9. Unique characteristics of each quality-control service.

- E. Reports: Prepare and submit certified written reports and documents as specified.
- F. Permits, Licenses, and Certificates: For County's record, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, correspondence, records, and similar documents established for compliance with standards and regulations bearing on performance of the Work.

1.6 CONTRACTOR'S QUALITY-CONTROL PLAN

- A. Quality-Control Plan, General: Submit quality-control plan within 10 days of Notice to Proceed, and not less than five days prior to preconstruction conference. Submit in format acceptable to COR. Identify personnel, procedures, controls, instructions, tests, records, and forms to be used to carry out Contractor's quality-assurance and quality-control responsibilities. Coordinate with Contractor's Construction Schedule.
- B. Quality-Control Personnel Qualifications: Engage qualified personnel trained and experienced in managing and executing quality-assurance and quality-control procedures similar in nature and extent to those required for Project.
1. Project quality-control manager may also serve as Project superintendent.
- C. Submittal Procedure: Describe procedures for ensuring compliance with requirements through review and management of submittal process. Indicate qualifications of personnel responsible for submittal review.
- D. Testing and Inspection: In quality-control plan, include a comprehensive schedule of Work requiring testing or inspection, including the following:
1. Contractor-performed tests and inspections including Subcontractor-performed tests and inspections. Include required tests and inspections and Contractor-elected tests and inspections. Distinguish source quality-control tests and inspections from field quality-control tests and inspections.
 2. Special inspections required by authorities having jurisdiction and indicated on the Statement of Special Inspections.
 3. County-performed tests and inspections indicated in the Contract Documents, including tests and inspections indicated to be performed by Commissioning Authority.
- E. Continuous Inspection of Workmanship: Describe process for continuous inspection during construction to identify and correct deficiencies in workmanship in addition to testing and inspection specified. Indicate types of corrective actions to be required to bring work into compliance with standards of workmanship established by Contract requirements.
- F. Monitoring and Documentation: Maintain testing and inspection reports including log of approved and rejected results. Include work COR has indicated as nonconforming or defective. Indicate corrective actions taken to bring nonconforming work into compliance with requirements. Comply with requirements of authorities having jurisdiction.

1.7 REPORTS AND DOCUMENTS

- A. Test and Inspection Reports: Prepare and submit certified written reports specified in other Sections. Include the following:
1. Date of issue.
 2. Project title and number.
 3. Name, address, telephone number, and email address of testing agency.
 4. Dates and locations of samples and tests or inspections.
 5. Names of individuals making tests and inspections.
 6. Description of the Work and test and inspection method.
 7. Identification of product and Specification Section.
 8. Complete test or inspection data.
 9. Test and inspection results and an interpretation of test results.
 10. Record of temperature and weather conditions at time of sample taking and testing and inspection.
 11. Comments or professional opinion on whether tested or inspected Work complies with the Contract Document requirements.
 12. Name and signature of laboratory inspector.
 13. Recommendations on retesting and reinspecting.
- B. Manufacturer's Technical Representative's Field Reports: Prepare written information documenting manufacturer's technical representative's tests and inspections specified in other Sections. Include the following:
1. Name, address, telephone number, and email address of technical 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.
- C. Factory-Authorized Service Representative's Reports: Prepare written information documenting manufacturer's factory-authorized service representative's tests and inspections specified in other Sections. Include the following:
1. Name, address, telephone number, and email address of factory-authorized service representative making report.
 2. Statement that equipment complies with requirements.
 3. Results of operational and other tests and a statement of whether observed performance complies with requirements.
 4. Statement whether conditions, products, and installation will affect warranty.
 5. Other required items indicated in individual Specification Sections.

1.8 QUALITY ASSURANCE

- A. General: Qualifications paragraphs in this article establish the minimum qualification levels required; individual Specification Sections specify additional requirements.

- B. Manufacturer Qualifications: A firm experienced in manufacturing products or systems similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units. As applicable, procure products from manufacturers able to meet qualification requirements, warranty requirements, and technical or factory-authorized service representative requirements.
- C. Fabricator Qualifications: A firm experienced in producing products similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.
- D. Installer Qualifications: A firm or individual experienced in installing, erecting, applying, or assembling work similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful in-service performance.
- E. Specialists: Certain Specification Sections require that specific construction activities shall be performed by entities who are recognized experts in those operations. Specialists shall satisfy qualification requirements indicated and shall be engaged for the activities indicated.
 - 1. Requirements of authorities having jurisdiction shall supersede requirements for specialists.
- F. Testing Agency Qualifications: An NRTL, an NVLAP, or an independent agency with the experience and capability to conduct testing and inspection indicated, as documented according to ASTM E 329; and with additional qualifications specified in individual Sections; and, where required by authorities having jurisdiction, that is acceptable to authorities.
- G. Manufacturer's Technical Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to observe and inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.
- H. Factory-Authorized Service Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.
- I. Preconstruction Testing: Where testing agency is indicated to perform preconstruction testing for compliance with specified requirements for performance and test methods, comply with the following:
 - 1. Contractor responsibilities include the following:
 - a. Provide test specimens representative of proposed products and construction.
 - b. Submit specimens in a timely manner with sufficient time for testing and analyzing results to prevent delaying the Work.
 - c. Provide sizes and configurations of test assemblies to adequately demonstrate capability of products to comply with performance requirements.
 - d. Build site-assembled test assemblies using installers who will perform same tasks for Project.
 - e. When testing is complete, remove test specimens and test assemblies; do not reuse products on Project.

2. Testing Agency Responsibilities: Submit a certified written report of each test, inspection, and similar quality-assurance service to COR and Commissioning Authority, with copy to Contractor. Interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from the Contract Documents.

1.9 QUALITY CONTROL

- A. County Responsibilities: Where quality-control services are indicated as County's responsibility, County will engage a qualified testing agency to perform these services.
 1. County will furnish Contractor with names, addresses, and telephone numbers of testing agencies engaged and a description of types of testing and inspection they are engaged to perform.
 2. Payment for these services will be made from testing and inspection allowances, as authorized by Change Orders.
 3. Costs for retesting and reinspecting construction that replaces or is necessitated by work that failed to comply with the Contract Documents will be charged to Contractor.
- B. Contractor Responsibilities: Tests and inspections not explicitly assigned to County are Contractor's responsibility. Perform additional quality-control activities, whether specified or not, to verify and document that the Work complies with requirements.
 1. Unless otherwise indicated, provide quality-control services specified and those required by authorities having jurisdiction. Perform quality-control services required of Contractor by authorities having jurisdiction, whether specified or not.
 2. Engage a qualified testing agency to perform quality-control services.
 - a. Contractor shall not employ same entity engaged by County, unless agreed to in writing by County.
 3. Notify testing agencies at least 24 hours in advance of time when Work that requires testing or inspection will be performed.
 4. Where quality-control services are indicated as Contractor's responsibility, submit a certified written report, in duplicate, of each quality-control service.
 5. Testing and inspection requested by Contractor and not required by the Contract Documents are Contractor's responsibility.
 6. Submit additional copies of each written report directly to authorities having jurisdiction, when they so direct.
- C. Retesting/Reinspecting: Regardless of whether original tests or inspections were Contractor's responsibility, provide quality-control services, including retesting and reinspecting, for construction that replaced Work that failed to comply with the Contract Documents.
- D. Testing Agency Responsibilities: Cooperate with COR, and Contractor in performance of duties. Provide qualified personnel to perform required tests and inspections.
 1. Notify COR, and Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.
 2. Determine the locations from which test samples will be taken and in which in-situ tests are conducted.
 3. Conduct and interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from requirements.

4. Submit a certified written report, in duplicate, of each test, inspection, and similar quality-control service through Contractor.
 5. Do not release, revoke, alter, or increase the Contract Document requirements or approve or accept any portion of the Work.
 6. Do not perform duties of Contractor.
- E. Manufacturer's Field Services: Where indicated, engage a factory-authorized service representative to inspect field-assembled components and equipment installation, including service connections. Report results in writing as specified in Section 013300 "Submittal Procedures."
- F. Manufacturer's Technical Services: Where indicated, engage a manufacturer's technical representative to observe and inspect the Work. Manufacturer's technical representative's services include participation in preinstallation conferences, examination of substrates and conditions, verification of materials, observation of Installer activities, inspection of completed portions of the Work, and submittal of written reports.
- G. Associated Contractor Services: Cooperate with agencies and representatives performing required tests, inspections, and similar quality-control services, and provide reasonable auxiliary services as requested. Notify agency sufficiently in advance of operations to permit assignment of personnel. Provide the following:
1. Access to the Work.
 2. Incidental labor and facilities necessary to facilitate tests and inspections.
 3. Adequate quantities of representative samples of materials that require testing and inspection. Assist agency in obtaining samples.
 4. Facilities for storage and field curing of test samples.
 5. Delivery of samples to testing agencies.
 6. Preliminary design mix proposed for use for material mixes that require control by testing agency.
 7. Security and protection for samples and for testing and inspection equipment at Project site.
- H. Coordination: Coordinate sequence of activities to accommodate required quality-assurance and quality-control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspection.
1. Schedule times for tests, inspections, obtaining samples, and similar activities.
- I. Schedule of Tests and Inspections: Prepare a schedule of tests, inspections, and similar quality-control services required by the Contract Documents as a component of Contractor's quality-control plan. Coordinate and submit concurrently with Contractor's Construction Schedule. Update as the Work progresses.
1. Distribution: Distribute schedule to County, COR, testing agencies, and each party involved in performance of portions of the Work where tests and inspections are required.
- 1.10 SPECIAL TESTS AND INSPECTIONS
- A. Special Tests and Inspections: Conducted by a qualified testing agency as required by authorities having jurisdiction, as indicated in individual Specification Sections, and as follows:

1. Verifying that manufacturer maintains detailed fabrication and quality-control procedures and reviewing the completeness and adequacy of those procedures to perform the Work.
2. Notifying COR, and Contractor promptly of irregularities and deficiencies observed in the Work during performance of its services.
3. Submitting a certified written report of each test, inspection, and similar quality-control service to COR with copy to Contractor and to authorities having jurisdiction.
4. Submitting a final report of special tests and inspections at Substantial Completion, which includes a list of unresolved deficiencies.
5. Interpreting tests and inspections and stating in each report whether tested and inspected work complies with or deviates from the Contract Documents.
6. Retesting and reinspecting corrected work.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 TEST AND INSPECTION LOG

- A. Test and Inspection Log: Prepare a record of tests and inspections. Include the following:
1. Date test or inspection was conducted.
 2. Description of the Work tested or inspected.
 3. Date test or inspection results were transmitted to COR.
 4. Identification of testing agency or special inspector conducting test or inspection.
- B. Maintain log at Project site. Post changes and revisions as they occur. Provide access to test and inspection log for COR's, reference during normal working hours.
1. Submit log at Project closeout as part of Project Record Documents.

3.2 REPAIR AND PROTECTION

- A. General: On completion of testing, inspection, sample taking, and similar services, repair damaged construction and restore substrates and finishes.
1. Provide materials and comply with installation requirements specified in other Specification Sections or matching existing substrates and finishes. Restore patched areas and extend restoration into adjoining areas with durable seams that are as invisible as possible. Comply with the Contract Document requirements for cutting and patching in Section 017300 "Execution."
- B. Protect construction exposed by or for quality-control service activities.
- C. Repair and protection are Contractor's responsibility, regardless of the assignment of responsibility for quality-control services.

END OF SECTION 014000

SECTION 014200 - REFERENCES

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 DEFINITIONS

- A. General: Basic Contract definitions are included in the Conditions of the Contract.
- B. "Approved": When used to convey Contracting Officer's Representative's (COR) action on Contractor's submittals, applications, and requests, "approved" is limited to COR's duties and responsibilities as stated in the Conditions of the Contract.
- C. "Directed": A command or instruction by COR. Other terms including "requested," "authorized," "selected," "required," and "permitted" have the 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 the same meaning as "indicated."
- E. "Regulations": Laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, and rules, conventions, and agreements within the construction industry that control performance of the Work.
- F. "Furnish": Supply and deliver to Project site, ready for unloading, unpacking, assembly, installation, and similar operations.
- G. "Install": Unload, temporarily store, unpack, assemble, erect, place, anchor, apply, work to dimension, finish, cure, protect, clean, and similar operations at Project site.
- H. "Provide": Furnish and install, complete and ready for the intended use.
- I. "Project Site": Space available for performing construction activities. The extent of Project site is shown on Drawings and may or may not be identical with the description of the land on which Project is to be built.

1.3 INDUSTRY STANDARDS

- A. Applicability of Standards: Unless the Contract Documents include more stringent requirements, applicable construction industry standards have the same force and effect as if bound or copied directly into the Contract Documents to the extent referenced. Such standards are made a part of the Contract Documents by reference.
- B. Publication Dates: Comply with standards in effect as of date of the 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 the Contract Documents.
1. Where copies of standards are needed to perform a required construction activity, obtain copies directly from publication source.

1.4 ABBREVIATIONS AND ACRONYMS

- A. Industry Organizations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities indicated in Gale's "Encyclopedia of Associations: National Organizations of the U.S." or in Columbia Books' "National Trade & Professional Associations of the United States."
- B. Industry Organizations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. This information is subject to change and is believed to be accurate as of the date of the Contract Documents.
1. AABC - Associated Air Balance Council; www.aabc.com.
 2. AAMA - American Architectural Manufacturers Association; www.aamanet.org.
 3. AAPFCO - Association of American Plant Food Control Officials; www.aapfco.org.
 4. AASHTO - American Association of State Highway and Transportation Officials; www.transportation.org.
 5. AATCC - American Association of Textile Chemists and Colorists; www.aatcc.org.
 6. ABMA - American Bearing Manufacturers Association; www.americanbearings.org.
 7. ABMA - American Boiler Manufacturers Association; www.abma.com.
 8. ACI - American Concrete Institute; (Formerly: ACI International); www.abma.com.
 9. ACPA - American Concrete Pipe Association; www.concrete-pipe.org.
 10. AEIC - Association of Edison Illuminating Companies, Inc. (The); www.aeic.org.
 11. AF&PA - American Forest & Paper Association; www.afandpa.org.
 12. AGA - American Gas Association; www.aga.org.
 13. AHAM - Association of Home Appliance Manufacturers; www.aham.org.
 14. AHRI - Air-Conditioning, Heating, and Refrigeration Institute (The); www.ahrinet.org.
 15. AI - Asphalt Institute; www.asphaltinstitute.org.
 16. AIA - American Institute of Architects (The); www.aia.org.
 17. AISC - American Institute of Steel Construction; www.aisc.org.
 18. AISI - American Iron and Steel Institute; www.steel.org.
 19. AITC - American Institute of Timber Construction; www.aitc-glulam.org.
 20. AMCA - Air Movement and Control Association International, Inc.; www.amca.org.
 21. ANSI - American National Standards Institute; www.ansi.org.
 22. AOSA - Association of Official Seed Analysts, Inc.; www.aosaseed.com.
 23. APA - APA - The Engineered Wood Association; www.apawood.org.
 24. APA - Architectural Precast Association; www.archprecast.org.
 25. API - American Petroleum Institute; www.api.org.
 26. ARI - Air-Conditioning & Refrigeration Institute; (See AHRI).
 27. ARI - American Refrigeration Institute; (See AHRI).
 28. ARMA - Asphalt Roofing Manufacturers Association; www.asphaltroofing.org.
 29. ASCE - American Society of Civil Engineers; www.asce.org.
 30. ASCE/SEI - American Society of Civil Engineers/Structural Engineering Institute; (See ASCE).
 31. ASHRAE - American Society of Heating, Refrigerating and Air-Conditioning Engineers; www.ashrae.org.

32. ASME - ASME International; (American Society of Mechanical Engineers); www.asme.org.
33. ASSE - American Society of Safety Engineers (The); www.asse.org.
34. ASSE - American Society of Sanitary Engineering; www.asse-plumbing.org.
35. ASTM - ASTM International; www.astm.org.
36. ATIS - Alliance for Telecommunications Industry Solutions; www.atis.org.
37. AWEA - American Wind Energy Association; www.awea.org.
38. AWI - Architectural Woodwork Institute; www.awinet.org.
39. AWMAC - Architectural Woodwork Manufacturers Association of Canada; www.awmac.com.
40. AWWA - American Water Works Association; www.awwa.org.
41. AWS - American Welding Society; www.aws.org.
42. AWWA - American Water Works Association; www.awwa.org.
43. BHMA - Builders Hardware Manufacturers Association; www.buildershardware.com.
44. BIA - Brick Industry Association (The); www.gobrick.com.
45. BICSI - BICSI, Inc.; www.bicsi.org.
46. BIFMA - BIFMA International; (Business and Institutional Furniture Manufacturer's Association); www.bifma.org.
47. BISSC - Baking Industry Sanitation Standards Committee; www.bissc.org.
48. BWF - Badminton World Federation; (Formerly: International Badminton Federation); www.bissc.org.
49. CDA - Copper Development Association; www.copper.org.
50. CEA - Canadian Electricity Association; www.electricity.ca.
51. CEA - Consumer Electronics Association; www.ce.org.
52. CFFA - Chemical Fabrics and Film Association, Inc.; www.chemicalfabricsandfilm.com.
53. CFSEI - Cold-Formed Steel Engineers Institute; www.cfsei.org.
54. CGA - Compressed Gas Association; www.cganet.com.
55. CIMA - Cellulose Insulation Manufacturers Association; www.cellulose.org.
56. CISCA - Ceilings & Interior Systems Construction Association; www.cisca.org.
57. CISPI - Cast Iron Soil Pipe Institute; www.cispi.org.
58. CLFMI - Chain Link Fence Manufacturers Institute; www.chainlinkinfo.org.
59. CPA - Composite Panel Association; www.pbmdf.com.
60. CRI - Carpet and Rug Institute (The); www.carpet-rug.org.
61. CRRC - Cool Roof Rating Council; www.coolroofs.org.
62. CRSI - Concrete Reinforcing Steel Institute; www.crsi.org.
63. CSA - Canadian Standards Association; www.csa.ca.
64. CSA - CSA International; (Formerly: IAS - International Approval Services); www.csa-international.org.
65. CSI - Construction Specifications Institute (The); www.csinet.org.
66. CSSB - Cedar Shake & Shingle Bureau; www.cedarbureau.org.
67. CTI - Cooling Technology Institute; (Formerly: Cooling Tower Institute); www.cti.org.
68. CWC - Composite Wood Council; (See CPA).
69. DASMA - Door and Access Systems Manufacturers Association; www.dasma.com.
70. DHI - Door and Hardware Institute; www.dhi.org.
71. ECA - Electronic Components Association; (See ECIA).
72. ECAMA - Electronic Components Assemblies & Materials Association; (See ECIA).
73. ECIA - Electronic Components Industry Association; www.eciaonline.org.
74. EIA - Electronic Industries Alliance; (See TIA).
75. EIMA - EIFS Industry Members Association; www.eima.com.
76. EJMA - Expansion Joint Manufacturers Association, Inc.; www.ejma.org.
77. ESD - ESD Association; (Electrostatic Discharge Association); www.esda.org.
78. ESTA - Entertainment Services and Technology Association; (See PLASA).
79. EVO - Efficiency Valuation Organization; www.evo-world.org.
80. FCI - Fluid Controls Institute; www.fluidcontrolsintstitute.org.

81. FIBA - Federation Internationale de Basketball; (The International Basketball Federation); www.fiba.com.
82. FIVB - Federation Internationale de Volleyball; (The International Volleyball Federation); www.fivb.org.
83. FM Approvals - FM Approvals LLC; www.fmglobal.com.
84. FM Global - FM Global; (Formerly: FMG - FM Global); www.fmglobal.com.
85. FRSA - Florida Roofing, Sheet Metal & Air Conditioning Contractors Association, Inc.; www.floridarooft.com.
86. FSA - Fluid Sealing Association; www.fluidsealing.com.
87. FSC - Forest Stewardship Council U.S.; www.fscus.org.
88. GA - Gypsum Association; www.gypsum.org.
89. GANA - Glass Association of North America; www.glasswebsite.com.
90. GS - Green Seal; www.greenseal.org.
91. HI - Hydraulic Institute; www.pumps.org.
92. HI/GAMA - Hydronics Institute/Gas Appliance Manufacturers Association; (See AHRI).
93. HMMA - Hollow Metal Manufacturers Association; (See NAAMM).
94. HPVA - Hardwood Plywood & Veneer Association; www.hpva.org.
95. HPW - H. P. White Laboratory, Inc.; www.hpwhite.com.
96. IAPSC - International Association of Professional Security Consultants; www.iapsc.org.
97. IAS - International Accreditation Service; www.iasonline.org.
98. IAS - International Approval Services; (See CSA).
99. ICBO - International Conference of Building Officials; (See ICC).
100. ICC - International Code Council; www.iccsafe.org.
101. ICEA - Insulated Cable Engineers Association, Inc.; www.icea.net.
102. ICPA - International Cast Polymer Alliance; www.icpa-hq.org.
103. ICRI - International Concrete Repair Institute, Inc.; www.icri.org.
104. IEC - International Electrotechnical Commission; <http://www.iec.ch>.
105. IEEE - Institute of Electrical and Electronics Engineers, Inc. (The); www.ieee.org.
106. IES - Illuminating Engineering Society; (Formerly: Illuminating Engineering Society of North America); www.ies.org.
107. IESNA - Illuminating Engineering Society of North America; (See IES).
108. IEST - Institute of Environmental Sciences and Technology; www.iest.org.
109. IGMA - Insulating Glass Manufacturers Alliance; www.igmaonline.org.
110. IGSHPA - International Ground Source Heat Pump Association; www.igshpa.okstate.edu.
111. ILI - Indiana Limestone Institute of America, Inc.; www.iliai.com.
112. Intertek - Intertek Group; (Formerly: ETL SEMCO; Intertek Testing Service NA); www.intertek.com.
113. ISA - International Society of Automation (The); (Formerly: Instrumentation, Systems, and Automation Society); www.isa.org.
114. ISAS - Instrumentation, Systems, and Automation Society (The); (See ISA).
115. ISFA - International Surface Fabricators Association; (Formerly: International Solid Surface Fabricators Association); www.isfanow.org.
116. ISO - International Organization for Standardization; www.iso.org.
117. ISSFA - International Solid Surface Fabricators Association; (See ISFA).
118. ITU - International Telecommunication Union; www.itu.int/home.
119. KCMA - Kitchen Cabinet Manufacturers Association; www.kcma.org.
120. LMA - Laminating Materials Association; (See CPA).
121. LPI - Lightning Protection Institute; www.lightning.org.
122. MBMA - Metal Building Manufacturers Association; www.mbma.com.
123. MCA - Metal Construction Association; www.metalconstruction.org.
124. MFMA - Maple Flooring Manufacturers Association, Inc.; www.maplefloor.org.
125. MFMA - Metal Framing Manufacturers Association, Inc.; www.metalframingmfg.org.
126. MHIA - Material Handling Industry of America; www.mhia.org.
127. MIA - Marble Institute of America; www.marble-institute.com.
128. MMPA - Moulding & Millwork Producers Association; www.wmmpa.com.

129. MPI - Master Painters Institute; www.paintinfo.com.
130. MSS - Manufacturers Standardization Society of The Valve and Fittings Industry Inc.; www.mss-hq.org.
131. NAAMM - National Association of Architectural Metal Manufacturers; www.naamm.org.
132. NACE - NACE International; (National Association of Corrosion Engineers International); www.nace.org.
133. NADCA - National Air Duct Cleaners Association; www.nadca.com.
134. NAIMA - North American Insulation Manufacturers Association; www.naima.org.
135. NBGQA - National Building Granite Quarries Association, Inc.; www.nbgqa.com.
136. NBI - New Buildings Institute; www.newbuildings.org.
137. NCAA - National Collegiate Athletic Association (The); www.ncaa.org.
138. NCMA - National Concrete Masonry Association; www.ncma.org.
139. NEBB - National Environmental Balancing Bureau; www.nebb.org.
140. NECA - National Electrical Contractors Association; www.necanet.org.
141. NeLMA - Northeastern Lumber Manufacturers Association; www.nelma.org.
142. NEMA - National Electrical Manufacturers Association; www.nema.org.
143. NETA - InterNational Electrical Testing Association; www.netaworld.org.
144. NFHS - National Federation of State High School Associations; www.nfhs.org.
145. NFPA - National Fire Protection Association; www.nfpa.org.
146. NFPA - NFPA International; (See NFPA).
147. NFRC - National Fenestration Rating Council; www.nfrc.org.
148. NHLA - National Hardwood Lumber Association; www.nhla.com.
149. NLGA - National Lumber Grades Authority; www.nlga.org.
150. NOFMA - National Oak Flooring Manufacturers Association; (See NWFA).
151. NOMMA - National Ornamental & Miscellaneous Metals Association; www.nomma.org.
152. NRCA - National Roofing Contractors Association; www.nrca.net.
153. NRMCA - National Ready Mixed Concrete Association; www.nrmca.org.
154. NSF - NSF International; www.nsf.org.
155. NSPE - National Society of Professional Engineers; www.nspe.org.
156. NSSGA - National Stone, Sand & Gravel Association; www.nssga.org.
157. NTMA - National Terrazzo & Mosaic Association, Inc. (The); www.ntma.com.
158. NWFA - National Wood Flooring Association; www.nwfa.org.
159. PCI - Precast/Prestressed Concrete Institute; www.pci.org.
160. PDI - Plumbing & Drainage Institute; www.pdionline.org.
161. PLASA - PLASA; (Formerly: ESTA - Entertainment Services and Technology Association); www.plasa.org.
162. RCSC - Research Council on Structural Connections; www.boltcouncil.org.
163. RFCI - Resilient Floor Covering Institute; www.rfci.com.
164. RIS - Redwood Inspection Service; www.redwoodinspection.com.
165. SAE - SAE International; www.sae.org.
166. SCTE - Society of Cable Telecommunications Engineers; www.scte.org.
167. SDI - Steel Deck Institute; www.sdi.org.
168. SDI - Steel Door Institute; www.steeldoor.org.
169. SEFA - Scientific Equipment and Furniture Association (The); www.sefalabs.com.
170. SEI/ASCE - Structural Engineering Institute/American Society of Civil Engineers; (See ASCE).
171. SIA - Security Industry Association; www.siaonline.org.
172. SJI - Steel Joist Institute; www.steeljoist.org.
173. SMA - Screen Manufacturers Association; www.smainfo.org.
174. SMACNA - Sheet Metal and Air Conditioning Contractors' National Association; www.smacna.org.
175. SMPTE - Society of Motion Picture and Television Engineers; www.smpte.org.
176. SPFA - Spray Polyurethane Foam Alliance; www.sprayfoam.org.
177. SPIB - Southern Pine Inspection Bureau; www.spib.org.
178. SPRI - Single Ply Roofing Industry; www.spri.org.

179. SRCC - Solar Rating & Certification Corporation; www.solar-rating.org.
 180. SSINA - Specialty Steel Industry of North America; www.ssina.com.
 181. SSPC - SSPC: The Society for Protective Coatings; www.sspc.org.
 182. STI - Steel Tank Institute; www.steeltank.com.
 183. SWI - Steel Window Institute; www.steelwindows.com.
 184. SWPA - Submersible Wastewater Pump Association; www.swpa.org.
 185. TCA - Tilt-Up Concrete Association; www.tilt-up.org.
 186. TCNA - Tile Council of North America, Inc.; www.tileusa.com.
 187. TEMA - Tubular Exchanger Manufacturers Association, Inc.; www.tema.org.
 188. TIA - Telecommunications Industry Association (The); (Formerly: TIA/EIA - Telecommunications Industry Association/Electronic Industries Alliance); www.tiaonline.org.
 189. TIA/EIA - Telecommunications Industry Association/Electronic Industries Alliance; (See TIA).
 190. TMS - The Masonry Society; www.masonrysociety.org.
 191. TPI - Truss Plate Institute; www.tpinst.org.
 192. TPI - Turfgrass Producers International; www.turfgrasssod.org.
 193. TRI - Tile Roofing Institute; www.tilerroofing.org.
 194. UL - Underwriters Laboratories Inc.; www.ul.com.
 195. UNI - Uni-Bell PVC Pipe Association; www.uni-bell.org.
 196. USAV - USA Volleyball; www.usavolleyball.org.
 197. USGBC - U.S. Green Building Council; www.usgbc.org.
 198. USITT - United States Institute for Theatre Technology, Inc.; www.usitt.org.
 199. WASTEC - Waste Equipment Technology Association; www.wastec.org.
 200. WCLIB - West Coast Lumber Inspection Bureau; www.wclib.org.
 201. WCMA - Window Covering Manufacturers Association; www.wcmanet.org.
 202. WDMA - Window & Door Manufacturers Association; www.wdma.com.
 203. WI - Woodwork Institute; www.wicnet.org.
 204. WSRCA - Western States Roofing Contractors Association; www.wsrca.com.
 205. WWPA - Western Wood Products Association; www.wwpa.org.
- C. Code Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. This information is believed to be accurate as of the date of the Contract Documents.
1. DIN - Deutsches Institut für Normung e.V.; www.din.de.
 2. IAPMO - International Association of Plumbing and Mechanical Officials; www.iapmo.org.
 3. ICC - International Code Council; www.iccsafe.org.
 4. ICC-ES - ICC Evaluation Service, LLC; www.icc-es.org.
- D. Federal Government Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. Information is subject to change and is up to date as of the date of the Contract Documents.
1. COE - Army Corps of Engineers; www.usace.army.mil.
 2. CPSC - Consumer Product Safety Commission; www.cpsc.gov.
 3. DOC - Department of Commerce; National Institute of Standards and Technology; www.nist.gov.
 4. DOD - Department of Defense; www.quicksearch.dla.mil.
 5. DOE - Department of Energy; www.energy.gov.
 6. EPA - Environmental Protection Agency; www.epa.gov.
 7. FAA - Federal Aviation Administration; www.faa.gov.
 8. FG - Federal Government Publications; www.gpo.gov/fdsys.
 9. GSA - General Services Administration; www.gsa.gov.

10. HUD - Department of Housing and Urban Development; www.hud.gov.
 11. LBL - Lawrence Berkeley National Laboratory; Environmental Energy Technologies Division; www.eetd.lbl.gov.
 12. OSHA - Occupational Safety & Health Administration; www.osha.gov.
 13. SD - Department of State; www.state.gov.
 14. TRB - Transportation Research Board; National Cooperative Highway Research Program; The National Academies; www.trb.org.
 15. USDA - Department of Agriculture; Agriculture Research Service; U.S. Salinity Laboratory; www.ars.usda.gov.
 16. USDA - Department of Agriculture; Rural Utilities Service; www.usda.gov.
 17. USDOJ - Department of Justice; Office of Justice Programs; National Institute of Justice; www.ojp.usdoj.gov.
 18. USP - U.S. Pharmacopeial Convention; www.usp.org.
 19. USPS - United States Postal Service; www.usps.com.
- E. Standards and Regulations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the standards and regulations in the following list. This information is subject to change and is believed to be accurate as of the date of the Contract Documents.
1. CFR - Code of Federal Regulations; Available from Government Printing Office; www.gpo.gov/fdsys.
 2. DOD - Department of Defense; Military Specifications and Standards; Available from DLA Document Services; www.quicksearch.dla.mil.
 3. DSCC - Defense Supply Center Columbus; (See FS).
 4. FED-STD - Federal Standard; (See FS).
 5. FS - Federal Specification; Available from DLA Document Services; www.quicksearch.dla.mil.
 - a. Available from Defense Standardization Program; www.dsp.dla.mil.
 - b. Available from General Services Administration; www.gsa.gov.
 - c. Available from National Institute of Building Sciences/Whole Building Design Guide; www.wbdg.org/ccb.
 6. MILSPEC - Military Specification and Standards; (See DOD).
 7. USAB - United States Access Board; www.access-board.gov.
 8. USATBCB - U.S. Architectural & Transportation Barriers Compliance Board; (See USAB).
- F. State Government Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. This information is subject to change and is believed to be accurate as of the date of the Contract Documents.
1. CBHF; State of California; Department of Consumer Affairs; Bureau of Electronic and Appliance Repair, Home Furnishings and Thermal Insulation; www.bearhfti.ca.gov.
 2. CCR; California Code of Regulations; Office of Administrative Law; California Title 24 Energy Code; www.calregs.com.
 3. CDHS; California Department of Health Services; (See CDPH).
 4. CDPH; California Department of Public Health; Indoor Air Quality Program; www.cal-iaq.org.
 5. CPUC; California Public Utilities Commission; www.cpuc.ca.gov.
 6. SCAQMD; South Coast Air Quality Management District; www.aqmd.gov.
 7. TFS; Texas A&M Forest Service; Sustainable Forestry and Economic Development; www.txforestservation.tamu.edu.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 014200

SECTION 015000 - TEMPORARY FACILITIES AND CONTROLS

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. Section includes requirements for temporary utilities, support facilities, and security and protection facilities.
- B. Related Requirements:
 - 1. Section 011000 "Summary" for work restrictions and limitations on utility interruptions.

1.3 USE CHARGES

- A. General: Installation and removal of and use charges for temporary facilities shall be included in the Contract Sum unless otherwise indicated. Allow other entities engaged in the Project to use temporary services and facilities without cost, including, but not limited to, Contracting Officer's Representative (COR), testing agencies, and authorities having jurisdiction.
- B. Water and Sewer Service from Existing System: Water from County'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 County'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 SUBMITTALS

- A. Site Utilization Plan: Show temporary facilities, temporary utility lines and connections, staging areas, construction site entrances, vehicle circulation, and parking areas for construction personnel.
- B. Implementation and Termination Schedule: Within 15 days of date established for commencement of the Work, submit schedule indicating implementation and termination dates of each temporary utility.
- C. Project Identification and Temporary Signs: Show fabrication and installation details, including plans, elevations, details, layouts, typestyles, graphic elements, and message content.
- D. Fire-Safety Program: Show compliance with requirements of NFPA 241 and authorities having jurisdiction. Indicate Contractor personnel responsible for management of fire-prevention program.

- E. Moisture- and Mold-Protection Plan: Describe procedures and controls for protecting materials and construction from water absorption and damage and mold.
- F. Dust- and HVAC-Control Plan: Submit coordination drawing and narrative that indicates the dust- and HVAC-control measures proposed for use, proposed locations, and proposed time frame for their operation. Include the following:
 - 1. Locations of dust-control partitions at each phase of work.
 - 2. HVAC system isolation schematic drawing.
 - 3. Location of proposed air-filtration system discharge.
 - 4. Waste-handling procedures.
 - 5. Other dust-control measures.

1.5 QUALITY ASSURANCE

- A. Electric Service: Comply with NECA, NEMA, and UL standards and regulations for temporary electric service. Install service to comply with NFPA 70.
- B. Tests and Inspections: Arrange for authorities having jurisdiction to test and inspect each temporary utility before use. Obtain required certifications and permits.
- C. Accessible Temporary Egress: Comply with applicable provisions in the United States Access Board's ADA-ABA Accessibility Guidelines.

1.6 PROJECT CONDITIONS

- A. Temporary Use of Permanent Facilities: Engage Installer of each permanent service to assume responsibility for operation, maintenance, and protection of each permanent service during its use as a construction facility before County's acceptance, regardless of previously assigned responsibilities.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Chain-Link Fencing: Minimum 2-inch , 0.148-inch- thick, galvanized-steel, chain-link fabric fencing; minimum 6 feet high with galvanized-steel pipe posts; minimum 2-3/8-inch- OD line posts and 2-7/8-inch- OD corner and pull posts, with 1-5/8-inch- OD top rails.
- B. Portable Chain-Link Fencing: Minimum 2-inch , 0.148-inch- thick, galvanized-steel, chain-link fabric fencing; minimum 6 feet high with galvanized-steel pipe posts; minimum 2-3/8-inch- OD line posts and 2-7/8-inch- OD corner and pull posts, with 1-5/8-inch- OD top and bottom rails. Provide galvanized-steel bases for supporting posts.
- C. Polyethylene Sheet: Reinforced, fire-resistive sheet, 10-mil minimum thickness, with flame-spread rating of 15 or less per ASTM E 84 and passing NFPA 701 Test Method 2.
- D. Dust-Control Adhesive-Surface Walk-Off Mats: Provide mats minimum 36 by 60 inches .

- E. Insulation: Unfaced mineral-fiber blanket, manufactured from glass, slag wool, or rock wool; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively.

2.2 TEMPORARY FACILITIES

- A. Field Offices, General: Prefabricated or mobile units with serviceable finishes, temperature controls, and foundations adequate for normal loading.

2.3 EQUIPMENT

- A. Fire Extinguishers: Portable, UL rated; with class and extinguishing agent as required by locations and classes of fire exposures.
- B. HVAC Equipment: Unless County authorizes use of permanent HVAC system, provide vented, self-contained, liquid-propane-gas or fuel-oil heaters with individual space thermostatic control.
 - 1. Use of gasoline-burning space heaters, open-flame heaters, or salamander-type heating units is prohibited.
- C. Air-Filtration Units: Primary and secondary HEPA-filter-equipped portable units with four-stage filtration. Provide single switch for emergency shutoff. Configure to run continuously.

PART 3 - EXECUTION

3.1 TEMPORARY FACILITIES, GENERAL

- A. Conservation: Coordinate construction and use of temporary facilities with consideration given to conservation of energy, water, and materials. Coordinate use of temporary utilities to minimize waste.
 - 1. Salvage materials and equipment involved in performance of, but not actually incorporated into, the Work. See other Sections for disposition of salvaged materials that are designated as County's property.

3.2 INSTALLATION, GENERAL

- A. Locate facilities where they will serve Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required by progress of the Work.
 - 1. Locate facilities to limit site disturbance as specified in Section 011000 "Summary."
- 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.

3.3 TEMPORARY UTILITY INSTALLATION

- A. General: Install temporary service or connect to existing service.

1. Arrange with utility company, County, and existing users for time when service can be interrupted, if necessary, to make connections for temporary services.
- B. Sewers and Drainage: Provide temporary utilities to remove effluent lawfully.
 1. Connect temporary sewers to municipal system as directed by authorities having jurisdiction.
- C. Sanitary Facilities: Provide temporary toilets, wash facilities, and drinking water for use of construction personnel. Comply with requirements of authorities having jurisdiction for type, number, location, operation, and maintenance of fixtures and facilities.
 1. Toilets: Use of County's existing toilet facilities will be permitted, as long as facilities are cleaned and maintained in a condition acceptable to County. At Substantial Completion, restore these facilities to condition existing before initial use.
- D. Temporary Heating and Cooling: 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 that will not have a harmful effect on completed installations or elements being installed.
 1. Provide temporary dehumidification systems when required to reduce ambient and substrate moisture levels to level required to allow installation or application of finishes and their proper curing or drying.
- E. Isolation of Work Areas in Occupied Facilities: Prevent dust, fumes, and odors from entering occupied areas.
 1. Prior to commencing work, isolate the HVAC system in area where work is to be performed according to coordination drawings.
 - a. Disconnect supply and return ductwork in work area from HVAC systems servicing occupied areas.
 - b. 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.
 2. Maintain dust partitions during the Work. Use vacuum collection attachments on dust-producing equipment. Isolate limited work within occupied areas using portable dust-containment devices.
 3. Perform daily construction cleanup and final cleanup using approved, HEPA-filter-equipped vacuum equipment.
- F. Lighting: Provide temporary lighting with local switching that provides adequate illumination for construction operations, observations, inspections, and traffic conditions.
 1. Install and operate temporary lighting that fulfills security and protection requirements without operating entire system.
- G. Telephone Service: Provide temporary telephone service in common-use facilities for use by all construction personnel. Install WiFi cell phone access equipment land-based telephone line(s) for each field office.
 1. Provide additional telephone lines for the following:

- a. Provide telephone line(s) for County's use.
 2. At each telephone, post a list of important telephone numbers.
- H. Electronic Communication Service: Provide a desktop computer in the primary field office adequate for use by COR and County to access Project electronic documents and maintain electronic communications. Equip computer with not less than the following:
1. Processor: Intel Core i5 or i7.
 2. Memory: 4 gigabyte.
 3. Disk Storage: 500 gigabyte hard-disk drive and combination DVD-RW/CD-RW drive.
 4. Display: 24-inch LCD monitor with 256-Mb dedicated video RAM.
 5. Full-size keyboard and mouse.
 6. Network Connectivity: 10/100BaseT Ethernet.
 7. Operating System: Microsoft Windows 7 Professional.
 8. Productivity Software:
 - a. Microsoft Office Professional, 2010 or higher, including Word, Excel, and Outlook.
 - b. Adobe Reader 11.0 or higher.
 - c. WinZip 7.0 or higher.
 9. Printer: "All-in-one" unit equipped with printer server, combining color printing, photocopying, scanning, and faxing, or separate units for each of these three functions.
 10. Internet Security: Integrated software, providing software firewall, virus, spyware, phishing, and spam protection in a combined application.
 11. Backup: External hard drive, minimum 2 terrabyte, with automated backup software providing daily backups.

3.4 SUPPORT FACILITIES INSTALLATION

- A. General: Comply with the 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.
 2. Maintain support facilities until COR schedules Substantial Completion inspection. Remove before Substantial Completion. Personnel remaining after Substantial Completion will be permitted to use permanent facilities, under conditions acceptable to County.
- B. Temporary Roads and Paved Areas: Construct and maintain temporary roads and paved areas adequate for construction operations. Locate temporary roads and paved areas within construction limits indicated on Drawings.
1. Provide dust-control treatment that is nonpolluting and nontracking. Reapply treatment as required to minimize dust.
- C. Temporary Use of Planned Permanent Roads and Paved Areas: Locate temporary roads and paved areas in same location as permanent roads and paved areas. Construct and maintain temporary roads and paved areas adequate for construction operations. Extend temporary roads and paved areas, within construction limits indicated, as necessary for construction operations.

1. Coordinate elevations of temporary roads and paved areas with permanent roads and paved areas.
 2. Prepare subgrade and install subbase and base for temporary roads and paved areas.
 3. Recondition base after temporary use, including removing contaminated material, regrading, proofrolling, compacting, and testing.
 4. Delay installation of final course of permanent hot-mix asphalt pavement until immediately before Substantial Completion. Repair hot-mix asphalt base-course pavement before installation of final course.
- 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 County's existing parking areas for construction personnel.
- F. Dewatering Facilities and Drains: 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.
 2. Remove snow and ice as required to minimize accumulations.
- G. Project Signs: Provide Project signs as required. Unauthorized signs are not permitted. Coordinate with County.
- H. Waste Disposal Facilities: Comply with requirements specified in Section 017419 "Construction Waste Management and Disposal."
- I. Waste Disposal Facilities: Provide waste-collection containers in sizes adequate to handle waste from construction operations. Comply with requirements of authorities having jurisdiction. Comply with progress cleaning requirements in Section 017300 "Execution."
- J. Lifts and Hoists: Provide facilities necessary for hoisting materials and personnel.
1. Truck cranes and similar devices used for hoisting materials are considered "tools and equipment" and not temporary facilities.
- K. Temporary Stairs: Until permanent stairs are available, provide temporary stairs where ladders are not adequate.
- L. Existing Stair Usage: Use of County's existing stairs will be permitted, provided stairs are cleaned and maintained in a condition acceptable to County. 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 damaged areas so no evidence remains of correction work.
- M. Temporary Use of Permanent Stairs: Use of new stairs for construction traffic will be permitted, provided stairs are protected and finishes restored to new condition at time of Substantial Completion.

3.5 SECURITY AND PROTECTION FACILITIES INSTALLATION

- A. Protection of Existing Facilities: Protect existing vegetation, equipment, structures, utilities, and other improvements at Project site and on adjacent properties, except those indicated to be removed or altered. Repair damage to existing facilities.
 - 1. Where access to adjacent properties is required in order to affect protection of existing facilities, obtain written permission from adjacent property County to access property for that purpose.
- B. Environmental Protection: Provide protection, operate temporary facilities, and conduct construction as required to comply with environmental regulations and that minimize possible air, waterway, and subsoil contamination or pollution or other undesirable effects.
 - 1. Comply with work restrictions specified in Section 011000 "Summary."
- C. Temporary Erosion and Sedimentation Control: Comply with requirements of EPA Construction General Permit or authorities having jurisdiction, whichever is more stringent.
- D. Temporary Erosion and Sedimentation Control: Provide measures to prevent soil erosion and discharge of soil-bearing water runoff and airborne dust to undisturbed areas and to adjacent properties and walkways, according to requirements of EPA Construction General Permit or authorities having jurisdiction, whichever is more stringent.
 - 1. Verify that flows of water redirected from construction areas or generated by construction activity do not enter or cross tree- or plant-protection zones.
 - 2. Inspect, repair, and maintain erosion- and sedimentation-control measures during construction until permanent vegetation has been established.
 - 3. Clean, repair, and restore adjoining properties and roads affected by erosion and sedimentation from Project site during the course of Project.
 - 4. Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.
- E. Stormwater Control: Comply with requirements of authorities having jurisdiction. Provide barriers in and around excavations and subgrade construction to prevent flooding by runoff of stormwater from heavy rains.
- F. Tree and Plant Protection: Install temporary fencing located as indicated or outside the drip line of trees to protect vegetation from damage from construction operations. Protect tree root systems from damage, flooding, and erosion.
- G. Pest Control: Engage pest-control service to recommend practices to minimize attraction and harboring of rodents, roaches, and other pests and to perform extermination and control procedures at regular intervals so Project will be free of pests and their residues at Substantial Completion. Perform control operations lawfully, using materials approved by authorities having jurisdiction.
- H. Site Enclosure Fence: Before construction operations begin, furnish and install site enclosure fence in a manner that will prevent people from easily entering site except by entrance gates.
 - 1. Extent of Fence: As required to enclose entire Project site or portion determined sufficient to accommodate construction operations.
 - 2. Maintain security by limiting number of keys and restricting distribution to authorized personnel. Furnish one set of keys to County.

- I. Security Enclosure and Lockup: Install temporary enclosure around partially completed areas of construction. Provide lockable entrances to prevent unauthorized entrance, vandalism, theft, and similar violations of security. Lock entrances at end of each workday.
- J. Barricades, Warning Signs, and Lights: Comply with requirements of authorities having jurisdiction for erecting structurally adequate barricades, including warning signs and lighting.
- K. Temporary Egress: Maintain temporary egress from existing occupied facilities as indicated and as required by authorities having jurisdiction.
- L. Covered Walkway: Erect protective, covered walkway for passage of individuals through or adjacent to Project site. Coordinate with entrance gates, other facilities, and obstructions. Comply with regulations of authorities having jurisdiction.
 - 1. Provide overhead decking, protective enclosure walls, handrails, barricades, warning signs, exit signs, lights, safe and well-drained walkways, and similar provisions for protection and safe passage.
 - 2. Paint and maintain appearance of walkway for duration of the Work.
- M. Temporary Enclosures: 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.
 - 1. Where heating or cooling is needed and permanent enclosure is incomplete, insulate temporary enclosures.
- N. Temporary Partitions: Provide floor-to-ceiling dustproof partitions to limit dust and dirt migration and to separate areas occupied by County from fumes and noise.
 - 1. Construct dustproof partitions with gypsum wallboard with joints taped on occupied side, and fire-retardant-treated plywood on construction operations side.
 - 2. Construct dustproof partitions with two layers of 6-mil polyethylene sheet on each side. Cover floor with two layers of 6-mil polyethylene sheet, extending sheets 18 inches up the sidewalls. Overlap and tape full length of joints. Cover floor with fire-retardant-treated plywood.
 - a. Construct vestibule and airlock at each entrance through temporary partition with not less than 48 inches between doors. Maintain water-dampened foot mats in vestibule.
 - 3. Where fire-resistance-rated temporary partitions are indicated or are required by authorities having jurisdiction, construct partitions according to the rated assemblies.
 - 4. Insulate partitions to control noise transmission to occupied areas.
 - 5. Seal joints and perimeter. Equip partitions with gasketed dustproof doors and security locks where openings are required.
 - 6. Protect air-handling equipment.
 - 7. Provide walk-off mats at each entrance through temporary partition.
- O. 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.
4. Provide temporary standpipes and hoses for fire protection. Hang hoses with a warning sign stating that hoses are for fire-protection purposes only and are not to be removed. Match hose size with outlet size and equip with suitable nozzles.

3.6 MOISTURE AND MOLD CONTROL

- A. Contractor's Moisture-Protection Plan: Describe delivery, handling, storage, installation, and protection provisions for materials subject to water absorption or water damage.
 1. Indicate procedures for discarding water-damaged materials, protocols for mitigating water intrusion into completed Work, and replacing water-damaged Work.
 2. Indicate sequencing of work that requires water, such as sprayed fire-resistive materials, plastering, and terrazzo grinding, and describe plans for dealing with water from these operations. Show procedures for verifying that wet construction has dried sufficiently to permit installation of finish materials.
 3. Indicate methods to be used to avoid trapping water in finished work.
- B. Exposed Construction Period: Before installation of weather barriers, when materials are subject to wetting and exposure and to airborne mold spores, protect as follows:
 1. Protect porous materials from water damage.
 2. Protect stored and installed material from flowing or standing water.
 3. Keep porous and organic materials from coming into prolonged contact with concrete.
 4. Remove standing water from decks.
 5. Keep deck openings covered or dammed.
- C. Partially Enclosed Construction Period: After installation of weather barriers but before full enclosure and conditioning of building, when installed materials are still subject to infiltration of moisture and ambient mold spores, protect as follows:
 1. Do not load or install drywall or other porous materials or components, or items with high organic content, into partially enclosed building.
 2. Keep interior spaces reasonably clean and protected from water damage.
 3. Periodically collect and remove waste containing cellulose or other organic matter.
 4. Discard or replace water-damaged material.
 5. Do not install material that is wet.
 6. Discard and replace stored or installed material that begins to grow mold.
 7. Perform work in a sequence that allows wet materials adequate time to dry before enclosing the material in gypsum board or other interior finishes.
- D. Controlled Construction Period: After completing and sealing of the building enclosure but prior to the full operation of permanent HVAC systems, maintain as follows:
 1. Control moisture and humidity inside building by maintaining effective dry-in conditions.
 2. Use temporary or permanent HVAC system to control humidity within ranges specified for installed and stored materials.
 3. Comply with manufacturer's written instructions for temperature, relative humidity, and exposure to water limits.

- a. Hygroscopic materials that may support mold growth, including wood and gypsum-based products, that become wet during the course of construction and remain wet for 48 hours are considered defective and require replacing.
- b. Measure moisture content of materials that have been exposed to moisture during construction operations or after installation. Record readings beginning at time of exposure and continuing daily for 48 hours. Identify materials containing moisture levels higher than allowed. Report findings in writing to COR.
- c. Remove and replace materials that cannot be completely restored to their manufactured moisture level within 48 hours.

3.7 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.
 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.
- C. Temporary Facility Changeover: 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. County reserves right to take possession of Project identification signs.
 2. Remove temporary roads and paved areas not intended for or acceptable for integration into permanent construction. Where area is intended for landscape development, remove soil and aggregate fill that do not comply with requirements for fill or subsoil. Remove materials contaminated with road oil, asphalt and other petrochemical compounds, and other substances that might impair growth of plant materials or lawns. Repair or replace street paving, curbs, and sidewalks at temporary entrances, as required by authorities having jurisdiction.
 3. At Substantial Completion, repair, renovate, and clean permanent facilities used during construction period. Comply with final cleaning requirements specified in Section 017700 "Closeout Procedures."

END OF SECTION 015000

SECTION 016000 - PRODUCT REQUIREMENTS

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. 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; and comparable products.
- B. Related Requirements:
 - 1. Section 012500 "Substitution Procedures" for requests for substitutions.
 - 2. Section 014200 "References" for applicable industry standards for products specified.

1.3 DEFINITIONS

- A. Products: Items obtained for incorporating into the Work, whether purchased for Project or taken from previously purchased stock. The term "product" includes the 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 the Contract Documents.
 - 2. New Products: Items that have not previously been incorporated into another project or facility. Products salvaged or recycled from other projects are not considered new products.
 - 3. Comparable Product: Product that is demonstrated and approved by Contracting Officer's Representative (COR) through submittal process to have the 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. Basis-of-Design Product Specification: A specification in which a single manufacturer's product is named and accompanied by the words "basis-of-design product," including make or model number or other designation. In addition to the basis-of-design product description, product attributes and characteristics may be listed to establish the significant qualities related to type, function, in-service performance and physical properties, weight, dimension, durability, visual characteristics, and other special features and requirements for purposes of evaluating comparable products of additional manufacturers named in the specification.

- C. Subject to Compliance with Requirements: Where the phrase "Subject to compliance with requirements" introduces a product selection procedure in an individual Specification Section, provide products qualified under the specified product procedure. In the event that a named product or product by a named manufacturer does not meet the other requirements of the specifications, select another named product or product from another named manufacturer that does meet the requirements of the specifications. Submit a comparable product request, if applicable.

1.4 ACTION SUBMITTALS

- A. Comparable Product Request Submittal: Submit request for consideration of each comparable product. Identify basis-of-design product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.
 - 1. Include data to indicate compliance with the requirements specified in "Comparable Products" Article.
 - 2. COR's Action: If necessary, COR will request additional information or documentation for evaluation within seven days of receipt of a comparable product request. COR will notify Contractor of approval or rejection of proposed comparable product request within 15 days of receipt of request, or seven days of receipt of additional information or documentation, whichever is later.
 - a. Form of COR's Approval of Submittal: As specified in Section 013300 "Submittal Procedures."
 - b. Use product specified if COR does not issue a decision on use of a comparable product request within time allocated.
- B. Basis-of-Design Product Specification Submittal: Comply with requirements in Section 013300 "Submittal Procedures." Show compliance with requirements.

1.5 QUALITY ASSURANCE

- A. Compatibility of Options: If Contractor is given option of selecting between two or more products for use on Project, select product compatible with products previously selected, even if previously selected products were also options.
 - 1. Each contractor is responsible for providing products and construction methods compatible with products and construction methods of other contractors.
 - 2. If a dispute arises between contractors over concurrently selectable but incompatible products, COR will determine which products shall be used.
- B. Identification of Products: Except for required labels and operating data, do not attach or imprint manufacturer or product names or trademarks on exposed surfaces of products or equipment that will be exposed to view in occupied spaces or on the exterior.
 - 1. Labels: Locate required product labels and stamps on a concealed surface, or, where required for observation following installation, on a visually accessible surface that is not conspicuous.
 - 2. Equipment Nameplates: Provide a permanent nameplate on each item of service-connected or power-operated equipment. Locate on a visually accessible but inconspicuous surface. Include information essential for operation, including the following:

- a. Name of product and manufacturer.
 - b. Model and serial number.
 - c. Capacity.
 - d. Speed.
 - e. Ratings.
3. See individual identification sections in Divisions 23 and 26 for additional identification requirements.

1.6 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, and handle products using means and methods that will prevent damage, deterioration, and loss, including theft and vandalism. 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 determine compliance with the Contract Documents and to determine 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 the elements, under cover in a weathertight enclosure above ground, with ventilation adequate to prevent condensation.
 4. Protect foam plastic from exposure to sunlight, except to extent necessary for period of installation and concealment.
 5. Comply with product manufacturer's written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage.
 6. Protect stored products from damage and liquids from freezing.
 7. Provide a secure location and enclosure at Project site for storage of materials and equipment by County's construction forces. Coordinate location with County.

1.7 PRODUCT WARRANTIES

- A. Warranties specified in other Sections shall be in addition to, and run concurrent with, other warranties required by the Contract Documents. Manufacturer's disclaimers and limitations on product warranties do not relieve Contractor of obligations under requirements of the Contract Documents.
 1. Manufacturer's Warranty: Written warranty furnished by individual manufacturer for a particular product and specifically endorsed by manufacturer to County.

2. Special Warranty: Written warranty required by the Contract Documents to provide specific rights for County.
- B. Special Warranties: Prepare a written document that contains appropriate terms and identification, ready for execution.
1. Manufacturer's Standard Form: Modified to include Project-specific information and properly executed.
 2. Specified Form: When specified forms are included with the Specifications, prepare a written document using indicated form properly executed.
 3. See other Sections for specific content requirements and particular requirements for submitting special warranties.
- C. Submittal Time: Comply with requirements in Section 017700 "Closeout Procedures."
- D. Automatic Control Warranty
1. Labor and materials for control systems shall be warranted for a period of two years to start at the substantial completion of the final phase of work.
 2. Control system failures during the warranty period shall be adjusted, repaired, or replaced at no cost or reduction in service to the County. The system includes all computer equipment, transmission equipment, and all sensors and control devices.
 3. The on-line support service shall allow the Controls supplier to dial out over telephone lines to or, connect via (through password-limited access) VPN through the internet monitor and control the facility's building automation system. This remote connection to the facility shall be within 2 hours of the time that the problem is reported. This coverage shall be extended to include normal business hours, after business hours, weekend and holidays. If the problem cannot be resolved with on-line support services, the Controls supplier shall dispatch the qualified personnel to the jobsite to resolve the problem within 24 hours after the problem is reported.
 4. Controls and Instrumentation contractor shall be responsible for temporary operations and maintenance of the control systems during all Phases of the construction period until final testing and verifications are complete; training of facility operators is complete; and acceptance of the project by Howard County Public Schools.

PART 2 - PRODUCTS

2.1 PRODUCT SELECTION PROCEDURES

- A. General Product Requirements: Provide products that comply with the Contract Documents, are undamaged and, unless otherwise indicated, 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. County reserves the right to limit selection to products with warranties meeting requirements of the Contract Documents.
 4. Where products are accompanied by the term "as selected," COR will make selection.
 5. Descriptive, performance, and reference standard requirements in the Specifications establish salient characteristics of products.

6. Or Equal: For products specified by name and accompanied by the term "or equal," or "or approved equal," or "or approved," comply with requirements in "Comparable Products" Article to obtain approval for use of an unnamed product.

- a. Submit additional documentation required by COR in order to establish equivalency of proposed products. Evaluation of "or equal" product status is by the COR, whose determination is final.

B. Product Selection Procedures:

1. Sole Product: Where Specifications name a single manufacturer and product, provide the named product that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.

- a. Sole product may be indicated by the phrase: "Subject to compliance with requirements, provide the following:"

2. Limited List of Products: Where Specifications include a list of names of both manufacturers and products, provide one of the products listed that complies with requirements. Comparable products or substitutions for Contractor's convenience be considered.

- a. Limited list of products may be indicated by the phrase: "Subject to compliance with requirements, provide one of the following:"

3. Limited List of Manufacturers: Where Specifications include a list of manufacturers' names, provide a product by one of the manufacturers listed that complies with requirements. Comparable products or substitutions for Contractor's convenience be considered.

- a. Limited list of manufacturers is indicated by the phrase: "Subject to compliance with requirements, provide products by one of the following:"

4. Basis-of-Design Product: Where Specifications name a product, or refer to a product indicated on Drawings, and include a list of manufacturers, provide the specified or indicated product or a comparable product by one of the other named manufacturers. Drawings and Specifications indicate sizes, profiles, dimensions, and other characteristics that are based on the product named. Comply with requirements in "Comparable Products" Article for consideration of an unnamed product by one of the other named manufacturers.

- a. For approval of products by unnamed manufacturers, comply with requirements in Section 012500 "Substitution Procedures" for substitutions for convenience.

2.2 COMPARABLE PRODUCTS

- A. Conditions for Consideration of Comparable Products: COR will consider Contractor's request for comparable product when the following conditions are satisfied. If the following conditions are not satisfied, COR may return requests without action, except to record noncompliance with these requirements:

1. Evidence that proposed product does not require revisions to the Contract Documents, is consistent with the Contract Documents, will produce the indicated results, and is compatible with other portions of the Work. Detailed comparison of significant qualities of proposed product with those named in the Specifications. Significant product qualities include attributes such as type, function, in-service performance and physical properties, weight, dimension, durability, visual characteristics, and other specific features and requirements.
 2. Evidence that proposed product provides specified warranty.
 3. List of similar installations for completed projects with project names and addresses and names and addresses of Owners, if requested.
 4. Samples, if requested.
- B. Submittal Requirements: Approval by the COR of Contractor's request for use of comparable product is not intended to satisfy other submittal requirements. Comply with specified submittal requirements.

PART 3 - EXECUTION (Not Used)

END OF SECTION 016000

SECTION 017300 - EXECUTION

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. Section includes general administrative and procedural requirements governing execution of the Work including, but not limited to, the following:
 - 1. Installation of the Work.
 - 2. Cutting and patching.
 - 3. Progress cleaning.
 - 4. Starting and adjusting.
 - 5. Protection of installed construction.
- B. Related Requirements:
 - 1. Section 011000 "Summary" for limits on use of Project site.
 - 2. Section 013300 "Submittal Procedures" for submitting surveys.
 - 3. Section 017700 "Closeout Procedures" for submitting final property survey with Project Record Documents, recording of County-accepted deviations from indicated lines and levels, replacing defective work, and final cleaning.
 - 4. Section 024119 "Selective Demolition" for demolition and removal of selected portions of the building.

1.3 DEFINITIONS

- A. Cutting: Removal of in-place construction necessary to permit installation or performance of subsequent work.
- B. Patching: Fitting and repair work required to restore construction to original conditions after installation of subsequent work.

1.4 PREINSTALLATION MEETINGS

- A. Cutting and Patching Conference: Conduct conference at Project site.
 - 1. Prior to submitting cutting and patching plan, review extent of cutting and patching anticipated and examine procedures for ensuring satisfactory result from cutting and patching work. Require representatives of each entity directly concerned with cutting and patching to attend, including the following:
 - a. Contractor's superintendent.
 - b. Trade supervisor responsible for cutting operations.

- c. Trade supervisor(s) responsible for patching of each type of substrate.
 - d. Mechanical, electrical, and utilities subcontractors' supervisors, to the extent each trade is affecting by cutting and patching operations.
2. Review areas of potential interference and conflict. Coordinate procedures and resolve potential conflicts before proceeding.

1.5 INFORMATIONAL SUBMITTALS

- A. Cutting and Patching Plan: Submit plan describing procedures at least 10 days prior to the time cutting and patching will be performed. Include the following information:
 1. Extent: Describe reason for and extent of each occurrence of cutting and patching.
 2. Changes to In-Place Construction: Describe anticipated results. Include changes to structural elements and operating components as well as changes in building appearance and other significant visual elements.
 3. Products: List products to be used for patching and firms or entities that will perform patching work.
 4. Dates: Indicate when cutting and patching will be performed.
 5. Utilities and Mechanical and Electrical Systems: List services and systems that cutting and patching procedures will disturb or affect. List services and systems that will be relocated and those that will be temporarily out of service. Indicate length of time permanent services and systems will be disrupted.
 - a. Include description of provisions for temporary services and systems during interruption of permanent services and systems.
- B. Landfill Receipts: Submit copy of receipts issued by a landfill facility, licensed to accept hazardous materials, for hazardous waste disposal.

1.6 QUALITY ASSURANCE

- A. Cutting and Patching: Comply with requirements for and limitations on cutting and patching of construction elements.
 1. Structural Elements: When cutting and patching structural elements, notify COR of locations and details of cutting and await directions from Contracting Officer's Representative (COR) before proceeding. Shore, brace, and support structural elements during cutting and patching. Do not cut and patch structural elements in a manner that could change their load-carrying capacity or increase deflection.
 2. 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. Operational elements include the following:
 - a. Primary operational systems and equipment.
 - b. Fire separation assemblies.
 - c. Air or smoke barriers.
 - d. Fire-suppression systems.
 - e. Plumbing piping systems.
 - f. Mechanical systems piping and ducts.
 - g. Control systems.

- h. Communication systems.
 - i. Fire-detection and -alarm systems.
 - j. Electrical wiring systems.
 - k. Operating systems of special construction.
 - 3. Other Construction Elements: Do not cut and patch other construction elements or 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. Other construction elements include but are not limited to the following:
 - a. Water, moisture, or vapor barriers.
 - b. Membranes and flashings.
 - c. Exterior curtain-wall construction.
 - d. Sprayed fire-resistive material.
 - e. Equipment supports.
 - f. Piping, ductwork, vessels, and equipment.
 - g. Noise- and vibration-control elements and systems.
 - 4. Visual Elements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch exposed construction in a manner that would, in COR's opinion, reduce the building's aesthetic qualities. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner.
- B. 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.
- 1. For projects requiring compliance with sustainable design and construction practices and procedures, use products for patching that comply with sustainable design requirements.
- B. In-Place Materials: Use materials for patching 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 provide a match acceptable to COR for the visual and functional performance of in-place materials.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examination and Acceptance of Conditions: Before proceeding with each component of the Work, 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. Examine roughing-in for mechanical and electrical systems to verify actual locations of connections before equipment and fixture installation.
 - 2. Examine walls, floors, and roofs for suitable conditions where products and systems are to be installed.
 - 3. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
- B. Written Report: Where a written report listing conditions detrimental to performance of the Work is required by other Sections, include the following:
 - 1. Description of the Work.
 - 2. List of detrimental conditions, including substrates.
 - 3. List of unacceptable installation tolerances.
 - 4. Recommended corrections.
- C. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

3.2 PREPARATION

- A. Field Measurements: Take field measurements as required to fit the Work properly. Recheck measurements before installing each product. Where portions of the 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 the Work.
- B. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.
- C. Review of Contract Documents and Field Conditions: Immediately on discovery of the need for clarification of the Contract Documents caused by differing field conditions outside the control of Contractor, submit a request for information to COR according to requirements in Section 013100 "Project Management and Coordination."

3.3 INSTALLATION

- A. General: Locate the Work and components of the 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 96 inches in occupied spaces and 90 inches in unoccupied spaces.
- B. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.
- C. Install products at the time and under conditions that will ensure the best possible results. Maintain conditions required for product performance until Substantial Completion.
- D. Conduct construction operations so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy.
- E. Sequence the Work and allow adequate clearances to accommodate movement of construction items on site and placement in permanent locations.
- F. Tools and Equipment: Where possible, select tools or equipment that minimize production of excessive noise levels.
- G. Templates: Obtain and distribute to the parties involved templates for work specified to be factory prepared and field installed. Check Shop Drawings of other portions of the Work to confirm that adequate provisions are made for locating and installing products to comply with indicated requirements.
- H. Attachment: Provide blocking and attachment plates and anchors and fasteners of adequate size and number to securely anchor each component in place, accurately located and aligned with other portions of the Work. Where size and type of attachments are not indicated, verify size and type required for load conditions.
1. Mounting Heights: Where mounting heights are not indicated, mount components at heights directed by COR.
 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.
- I. Joints: Make joints of uniform width. Where joint locations in exposed work are not indicated, arrange joints for the best visual effect. Fit exposed connections together to form hairline joints.
- J. Repair or remove and replace damaged, defective, or nonconforming Work.
1. Comply with Section 017700 "Closeout Procedures" for repairing or removing and replacing defective Work.
- 3.4 CUTTING AND PATCHING
- A. Cutting and Patching, 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.

- B. 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 existing warranties.
- C. Temporary Support: Provide temporary support of work to be cut.
- D. 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.
- E. 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 Section 011000 "Summary."
- F. 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.
- G. 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 neatly to minimum 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 and Masonry: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.
 - 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. Proceed with patching after construction operations requiring cutting are complete.
- H. 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 practicable. Provide materials and comply with installation requirements specified in other Sections, where applicable.
 - 1. Inspection: Where feasible, test and inspect patched areas after completion to demonstrate physical 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 minimize 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. Floors and 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, prepare substrate and apply primer and intermediate paint coats appropriate for substrate over the patch, and apply final paint coat over entire unbroken surface containing the patch. Provide additional coats until patch blends with adjacent surfaces.
- 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 and ensures thermal and moisture integrity of building enclosure.
- I. Cleaning: Clean areas and spaces where cutting and patching are performed. Remove paint, mortar, oils, putty, and similar materials from adjacent finished surfaces.

3.5 PROGRESS CLEANING

- A. General: Clean Project site and work areas daily, including common areas. 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 waste materials more than seven days during normal weather or three days if the temperature is expected to rise above 80 degrees 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.
 - 4. Coordinate progress cleaning for joint-use areas where Contractor and other contractors are working concurrently.
- B. Site: Maintain Project site free of waste materials and debris.
- C. Work Areas: Clean areas where work is in progress to the level of cleanliness necessary for proper execution of the Work.
 - 1. Remove liquid spills promptly.
 - 2. Where dust would impair proper execution of the Work, broom-clean or vacuum the 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 the 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: Do not bury or burn waste materials on-site. Do not wash waste materials down sewers or into waterways. Comply with waste disposal requirements in Section 017419 "Construction Waste Management and Disposal."

- H. During handling and installation, clean and protect construction in progress and adjoining materials already in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.
- I. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.
- J. Limiting Exposures: Supervise construction operations to ensure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.

3.6 STARTING AND ADJUSTING

- A. Coordinate startup and adjusting of equipment and operating components with requirements by commissioning agent.
- B. Start equipment and operating components to confirm proper operation. Remove malfunctioning units, replace with new units, and retest.
- C. Adjust equipment for proper operation. Adjust operating components for proper operation without binding.
- D. Test each piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
- E. Manufacturer's Field Service: Comply with qualification requirements in Section 014000 "Quality Requirements."

3.7 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.

END OF SECTION 017300

SECTION 017419 - CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL

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. Section includes administrative and procedural requirements for the following:
 - 1. Salvaging nonhazardous demolition and construction waste.
 - 2. Recycling nonhazardous demolition and construction waste.
 - 3. Disposing of nonhazardous demolition and construction waste.
- B. Related Requirements:
 - 1. Section 024119 "Selective Demolition" for disposition of waste resulting from partial demolition of buildings, structures, and site improvements, and for disposition of hazardous waste.

1.3 DEFINITIONS

- A. Construction Waste: Building and site improvement materials and other solid waste resulting from construction, remodeling, renovation, or repair operations. Construction waste includes packaging.
- B. Demolition Waste: Building and site improvement materials resulting from demolition or selective demolition operations.
- C. Disposal: Removal off-site of demolition and construction waste and subsequent sale, recycling, reuse, or deposit in landfill or incinerator acceptable to authorities having jurisdiction.
- D. Recycle: Recovery of demolition or construction waste for subsequent processing in preparation for reuse.
- E. Salvage: Recovery of demolition or construction waste and subsequent sale or reuse in another facility.
- F. Salvage and Reuse: Recovery of demolition or construction waste and subsequent incorporation into the Work.

1.4 PERFORMANCE REQUIREMENTS

- A. General: Achieve end-of-Project rates for salvage/recycling of 50 percent by weight of total non-hazardous solid waste generated by the Work. Practice efficient waste management in the use of materials in the course of the Work. Use all reasonable means to divert construction and demolition waste from landfills and incinerators. Facilitate recycling and salvage of materials, including the following:

1. Demolition Waste:

- a. Asphalt paving.
- b. Concrete.
- c. Concrete reinforcing steel.
- d. Brick.
- e. Concrete masonry units.
- f. Plywood and oriented strand board.
- g. Roofing.
- h. Insulation.
- i. Glazing.
- j. Metal studs.
- k. Gypsum board.
- l. Acoustical tile and panels.
- m. Carpet.
- n. Equipment.
- o. Cabinets.
- p. Piping.
- q. Supports and hangers.
- r. Sprinklers.
- s. Mechanical equipment.
- t. Refrigerants.
- u. Electrical conduit.
- v. Copper wiring.
- w. Lamps.
- x. Ballasts.
- y. Electrical devices.

2. Construction Waste:

- a. Masonry and CMU.
- b. Metals.
- c. Roofing.
- d. Insulation.
- e. Gypsum board.
- f. Piping.
- g. Electrical conduit.
- h. Packaging: Regardless of salvage/recycle goal indicated in "General" Paragraph above, salvage or recycle 100 percent of the following uncontaminated packaging materials:
 - 1) Paper.
 - 2) Cardboard.
 - 3) Boxes.
 - 4) Plastic sheet and film.
 - 5) Polystyrene packaging.

- 6) Wood crates.
- 7) Plastic pails.

1.5 ACTION SUBMITTALS

- A. Waste Management Plan: Submit plan within 30 days of date established for the Notice to Proceed.

1.6 INFORMATIONAL SUBMITTALS

- A. Waste Reduction Progress Reports: Concurrent with each Application for Payment, submit report. Use Form CWM-7 for construction waste and Form CWM-8 for demolition waste. Include the following information:
 - 1. Material category.
 - 2. Generation point of waste.
 - 3. Total quantity of waste in tons.
 - 4. Quantity of waste salvaged, both estimated and actual in tons.
 - 5. Quantity of waste recycled, both estimated and actual in tons.
 - 6. Total quantity of waste recovered (salvaged plus recycled) in tons.
 - 7. Total quantity of waste recovered (salvaged plus recycled) as a percentage of total waste.
- B. Waste Reduction Calculations: Before request for Substantial Completion, submit calculated end-of-Project rates for salvage, recycling, and disposal as a percentage of total waste generated by the Work.
- C. Recycling and Processing Facility Records: Indicate receipt and acceptance of recyclable waste by recycling and processing facilities licensed to accept them. Include manifests, weight tickets, receipts, and invoices.
- D. Landfill and Incinerator Disposal Records: Indicate receipt and acceptance of waste by landfills and incinerator facilities licensed to accept them. Include manifests, weight tickets, receipts, and invoices.
- E. Statement of Refrigerant Recovery: Signed by refrigerant recovery technician responsible for recovering refrigerant, stating that all refrigerant that was present was recovered and that recovery was performed according to EPA regulations. Include name and address of technician and date refrigerant was recovered.

1.7 QUALITY ASSURANCE

- A. Refrigerant Recovery Technician Qualifications: Certified by EPA-approved certification program.
- B. Regulatory Requirements: Comply with hauling and disposal regulations of authorities having jurisdiction.
- C. Waste Management Conference: Conduct conference at Project site to comply with requirements in Section 013100 "Project Management and Coordination." Review methods and procedures related to waste management including, but not limited to, the following:

1. Review and discuss waste management plan including responsibilities of waste management coordinator.
2. Review requirements for documenting quantities of each type of waste and its disposition.
3. Review and finalize procedures for materials separation and verify availability of containers and bins needed to avoid delays.
4. Review procedures for periodic waste collection and transportation to recycling and disposal facilities.
5. Review waste management requirements for each trade.

1.8 WASTE MANAGEMENT PLAN

- A. General: Develop a waste management plan according to ASTM E 1609 and requirements in this Section. Plan shall consist of waste identification, waste reduction work plan, and cost/revenue analysis. Distinguish between demolition and construction waste. Indicate quantities by weight or volume, but use same units of measure throughout waste management plan.
- B. Waste Identification: Indicate anticipated types and quantities of demolition construction waste generated by the Work. Include estimated quantities and assumptions for estimates.
- C. Waste Reduction Work Plan: List each type of waste and whether it will be salvaged, recycled, or disposed of in landfill or incinerator. Include points of waste generation, total quantity of each type of waste, quantity for each means of recovery, and handling and transportation procedures.
 1. Salvaged Materials for Reuse: For materials that will be salvaged and reused in this Project, describe methods for preparing salvaged materials before incorporation into the Work.
 2. Recycled Materials: Include list of local receivers and processors and type of recycled materials each will accept. Include names, addresses, and telephone numbers.
 3. Disposed Materials: Indicate how and where materials will be disposed of. Include name, address, and telephone number of each landfill and incinerator facility.
 4. Handling and Transportation Procedures: Include method that will be used for separating recyclable waste including sizes of containers, container labeling, and designated location where materials separation will be performed.
- D. Cost/Revenue Analysis: Indicate total cost of waste disposal as if there was no waste management plan and net additional cost or net savings resulting from implementing waste management plan. Include the following:
 1. Total quantity of waste.
 2. Estimated cost of disposal (cost per unit). Include hauling and tipping fees and cost of collection containers for each type of waste.
 3. Total cost of disposal (with no waste management).
 4. Revenue from salvaged materials.
 5. Revenue from recycled materials.
 6. Savings in hauling and tipping fees by donating materials.
 7. Savings in hauling and tipping fees that are avoided.
 8. Handling and transportation costs. Include cost of collection containers for each type of waste.
 9. Net additional cost or net savings from waste management plan.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 PLAN IMPLEMENTATION

- A. General: Implement approved waste management plan. Provide handling, containers, storage, signage, transportation, and other items as required to implement waste management plan during the entire duration of the Contract.
 - 1. Comply with operation, termination, and removal requirements in Section 015000 "Temporary Facilities and Controls."
- B. Training: Train workers, subcontractors, and suppliers on proper waste management procedures, as appropriate for the Work.
 - 1. Distribute waste management plan to everyone concerned within three days of submittal return.
 - 2. Distribute waste management plan to entities when they first begin work on-site. Review plan procedures and locations established for salvage, recycling, and disposal.

3.2 SALVAGING DEMOLITION WASTE

- A. Salvaged Items for Reuse in the Work: Salvage items for reuse and handle as follows:
 - 1. Clean salvaged items.
 - 2. Pack or crate items after cleaning. Identify contents of containers with label indicating elements, date of removal, quantity, and location where removed.
 - 3. Store items in a secure area until installation.
 - 4. Protect items from damage during transport and storage.
 - 5. Install salvaged items to comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make items functional for use indicated.
- B. Salvaged Items for Owner's Use: Salvage items for Owner's use and handle as follows:
 - 1. Clean salvaged items.
 - 2. Pack or crate items after cleaning. Identify contents of containers with label indicating elements, date of removal, quantity, and location where removed.
 - 3. Store items in a secure area until delivery to County.
 - 4. Transport items to Owner's storage area designated by County.
 - 5. Protect items from damage during transport and storage.
- C. Equipment: Drain tanks, piping, and fixtures. Seal openings with caps or plugs. Protect equipment from exposure to weather.
- D. Electrical Devices: Separate switches, receptacles, switchgear, transformers, meters, panelboards, circuit breakers, and other devices by type.

3.3 RECYCLING DEMOLITION AND CONSTRUCTION WASTE, GENERAL

- A. General: Recycle paper and beverage containers used by on-site workers.
- B. Recycling Receivers and Processors.
- C. Recycling Incentives: Revenues, savings, rebates, tax credits, and other incentives received for recycling waste materials shall be shared equally by Owner and Contractor.
- D. Preparation of Waste: Prepare and maintain recyclable waste materials according to recycling or reuse facility requirements. Maintain materials free of dirt, adhesives, solvents, petroleum contamination, and other substances deleterious to the recycling process.
- E. Procedures: Separate recyclable waste from other waste materials, trash, and debris. Separate recyclable waste by type at Project site to the maximum extent practical according to approved construction waste management plan.
 - 1. Provide appropriately marked containers or bins for controlling recyclable waste until removed from Project site. Include list of acceptable and unacceptable materials at each container and bin.
 - a. Inspect containers and bins for contamination and remove contaminated materials if found.
 - 2. Stockpile processed materials on-site without intermixing with other materials. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.
 - 3. Stockpile materials away from construction area. Do not store within drip line of remaining trees.
 - 4. Store components off the ground and protect from the weather.
 - 5. Remove recyclable waste from County's property and transport to recycling receiver or processor.

3.4 RECYCLING DEMOLITION WASTE

- A. Wood Materials: Sort and stack members according to size, type, and length. Separate lumber, engineered wood products, panel products, and treated wood materials.
- B. Metals: Separate metals by type.
- C. Gypsum Board: Stack large clean pieces on wood pallets or in container and store in a dry location. Remove edge trim and sort with other metals. Remove and dispose of fasteners.
- D. Acoustical Ceiling Panels and Tile: Stack large clean pieces on wood pallets and store in a dry location.
- E. Piping: Reduce piping to straight lengths and store by type and size. Separate supports, hangers, valves, sprinklers, and other components by type and size.
- F. Conduit: Reduce conduit to straight lengths and store by type and size.

3.5 RECYCLING CONSTRUCTION WASTE

A. Packaging:

1. Cardboard and Boxes: Break down packaging into flat sheets. Bundle and store in a dry location.
2. Polystyrene Packaging: Separate and bag materials.
3. Pallets: As much as possible, require deliveries using pallets to remove pallets from Project site. For pallets that remain on-site, break down pallets into component wood pieces and comply with requirements for recycling wood.
4. Crates: Break down crates into component wood pieces and comply with requirements for recycling wood.

B. Gypsum Board: Stack large clean pieces on wood pallets or in container and store in a dry location.

1. Clean Gypsum Board: Grind scraps of clean gypsum board using small mobile chipper or hammer mill. Screen out paper after grinding.

3.6 DISPOSAL OF WASTE

A. General: Except for items or materials to be salvaged, recycled, or otherwise reused, remove waste materials from Project site and legally dispose of them in a landfill or incinerator acceptable to authorities having jurisdiction.

1. Except as otherwise specified, do not allow waste materials that are to be disposed of 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 waste materials.

C. Disposal: Remove waste materials from County's property and legally dispose of them.

END OF SECTION 017419

SECTION 017700 - CLOSEOUT PROCEDURES

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. 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.
 - 4. Final cleaning.
 - 5. Repair of the Work.
- B. Related Requirements:
 - 1. Section 017823 "Operation and Maintenance Documentation" for additional operation and maintenance manual requirements.
 - 2. Section 017839 "Project Record Documents" for submitting Record Drawings, Record Specifications, and Record Product Data.
 - 3. Section 018200 "Demonstration and Training" for requirements to train the County's maintenance personnel to adjust, operate, and maintain products, equipment, and systems.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of cleaning agent.
- B. Contractor's List of Incomplete Items: Initial submittal at Substantial Completion.
- C. Certified List of Incomplete Items: Final submittal at final completion.

1.4 CLOSEOUT SUBMITTALS

- A. Certificates of Release: From authorities having jurisdiction.
- B. Certificate of Insurance: For continuing coverage.
- C. Field Report: For pest control inspection.

1.5 MAINTENANCE MATERIAL SUBMITTALS

- A. Schedule of Maintenance Material Items: For maintenance material submittal items specified in other Sections.

1.6 SUBSTANTIAL COMPLETION PROCEDURES

- A. Contractor's List of Incomplete Items: Prepare and submit a list of items to be completed and corrected (Contractor's 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 County unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
 - 2. Submit closeout submittals specified in other Division 01 Sections, including project record documents, operation and maintenance manuals, damage or settlement surveys, property surveys, 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 Contracting Officer's Representative (COR). Label with manufacturer's name and model number.
 - 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 COR's signature for receipt of submittals.
 - 5. Submit testing, adjusting, and balancing records.
 - 6. Submit sustainable design submittals not previously submitted.
 - 7. Submit changeover information related to County's occupancy, use, operation, and maintenance.
- C. Procedures 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. Advise County of pending insurance changeover requirements.
 - 2. Make final changeover of permanent locks and deliver keys to County. Advise County'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 County's personnel in operation, adjustment, and maintenance of products, equipment, and systems. Submit demonstration and training video recordings specified in Section 017900 "Demonstration and Training."
 - 6. Advise County of changeover in utility services.

7. Participate with County in conducting inspection and walkthrough with local emergency responders.
 8. Terminate and remove temporary facilities from Project site, along with construction tools, and similar elements.
 9. Complete final cleaning requirements.
 10. Touch up paint and otherwise repair and restore marred exposed finishes to eliminate visual defects.
- D. Inspection: Submit a written request for inspection to determine Substantial Completion a minimum of 10 days prior to date the Work will be completed and ready for final inspection and tests. On receipt of request, COR will either proceed with inspection or notify Contractor of unfulfilled requirements. COR 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 COR, that must be completed or corrected before certificate will be issued.
1. Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.
 2. Results of completed inspection will form the basis of requirements for final completion.

1.7 FINAL COMPLETION PROCEDURES

- A. Submittals Prior to Final Completion: Before requesting final inspection for determining final completion, complete the following:
1. Submit a final Application for Payment according to Section 012900 "Payment Procedures."
 2. Certified List of Incomplete Items: Submit certified copy of COR's Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by COR. Certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.
 3. Certificate of Insurance: Submit evidence of final, continuing insurance coverage complying with insurance requirements.
 4. Submit pest-control final inspection report.
 5. Submit final completion photographic documentation.
- B. Inspection: Submit a written request for final inspection to determine 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, COR will either proceed with inspection or notify Contractor of unfulfilled requirements. COR 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. Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.

1.8 LIST OF INCOMPLETE ITEMS (PUNCH LIST)

- A. 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.

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 COR.
 - d. Name of Contractor.
 - e. Page number.
4. Submit list of incomplete items in the following format:
 - a. MS Excel electronic file. COR will return annotated file.
 - b. PDF electronic file. COR will return annotated file.
 - c. Web-based project software upload. Utilize software feature for creating and updating list of incomplete items (punch list).
 - d. Three paper copies. COR will return two copies.

1.9 SUBMITTAL OF PROJECT WARRANTIES

- A. Time of Submittal: Submit written warranties on request of COR for designated portions of the Work where warranties are indicated to commence on dates other than date of Substantial Completion, or when delay in submittal of warranties might limit County's rights under warranty.
- B. Partial Occupancy: Submit properly executed warranties within 15 days of completion of designated portions of the Work that are completed and occupied or used by County during construction period by separate agreement with Contractor.
- C. Organize warranty documents into an orderly sequence based on the table of contents of Project Manual.
- D. Warranty Electronic File: Provide warranties and bonds in PDF format. Assemble complete warranty and bond submittal package into a single electronic PDF file with bookmarks enabling navigation to each item. Provide bookmarked table of contents at beginning of document.
 1. Submit on digital media acceptable to COR.
- E. Warranties in Paper Form:
 1. Bind warranties and bonds in heavy-duty, three-ring, vinyl-covered, loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2-by-11-inch paper.
 2. Provide heavy paper dividers with plastic-covered tabs for each separate warranty. Mark tab to identify the product or installation. Provide a typed description of the product or installation, including the name of the product and the name, address, and telephone number of Installer.
 3. Identify each binder on the front and spine with the typed or printed title "WARRANTIES," Project name, and name of Contractor.
- F. Provide additional copies of each warranty to include in operation and maintenance manuals.

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.
 - 1. Use cleaning products that comply with Green Seal's GS-37, or if GS-37 is not applicable, use products that comply with the California Code of Regulations maximum allowable VOC levels.

PART 3 - EXECUTION

3.1 FINAL CLEANING

- A. General: Perform 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 designated 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 not planted, mulched, or paved to a smooth, even-textured surface.
 - d. Remove tools, construction equipment, machinery, and surplus material from Project site.
 - e. Remove snow and ice to provide safe access to building.
 - f. 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.
 - g. Remove debris and surface dust from limited access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.
 - h. Sweep concrete floors broom clean in unoccupied spaces.
 - i. Vacuum carpet and similar soft surfaces, removing debris and excess nap; clean according to manufacturer's recommendations if visible soil or stains remain.
 - j. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other noticeable, vision-obscuring materials. Polish mirrors and glass, taking care not to scratch surfaces.
 - k. Remove labels that are not permanent.

- I. Wipe surfaces of mechanical and electrical equipment and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.
 - m. Clean plumbing fixtures to a sanitary condition, free of stains, including stains resulting from water exposure.
 - n. Replace disposable air filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grills.
 - o. Clean ducts, blowers, and coils if units were operated without filters during construction or that display contamination with particulate matter on inspection.
 - 1) Clean HVAC system in compliance with NADCA ACR. Provide written report on completion of cleaning.
 - p. Clean light fixtures, lamps, globes, and reflectors to function with full efficiency.
 - q. Leave Project clean and ready for occupancy.
 - C. Pest Control: Comply with pest control requirements in Section 015000 "Temporary Facilities and Controls." Prepare written report.
 - D. Construction Waste Disposal: Comply with waste disposal requirements in Section 017419 "Construction Waste Management and Disposal."

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.
 - 4. Replace burned-out bulbs, bulbs noticeably dimmed by hours of use, and defective and noisy starters in fluorescent and mercury vapor fixtures to comply with requirements for new fixtures.

END OF SECTION 017700

SECTION 017823 - OPERATION AND MAINTENANCE DATA

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. 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. Section 013300 "Submittal Procedures" for submitting copies of submittals for operation and maintenance manuals.

1.3 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.

1.4 CLOSEOUT SUBMITTALS

- A. Submit operation and maintenance manuals indicated. Provide content for each manual as specified in individual Specification Sections, and as reviewed and approved at the time of Section submittals. Submit reviewed manual content formatted and organized as required by this Section.
 - 1. Contracting Officer's Representative (COR) 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 COR. Enable reviewer comments on draft submittals.
 - 2. Submit three paper copies. COR will return two copies.

- C. Initial Manual Submittal: Submit draft copy of each manual at least 30 days before commencing demonstration and training. COR will comment on whether general scope and content of manual are acceptable.
- D. Final Manual Submittal: Submit each manual in final form prior to requesting inspection for Substantial Completion and at least 15 days before commencing demonstration and training. COR and Commissioning Authority will return copy with comments.
 - 1. Correct or revise each manual to comply with COR's comments. Submit copies of each corrected manual within 15 days of receipt of COR's comments and prior to commencing demonstration and training.
- E. Comply with Section 017700 "Closeout Procedures" for schedule for submitting operation and maintenance documentation.

1.5 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.
- B. Manuals, Paper Copy: Submit manuals in the form of hard-copy, bound and labeled volumes.
 - 1. Binders: Heavy-duty, three-ring, vinyl-covered, loose-leaf binders, in thickness necessary to accommodate contents, sized to hold 8-1/2-by-11-inch paper; with clear plastic sleeve on spine to hold label describing contents and with pockets inside covers to hold folded oversize sheets.
 - a. If two or more binders are necessary to accommodate data of a system, organize data in each binder into groupings by subsystem and related components. Cross-reference other binders if necessary to provide essential information for proper operation or maintenance of equipment or system.
 - b. Identify each binder on front and spine, with printed title "OPERATION AND MAINTENANCE MANUAL," Project title or name, and subject matter of contents, and indicate Specification Section number on bottom of spine. Indicate volume number for multiple-volume sets.
 - 2. Dividers: Heavy-paper dividers with plastic-covered tabs for each section of the manual. Mark each tab to indicate contents. Include typed list of products and major components of equipment included in the section on each divider, cross-referenced to Specification Section number and title of Project Manual.

3. Protective Plastic Sleeves: Transparent plastic sleeves designed to enclose diagnostic software storage media for computerized electronic equipment. Enclose title pages and directories in clear plastic sleeves.
4. Supplementary Text: Prepared on 8-1/2-by-11-inch white bond paper.
5. Drawings: Attach reinforced, punched binder tabs on drawings and bind with text.
 - a. If oversize drawings are necessary, fold drawings to same size as text pages and use as foldouts.
 - b. If drawings are too large to be used as foldouts, fold and place drawings in labeled envelopes and bind envelopes in rear of manual. At appropriate locations in manual, insert typewritten pages indicating drawing titles, descriptions of contents, and drawing locations.

1.6 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 County.
 4. Date of submittal.
 5. Name and contact information for Contractor.
 6. Name and contact information for Construction Manager.
 7. Name and contact information for COR.
 8. Name and contact information for Commissioning Authority.
 9. Names and contact information for major consultants to the COR that designed the systems contained in the manuals.
 10. Cross-reference to related systems in other operation and maintenance manuals.
- C. Table of Contents: List each product included in manual, identified by product name, indexed to the content of the volume, and cross-referenced to Specification Section number in Project Manual.
 1. If operation or maintenance documentation requires more than one volume to accommodate data, include comprehensive table of contents for all volumes in each volume of the set.
- D. Manual Contents: Organize into sets of manageable size. Arrange contents alphabetically by system, subsystem, and equipment. If possible, assemble instructions for subsystems, equipment, and components of one system into a single binder.

- 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."

1.7 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.

1.8 EMERGENCY MANUALS

- A. Emergency Manual: Assemble a complete set of emergency information indicating procedures for use by emergency personnel and by County'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 County'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.

1.9 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 County'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.

1.10 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 County'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.
- 1.11 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 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. 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 017823

SECTION 017839 - PROJECT RECORD DOCUMENTS

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. Section includes administrative and procedural requirements for project record documents, including the following:
 - 1. Record Drawings.
 - 2. Record Specifications.
 - 3. Record Product Data.
 - 4. Miscellaneous record submittals.
- B. Related Requirements:
 - 1. Section 017300 "Execution" for final property survey.
 - 2. Section 017700 "Closeout Procedures" for general closeout procedures.
 - 3. Section 017823 "Operation and Maintenance Documentation" for operation and maintenance manual requirements.

1.3 CLOSEOUT SUBMITTALS

- A. Record Drawings: Comply with the following:
 - 1. Number of Copies: Submit one set(s) of marked-up record prints.
 - 2. Number of Copies: Submit one set of record Drawings to the County.
 - a. Initial Submittal:
 - 1) Submit one paper-copy set(s) of marked-up record prints.
 - 2) Submit PDF electronic files of scanned record prints and one of file prints.
 - 3) Submit record digital data files and one set(s) of plots.
 - 4) Contracting Officer's Representative (COR) will indicate whether general scope of changes, additional information recorded, and quality of drafting are acceptable.
 - b. Final Submittal:
 - 1) Submit one paper-copy set(s) of marked-up record prints.
 - 2) Submit record digital data files and three set(s) of record digital data file plots.
 - 3) Plot each drawing file, whether or not changes and additional information were recorded.

- B. Record Specifications: Submit one paper copy of Project's Specifications, including addenda and contract modifications.
- C. Record Product Data: Submit one paper copy 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.
- D. Miscellaneous Record Submittals: See other Specification Sections for miscellaneous record-keeping requirements and submittals in connection with various construction activities. Submit one paper copy of each submittal.
- E. Reports: Submit written report weekly indicating items incorporated into project record documents concurrent with progress of the Work, including revisions, concealed conditions, field changes, product selections, and other notations incorporated.

1.4 RECORD DRAWINGS

- A. Record Prints: Maintain one set of marked-up paper copies of the Contract Drawings and Shop Drawings, incorporating new and revised drawings as modifications are issued.
 - 1. Preparation: Mark record prints to show the 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 the markup before enclosing concealed installations.
 - e. Cross-reference record prints to corresponding photographic documentation.
 - 2. Content: Types of items requiring marking include, but are not limited to, the 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 COR's written orders.
 - j. Details not on the original Contract Drawings.
 - k. Field records for variable and concealed conditions.
 - l. Record information on the Work that is shown only schematically.
 - 3. Mark the Contract Drawings and Shop Drawings completely and accurately. Use 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 the 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.
- B. Record Digital Data Files: Immediately before inspection for Certificate of Substantial Completion, review marked-up record prints with COR. When authorized, prepare a full set of corrected digital data files of the Contract Drawings, as follows:
1. Format: Same digital data software program, version, and operating system as the original Contract Drawings.
 2. Format: DWG, Version 2019, Microsoft Windows operating system.
 3. Format: Annotated PDF electronic file with comment function enabled.
 4. Incorporate changes and additional information previously marked on record prints. Delete, redraw, and add details and notations where applicable.
 5. Refer instances of uncertainty to COR for resolution.
 6. COR will furnish Contractor with one set of digital data files of the Contract Drawings for use in recording information.
 - a. See Section 013100 "Project Management and Coordination" for requirements related to use of COR's digital data files.
 - b. COR will provide data file layer information. Record markups in separate layers.
- C. Format: Identify and date each record Drawing; include the designation "PROJECT RECORD DRAWING" in a prominent location.
1. Record Prints: Organize record prints into manageable sets. Bind each set with durable paper cover sheets. Include identification on cover sheets.
 2. Format: Annotated PDF electronic file with comment function enabled.
 3. Record Digital Data Files: Organize digital data information into separate electronic files that correspond to each sheet of the Contract Drawings. Name each file with the sheet identification. Include identification in each digital data file.
 4. Identification: As follows:
 - a. Project name.
 - b. Date.
 - c. Designation "PROJECT RECORD DRAWINGS."
 - d. Name of COR.
 - e. Name of Contractor.

1.5 RECORD SPECIFICATIONS

- A. Preparation: Mark Specifications to indicate the actual product installation where installation varies from that indicated in Specifications, addenda, and contract modifications.
1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
 2. Mark copy with the proprietary name and model number of products, materials, and equipment furnished, including substitutions and product options selected.
 3. Record the name of manufacturer, supplier, Installer, and other information necessary to provide a record of selections made.
 4. For each principal product, indicate whether record Product Data has been submitted in operation and maintenance manuals instead of submitted as record Product Data.

5. Note related Change Orders, record Product Data, and record Drawings where applicable.

- B. Format: Submit record Specifications as paper copy.

1.6 RECORD PRODUCT DATA

- A. Recording: Maintain one copy of each submittal during the construction period for project record document purposes. Post changes and revisions to project record documents as they occur; do not wait until end of Project.
- B. Preparation: Mark Product Data to indicate the 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 the product delivered to Project site and changes in manufacturer's written instructions for installation.
 3. Note related Change Orders, record Specifications, and record Drawings where applicable.
- C. Format: Submit record Product Data as paper copy.
 1. Include record Product Data directory organized by Specification Section number and title, electronically linked to each item of record Product Data.

1.7 MISCELLANEOUS RECORD SUBMITTALS

- A. Assemble miscellaneous records required by other Specification Sections for miscellaneous record keeping and submittal in connection with actual performance of the Work. Bind or file miscellaneous records and identify each, ready for continued use and reference.
- B. Format: Submit miscellaneous record submittals as paper copy.
 1. Include miscellaneous record submittals directory organized by Specification Section number and title, electronically linked to each item of miscellaneous record submittals.

1.8 MAINTENANCE OF RECORD DOCUMENTS

- A. Maintenance of Record Documents: Store record documents in the field office apart from the 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 COR's reference during normal working hours.

PART 2 - PRODUCTS

PART 3 - EXECUTION

END OF SECTION 017839

SECTION 018200 - DEMONSTRATION AND TRAINING

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. Section includes administrative and procedural requirements for instructing County's personnel, including the following:
 - 1. Instruction in operation and maintenance of systems, subsystems, and equipment.
 - 2. Demonstration and training video recordings.
- B. Unit Price for Instruction Time: Length of instruction time will be measured by actual time spent performing demonstration and training in required location. No payment will be made for time spent assembling educational materials, setting up, or cleaning up.

1.3 INFORMATIONAL SUBMITTALS

- A. Instruction Program: Submit 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.
 - 1. Indicate proposed training modules using manufacturer-produced demonstration and training video recordings for systems, equipment, and products in lieu of video recording of live instructional module.
- B. Qualification Data: For videographer.
- 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.

1.4 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 Contracting Officer's Representative (COR).
 - d. Name of Construction Manager.
 - e. Name of Contractor.
 - f. Date of video recording.
2. Transcript: Prepared and bound in format matching operation and maintenance manuals. Mark appropriate identification on front and spine of each binder. Include a cover sheet with same label information as the corresponding video recording. Include name of Project and date of video recording on each page.
3. 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.
4. At completion of training, submit complete training manual(s) for County's use prepared in same paper and PDF file format required for operation and maintenance manuals specified in Section 017823 "Operation and Maintenance Documentation."

1.5 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 Section 014000 "Quality Requirements," experienced in operation and maintenance procedures and training.
- C. Videographer Qualifications: A professional videographer who is experienced photographing demonstration and training events similar to those required.
- D. Preinstruction Conference: Conduct conference at Project site to comply with requirements in Section 013100 "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.

1.6 COORDINATION

- A. Coordinate instruction schedule with County's operations. Adjust schedule as required to minimize disrupting County's operations and to ensure availability of County's personnel.
- 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 have been reviewed and approved by COR.

1.7 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. Systems and equipment operation manuals.
- c. Systems and equipment maintenance manuals.
- d. Product maintenance manuals.
- e. Project Record Documents.
- f. Identification systems.
- g. Warranties and bonds.
- h. 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.
- 1.8 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 Section 017823 "Operation and Maintenance Documentation."
 - B. Set up instructional equipment at instruction location.

1.9 INSTRUCTION

- A. Facilitator: Engage a qualified facilitator to prepare instruction program and training modules, to coordinate instructors, and to coordinate between Contractor and County for number of participants, instruction times, and location.
- B. Engage qualified instructors to instruct County's personnel to adjust, operate, and maintain systems, subsystems, and equipment not part of a system.
 - 1. COR will furnish an instructor to describe basis of system design, operational requirements, criteria, and regulatory requirements.
 - 2. County will furnish an instructor to describe County's operational philosophy.
 - 3. County 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 County, through COR, with at least seven 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 County. Remove instructional equipment. Restore systems and equipment to condition existing before initial training use.

1.10 DEMONSTRATION AND TRAINING VIDEO RECORDINGS

- A. General: Engage a qualified commercial videographer to record demonstration and training video recordings. Record each training module separately. Include classroom instructions and demonstrations, board diagrams, and other visual aids, but not student practice.
 - 1. At beginning of each training module, record each chart containing learning objective and lesson outline.
- B. Digital Video Recordings: Provide high-resolution, digital video in MPEG format, produced by a digital camera with minimum sensor resolution of 12 megapixels and capable of recording in full HD mode.
 - 1. Submit video recordings on CD-ROM or thumb drive.
 - 2. File Hierarchy: Organize folder structure and file locations according to Project Manual table of contents. Provide complete screen-based menu.
 - 3. File Names: Utilize file names based on name of equipment generally described in video segment, as identified in Project specifications.
 - 4. Contractor and Installer Contact File: Using appropriate software, create a file for inclusion on the equipment demonstration and training recording that describes the following for each Contractor involved on the Project, arranged according to Project Manual table of contents:

- a. Name of Contractor/Installer.
 - b. Business address.
 - c. Business phone number.
 - d. Point of contact.
 - e. Email address.
- C. Recording: Mount camera on tripod before starting recording, unless otherwise necessary to adequately cover area of demonstration and training. Display continuous running time.
 - 1. Film training session(s) in segments not to exceed 15 minutes.
 - a. Produce segments to present a single significant piece of equipment per segment.
 - b. Organize segments with multiple pieces of equipment to follow order of Project Manual table of contents.
 - c. Where a training session on a particular piece of equipment exceeds 15 minutes, stop filming and pause training session. Begin training session again upon commencement of new filming segment.
- D. Light Levels: Verify light levels are adequate to properly light equipment. Verify equipment markings are clearly visible prior to recording.
 - 1. Furnish additional portable lighting as required.
- E. Narration: Describe scenes on video recording by audio narration by microphone while video recording is recorded. Include description of items being viewed.
- F. Transcript: Provide a transcript of the narration. Display images and running time captured from videotape opposite the corresponding narration segment.
- G. Preproduced Video Recordings: Provide video recordings used as a component of training modules in same format as recordings of live training.

PART 2 - PRODUCTS

PART 3 - EXECUTION

END OF SECTION 017900

SECTION 024119 - SELECTIVE DEMOLITION

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. Demolition and removal of selected portions of building or structure.
 - 2. Demolition and removal of selected site elements.
 - 3. Salvage of existing items to be reused or recycled.

- B. Related Requirements:

- 1. Section 011000 "Summary" for restrictions on the use of the premises, County-occupancy requirements, and phasing requirements.
 - 2. Section 017300 "Execution" for cutting and patching procedures.

1.3 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: Carefully detach from existing construction, in a manner to prevent damage, and deliver to County ready for reuse.
- C. Remove and Reinstall: Detach items from existing construction, prepare for reuse, and reinstall where indicated.
- D. Existing to Remain: Existing items of construction that are not to be permanently removed and that are not otherwise indicated to be removed, removed and salvaged, or removed and reinstalled.

1.4 MATERIALS OWNERSHIP

- A. Unless otherwise indicated, demolition waste becomes property of Contractor.

1.5 PREINSTALLATION MEETINGS

- A. Pre-demolition Conference: Conduct conference at Project site.
 - 1. Inspect and discuss condition of construction to be selectively demolished.
 - 2. Review structural load limitations of existing structure.

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.

1.6 INFORMATIONAL SUBMITTALS

- A. Proposed Protection Measures: Submit report, including drawings, that indicates the measures proposed for protecting individuals and property, for environmental protection, for dust control and, for noise control. Indicate proposed locations and construction of barriers.
- B. 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 County's on-site operations are uninterrupted.
 2. Interruption of utility services. Indicate how long utility services will be interrupted.
 3. Coordination for shutoff, capping, and continuation of utility services.
 4. Use of elevator and stairs.
 5. Coordination of County's continuing occupancy of portions of existing building and of County's partial occupancy of completed Work.
- C. Inventory: Submit a list of items to be removed and salvaged and deliver to County prior to start of demolition.
- D. Predemolition Photographs or Video: Submit before Work begins.
- E. Warranties: Documentation indicated that existing warranties are still in effect after completion of selective demolition.

1.7 CLOSEOUT SUBMITTALS

- A. Inventory: Submit a list of items that have been removed and salvaged.
- B. Landfill Records: Indicate receipt and acceptance of hazardous wastes by a landfill facility licensed to accept hazardous wastes.

1.8 FIELD CONDITIONS

- A. County will occupy portions of building immediately adjacent to selective demolition area. Conduct selective demolition so County's operations will not be disrupted.
- B. Conditions existing at time of inspection for bidding purpose will be maintained by County as far as practical.
 1. Before selective demolition, County will remove the following items:
 - a. Free-standing Furniture.
 - b. Whiteboards and Chalkboards.

- C. Notify Contracting Officer's Representative (COR) of discrepancies between existing conditions and Drawings before proceeding with selective demolition.
- D. Storage or sale of removed items or materials on-site is not permitted.
- E. 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 WARRANTY

- A. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during selective demolition, by methods and with materials so as not to void existing warranties. Notify warrantor before proceeding. Existing warranties include the following:
 - 1. Roof.
- B. Notify warrantor on completion of selective demolition, and obtain documentation verifying that existing system has been inspected and warranty remains in effect. Submit documentation at Project closeout.

PART 2 - PRODUCTS

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify that utilities have been disconnected and capped before starting selective demolition operations.
- B. Review record documents of existing construction provided by County. County does not guarantee that existing conditions are same as those indicated in record documents.
- C. Survey existing conditions and correlate with requirements indicated to determine extent of selective demolition required.
- 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 COR.
- E. Survey of Existing Conditions: Record existing conditions by use of measured drawings preconstruction photographs.
 - 1. Inventory and record the condition of items to be removed and salvaged. Provide photographs of conditions that might be misconstrued as damage caused by salvage operations.
 - 2. Before selective demolition or removal of existing building elements that will be reproduced or duplicated in final Work, make permanent record of measurements, materials, and construction details required to make exact reproduction.

3.2 UTILITY SERVICES AND MECHANICAL/ELECTRICAL SYSTEMS

- A. Existing Services/Systems to Remain: Maintain services/systems indicated to remain and protect them against damage.
 - 1. Comply with requirements for existing services/systems interruptions specified in Section 011000 "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 electrical and HVAC systems, equipment, and components indicated to be removed.
 - a. Equipment to Be Removed: Disconnect and cap services and remove equipment.
 - b. Equipment to Be Removed and Reinstalled: Disconnect and cap services and remove, clean, and store equipment; when appropriate, reinstall, reconnect, and make equipment operational.
 - c. Equipment to Be Removed and Salvaged: Disconnect and cap services and remove equipment and deliver to County.
 - d. Ducts to Be Removed: Remove portion of ducts indicated to be removed and plug remaining ducts with same or compatible ductwork material.

3.3 PREPARATION

- 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 Section 015000 "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 Section 015000 "Temporary Facilities and Controls."

3.4 SELECTIVE DEMOLITION, GENERAL

- A. General: Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:
1. Proceed with selective demolition systematically, from higher to lower level. Complete selective demolition operations above each floor or tier before disturbing supporting members on the next lower level.
 2. 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.
 3. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
 4. Do not use cutting torches until work area is cleared of flammable materials. At concealed spaces, such as duct and pipe interiors, verify condition and contents of hidden space before starting flame-cutting operations. Maintain fire watch and portable fire-suppression devices during flame-cutting operations.
 5. Maintain adequate ventilation when using cutting torches.
 6. Remove decayed, vermin-infested, or otherwise dangerous or unsuitable materials and promptly dispose of off-site.
 7. Remove structural framing members and lower to ground by method suitable to avoid free fall and to prevent ground impact or dust generation.
 8. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
 9. Dispose of demolished items and materials promptly. Comply with requirements in Section 017419 "Construction Waste Management and Disposal."
- 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 County.
 4. Transport items to County's storage area designated by County.
 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.
 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 COR, 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 DISPOSAL OF DEMOLISHED MATERIALS

- A. General: Except for items or materials indicated to be recycled, reused, salvaged, reinstalled, or otherwise indicated to remain County'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.
 - 3. Remove debris from elevated portions of building by chute, hoist, or other device that will convey debris to grade level in a controlled descent.
 - 4. Comply with requirements specified in Section 017419 "Construction Waste Management and Disposal."
- B. Burning: Do not burn demolished materials.
- C. Disposal: Transport demolished materials off County's property and legally dispose of them.

3.6 CLEANING

- 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.

END OF SECTION 024119

SECTION 078413 - PENETRATION FIRESTOPPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Penetrations in fire-resistance-rated walls.
 - 2. Penetrations in horizontal assemblies.
 - 3. Penetrations in smoke barriers.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Product Schedule: For each penetration firestopping system. Include location and design designation of qualified testing and inspecting agency.
 - 1. 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.

1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For qualified Installer.
- B. Installer Certificates: From Installer indicating penetration firestopping has been installed in compliance with requirements and manufacturer's written recommendations.
- C. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for penetration firestopping.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: A firm experienced in installing penetration firestopping similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful performance. Qualifications include having the necessary experience, staff, and training to install manufacturer's products per specified requirements. Manufacturer's willingness to sell its penetration firestopping products to Contractor or to Installer engaged by Contractor does not in itself confer qualification on buyer.
- B. Fire-Test-Response Characteristics: Penetration firestopping shall comply with the following requirements:
 - 1. Penetration firestopping tests are performed by a qualified testing agency acceptable to authorities having jurisdiction.
 - 2. Penetration firestopping is identical to those tested per testing standard referenced in "Penetration Firestopping" Article. Provide rated systems complying with the following requirements:
 - a. Penetration firestopping products bear classification marking of qualified testing and inspecting agency.
- C. Preinstallation Conference: Conduct conference at Project site.

1.6 PROJECT CONDITIONS

- A. Environmental Limitations: Do not install penetration firestopping when ambient or substrate temperatures are outside limits permitted by penetration firestopping manufacturers or when substrates are wet because of rain, frost, condensation, or other causes.
- B. Install and cure penetration firestopping per manufacturer's written instructions using natural means of ventilations or, where this is inadequate, forced-air circulation.

1.7 COORDINATION

- A. Coordinate construction of openings and penetrating items to ensure that penetration firestopping is installed according to specified requirements.
- B. Coordinate sizing of sleeves, openings, core-drilled holes, or cut openings to accommodate penetration firestopping.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Grace Construction Products.

2. Hilti, Inc.
3. 3M Fire Protection Products.
4. Tremco, Inc.; Tremco Fire Protection Systems Group.
5. USG Corporation.

2.2 PENETRATION FIRESTOPPING

- 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.
- 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-barrier walls, smoke-barrier walls 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.
- D. Penetrations in Smoke Barriers: 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.
- E. W-Rating: Provide penetration firestopping showing no evidence of water leakage when tested according to UL 1479.
- F. 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.
- G. Accessories: Provide components for each penetration firestopping system that are needed to install fill materials and to maintain ratings required. Use only those components specified by penetration firestopping manufacturer and approved by qualified testing and inspecting agency for firestopping indicated.
 1. Substrate primers.
 2. Collars.

2.3 MIXING

- A. For those products requiring mixing before application, comply with penetration firestopping manufacturer's written instructions for accurate proportioning of materials, water (if required), type of mixing equipment, selection of mixer speeds, mixing containers, mixing time, and other items or procedures needed to produce products of uniform quality with optimum performance characteristics for application indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Installer present, for compliance with requirements for opening configurations, penetrating items, substrates, and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Surface Cleaning: Clean out openings immediately before installing penetration firestopping to comply with manufacturer's written instructions and with the following requirements:
 - 1. Remove from surfaces of opening substrates and from penetrating items foreign materials that could interfere with adhesion of penetration firestopping.
 - 2. Clean opening substrates and penetrating items to produce clean, sound surfaces capable of developing optimum bond with penetration firestopping. Remove loose particles remaining from cleaning operation.
 - 3. Remove laitance and form-release agents from concrete.
- B. Priming: Prime substrates where recommended in writing by manufacturer using that manufacturer's recommended products and methods. Confine primers to areas of bond; do not allow spillage and migration onto exposed surfaces.
- C. Masking Tape: Use masking tape to prevent penetration firestopping from contacting adjoining surfaces that will remain exposed on completion of the Work and that would otherwise be permanently stained or damaged by such contact or by cleaning methods used to remove stains. Remove tape as soon as possible without disturbing firestopping's seal with substrates.

3.3 INSTALLATION

- A. General: Install penetration firestopping to comply with manufacturer's written installation instructions and published drawings for products and applications indicated.
- B. Install forming materials and other accessories of types required to support fill materials during their application and in the position needed to produce cross-sectional shapes and depths required to achieve fire ratings indicated.

1. After installing fill materials and allowing them to fully cure, remove combustible forming materials and other accessories not indicated as permanent components of firestopping.
- C. Install fill materials for firestopping by proven techniques to produce the following results:
1. Fill voids and cavities formed by openings, forming materials, accessories, and penetrating items as required to achieve fire-resistance ratings indicated.
 2. Apply materials so they contact and adhere to substrates formed by openings and penetrating items.
 3. For fill materials that will remain exposed after completing the Work, finish to produce smooth, uniform surfaces that are flush with adjoining finishes.

3.4 IDENTIFICATION

- A. Identify penetration firestopping with preprinted 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 firestopping. Use mechanical fasteners or self-adhering-type labels with adhesives capable of permanently bonding labels to surfaces on which labels are placed. Include the following information on labels:
1. The words "Warning - Penetration Firestopping - Do Not Disturb. Notify Building Management of Any Damage."
 2. Contractor's name, address, and phone number.
 3. Designation of applicable testing and inspecting agency.
 4. Date of installation.
 5. Manufacturer's name.
 6. Installer's name.

3.5 CLEANING AND PROTECTION

- A. Clean off excess fill materials adjacent to openings as the Work progresses by methods and with cleaning materials that are approved in writing by penetration firestopping manufacturers and that do not damage materials in which openings occur.

END OF SECTION 078413

SECTION 230500 - BASIC MECHANICAL MATERIALS AND METHODS

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

- A. Requirements of this Section are applicable to work in Division 23.
- B. Contract Documents
 - 1. Unless otherwise modified, drawings and general provisions of the Contract, including provisions of General Conditions, Supplementary Conditions, Division 00, and Division 01 govern work under Division 23.
 - 2. Contract drawings for mechanical work are diagrammatic, intended to convey scope and general arrangement.
 - 3. Refer questions involving document interpretation or discrepancies to Contracting Officer Representative (COR) for review and direction.
 - 4. Correct faulty work due to resolving discrepancies without proper approval.
 - 5. Specifications establish quality of materials, equipment, workmanship and methods of construction.
 - 6. Follow drawings and specifications in laying out work. Consult other applicable contract drawings and specifications, become familiar with conditions affecting work.
- C. Scope
 - 1. The work in Division 23 includes furnishing and installing the mechanical work complete and ready for satisfactory service.
 - 2. Requirements specified govern work in all sections of Division 23.
 - 3. Some of the work described in this section is also applicable to the scope of Division 26.

1.2 RELATED DIVISIONS

- A. Division 01 – General Requirements
- B. Division 02 – Existing Conditions
- C. Division 26 – Electrical

1.3 QUALITY ASSURANCE

- A. Regulations: Comply with regulations of NFPA, Maryland, Howard County, and municipal building ordinances, and other applicable codes and regulations.
- B. Provide UL label on electric powered equipment or certification that equipment has been tested by a testing agency approved by the local authority as equivalent in safety to UL labeled equipment.
- C. Material and Equipment Requirements
 - 1. Use products of one manufacturer where two or more items of same kind of equipment are required.
 - 2. Materials and equipment shall have a record of one-year successful field use.

3. For certain items of equipment, the specification and the project design are based upon the specified manufacturer's product. Other manufacturers' names are listed. Contractor may purchase, conditional upon meeting project requirements, equipment from the listed manufacturers.
 4. Only the manufacturer's equipment upon which, the specification and the project design has been based, has been checked for this project. Check allocated space and structure for suitability of equipment of other listed manufacturers, including parts replacement and servicing.
 5. Basis of Design Products: Where the Specifications or Drawings name a specific manufacturer's product accompanied by the words "Basis of Design," including make or model number or other designation, provide the specified or indicated product or a comparable product by one of the other named manufacturers. Naming of a Basis of Design product is intended to establish the significant qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics for purposes of evaluating comparable products of additional manufacturers named in the specification. The drawings indicate the general size, configuration, location, connections and/or support for equipment or systems specified with relation to the other building systems.
- D. Workmanship
1. Remove and replace, at no extra cost, work not in conformance with contract requirements.
 2. Coordinate work and cooperate with other trades to facilitate execution of work.
- E. Coordination with Other Trades
1. Contractor shall give full cooperation and coordination with other trades and shall furnish any information necessary to permit the work of all trades to be installed satisfactorily with the least possible interference or delay.
 2. The Contractor shall furnish to other trades, as required, all necessary templates, patterns, setting plans and shop details for the proper installation of the work and for the purpose of coordination adjacent work.
- F. Asbestos or asbestos-containing materials shall not be utilized or allowed on this project. The Contractor shall be rigorous in assuring that all materials, equipment, systems, and components do not contain asbestos. Any deviations from this exclusion shall be remedied at the Contractor's expense without regard to prior submittal approvals.
- G. Access: The Contractor shall specifically consider all materials and equipment installations and shall coordinate with the work of all trades to insure easy and unobstructed accessibility of all systems for operations, maintenance, repairs, and replacement. Installation of all specified materials and equipment including but not limited to, equipment, supports, ductwork, pipe, electrical conduit and controls shall be in a manner which will allow complete unobstructed access to all panels, access doors, filter racks, control boxes, controls actuators, sensors, valves, tube bundles and all other items requiring access for operations or maintenance. All items such as controls, actuators and valves which require servicing or manual operations for system use shall be located such as to be accessible without standing on other equipment, whenever it is possible or practical. Any installation of new equipment or materials which causes problems related to access of new or existing equipment shall be disapproved by the COR and re-accomplished by the Contractor.
- H. Structural Steel Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M.

1.4 ACTION SUBMITTALS

- A. Manufacturer's technical product data, installation instructions and description of accessories for each type to be used and system designation:
1. Access Panels.
 2. Motors and power factor correction capacitors (submit under section specifying related equipment).
 3. Operating and maintenance manuals.
 4. Statement of field instruction completion.

1.5 INFORMATIONAL SUBMITTALS

Welding certificates.

1.6 APPLICABLE PUBLICATIONS

The publications listed in this section form a part of this specification to the extent referenced. The publications are referenced in the text by the basic designation.

1.7 PROJECT CONDITIONS

- A. References: References to standards, codes, catalogs and recommendations are latest edition in effect on date of invitation to bid.
- B. Refer to applicable contract drawings and specifications pertaining to other Divisions for conditions affecting work.
- C. Definitions: The following are definitions of terms and expressions used in Division 23:
1. Concealed - Hidden from normal sight; includes work in crawl spaces, above ceilings, and in building shafts.
 2. Directed - directed by Contracting Officer.
 3. Ductwork - includes ducts, fittings, housings, dampers, supports and accessories comprising a system.
 4. Equal, equivalent - possessing the same performance qualities and characteristics and fulfilling the same utilitarian function.
 5. Exposed - not concealed.
 6. Piping - includes pipe, fittings, valves, supports and accessories comprising a system.
 7. Removable - detachable from the structure or system without physical alteration of materials or equipment and without disturbance to other construction.
 8. Review - limited observation or checking to ascertain general conformance with design concept of the work and with information given in contract documents. Such action does not constitute a waiver or alteration of the contract requirements.
- D. Refer to Division 01, "References" for additional definition of terms.

1.8 WARRANTY

Deliver to the COR certificates of equipment warranty extending beyond the guarantee period.

1.9 OPERATION AND MAINTENANCE REQUIREMENTS

Provide Operation and Maintenance Manuals in accordance with Section 017823, "Operation and Maintenance Documentation".

PART 2 - PRODUCTS

2.1 ACCESS PANELS

- A. Steel: Prime coated, flush screwdriver operated cam action lock. Minimum size 12 by 16 inches, except as otherwise specified. In acoustical tile ceilings, size to fit full tiles but minimum size 12 by 24 inches; panels shall conform to architectural ceiling panel pattern.
- B. Frame shall have anchor lugs for fastening to construction.
- C. Access panels in plaster and gypsum board surfaces shall be solid flush steel type with expanded metal lath spot welded in place. Frame shall have 2-inch wide lath plaster bond or for gypsum board, a joint compound bead.
- D. Provide UL "B" labeled doors or panels in walls and building elements constructed for a 2-hour fire resistant rating.
- E. Manufacturers: C.E. Sparrow (CESCO), Bilco, Elmdor, Karb, Milcor, Zurn, equal Milcor Styles AP, AT, K, M, and "B" label.

2.2 MOTORS AND ELECTRICALLY OPERATED EQUIPMENT

- A. References, Characteristics and Ratings
 - 1. Refer to Electrical Division for requirements of electrical work including starters specified in the Mechanical Divisions.
 - 2. Provide motors and other equipment requiring electrical power or control service suitable for the electrical characteristics indicated on the Electrical Drawings.
 - 3. Horsepower ratings indicated are for manufacturer's equipment upon which the specification is based. Submit proposed deviations from these ratings for review by the COR. Pay costs incurred by deviations, which are permitted.
 - 4. Provide motor rated for 200 volts for 208-volt service. Provide 230 and 460 volt rated motors for 240 and 480 volt service.
 - 5. Brake horsepower rating at specified duty shall not exceed 85 percent of nameplate horsepower rating times NEMA service factor for motors with 1.15 service factor except where other limits are stated for certain equipment, i.e. fans, the maximum load percentage shall be as stated under that equipment times the 1.15 service factor
 - 6. Motors controlled by variable frequency drive (VFD) controllers shall be inverter type motors, compatible and suitable for operation with the VFD provided for this project.

- a. Horsepower ratings of VFD shall be same as motor.
- b. Provide motor with a maintenance free, circumferential, conductive micro fiber shaft grounding ring equal to Electro Static Technology Aegis SGR bearing protection ring to discharge shaft currents to ground.

B. Overload Protection

1. Protect each motor, either individually mounted or in unitary equipment, with overload devices such as fuses, thermal cutouts, or thermal protectors installed in each ungrounded conductor serving each motor. Mount these overload devices in the motor controller or in a control panel in unitary equipment.
2. For equipment that requires the use of fuses, provide the proper size and type of fuses mounted on accessible fuse blocks, integral to the equipment, wired in accordance with applicable codes.

C. Construction

1. Construct motors in accordance with NEMA Standard Publication MG-1, latest edition, and the applicable IEEE standards.
2. Frame sizes in accordance with NEMA Standard MG-1 and MG-13, latest editions.
3. Starting torque, NEMA Design B, 2-4 percent slip.
4. Starting (locked rotor) kVA as required by the driven equipment. On motors with a locked rotor indicating code letter of "F" or higher, the manufacturer shall notify the electrical contractor for circuit breaker adjustment in accordance with Division 26, "Electrical."
5. Indoor, General Use: Open dripproof construction, 1.15 service factor.
6. Rotor: Random-wound, squirrel cage.

- D. Insulation: NEMA Insulation Class B for operation in 40 degrees C ambient; except NEMA Premium efficient motors and motors used in conjunction with variable frequency drive controllers shall be NEMA Class F insulation with horsepower rating based on Class B rise. Where motors operate in a maximum ambient temperature above 40 degrees C, provide motors suitably designed for the ambient temperature indicated, employing a different class of insulation or having a change in frame size, i.e., the ambient temperature plus motor full load temperature rise plus 10 degrees C shall not exceed the temperature rating of the insulation system.

- E. Power Factor Correction Capacitors: Three-phase, rated for the applied circuit voltage, fused at 5 KVAR's and above. Employ non-PCB impregnated paper or film dielectric and insulation; installed in indoor dustproof NEMA Type 12, or outdoor NEMA Type 3R enclosure, depending on location; contain maximum of 3 gallons of a combustible insulating liquid; equipped with integral discharge resistors to reduce voltage to a maximum of 50 volts in three minutes.

Power factor correction capacitors shall be sized by the motor manufacturer. List the capacitor KVAR, the full load current of the motor-capacitor combination to enable proper sizing of the overload protection and the corrected power factor at no load and full load on the shop drawings for the equipment. Do not provide power factor correction capacitors for motors served by a variable frequency drive or motors with reduced voltage starting. Do not provide power factor correction capacitors for fans that have dual motors mounted on a single common shaft and with other drive arrangements that rotate both motors.

1. Individual single speed, non-reversing motors, 5 HP and larger, having a full load power factor of less than 90 percent, shall be supplied by the equipment supplier, with power factor correcting capacitors that correct the full load power factor of the circuit to a minimum of 90 percent and the no load power factor to a maximum of unity.

2. On single speed, non-reversing motors started by reduced voltage controllers such as star-delta, auto transformer, primary resistor, etc., provide necessary contactors and interlocks to prevent insertion of capacitor until controller and motor are operating in the full run mode. Full load power factor of the circuit shall be a minimum of 90 percent.
3. Provide multiple speed motors with capacitors for the full speed mode. Provide necessary contactors and interlocks to permit insertion only on the full speed mode. Full load, full speed power factor of the circuit shall be a minimum of 90 percent.
4. On package or unitized equipment on which motors and controls are factory wired up to a point or points of power connection, install and connect power factor correction capacitors to the motor circuits between the starters and the motors, as part of the factory supplied assembly.

F. Single Phase Motors

1. 1/6 Horsepower or Less: Split phase capacitor start, permanent split capacitor or resistance start, capacitor run.
2. 1/4 and 1/3 Horsepower: Capacitor starts.
3. Bearings: "Life-time" sealed ball bearing type, oilable ball bearing or sleeve type.
4. High efficiency energy saving type with a minimum efficiency of 70 percent and a minimum full load power factor of 77 percent.

G. Three Phase Motors:

1. NEMA Premium efficiency polyphase induction type.
2. Minimum full load power factor before power factor correction of horizontal and vertical shaft motors shall be as follows:

HP	RPM	POWER FACTOR
1/2	3600 and 1800	70 Percent
3/4	3600 and 1800	70 Percent
1, 1-1/2 and 2	3600 and 1800	79 Percent
3 to 30	3600 and 1800	85 Percent

3. Minimum efficiency (in percent) of horizontal and vertical shaft motors shall be follows:

Open Dripproof (ODP) Motors

HP	1200 RPM	1800 RPM	3600 RPM
	Minimum Full Load Efficiency (%) (6-Pole)	Minimum Full Load Efficiency (%) (4-Pole)	Minimum Full Load Efficiency (%) (2-Pole)
1	82.5	85.5	77.0
1-1/2	86.5	86.5	84.0
2	87.5	86.5	85.5
3	88.5	89.5	85.5
5	89.5	89.5	86.5
7-1/2	90.2	91.0	88.5
10	91.7	91.7	89.5

15	91.7	93.0	90.2
20	92.4	93.0	91.0
25	93.0	93.6	91.7
30	93.6	94.1	91.7

NOTE: Efficiencies are nameplate ratings and must be tested in accordance with IEEE Standard 112, Method B.

Totally Enclosed Fan Cooled (TEFC) Motors

HP	1200 RPM	1800 RPM	3600 RPM
	Minimum Nominal Efficiency (%)	Minimum Nominal Efficiency (%)	Minimum Nominal Efficiency (%)
1	82.5	85.5	77.0
1-1/2	87.5	86.5	84.0
2	88.5	86.5	85.5
3	89.5	89.5	86.5
5	89.5	89.5	88.5
7-1/2	91.0	91.7	89.5
10	91.0	91.7	90.2
15	91.7	92.4	91.0
20	91.7	93.0	91.0
25	93.0	93.6	91.7
30	93.0	93.6	91.7

NOTE: Efficiencies are nameplate ratings and must be tested in accordance with IEEE Standard 112, Method B.

- Measure motor efficiencies as tested in accordance with ANSI/IEEE Standard 112, Test Method B. Do not extrapolate efficiencies from other data. Measure each horsepower rated size. Submit test data from certified independent testing laboratory of standard manufacturer run per horsepower rated size.

H. Bearings and Bases

- Motors 1/2 through 2 Horsepower: Sealed "life-time" ball bearing or regreaseable ball bearing type with minimum life of 25,000 hours under "V" belt load conditions.
- Motors 3 through 30 Horsepower: Anti-friction bearings sized for a minimum life of 25,000 hours under "V" belt load conditions or a minimum life of 100,000 hours for a direct connected load. House bearings in a re-greaseable race with provision for purging old grease. Preload bearings with a bearing load spring to minimize noise and increase bearing life.
- Motors for Belt Drive: Cast iron or steel base with slide rails having screw adjustments.

2.3 HANGER ATTACHMENT - Application and Type

- Concrete (New): Iron or steel inserts. Expander type anchors, specified for existing may be used provided concrete is clear of conduit for drilled depth.
- Concrete (Existing): Double plated expander type anchors. Phillips, Hilti or approved equivalent. Loads shall not exceed 1/4 of tested pullout (or shear) strength.

- C. Steel Beams: Iron or steel beam clamps.
- D. Brick or Block Walls: Brackets fastened with self-drilling anchors or toggle bolts, light duty; or through bolts with backplates, heavy duty.

2.4 SLEEVES AND ESCUTCHEON PLATES

- A. Sleeves for Conduits - Material and Application
 - 1. Galvanized Standard Weight Steel Pipe:
 - a. Interior concrete walls.
 - b. Interior masonry walls
 - 2. 22 Gage Galvanized Steel:
 - a. Stud partitions.
 - b. Suspended plaster and gypsum board ceilings.
- B. Sleeves for Ductwork: 20 gage galvanized steel.
- C. Sealant: One part polysulfide, equivalent to Pecora Synthacaulk GC24 or polycarbonate, equivalent to Proseal 34 for general use.

PART 3 - EXECUTION

3.1 ACCESS PANELS

- A. Provide access panels or doors that are indicated or required for access to coils, fire dampers, smoke dampers, control devices, and to concealed mechanical and electrical devices which may require future inspection, repair or adjustment; and elsewhere as required by applicable codes.
- B. Use ceiling element as access panel in suspended metal pan, lay-in panel, and accessible tile ceilings.
- C. Attach a 1/4-inch diameter color-coded aluminum tag to exposed grid tees or ceiling elements used as access panels and recessed pan doors.
- D. Acoustic Tile Ceiling: Fit frame with anchoring devices for suspension system.

3.2 MOTORS AND ELECTRICALLY OPERATED EQUIPMENT

- A. Align motor, drives, and driven equipment to avoid excessive strain or wear.
- B. Check belt tension with a tension tester for the deflection force recommended by the manufacturer. Check and adjust tension after several minutes operation and then after eight hours of operation.
- C. Power factor correction capacitors for individual motors are installed and connected under the Electrical Division. Coordinate with the Electrical Contractor.

- D. Install shaft grounding ring on shaft of motors served by variable speed drives in accordance with manufacturer's recommendations and instructions.

3.3 HANGER ATTACHMENT

Select and install structural attachments for hangers supporting pipes, ducts, conduit and equipment adequately for stresses to which they may be subject and for proper distribution of load to building structural members.

3.4 SLEEVES AND ESCUTCHEON PLATES

- A. Install sleeves for pipes and conduits passing through plaster ceilings, gypsum board ceilings, walls, partitions, air handling unit casings, structural members, and other building parts. Install sleeves in time to permit construction progress as scheduled.
- B. Install sleeves for ducts passing through walls, plaster ceilings, gypsum board ceilings, and partitions as follows:
 - 1. Where Vermin Control is indicated.
 - 2. Walls with waterproofing.
 - 3. Fire-rated walls
- C. Install sleeves with length to pass through full thickness of construction.
- D. Provide 1/2-inch minimum clearance between sleeve and conduit, pipe, duct or covering. Center conduit, pipe or duct in sleeve unless otherwise indicated. Insulation thickness specified for use through sleeves requiring vermin proofing shall be as specified but not less than 1-inch minimum thickness. Refer to Section 230700 Mechanical Insulation.
- E. Install ends of sleeves flush with finished wall surfaces.
- F. Hem edges of duct sleeves extending above floor.
- G. Reinforce sleeves temporarily, if necessary, to preserve accurate shape without distortion during construction.
- H. Grout sleeves in and concrete walls into building structure to make joint watertight.
- I. Install escutcheon plates for conduits at ceilings, walls, and partitions in finished areas unless otherwise indicated.
 - 1. Fit escutcheons around conduit.
 - 2. Outside diameter shall cover sleeve.
- J. Pack annular space between sleeve and conduit or duct and voids between building construction and conduit, duct, or sleeves as follows:
 - 1. Firestop equal to U.S. Gypsum Thermafiber, caulked at both ends to manufacturer's recommended depth with sealant, for the following sleeve locations:
 - a. Where vermin control is indicated.
 - b. Walls with waterproofing.
 - 2. For the following locations, pack annular space between sleeve and conduit or duct and voids between building construction and conduit or duct sleeves with industrial felt equal

to U.S. Gypsum Thermafiber, caulked at both ends to manufacturer's recommended depth with sealant, or code approved firestopping foam, caulk, or putty that meets ASTM E-814 with UL classification. Sealants shall not contain toxic or flammable solvents and shall not produce toxic or flammable outgasing during any stage of application, curing, drying or fire conditions.

- a. Smoke Barriers.
 - b. Fire Rated Walls.
3. See Section 230700, "Mechanical Insulation," for fire stop insulation on pipes and ducts through sleeves.
- K. Prime surfaces prior to caulking to obtain good adhesion where recommended by sealant manufacturer.
- L. Vermin Control: Provide vermin control for conduits and ducts passing through ceilings, walls, and partitions.
- M. Leak Test: After allowing for a full cure, test sleeves and sleeve seals for leaks. Repair leaks and retest until no leaks exist.
- 1. Sleeves and sleeve seals will be considered defective if they do not pass tests and inspections.

3.5 PROJECT RECORD DOCUMENTS

Maintain at the site one set of black or blue line on white prints of drawings, copies of specifications, addenda, shop drawings reviewed by COR, change orders and other modifications in good order and marked in red ink to record changes made during construction. Deliver these in final complete form to the Contracting Officer upon completion of work.

3.6 MATERIAL AND EQUIPMENT LIST

- A. Submit for COR's review a list of subcontractors' and manufacturers' names for items proposed for the work within 15 days after award of the contract.
- B. Failure to submit list or name manufacturers acceptable to COR within time limit will result in COR selecting a list of manufacturers, and selection shall be binding upon Contractor.

3.7 SHOP DRAWINGS AND DESCRIPTIVE DATA

- A. Submit electronic copies, in accordance with Division 01 of manufacturer's shop drawings and descriptive data.
- B. Establish that the physical and functional character of each item including, size, type and required service access is suited for its intended location and use.
- C. Coordinate drawings and data before submitting and certify that provisions of the contract documents have been met.
- D. Call attention, in writing, to deviations from contract requirements.

- E. Do not fabricate, deliver to site, or install items requiring shop drawing review, until the review has been completed by the Contracting Officer and the shop drawing has been marked to indicate "No Exception Noted" or "Make Corrections Noted."
- F. Specifically identify pertinent project data on the shop drawings.
- G. Include Operation and Maintenance Data.
- H. Use only final or corrected drawings and data for construction.
- I. The COR's review of submittals shall not be construed as a complete check, but will indicate only that the general method of construction, materials, detailing and other information are satisfactory. Approval will not relieve the Contractor of the responsibility for any error which may exist, as the Contractor under the requirements of this contract is responsible for dimensions, the design of adequate connections and details, and the satisfactory construction of all work.

3.8 SITE EXAMINATION

Failure to visit site and become familiar with local conditions prior to bidding will not relieve the Contractor of his responsibility for complying with the Contract Documents.

3.9 PERMITS

- A. Obtain and pay for permits where required by air and water quality control regulations.
- B. Obtain and pay for required permits.

3.10 CUTTING AND PATCHING

- A. Unless otherwise directed, do cutting and patching. Repair damaged fireproofing and waterproofing to original or better condition.
- B. Do not cut walls, floors, reinforced concrete or structural steel without COR's permission. Install services without affecting reinforcing steel.

3.11 CLEANING UP

- A. Keep premises free from accumulation of debris.
- B. Remove tools, scaffolding, surplus material, debris, and leave premises broom clean.
- C. On discontinuance of part of the work, place debris in containers and promptly remove them from the County's property.

3.12 WORK IN EXISTING BUILDINGS

- A. Conditions of Occupancy

1. This building will be occupied during the life of this contract. Execute work in a manner to impose minimal interference with the normal functioning of the building and its occupants. When interference is unavoidable, schedule work 14 days in advance with the COR.
2. Make temporary connections where necessary to maintain uninterrupted electrical, plumbing, and heating service.
3. Provide adequate protection for the building, its contents, and occupants.
4. Perform work as quietly as possible to avoid unnecessary disturbance. Unusual precaution may be necessary in the conduct of work in some areas to achieve satisfactory compliance.
5. Coordinate with COR to perform sheet metal work, masonry demolition, or other work producing high noise levels, dust, or hazards to occupants in occupied areas.
6. Comply with regulations of COR pertaining to circulation, sanitation, and behavior of Contractor's personnel.
7. No impact driven piling shall be permitted. Minimum use of impact tools shall be limited to handheld tools and shall be scheduled 5 days in advance with COR.

B. Field Office, Storage, and Loading Facilities

1. Use only those toilet facilities designated by the COR for use by Contractor's personnel.
2. Store equipment and materials in areas designated by COR in a manner which will not (a) cause concentrations of weight potentially damaging to building structure, (b) impede normal building traffic, or (c) be a hazard to occupants.
3. Use only the entrance designated by the COR for delivery and removal of materials. Schedule deliveries and removals with the COR in advance. Unscheduled traffic must give precedence to COR's usage. Do not impede access through doorways and corridors with materials, containers, or parked conveyances.
4. Use only rubber wheeled wheelbarrows, dollies, or carts over finished floor.
5. Keep office, storage, and loading areas neat and clean.

C. Barricades

1. Erect temporary barriers for protection of occupants, building, and building contents.
2. Where partitions separating occupied areas must be cut, close hole with tight fitting temporary plywood closure panel, 1/2-inch minimum thickness, to form visual and acoustical barrier.
3. Protect exposed holes in floors in accordance with applicable codes and regulations.
4. Enclose dust-producing operations with plastic sheets or drop cloths to prevent the spread of dust into occupied areas. Maintain a negative pressure environment relative to the surrounding spaces.
 - a. Take the necessary precautions to prevent the spread of dust and dirt through the existing HVAC system, including outdoor intakes. Protect supply, return and exhaust air openings.

D. Alterations

1. Cut, alter, remove or temporarily remove and replace existing work necessary for installation of mechanical and associated electrical work. Maintain the necessary clearances for accessibility or compliance with code around existing equipment, devices, etc., that are to remain.
2. Verify dimensions of existing building elements pertaining to the installation of new work to assure physical compatibility prior to fabrication or installation.
3. Where the installation of new services or the extension of existing services requires cutting of existing floors, walls, partitions, etc., check for the presence of existing mechanical and electrical services within or immediately beneath construction and exercise necessary precautions to prevent damage to the service or injury to personnel

due to contact with same. Where practical, temporarily disconnect such existing service during the cutting operation. Schedule such outages in service with the COR, 14 days in advance.

E. Furnishings and Equipment

1. Identify, to the COR at the time work is scheduled, movable furnishings and equipment which interfere with the progress of the work.
2. Protect remaining furnishings and equipment in work area, both movable and fixed, with drop cloths, batting or other means to prevent damage.

F. Removal of Materials and Equipment

1. Remove promptly from the site, materials and equipment specified to be removed and not reinstalled or stored.
2. Unless otherwise indicated, removal of pipes, ducts, and equipment includes removal of accessories such as hangers, air outlets, piping connections, junction boxes, starters, etc. and all abandoned and non-operational mechanical system components within limits of the contract. Remove to source or, if concealed, to point of concealment, connections to mechanical equipment required to be removed or disconnected. Terminate connections behind finished surfaces and, if subject to movement, clear of building construction. Cap connections extending from ducts or piping remaining in service. Contractor shall mark all components to be removed and obtain confirmation from COR.

G. Cleaning Ductwork: Vacuum clean internally existing ductwork within twenty feet of ductwork modified/replaced under new work.

H. Connections to Existing Systems

1. Connect to existing systems as indicated.
2. Obtain permission from COR 14 days in advance if outage of service is necessary to make connections. See the Article titled, "Outages."
3. Repair insulation damaged at points of connection. Restore integrity of vapor barriers and surface finish.

3.13 PROTECTION

- A. Protect mechanical and electrical material and equipment from the elements or other injury as soon as delivered on premises.
- B. Cap or plug openings in equipment, duct, and conduit systems, to exclude dirt and other foreign material. Do not use rags, wool, cotton, paper, waste or similar materials for plugging.
- C. Existing components of the building and its systems shall be protected from damage. Any damage to these components shall be repaired or replaced to the satisfaction of the COR. Special care shall be taken with regards to insulation on existing piping and ductwork. Damaged insulation shall be replaced so that the vapor barrier and insulating characteristics of the material match those prior to damage taking place.

3.14 CLEANING OF SYSTEMS

- A. Clean fans, ductwork, enclosures, registers, grilles, and diffusers at completion of work.

- B. Pay for labor and materials required to locate and remove obstructions from systems clogged with construction refuse after acceptance. Replace and repair work disturbed during removal of obstructions.
- C. Install air filters of equal efficiency to those in permanent air systems operated for temporary heating or air balancing during construction. Replace with clean filters of same efficiency prior to acceptance and after cleaning of system.
 - 1. Replace existing filters in existing systems serving the renovated areas at the discretion of the COR that may have become loaded due to renovation work.
- D. Leave systems clean, and in complete running order.

3.15 EQUIPMENT SUPPORTS

- A. Provide equipment supports consisting of platforms, gratings, structural members, hangers, rods, racks, and incidental materials.
- B. Design and construct supporting structures of strength to safely withstand stresses to which they may be subjected and to properly distribute the load and impact over building areas.
- C. Ceiling Suspended Platforms: Construct with steel hangers. Brace and fasten to building structure.
- D. Wall Mounted Platforms: Construct with steel brackets.

3.16 OPERATING AND MAINTENANCE MANUAL

- A. Furnish manual bound and indexed containing:
 - 1. Brief description of each system and components.
 - 2. Starting and stopping procedures.
 - 3. Day/night changeover.
 - 4. Seasonal changeover
 - 5. Special operating instructions.
 - 6. Routine maintenance procedures.
 - 7. Schedule for periodic servicing and lubrication.
 - 8. Manufacturers' printed operating and maintenance instructions, parts lists, illustrations and diagrams.
 - 9. Manufacturers' Data Report Form U-1 certifying code compliance for equipment specified to be constructed in accordance with ASME Code for Unfired Pressure Vessels.
 - 10. One final or corrected reviewed copy of each shop drawing and Contractor's drawings.
 - 11. One copy of each wiring and piping diagram.
 - 12. One reviewed copy of certified test reports.
 - 13. Air balancing report.
 - 14. Product warranty information.
- B. Submit to COR for review at least 30 days prior to date it is expected system will be turned over to the County.
- C. After review by COR, submit three copies to the County and one to Engineer of Record.

3.17 FIELD INSTRUCTION

- A. Provide operating and maintenance staff demonstrations and training in accordance with Section 018200, "Demonstration and Training".
 - 1. Provide a walking tour, demonstrating all new mechanical equipment, system layout, routing and labeling.
- B. Upon completion of work, instruct County's representatives in the proper operation and maintenance of the mechanical and electrical systems.
- C. Instruction periods specified below shall be in addition to instructions specified for certain items elsewhere in the specifications.
- C. Instructions shall be given by persons expert in the operation and maintenance and shall be for a period of not less than 1 eight-hour day.
- D. Prepare statement(s) for signing by County's representative indicating date of completion of instructions and hours expended. Furnish copy of signed statement to Contracting Officer.

3.18 OUTAGES

- A. The purpose of this article is to establish standard procedures for requesting an outage for mechanical, electrical, or operational systems or services associated with the building and physical plant.
- B. An outage is defined as prohibiting or restricting a mechanical, electrical or operational service from routine operation (see attached outage request for service included). For purposes of repair, replacement or connection to an existing system, this standard shall be followed.
- C. All persons requesting an outage shall complete an "Outage Request Form" included at the end of this Section.
- D. Contractor shall submit, in writing with the "Outage Request Forms" a plan on the work to be performed during the outage, including length of time and reason the utility system must be shutdown. Contractor, in conjunction with the COR, shall research and identify all systems affected by Outage as well as locating and listing all components by tag or facility equipment number, and all the action required at each to achieve the outage. Submit written Plan and Outage Form 14 days in advance of requested outage to COR.
- E. All "Outage Request Forms" and the Outage Plan shall be reviewed by the construction foreman or superintendent for feasibility and necessity.
- F. The number and duration of all outages shall be minimized.
- G. A master outage list, with the approximate required dates, shall be submitted to the COR within 14 days from the commencement of work.
- H. All systems when shutdown, shall be tagged in accordance with OSHA lock-out/tag-out procedures.

3.19 ASBESTOS

Should any material resembling asbestos-containing materials be encountered during excavation of work, immediately notify COR for instructions before proceeding.

Attachments: Outage Request Form

END OF SECTION 230500

OUTAGE REQUEST FORM

DATE: _____

OUTAGE REQUESTED BY: _____

DEPARTMENT/COMPANY NAME: _____

PURPOSE OF OUTAGE: _____

DATE NEEDED: _____

BUILDING AFFECTED: _____**AREA WITHIN BUILDING TO BE AFFECTED:** _____**THE FOLLOWING SERVICES ARE REQUESTED TO BE REMOVED FROM SERVICE:**

_____ HOURS

- | | | |
|----|------------------------------|-----------------------------------|
| a. | ___ FIRE PROTECTION | ___ SPRINKLER |
| | | ___ HOSE CABINET/STANDPIPE SYSTEM |
| b. | ___ COLD WATER (DOMESTIC) | |
| c. | ___ SANITARY SEWER | |
| d. | ___ HOT WATER (DOMESTIC) | |
| e. | ___ STEAM | |
| i. | ___ AIR HANDLING SYSTEMS | |
| j. | ___ ELEVATOR | |
| k. | ___ NORMAL ELECTRIC POWER | ___ LIGHTING |
| | | ___ POWER |
| l. | ___ EMERGENCY ELECTRIC POWER | |
| n. | ___ NATURAL GAS | |

SECTION 230553 - IDENTIFICATION FOR MECHANICAL DUCTWORK AND EQUIPMENT

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

Identification labels, warning signs, stencils, and nameplates for ductwork and equipment; and wire markers.

1.2 RELATED DIVISIONS AND SECTIONS

- A. Division 01 - General Requirements
- B. Section 230500 - Basic Mechanical Materials and Methods
- C. Section 230923 - HVAC Instrumentation and Controls
- D. Section 232923 - Variable Frequency Drives
- E. Section 233113 – Duct and Duct Accessories

1.3 QUALITY ASSURANCE

- A. All work, materials, equipment, installation and accessories shall comply with the International Mechanical Code and all city,/county, state, and federal regulations.
- B. Comply with requirements of the following:
 - 1. ASME A13.1, Scheme for the Identification of Piping Systems.
 - 2. ANSI Z535.1, American National Standard for Safety Colors.

1.4 ACTION SUBMITTALS

- A. Submit in accordance with Division 01 and Section 230500, "Basic Mechanical Materials and Methods".
- B. Manufacturer's technical product data, including installation instructions, accessories, supports, fittings, finishes, construction details, and dimensions of assemblies and components:

Labels
Warning Signs
Nameplates
Wire Markers

1.5 APPLICABLE PUBLICATIONS

The publications form a part of this specification to the extent referenced and shall be the latest adopted date of the publication. The publications are referenced in the text by the basic designation.

1.6 PROJECT CONDITIONS

Provide all materials and perform all labor required for a complete identification system as indicated on the drawings and as specified.

PART 2 - PRODUCTS

2.1 EQUIPMENT NAMEPLATES

A. Metal Nameplates 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 metal plates, with predrilled or stamped holes for attachment hardware.
2. Minimum Nameplate Size: Length and width vary for required nameplate content, but not less than 2-1/2-by-3/4-inch.
3. Minimum Letter Size: 1/2-inch high block type, with capital white letters on a black background for name of units for viewing distances of 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.
 - a. Provide 1/2-inch high white letters on a red background for emergency operating instructions for viewing distances of 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.

B. Plastic Nameplates for Equipment:

1. Material and Thickness: Multilayer, laminated, multicolor, phenolic plates with beveled edges for mechanical engraving, 1/8 inch thick, with predrilled holes for attachment hardware.
2. Maximum Temperature: Able to withstand temperatures of up to 160 degrees F.
3. Minimum Nameplate Size: Length and width vary for required nameplate content, but not less than 2-1/2-by-3/4-inch.
4. Minimum Letter Size: Engraved 1/2-inch high block type, with capital white letters on a black background for name of units for viewing distances of 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.
 - a. Provide engraved 1/2-inch high white letters on red background for emergency operating instructions for viewing distances of 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.

C. Fasteners: Stainless steel rivets or self-tapping screws.

D. Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.

E. Nameplate Content: Include equipment's Drawing designation or unique equipment number.

F. Manufacturers: Brady, Brimar Industries, Craftmark Pipe Markers, Kolbi Pipe Markers, Seton.

2.2 WARNING SIGNS AND WARNING LABELS

- A. Material and Thickness: Multilayer, multicolor, plastic labels for mechanical engraving, 1/8-inch thick, with predrilled holes for attachment hardware.
- B. Maximum Temperature: Able to withstand temperatures of up to 160 degrees F.
- C. Minimum Label Size: Length and width vary for required label content, but not less than 2-1/2 by 3/4-inch.
- D. Minimum Letter Size: 1/2-inch for name of units for viewing distances of 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.
- E. Fasteners: Stainless steel rivets or self-tapping screws.
- F. Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.
- G. Arc-Flash Warning Signs: Provide arc-flash warning signs in locations and with content in accordance with requirements of OSHA and NFPA 70E, and other applicable codes and standards.
- H. Label Content: Include caution and warning information plus emergency notification instructions.
- I. Manufacturers: Brady, Brimar Industries, Craftmark Pipe Markers, Seton.

2.3 DUCT LABELS

- A. Preprinted, color coded duct labels, with lettering indicating service and showing flow direction in accordance with ASME A13.1 and ANSI Z535.1.
- B. Self-Adhesive Duct Labels: Printed plastic with contact-type, permanent-adhesive backing.
- C. Duct Label Contents: Include identification of ductwork service. Also include:
 - 1. Flow-Direction Arrows: Include flow-direction arrows on distribution ductwork. Arrows may be either integral with label or applied separately.
 - 2. Lettering Size: Size letters in accordance with ASME A13.1 for piping, however; not less than 1-inch for viewing distances of up to 72 inches and proportionately larger lettering for greater viewing distances.
- D. Manufacturer: Brady, Brimar Industries, Craftmark Pipe Markers, Kolbi Pipe Markers, Seton.

2.4 WARNING TAGS

- A. Preprinted accident-prevention tags of plasticized card stock with matte finish suitable for writing.
 - 1. Size: Approximately 4-by-7 inches.
 - 2. Fasteners: Brass grommet and wire.
Nomenclature: Large-size primary caption, such as "DANGER," "CAUTION," or "DO NOT OPERATE."

- B. Manufacturers: Brady, Craftmark Pipe Markers, Kolbi Pipe Markers, Seton.

2.5 WIRE MARKERS

- A. Self-sticking W. H. Brady Co. Perma Code wire markers.
- B. Manufacturers: Brady, Brimar Industries, Seton

PART 3 - EXECUTION

3.1 PREPARATION

Clean ductwork and equipment surfaces of incompatible primers, paints, and encapsulants, as well as dirt, oil, grease, release agents, and other substances that could impair bond of identification devices.

3.2 INSTALLATION, GENERAL REQUIREMENTS

- 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.
- D. Locate identifying devices so that they are readily visible from the point of normal approach.
- E. Protect finished identification to ensure that markings are clear and legible when project is turned over to the County.

3.3 INSTALLATION OF EQUIPMENT NAMEPLATES, WARNING SIGNS, AND WARNING LABELS

- A. Permanently fasten nameplates, signs, and labels on each item of mechanical equipment.
- B. Locate equipment labels where accessible and visible.
- C. Designate which items are main or standby.
- D. Equipment requiring identification:
 - Control Panels
 - Electric Duct Heaters
 - Reheat Coils
 - Variable Frequency Drives
- E. Electrical Items: Identify disconnect switches, starting devices, controls, control switches, pushbutton stations with nameplates.

- F. Arc-Flash Warning Signs: Provide arc-flash warning signs on electrical disconnects and other equipment where arc-flash hazard exists, as indicated on Drawings, and in accordance with requirements of OSHA and NFPA 70E, and other applicable codes and standards.

3.4 INSTALLATION OF DUCT LABELS

- A. Install self-adhesive duct labels showing service and flow direction with permanent adhesive on air ducts.

1. Provide labels in the following color codes:

DUCTWORK SERVICE	TEXT/BACKGROUND COLOR
Air Conditioning Return	White/Green
Air Conditioning Supply	White/Green
General Exhaust	Black/Yellow
Outdoor Air	White/Blue
Relief Air	White/Blue
Toilet Exhaust	Black/Yellow

- B. Duct-Label Locations: Locate duct labels where new ductwork 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. On each type of service.
2. Mains and principal branches of ductwork.
3. Within 3 feet of each control device.
4. Near each branch connection, excluding short take-offs.
5. At access doors, manholes, and similar access points that permit view of concealed ductwork.
6. Within 3 feet of equipment items and other points of origination and termination.
7. Near each point where ducts enter into and exit from concealed spaces and at maximum intervals of 20 feet where exposed or are concealed by removable ceiling system with a minimum of one marking per room. Reduce intervals to 10 feet in areas of congested piping, ductwork, and equipment.
8. At each side of penetration of walls, partitions and floors within one foot of penetration.

3.5 INSTALLATION OF WARNING TAGS

- A. Warning Tag Color: Black letters on an ANSI Z535.1 safety-yellow background.
- B. Attach warning tags, with proper message, to equipment and other items where applicable.

3.6 WIRE MARKERS

Identify control wires with wire markers.

END OF SECTION 230553

SECTION 230593 - TESTING, ADJUSTING, AND BALANCING

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

Preparation, testing, adjusting, and balancing of mechanical equipment and air distribution systems including inspection and certification reports.

1.2 RELATED DIVISIONS

- A. Division 01 – General Requirements
- B. Division 23 - Heating, Ventilating, and Air Conditioning
- C. Division 26 - Electrical

1.3 QUALITY ASSURANCE

- A. Agency shall be a member of the Associated Air Balance Council or the National Environmental Balancing Bureau.
- B. Perform work in accordance with AABC or NEBB National Standards.
- C. Certify that measurement instruments have been calibrated within 12 months prior to use on this project.
- D. Agency shall directly oversee work performed by it employing a competent supervisor subject to the approval of the Contracting Officer's Representative (COR).

1.4 SUBMITTALS

- A. Submit in accordance with Division 01 and Section 230500, "Basic Mechanical Materials and Methods".
- B. Qualifications of Personnel
- C. List of Instrumentation and Instrumentation Certification Report
- D. Proposed Work Schedule Outline
- E. Equipment Installation Inspection Report(s)
- F. Testing, Adjusting and Balancing Report

1.5 APPLICABLE PUBLICATIONS

The publications form a part of this specification to the extent referenced. The publications are referenced in the text by the basic designation.

1.6 PROJECT CONDITIONS

- A. Obtain applicable contract documents and copies of submittals for equipment and automatic control systems.
- B. After cleaning, prepare systems for proper operation. Systems shall be completely installed and in continuous operation before testing, adjusting and balancing (TAB) work is performed.

PART 2 - PRODUCTS**2.1 DUCTWORK TEST HOLE PLUGS**

Removable self-sealing plastic

2.2 INSULATION REPAIR

Match original material type, vapor barrier jacket and thickness.

PART 3 - EXECUTION**3.1 DUCTWORK TEST HOLE PLUGS**

Install plugs in ductwork after drilling test holes.

3.2 INSULATION REPAIR

Repair insulation removed or damaged for TAB work.

3.3 INDEPENDENT TAB AGENCY

- A. Procure the services of an independent balancing and testing agency, not associated with the Mechanical Contractor, to perform the testing, adjustment and balancing (TAB) of equipment and air flows including air outlets in the heating, ventilating and air conditioning systems. Report instances in which the specified quantities cannot be provided by the installed equipment so that corrections to the equipment can be made under the section wherein it was specified.
- B. Add dampers and valves required for correct balance as recommended by the agency at no additional cost to the County. Submit such additions for COR's review.

3.4 TAB INSTRUMENTS

Calibrate instruments used for testing and balancing of air and hydronic systems within a period of 12 months prior to TAB. Submit final test analysis reports, including a letter of certification listing instrumentation used and last date of calibration.

3.5 TAB REPORTS

- A. Inspection reports covering equipment and systems installation shall be submitted during early stage of the project in order to allow timely correction of deficiencies.
- B. Follow check list format developed by AABC or NEBB supplemented by narrative comments, with emphasis on air handling units and fans. Check for conformance with submittals.
- C. TAB reports covering flow balance, adjustments, and performance tests, working copy of reports shall be submitted as soon as TAB is performed for any necessary system evaluation.
- D. Include in final reports uncorrected installation deficiencies noted during TAB and applicable explanatory comments on test results that differ from design requirements.
- E. Submit three copies of complete test reports for review.

3.3 TAB PROCEDURES

A. Balancing Objectives

- 1. Balance air outlets and water coils to plus or minus 10 percent of design flow.
- 2. Adjust fan speed and modify pumps or controls as required to produce design flow.
- 3. Adjust system for design outdoor air quantity. All existing air handling units shown on drawings shall be rebalanced to original/existing scheduled airflow or scheduled alternate airflow where indicated on controls drawings. Coordinate with engineer to confirm required airflow prior to rebalancing.
- 4. Adjust system for design supply air quantity. All existing air handling units shown on drawings shall be rebalanced to original/existing scheduled airflow or scheduled alternate airflow where indicated on controls drawings. Coordinate with engineer to confirm required airflow prior to rebalancing.
- 5. Adjust system for design return air quantity. All existing air handling units shown on drawings shall be rebalanced to original/existing scheduled airflow or scheduled alternate airflow where indicated on controls drawings. Coordinate with engineer to confirm required airflow prior to rebalancing.
- 6. All existing air handling units shown on drawings shall have heating water coils and cooling coils rebalanced to original/existing scheduled water flow. Coordinate with engineer to confirm required water flow prior to rebalancing.
- 7. Adjust system for design recirculating air quantity.
- 8. Adjust system for design exhaust air quantity.
- 9. Test and record heating and cooling apparatus entering and leaving air, water, and refrigerant temperatures.
- 10. Adjust flow patterns from air distribution devices to minimize drafts.

11. Refer to drawings M701 through M708 for the design airflows for the HVAC units and the design airflows for the heating and chilled water coils.

B. Performance Tests

1. General: Conduct capacity tests on equipment. Conduct tests during a period of stable operations and minimum load fluctuation. Submit a performance report for each item tested which includes a comparison of installed capacity and specified capacity. Guidelines for the required tests and reports are as follows:
 - a. Adjust fan speed to give specified air flow.
 - b. Record static pressure entering and leaving unit.
 - c. Record air temperatures entering and leaving each coil.
 - d. Record water flow rates, pressure and temperatures, as described for coil.
 - e. Complete approved report forms as required to describe performance.
3. Heating Coil: Record the following information for each coil:
 - f. Water flow rate.
 - g. Water pressure entering and leaving.
 - h. Water temperature entering and leaving.
 - i. Airflow rate.
 - j. Air temperature entering and leaving.
 - k. Complete approved report form.
4. Electric Heating Coil: Observe and record the following:
 - a. Airflow rate.
 - b. Air temperature entering and leaving.
 - c. Current and Voltage input to coil for each increment and total.
 - d. Complete approved report form.

3.6 TAB PHASING

- A. Coordinate TAB procedures with phase construction completion requirements for the project. Systems serving completed phases of the project will require TAB for such phases prior to partial acceptance and for final acceptance.
- B. Allow sufficient time in construction schedule for TAB and submission of reports prior to partial acceptance and for final acceptance.

3.7 EQUIPMENT INSTALLATION INSPECTION

An evaluation report shall be completed after air distribution equipment is on site and duct installation has begun, but in advance of performance testing and balancing work. Identify and report deviations from design and ensure that systems will be ready for TAB at the appropriate time.

3.8 TAB REQUIREMENTS

- A. Provide TAB for equipment and motors including performance tests as required in applicable sections of Division 23.
- B. During final TAB, related systems shall be in full operation.
- C. Test and balance systems in all specified modes of operation, including economizer and fire/smoke emergency modes. Verify that dampers and other controls function properly.
- D. Operate fans at slowest speed that will deliver indicated air quantity.
- E. Compensate for condition of filters at time of balancing so that system will deliver proper amount of air when filters become dirt-laden and nearly due for replacement.
- F. Record positions of outdoor, return, and relief dampers as set for cooling cycle.
- G. Adjust duct volume dampers to minimize inlet and outlet damper throttling.
- H. Operating Tests: Demonstrate to COR the specified performance of systems and components.
- I. Rebalance existing air devices to previously measured airflows.

3.9 COORDINATION WITH THE AUTOMATIC CONTROL SUBCONTRACTOR

The Automatic Control System (ACS) Subcontractor shall put the system in the required mode of operation as requested by the Testing and Balancing (TAB) Subcontractor. All programming changes and reporting of data from the Building Automation System (BAS) needed to achieve proper performance shall be done by the ACS Subcontractor. The TAB Subcontractor shall be the lead Subcontractor in coordinating his work and the ACS Subcontractor's work. All work is by the TAB Subcontractor unless noted as being the responsibility of the ACS Subcontractor.

END OF SECTION 230593

SECTION 230700 - MECHANICAL INSULATION

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

Insulation for piping, ductwork, and equipment specified in Divisions 22 and 23.

1.2 RELATED DIVISIONS AND SECTIONS

- A. Division 01 - General Requirements
- B. Section 230500 - Basic Mechanical Materials and Methods
- C. Section 232000 - Building Services Piping
- D. Section 232116 - Hydronic Piping Specialties
- E. Section 233113 - Ducts and Duct Accessories

1.3 QUALITY ASSURANCE

- A. Unless otherwise noted, pipe insulation shall have a K value insulation conductivity Btu inch/hour-ft² degrees F in accordance with ASHRAE 90.1.
- B. Unless otherwise noted, duct insulation shall have an insulation R-value (hour)(ft²) (degrees F)/Btu) in accordance with ASHRAE 90.1.
- C. Duct insulation materials are restricted to those which are UL listed in accordance with the requirements of NFPA 90A, latest edition, and with a flame spread index not over 25 and a smoke developed index no higher than 50.
- D. Insulation on pipes and ducts through floors, fire rated walls, and smoke barriers shall be UL listed fire-stop insulation to maintain fire resistance of the floor, fire rated wall, or smoke barrier in accordance with NFPA 101.
- E. Field applied canvas, woven glass fiber reinforcing mesh, woven polyester mesh, and woven glass fiber cloth covering shall be flame and mildew proof.

1.4 SUBMITTALS

- A. Submit in accordance with Division 01 and Section 230500, "Basic Mechanical Materials and Methods".
- B. Each type of insulation: Manufacturer and product designation, surface burning characteristics, thickness, density in pounds in accordance with cubic foot, conductivity or R-value, jackets (factory and field applied), and accessories.
- C. System application for each type of insulation.
- D. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.

1. Detail application of protective shields, saddles, and inserts at hangers for each type of insulation and hanger.
 2. Detail application at linkages of control devices.
 3. Detail removable insulation at piping specialties.
 4. Detail removable insulation at equipment connections.
- E. Statement of compliance with ASHRAE 90.1.
- F. Statement of compliance with NFPA 90A, flame spread index and smoke developed index requirements.
- G. Statement of compliance with National Architectural and Industrial Maintenance Rule for VOC levels on Adhesives, Mastics, and Coatings for the State of Maryland.
- H. Statement of compliance with Ozone Transport Commission for VOC levels on Adhesives, Mastics, and Coatings for the State of Maryland.
- 1.5 APPLICABLE PUBLICATIONS
- The publications form a part of this specification to the extent referenced. The publications are referenced in the text by the basic designation.
- 1.6 PROJECT CONDITIONS
- A. Where insulation must be stored outdoors, provide polyethylene film cover for protection. Insulation that becomes wet shall be replaced; drying of insulation is not acceptable.
- B. Coordinate clearance requirements for installation of insulation and field applied jackets and finishes for pipe and equipment installation and space for maintenance.

PART 2 - PRODUCTS

2.1 GENERAL MATERIAL REQUIREMENTS

- A. Products shall not contain asbestos, lead, mercury, or mercury compounds.
- B. Products shall comply with the National Architectural and Industrial Maintenance (AIM) Rule for VOC levels for the State of Maryland.
- C. Products shall comply with the Ozone Transport Commission limits for VOC levels for the State of Maryland.

2.2 ADHESIVES, MASTICS, COATINGS

A. Adhesives

1. Type A1
 - a. High tack, rapid setting water-based adhesive.
 - b. Solvent free, low VOC (0.03 pounds/gallon) synthetic elastomer emulsion.
 - c. Non-flammable when wet and fire-resistant when dry.
 - d. Moisture resistant.
 - e. Flame spread index 0 and smoke developed index 0.

- f. Asbestos, lead, and mercury free.
- g. ASTM C916 Type 11.

B. Mastics

1. Type M1

- a. White, flexible, water-based vapor barrier mastic.
- b. Low VOC (0.3 pounds/gallon).
- c. Non-flammable when wet and fire-resistive when dry.
- d. Water resistant and low water vapor permeance.
- e. Flame spread index 5 and smoke developed index 25.
- f. Asbestos, lead, and mercury free.
- g. MIL-C-19565C, Type II.

2. Type M3

- a. White, flexible, elastomeric coating.
- b. Vapor barrier for outdoor application, chemical resistant, and UV and sunlight resistance.
- c. Fire resistant.
- d. Flame spread index 10 and smoke developed index 15.
- e. Asbestos, lead, and mercury free.

C. Coatings

1. Type C1

- a. White, washable, abrasion-resistant coating.
- b. Low VOC (0.13 pounds/gallon).
- c. Fire resistant.
- d. Flame spread index 10 and smoke developed index 5.
- e. Asbestos, lead, and mercury free.
- f. MIL-A-3316C, Class I, Grade A.

D. Manufacturers: Childers, Foster, Mon-Eco Industries.

2.3 INSULATION TYPES

A. Type A

- 1. Insulation: Pre-formed, sectional molded glass fiber pipe insulation bonded with a thermosetting resin meeting ASTM C547 Standard Specifications for Mineral Fiber Pipe Insulation, Type I, Grade A.
- 2. Minimum Density: 3.0 pounds per cubic foot.
- 3. Factory Applied Jacket: White, polypropylene-coated ASJ jacket with self-sealing, pressure sensitive, acrylic based adhesive covered by a removable protective strip, kraft paper, fiberglass reinforced scrim with aluminum foil backing, complying with ASTM C1136, Type I.
- 4. Factory-fabricated shapes in accordance with ASTM C450 and ASTM C585.
- 5. Insulated Fitting Covers: Insulation insert with PVC cover equivalent to Zeston.
- 6. Operating Temperatures: 0 to 850 degrees F.
- 7. Maximum Moisture Vapor Transmission: 0.01 perms.
- 8. Manufacturers: Johns-Manville Micro-Lok HP Ultra, Knauf Earthwool 1000° Pipe Insulation, Owens-Corning Fiberglass Insulation SSLII with ASJ Max.

9. Polyguard RG-CW or approved equal mineralization coating for application to the interior surface of the insulation.
- B. Type C
1. Insulation: Flexible, closed-cell elastomeric pipe insulation equal to AP Armaflex or AP Armaflex SS, ASTM C534 Standard Specification for Preformed Flexible Elastomeric Cellular Thermal Insulation in Sheet and Tubular Form, Type I.
 2. Minimum Density – 3 to 5 pounds in accordance with cubic foot.
 3. Material shall have a flame spread index of 25 or less and a smoke developed index of 50 or less as tested by ASTM E84.
 4. Suitable for temperatures 0 to 220 degrees F.
 5. Maximum moisture vapor transmission of 0.08 perms.
 6. Manufacturers: Armacell, Rubatex.
 7. Polyguard RG-CW or approved equal mineralization coating for application to the interior surface of the insulation.
- C. Type E
1. Insulation: Flexible glass fiber blanket bonded with a thermosetting resin meeting ASTM C553 Standard Specification for Mineral Fiber Blanket Thermal Insulation for Commercial and Industrial Applications, Type II.
 2. Minimum Density - 3/4-pound per cubic foot.
 3. Factory Applied Jacket: FRK/FSK facing, vapor retardant barrier jacket of minimum 0.001-inch aluminum foil, fiberglass reinforced scrim with kraft paper backing, complying with ASTM C1136, Type II.
 4. Operating Temperatures: Up to 250 degrees F.
 5. Maximum moisture vapor transmission of 0.02 perms.
 6. Manufacturers: Certain-Teed, Johns-Manville Microlite EQ FSK Duct Wrap, Knauf Atmosphere Duct Wrap, Owens-Corning SoftR Duct Wrap FRK.
- D. Type G
1. Insulation: Rigid glass fiberboard bonded with a thermosetting resin meeting ASTM C612 Standard Specification for Mineral Fiber Block and Board Thermal Insulation, Type IA or IB.
 2. Minimum density - 6 pounds per cubic foot.
 3. Factory Applied Jacket: White, polypropylene-coated ASJ jacket, kraft paper, fiberglass reinforced scrim with aluminum foil backing, complying with ASTM C1136, Type I.
 4. Operating Temperatures: 35 to 250 degrees F.
 5. Maximum moisture vapor transmission of 0.02 perms.
 6. Corner Angles: PVC, Aluminum, or Stainless Steel suitable for the application.
 7. Manufacturers: Certain-Teed Commercial Board, Johns-Manville 800 Series Spin-Glas, Knauf Earthwool Insulation Board, Owens-Corning 700 Series Board Insulation.
- E. Type H
1. Insulation: Rigid glass fiberboard bonded with a thermosetting resin meeting ASTM C612 Standard Specification for Mineral Fiber Block and Board Thermal Insulation, Type IA or IB.
 2. Minimum Density: 6 pounds per cubic foot.
 3. Field Applied Jacket:
 - a. Mastic for ductwork exposed to weather: Equal to Foster 30-90 mastic/coating.
 - b. Elastomeric sheet roofing:

- 1) Membrane: 0.045-inch-thick (1-mm-thick) reinforced EPDM.
- 2) Seaming materials: Recommended by membrane manufacturer.
- 3) Flexible counterflashing: Uncured EPDM, by manufacturer of roofing membrane and recommended for use with it.
- 4) Color: Black.
4. Operating Temperatures: 35 to 250 degrees F.
5. Maximum Moisture Vapor Transmission: 0.02 perms.
6. Corner Angles: PVC, Aluminum, or Stainless Steel suitable for the application.
7. Manufacturers: Certain-Teed CertaPro Commercial Board, Johns-Manville 800 Series Spin-Glas, Knauf Earthwool Insulation Board, Owens-Corning 700 Series Board Fiberglass Insulation.

2.4 FIELD APPLIED PIPE JACKETS

A. PVC Jacket

1. High-impact resistant, UV-resistant PVC complying with ASTM D 1784, Class 16354-C; 30 mils thick, roll stock ready for shop or field cutting and forming.
2. Adhesive: As recommended by jacket material manufacturer.
3. Color: Color-code jackets based on system. Color as selected by COR.
4. Factory-fabricated fitting covers to match jacket if available; otherwise, field fabricate.
5. Manufacturers: Johns Manville; P.I.C. Plastics, Inc.; Proto Corporation; Speedline Corporation.

B. PVC Tape: White vapor-retarder tape matching field-applied PVC jacket with acrylic adhesive; suitable for indoor and outdoor applications.

1. Width: 2 inches.
2. Thickness: 6 mils.
3. Adhesion: 64 ounces force/inch in width.
4. Elongation: 500 percent.
5. Tensile Strength: 18 lbf/inch in width.
6. Manufacturers: ABI, Compac Corporation, Venture Tape.

C. PVC Jacket Adhesive: Compatible with PVC jacket.

1. For indoor applications; adhesive shall have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
2. Manufacturers: Dow Corning Corporation 739, Dow Silicone; Johns Manville Zeston Perma-Weld, CEEL-TITE Solvent Welding Adhesive; P.I.C. Plastics, Inc. Welding Adhesive; Speedline Corporation Polyco VP Adhesive.

PART 3 - EXECUTION

3.1 GENERAL PREPARATION AND APPLICATION REQUIREMENTS

- A. Complete piping, ductwork, and equipment tests before insulation is applied.
- B. Clean and dry surfaces to be insulated of loose scale, dirt, oil, water and other foreign matter that will adversely affect insulation application.
- C. Install insulation materials, vapor barriers or retarders, jackets, and thicknesses required for each item of pipe system and equipment, as specified in insulation system schedules
- D. Insulate completely metal surfaces of piping, ductwork and equipment other than hangers as delineated under Extent of Insulation.

- E. 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.
- F. Install insulation with tight longitudinal seams and end joints. Bond seams and joints with adhesive recommended by insulation material manufacturer.
- G. Install insulation with least number of joints practical.
- H. Permit expansion and contraction without causing damage to insulation or surface finish.
- I. Extend surface finish to protect surfaces, ends, and raw edges of insulation.
- J. Fire-stop insulation shall be continuous to 6 inches on either side of barrier. Seal jacket seam and end joints to adjacent sections of insulation for continuous vapor barrier. Annular space between insulation and sleeve shall be sealed as specified in Section 230500, "Basic Mechanical Materials and Methods," in the Article titled, "Sleeves and Escutcheons."
- K. Provide vapor retarding barriers continuous and uninterrupted throughout the system where specified, except where insulation is interrupted for fire dampers and electric duct heaters.
- L. Where connections are made to existing systems, provide insulation as specified and to match existing where existing insulation is removed or damaged for new connection. Provide vapor barrier continuously sealed to the existing insulation.
- M. Mix insulating cements with clean potable water.
- N. 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.
- O. Install insulation with longitudinal seams at top and bottom of horizontal runs.
- P. Install multiple layers of insulation with longitudinal and end seams staggered.
- Q. Do not weld brackets, clips, or other attachment devices to piping, fittings, and specialties.
- R. Keep insulation materials dry during storage, application, and finishing. Replace insulation materials that become wet.
- S. Cut insulation in a manner to avoid compressing insulation.
- T. Finish installation with systems at operating conditions. Repair joint separations and cracking due to thermal movement.
- U. 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.
- V. Penetrations
 - 1. Roof and Aboveground Exterior Wall Penetrations: Install insulation continuously through penetrations.

- a. Seal penetrations with flashing sealant.
 - b. For applications requiring only indoor insulation, terminate insulation above roof surface for roof penetrations, and at inside wall surface for wall penetrations. Seal with joint sealant.
 - c. For applications requiring indoor and outdoor insulation, install insulation for outdoor applications tightly joined to indoor insulation ends. Seal joint with joint sealant.
 - d. Extend jacket of outdoor insulation outside roof flashing at least 2 inches below top of roof flashing for roof penetrations, and outside wall flashing for wall penetrations and overlap wall flashing at least 2 inches.
 - e. Seal jacket to roof flashing with flashing sealant.
2. Non-Fire Rated Interior Floor, Wall and Partition Penetrations: Install insulation continuously through floors, walls and partitions.
 3. Fire-Rated Floor, Wall and Partition Penetrations:
 - a. Terminate insulation at fire damper sleeves and externally insulate damper sleeves to match adjacent insulation. Overlap duct insulation at least 2 inches.
 - b. Pipe: Install insulation continuously through floor penetrations.
 - c. Seal penetrations through fire-rated assemblies according to Section 078413, "Penetration Firestopping".

W. Piping

1. Insulate valves, strainers and fittings, including unions and flanges. For the purpose of this specification, fittings include unions and flanges.
2. Install insulation with continuous thermal and vapor retardant integrity, unless otherwise noted. Use premolded material where available.
3. Insulate valve bodies and flanges up to and including bonnets, except for condenser water and chilled water valves. Insulate over packing nuts in a manner to permit removal for adjustment and repacking of chilled water valves.
4. Insulate strainers in a manner to permit removal of the basket without disturbing the insulation of the strainer.
5. Fill hollow interior of protection saddles with insulating cement.
6. Insulate instrument connections for thermometers, pressure gages, pressure temperature taps, test connections, flow meters, sensors, switches, and transmitters on insulated pipes. 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.
7. Where removable insulation covers are indicated, make insulation form sectional pipe insulation of the same thickness as that of the adjoining pipe. Install same insulation jacket as that of the adjoining pipe insulation.

X. Ductwork

1. Use of materials is restricted for duct insulation to those which are UL listed in accordance with the requirements of NFPA 90A, latest edition, and with a fire hazard rating as tested in accordance with ASTM E84, UL 723, NFPA 255 not to exceed 25 flame spread index and smoke developed index not to exceed 50.
2. Cover standing seams and metal surfaces with insulation.
3. Provide staples that are stainless steel, outward clinching, and sealed to maintain vapor barrier.
4. Unless otherwise indicated, insulation is not required on factory insulated flexible ducts.
5. Interrupt insulation at fire dampers in walls and floors. Lap and seal vapor barrier over ends of insulation.

Y. Equipment

1. Cut or score insulation to fit shape and contour of equipment. Bevel insulation edges for cylindrical surfaces for tight joints.
2. Stagger end joints. Stagger joints between insulation layers at least 3 inches.
3. Provide permanently fastened angles or plates, where required, to support insulation. Protect exposed corners with secured corner angles.
4. Do not weld anchor pins to ASME-labeled pressure vessels.
5. Apply insulation on access opening and cover plates as separate sections, with insulation cut back for access to bolt heads and other fasteners. Bevel and seal insulation ends around manholes, handholes, and ASME stamps.
6. Do not cover nameplates. Cut back the insulation, bevel, seal, and line edges with 24-gage galvanized steel.
7. Insulate skirts, cradles, legs and other supports of vessels storing materials at 60 degrees F or lower temperature for a distance away from the vessel four times the thickness of the insulating material same as the vessel.

- Z. Vermin Proofing: Wherever insulated piping and ductwork pass through sleeves or openings which are required to be vermin proof, provide sections of foamed glass insulation equal in length to length of sleeves. Refer to Section 230500, "Basic Mechanical Materials and Methods," in the Article titled, "Sleeves and Escutcheons" for details and extent of vermin proofing.

3.2 ADHESIVES, MASTICS, COATINGS

- A. Apply adhesives, mastics and coatings at the rate of coverage and in a manner recommended by the manufacturer.
- B. Materials shall be compatible with insulation materials, jackets, and substrates and for bonding insulation to itself and to surfaces to be insulated, unless otherwise noted.
- C. Mastics shall comply with MIL-C-19565C, Type II.
- D. Lagging adhesives shall comply with MIL-A-3316C, Class I, Grade A.

3.3 INSULATION TYPES

A. Type A

1. Application
 - a. Pipe: Fit insulation to pipe, staggering longitudinal joints. Seal longitudinal joint overlaps with 4-inch wide sealing strips of vapor barrier jacket material applied on circumferential joints with Type A1 adhesive.
 - b. Fittings and Valves: Apply fabricated or premolded insulated fitting covers or insulating cement equal in thickness and density to adjoining pipe insulation. Seal with a 1/16-inch thick coat of Type M1 mastic for cold and dual temperature lines. Seal with a 1/16-inch thick coat of Type C1 coating for hot lines. Imbed a layer of glass fiber fitting tape in the mastic or coating and after the initial coat has dried, apply an additional 1/16-inch coat of mastic or coating.
2. Surface Finish
 - a. All piping:

- 1) Pipe
 - a) Standard duty, concealed and exposed – no additional finish required.
 - b) Heavy Duty – Apply a tack coat of Type C1 coating over entire surface; imbed a layer of 8-ounce canvas; when dry, apply a second coat of Type C1 coating.
- 2) Fittings, Flanges, Pipe Specialties, and Valves:
 - a) Standard Duty – No additional finish required.
 - b) Heavy Duty – Apply finish coat of Type C1 coating after mastic has thoroughly dried.
- b. For piping outdoors:
 - 1) Apply a 0.016-inch aluminum metal jacket with vapor barrier. Place pre-formed 2-inch butt strap with sealant over seams and secure 1/2-inch aluminum band and wing seal.
3. Chilled and Dual Temperature Water Piping: Coat inside of insulation with mineralization coating. Apply coating to inside core of insulation simultaneously with the installation of the insulation and rotate onto the pipe.

B. Type C

1. Pipe: Slip the insulation over the pipe wherever possible or slit the insulation sections and apply around the pipe. Seal seams and joints with ArmaFlex 520 adhesive or equivalent to prevent the passage of air to the surface being insulated.
2. Fittings, Flanges, Pipe Specialties, and Valves: Fabricate segments of insulation, miter joints using preformed pipe insulation and sections of pipe insulation in accordance with manufacturer's instructions or use prefabricated fittings from the manufacturer or recommended third party. Seal with insulation manufacturer's adhesive to prevent the passage of air to the surface being insulated.
 - a. Fill voids with cut sections of insulation same thickness as pipe insulation.
 - b. Arrange insulation on valves to permit access to packing and to allow valve operation without disturbing insulation.
3. Outdoors:
 - a. Apply two coats of WB Armaflex finish, or approved equal, in accordance with manufacturer's instructions and recommendations.
 - b. Locate seams on lower half of the pipe.
4. Chilled Water Piping: Coat inside of insulation with mineralization coating. Apply coating to inside core of insulation simultaneously with the installation of the insulation and rotate onto the pipe.

C. Type E

1. Wrap insulation around duct and seal joints in accordance with manufacturer's instructions. Use of adhesive to attach insulation to duct is prohibited. Secure insulation on

- ducts with long sides or diameters exceeding 24 inches with pins welded or adhered on 18-inch centers. Secure washers on pins.
2. Butt insulation joints with reinforced foil face extending 2 inches beyond the insulation for lagging and seal flaps with Type A1 adhesive.
 3. Use stainless steel staples to assist in securing insulation. Seal vapor barrier penetration with Type M1 Mastic.
 4. On rectangular and square ducts, install so insulation is not excessively compressed at corners.

D. Type G

1. Application

- a. Secure insulation with pins welded or adhered to sheet metal on 15-inch centers. Cut side pieces of insulation to lap top and bottom pieces. Apply Type A1 adhesive to entire underside of horizontal metal surfaces. Secure 1-1/2-inch diameter fiber or tin-coated disk to pins.
- b. Protect outer corners of insulation with 3 by 3-inch aluminum angles or roll-on corner bead.
- c. Butt insulation joints, seal with 4-inch vapor barrier foil tape or 2-inch laps adhered with Type A1 adhesive. Seal over penetrations and disks with tape or Type M1 mastic.

2. Surface Finish

- a. Imbed glass-reinforcing fabric, 20 by 20 mesh (1-1/2-ounce minimum) in tack coat of Type C1 coating (2 gallons in accordance with 100-square-foot) lapping joints a minimum of 2 inches.
- b. Finish when dry with final coat of Type C1 coating (4 gallons in accordance with 100-square-foot).

F. Type H

1. Application

- a. Insulate exterior ductwork, whether lined or unlined, with rigid insulation 2 inches thick.
- b. Over standing seams and reinforcing angles, install thickness to cover protrusions at least 0.5 inch.
- c. Taper insulation on top of duct from center to each side, to slope no less than 1:12.
- d. Mechanically fasten, with washers firmly embedded in insulation. Install fasteners in rows, no more than 18 inches on centers. Install rows no more than 18 inches apart, but no fewer than two rows each on top, bottom, and each side.
- e. Install corner beads on external corners.
- f. Where insulated duct penetrates walls, fully flash top, bottom, and sides.
- g. Finish: Cover insulated ducts with elastomeric sheet roofing membrane, fully adhered to fiberglass insulation.
 - 1) Apply adhesive at rate recommended by membrane manufacturer, to insulation and to membrane.
 - 2) Overlap edges and ends minimum 3 inches. Splice and seal in accordance with membrane manufacturer's installation instructions.

- 3) Roll surfaces, following membrane manufacturer's installation instructions.

3.4 FIELD APPLIED PIPE JACKETS

- A. Where PVC jackets are used, install with 1-inch overlap at longitudinal seams and end joints for horizontal applications. Seal with manufacturer's recommended adhesive.
1. Apply two continuous beads of adhesive to seams and joints, one bead under lap and the finish bead along seam and joint edge.

3.5 INSTALLATION SCHEDULE

- A. Piping

PIPING SYSTEM	MATERIAL TYPE	INSULATION THICKNESS IN INCHES FOR PIPE SIZE				
		Less than 1"	1 to less than 1-1/2"	1-1/2 to less than 4"	4 to less than 8"	8" & Larger
Low Temperature Hot Water Heating (200°F or less)	A, C	1-1/2	1-1/2	2	2	2

- B. Ductwork (Note 3)

FOR AIR SYSTEMS TRANSPORTING AIR AT 48 DEGREES F AND ABOVE	MATERIAL TYPE	INSULATION THICKNESS (INCHES)
Concealed	E	2
Exposed Rectangular	G	2
Field Fabricated Casings	G	2
Outdoors	H	3

- C. Equipment

PIPING SYSTEM	MATERIAL TYPE	INSULATION THICKNESS
Duct Mounted Heating Coil	A, C	2

Note 1: Locate hangers outside of insulation with saddles or thermal shields specified under another section. In the saddle, provide a half section of calcium silicate or foam glass equal in thickness to adjoining insulation, sized to carry load without crushing, and vapor sealed. Insulate supports and anchors in contact with pipe the same as piping.

Note 2: Type C may be used in lieu of Type A, where indicated at Contractor's option, for pipes up through 2-inch except where heavy-duty finish is required.

Note 3: If insulated ductwork is supported from the bottom, provide calcium silicate or foam glass equal to thickness of the adjoining insulation at the support. Vapor seal and size to carry the load without crushing.

3.6 EXTENT OF INSULATION

- A. Piping: Insulate as designated in Installation Schedule.
- B. Ductwork and Plenums: Insulate the following:
 - 1. Outdoor air.
 - 2. Supply air.
 - 3. Supply, Return and Exhaust ducts located above roof and outside of building.
 - 4. Relief and exhaust air ductwork and plenum between motor operated damper or gravity backdraft damper and penetration of building exterior.
 - 5. Field fabricated casings.
 - 6. Intake and exhaust air plenums.
- C. Equipment: Insulate as designated in Installation Schedule.

END OF SECTION 230700

SECTION 230923 - HVAC INSTRUMENTATION AND CONTROLS

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

Contractor shall connect to existing automatic control system. Contractor shall provide automatic operation of heating systems including any required controllers, operators, valves, dampers, control cabinets, control center, and accessories.

1.2 RELATED DIVISIONS AND SECTIONS

- A. Division 01 - General Requirements
- B. Section 230500 - Basic Mechanical Materials and Methods
- C. Section 230593 - Testing, Adjusting, and Balancing
- D. Section 232000 – Building Services Piping
- E. Section 232923 – Variable Frequency Drives
- F. Section 233113 - Duct and Duct Accessories
- G. Division 26 – Electrical
- H. Division 28 – Electronic Security and Safety

1.3 QUALITY ASSURANCE

- A. Automatic control system contractor must be a direct, wholly owned, branch of the controls manufacturer, not a representative or a distributor.
- B. Electrical work shall comply with NFPA 70, National Electrical Code.
- C. Direct Digital Control System
 - 1. The automatic control system shall be an extension of the existing system and include open architecture system with native BACnet Architecture. The existing system is JCI Metasys.
 - 2. Digital system controller shall be a UL approved signaling system and shall comply with the latest Federal Communications Commission regulations.
 - 3. The automatic control system subcontractor shall be responsible for quantity and type of controllers to make the DDC system fully operational.
- D. Automatic control system subcontractor shall be responsible for providing quantity and type of transformers to make their system operational, except where transformers are furnished and mounted by the equipment manufacturer.

- E. Automatic Controls contractor shall coordinate with the manufacturer of equipment being controlled to ensure compatibility between the equipment capabilities and control sequences.

1.4 SUBMITTALS

- A. Submit in accordance with Division 01 and Sections 230500, "Basic mechanical Materials and Methods".
- B. Schematic wiring and control diagrams including graphic system representation, operating sequences, and control description for entire system.
- C. Valve schedule.

1.5 APPLICABLE PUBLICATIONS

The publications form a part of this specification to the extent referenced. The publications are referenced in the text by the basic designation.

PART 2 - PRODUCTS

2.1 AUTOMATIC CONTROL SYSTEM

- A. Automatic control system shall be direct digital control with electronic actuation, electronic or electric control complete with necessary electrical interlocks, protective devices and associated control wiring. Coordinate with Howard County Public schools for existing control system manufacturer and point of contact.
- B. Control shall be performed by a field programmable Digital System Controller (DSC), microprocessor based, which incorporates direct digital control, energy management functions, and provides for digital display and local adjustments of desired variables at the control cabinet.
- C. Controllers, operators, dampers, panels, and other control devices shall generally be the standard product of one manufacturer.
- D. Manufacturers: Johnson Controls Metasys Extended Architecture.

2.2 CONTROLLERS

- A. Type: Proportional or positive action (for on-off control) with adjustable set point and modulating range or differential. Controllers, mounted on control panels, shall be remote sensing.
- B. Controllers for air handling unit supply temperature and elsewhere as indicated shall be PID adjusted for stable modulating range, yet limiting deviation from control point of 1 degree F.
- C. Occupancy sensors
 - 1. Provide Wattstopper High Bay model or equal by alternate manufacturer.
 - 2. Provide a sufficient quantity of occupancy sensors to provide complete coverage of the area (room or space). Provisions shall be provided for connection to BAS.

- a. Occupancy sensors are to be ceiling mounted. Occupancy sensors must be suitable for a ceiling of 12-14 feet of height in cafeteria areas.
 - b. Install occupancy sensors in accordance with NFPA 70 requirements and the manufacturer's instructions. Do not locate occupancy sensors within 2 m 6 feet of HVAC outlets or heating ducts, or where they can "see" beyond any doorway. Installation above doorway(s) is preferred.
 - c. Do not use ultrasonic sensors in spaces containing ceiling fans.
 - d. Install sensors to detect motion to within 600 mm 2 feet of all room entrances and to not trigger due to motion outside the room.
 - e. Set the off-delay timer to 15 minutes unless otherwise indicated. Adjust sensors prior to beneficial occupancy, but after installation of furniture systems, shelving, partitions, etc.
 - f. For each controlled area, provide one hundred percent coverage capable of detecting small hand-motion movements, accommodating all occupancy habits of single or multiple occupants at any location within the controlled room.
- D. Room Combination Carbon Dioxide, Humidity and Temperature Sensors:
- 1. Adjustable Range:
 - g. Heating Control: 55 to 75 degrees F.
 - h. Cooling Control: 70 to 85 degrees F.
 - i. Heating and Cooling Control: 55 to 85 degrees F.
 - 2. Fixed modulating range is permissible for unit thermostats.
 - 3. Equip day-night temperature sensors with external manual reset to "Day" with automatic recycle.
 - 4. Temperature sensors must be suitable for field calibration. Room sensors shall be a combination Carbon Dioxide, humidity and Temperature sensor.
 - 5. Guards: Cast metal, heavy gage stamped metal or thermoplastic material with lock for access to thermostat controls.
 - 6. Provide specific features as indicated:
 - a. Single setpoint temperature sensors shall have a 10 degrees F adjustable bandwidth with sensitivity capable of holding the setpoint at plus or minus 1/2 degrees F with bandwidth set at minimum position.
 - b. Deadband temperature sensors shall have two distinct setpoints with a 10 degrees F adjustable deadband between heating and cooling setpoints. Minimum deadband shall be 5 degrees F, unless otherwise noted.
 - c. Equip temperature sensors with digital display where indicated, otherwise provide without digital display.
 - d. Provide temperature sensors with concealed adjustment unless otherwise indicated.
- E. Electric Duct Heater Control: Furnish SCR controllers to heater manufacturer for factory mounting in heater terminal box.

2.3 OPERATORS

- A. Operators shall return to open or closed position as required to minimize possibilities of freezing, system malfunction or overheating upon system shutdown, changeover, or power failure.

- B. Operators shall be quiet and have ample power to provide smooth, repeatable proportional positioning under all operating conditions, and shall be rated to allow for motor, damper or valve deterioration.
- C. Sequencing of operation for DDC systems shall be software programmable.
- D. Provide one motor for each damper section, as required.
- E. Coordinate requirement of operators for air terminal units with manufacturer.

2.4 VALVES

- A. Globe or angle pattern rated for 125 psig (860 kPa) working pressure.
- B. 2-1/2-inch (65 mm) and larger IBBM, flanged connection; 2-inch through 3/4-inch, brass or bronze screwed, union connection; 1/2-inch and smaller, flared connections.
- C. Teflon or synthetic rubber packing suitable for extremes of system temperatures and pressures.
- D. Furnish single seated valves with renewable discs or seats, except valves serving individual terminal units.
- E. Characteristics: Select for optimum performance for indicated service.
- F. Maximum Pressure Loss
 - 1. Water Service: System modulating control, 10 feet w.g..

2.5 ELECTRIC WIRING AND CONTROL

- A. Electrical work shall conform to the Electrical Division requirements except as modified below.
- B. Minimum wire size shall conform to NFPA 70 (National Electrical Code) requirements.
- C. Minimum Conduits Size: 3/4-inch, conduit mounted outdoors or in damp areas shall be rigid.
- D. Class 1 Wiring (Greater than 30 volts): Install in conduit in accordance with NFPA 70 (National Electrical Code).
- E. Class 2 Wiring (30 volts or less): Remote control and signal wiring may be run in multi-conductor cable with PVC insulation, Mylar binder and PVC jacket. Digital transmission shall be through twisted, shielded pair. Entire installation shall be in accordance with NFPA 70 (National Electrical Code), and shall meet additional requirements noted.
- F. Cables carrying AC circuits sensitive to external fields shall be shielded.
- G. All new circuits shall have green-grounding conductor sized in accordance with Article 250 of NFPA 70 (National Electrical Code).
- H. No more than eight current carrying conductors shall be placed in a single conduit.
- I. Materials installed in ceiling plenums used to transport supply or return air shall be plenum rated and meet applicable code requirements.

- J. Furnish control transformers with steel enclosures with separate primary and secondary compartments, each with conduit connections.
- K. Secondary side of control transformer shall be fused.
- L. Controllers and Operators
 - 1. All controls shall be designed to function properly with a power source voltage variation of plus or minus 10 percent.
 - 2. Operators shall be hydraulic, thermal or gear type, totally enclosed with oil immersed gear.
 - 3. Select speed of operation to prevent hunting.

2.6 CONTROL CENTER

- A. The existing control center shall be upgraded as required. Control center shall capable of running all control software for renovated and existing to remain. Program shall be upgraded to the latest architecture and all graphical representations upgraded to include all of existing and new work shown on sequence of operation.
- B. The control center shall be capable of performing the following functions:
 - Monitoring
 - Energy Management
 - Operator Interface
 - Programmable
 - Expandable
 - Self-diagnostics
 - Default Operating Procedures
 - Alarms
 - Remote Communications
 - Remote Control Point Adjustment
 - Graphic Panels
- C. The control center shall have reporting capabilities definable and changeable by the operator. Automatic report generation capabilities shall be included.

2.7 DIRECT DIGITAL SYSTEM

- A. The digital system controller (DSC) shall perform its assigned control and energy management functions as a standalone unit, and shall be by the simple addition of a communication card, capable of being incorporated into a BAS trunk for communication with and management by a building automation system. The DSC shall also provide for user interface through a standard web browser. The building automation system's full feature set shall be accessible through web browser. Any computer on the building's network Ethernet must be capable of acting as the operator workstation. The web browser shall be capable of being set up to access the controller directly over the IP network or through the Internet or public telephone service for remote operation and system fault diagnosis. Contractor shall provide all hardware and/or software required to allow for complete user access to system through web browser. The DSC shall perform its full control and energy management functions regardless of condition of communications link with the building automation system. These stand-alone capabilities shall include, but not be limited to, the following:

1. Control Functions:
 - a. Closed loop control functions (P, PI, PID, Incremental, Floating, etc.).
 - b. Energy management functions, including but not limited to:
 - Supply Water Reset
 - Adaptive Optimal Start
 - Duty Cycling
 - Event Initiated Programs
2. Control:
 - a. Control algorithms shall be available and resident in the DSC to permit proportional, integral, and derivative control modes in any combination to meet the needs of the application. Other control modes, such as incremental, floating, or two position, shall be available to adapt to job needs.
 - b. Control shall be performed in a digital manner, using the digital signal from the microprocessor-based controller converted through electronic circuitry for modulation of electric actuators or through pneumatic-electronic switch..
3. Energy Management: DSC shall be capable of performing the energy management functions indicated.
4. Operator Interface:
 - a. The building control system shall permit full operator communication including:
 - (1) Obtaining information about the performance of the system.
 - (2) Allowing the operator to change the system operation diagnosing system malfunctions.
 - (3) Operator communication through the use of any of the following operator terminals:
 - PC
 - Laptop
 - Smart phone
 - Tablet device
 - b. It shall be possible to have one operator's terminal at each stand-alone control unit, or to have a single operator's device which can be connected to any panel in the network. The building control system shall permit complete operation of any stand-alone control unit within the network, from any operator terminal within the system.
 - c. Adjustments of control variable shall be available at the controller. These adjustments shall include, but not be limited to:
 - Proportional Gain
 - Integral Rate
 - Velocity and Acceleration Constants Associated with Incremental Control
 - On/Off Values of Two-Position Control
 - d. Access to programs and points shall be password controlled.
5. Field Programmable: The controller shall contain necessary mathematics, logic, utility functions, and standard energy calculations and control functions in ROM to be available in any combination for field programming the unit. These routines shall include, but not be limited to:
 - a. Math Routines:

- Basic Arithmetic
 - Binary Logic
 - Relational Logic
 - Fixed Formulas for Psychometric Calculations
 - b. Utility Routines:
 - Process Entry and Exit
 - Keyboard Functions
 - Variable Adjustments and Output
 - Alarm Indication
 - Restart
 - c. Control Routines:
 - Signal Compensation
 - Loop Control
 - Energy Conservation
 - Timed Programming
 - d. Final field programming shall be stored in battery backed-up RAM.
6. Expandability: The DSC shall be expandable by adding additional field interface units that operate through the processor of the DSC. The processor in the DSC shall be able to manage the remote field interface units, thereby expanding its control loop and energy management point capacity.
7. Calibration Compensation: To maintain long term analog accuracy in the controller sensing circuits, the DSC shall sense the voltage being supplied to the resistance sensing element and, through firmware, compensate for power supply changes due to long term drift, or drift due to ambient temperature changes at the power supply.
8. Battery Backup: Provide a minimum of 20 hours of battery backup for the RAM with an automatic battery charger.
9. Diagnostics: The DSC shall contain in its program a self-test procedure for checking the indication lights on the digital display and, by means of an indestructible memory, check the computer.
10. Default Operating Procedure and Alarms:
- a. Variables shall be identified as being reliable or unreliable. When a calculation is required to use a value (sensed or calculated) which is identified as being unreliable, the unreliable data value shall flash. The calculation shall use a default value programmed into the unit.
 - b. Alarms (fan that did not start, etc.) and deviation alarms (temperature off manual, etc.) shall light a red alarm light. A scan shall then identify alarm conditions and their identifier.
11. Control Cabinets:
- a. Enclose the DSC in a control cabinet. Construct cabinet such that it can be mounted and electrical terminations made during the construction phase of the project. Remove the DSC electronics and reinstall at a later phase, i.e., commissioning of the system.
 - b. The DSC cabinet shall be provided with a key lock. Multiple cabinets shall utilize one master key.
 - c. Control wiring and system communications shall be electrically terminated inside the DSC cabinet.
12. Change-of-State Reporting: The system shall be able to detect changes in a controller's point status and report this change to the operator.

13. Remote Communications: Construct the DSC cabinet shall include a general purpose data modem for remote communications. Modem input shall be standard RS232 connector.

B. Application Specific Controllers

1. Controllers shall provide both standalone and networked direct digital control of items listed in input/output (I/O) Summary.
2. Each controller shall retain program, control algorithms, and setpoint information for at least 72 hours in the event of a power failure and shall return to normal operation upon stable restoration of normal line power.
3. Each controller shall report its communication status to the DSC. The DSC shall provide a system advisory upon communication failure and restoration.
4. For each primary HVAC system, provide means of indication of system performance and setpoints at the controller.
5. For each primary HVAC system, provide a means to adjust setpoints and start/stop equipment through the controller.
6. Provide a means to prevent unauthorized personnel from accessing setpoint adjustments and equipment control definitions.
7. The controller shall provide the functionality to download and upload configuration data, both locally at the controller and via the communications Network.
8. Control Cabinet
 - a. Enclose the controller in a control cabinet. Construct cabinet such that it can be mounted and electrical terminations made during the construction phase of the project. Remove the controller electronics and reinstall at a later phase, i.e., commissioning of the system.
 - b. Control wiring and system communications shall be electrically terminated inside the controller cabinet.

C. Trending

1. Trend and store all items listed in the I/O Summary charts.
2. Store for a minimum of 365 calendar days.
3. Store data in a manner that allows custom queries and reports to be produced using industry-standard software tools.

- D. Licenses: Identify and include any costs associated with providing programming software licenses for eight workstations or laptops.

- E. Dashboard: Configure dashboard to County's request.

2.9 REMOVAL OF EXISTING CONTROL DEVICES

All existing control devices removed shall be salvaged and turned over to Howard County Public Schools.

PART 3 – EXECUTION

3.1 AUTOMATIC CONTROL SYSTEM

- A. Automatic control system subcontractor shall install and adjust entire control system and supervise initial operation with mechanics or subcontractors in his employ.
- B. Provide all field connections, relays, control transfer switches necessary for interlocking starters of (a) supply fans with return.
- C. Identify gages and controls. Note normal conditions with permanent markings.
- D. Control Diagrams
 - 1. Submit in accordance with Section 230500, "Basic Mechanical Materials and Methods," black line schematic wiring and control piping diagrams including graphic system representation, operating sequence and control description for entire system.
 - 2. Submit damper schedule.
 - 3. Upon completion of work, mount one "as built" set of diagrams in control panel associated with diagram.
- E. Update existing control graphics to reflect changes incorporated. Modify existing pneumatic graphics to reflect those converted to DDC.

3.2 CONTROLLERS

- A. Mount all controllers securely at accessible, vibration free locations.
- B. Housings for controls inside ducts shall be streamlined. Location subject to Contracting Officer's Representative's (COR) approval.
- C. Field check calibration and adjustment of all controllers.
- D. Sensing Elements
 - 1. Locate where responsive to representative temperatures or minimum temperature for low limit or freeze protection temperature sensors.
 - 2. Provide elements with firm support and insulate from direct contact with coils or other heat conductors.
 - 3. Protect capillaries between element and controller where exposed to damage with flexible armor or conduit.
- E. Room Temperature Sensors: Provide temperature sensors in accordance with the following schedule:

SPACE	DIGITAL DISPLAY	EXTERNAL ADJUSTMENT	SINGLE SETPOINT	DEADBAND
Auditorium/Gym/ Cafeteria		X	X	

- 1. Mount room temperature sensors located on outside walls on insulated subbases.
- 2. Mount unit type thermostats centered below access door.
- 3. Guards: Fasten securely to building independent of thermostat for thermostats in:

- a. Gymnasium/Auditorium/Cafeteria
- 4. Room sensors shall be a combination Carbon Dioxide, Humidity and Temperature sensor.
- F. Safety Controls
 - 1. All safety controls and control interlocks shall be active with the motor start H-O-A switch in the "Hand," "Off," and "Automatic" positions.
 - a. Provide transformer for each low voltage operator. Low voltage wiring from transformer to operator provided under the Electrical Division.
 - 2. Smoke detectors shall be furnished and connected with power to operators from the fire alarm system to low voltage operators or transformers under Fire Alarm Specification.
- 3.4 VALVES

Comply with installation requirements in Section 23 20 00, "Building Services Piping."
- 3.2 OPERATORS

Furnish operators for air terminal units to unit manufacturer if required for compatibility.
- 3.3 ELECTRIC WIRING AND CONTROL
 - A. Obtain control power from nearest power panel having 120 volts available. Provide breaker in empty space in panel properly sized for load. Provide separate breaker for each DDC cabinet.
 - B. Control power may be derived from line side of a starter provided circuit is fused and all controls so energized are associated only with this starter and motor.
 - C. Control transformer furnished as an integral part of a starter shall not be used as a power source for additional control.
 - D. Starter disconnect or separate switch immediately adjacent to starter shall disconnect power from all line voltage or 120-volt control wiring entering starter.
- 3.5 CONTROL CENTER (GRAPHIC USER INTERFACE)

Locate where indicated by the COR.
- 3.6 DIRECT DIGITAL CONTROL SYSTEM

Control of the primary equipment as indicated on the drawings. Items listed in the Input/Output (I/O) Summary Charts shall be performed by the Direct Digital Control System.
- 3.7 COORDINATION WITH TESTING, ADJUSTING, AND BALANCING SUBCONTRACTOR
 - A. The Automatic Control System (ACS) Subcontractor shall put the system in the required mode of operation as requested by the Testing and Balancing (TAB) Subcontractor. All programming changes and reporting of data from the Building Automation System (BAS) needed to achieve proper performance shall be done by the ACS Subcontractor. The TAB Subcontractor shall be

the lead Subcontractor in coordinating his work and the ACS Subcontractor's work. All work is by the TAB Subcontractor unless noted as being the responsibility of the ACS Subcontractor.

3.8 INPUT/OUTPUT (I/O) SUMMARY CHARTS

The control points on I/O Summary Charts are shown on the drawings.

END OF SECTION 230923

SECTION 232000 - BUILDING SERVICES PIPING

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

Piping, fittings, joints, valves, strainers, supports, anchors, guides, and flow measurement systems for Division 23.

1.2 RELATED DIVISIONS AND SECTIONS

- A. Division 01 - General Requirements
- B. Section 230500 - Basic Mechanical Materials and Methods
- C. Section 230700 - Mechanical Insulation
- D. Section 230923 - HVAC Instrumentation and Controls
- E. Section 236593 - Testing, Adjusting, and Balancing

1.3 QUALITY ASSURANCE

- A. Valves shall conform to ASME Boiler and Pressure Vessel Code Specifications where indicated or required by state or local code.

1.4 SUBMITTALS

- A. Submit in accordance with Division 01 and Section 230500 "Basic Mechanical Materials and Methods".
- B. Statement of piping and fitting material, and type of joint to be used for each piping system.
- C. Manufacturer's technical product data, installation instructions and description of accessories for each type to be used and system designation:

Valves
Strainers
Pipe Supports
Insulation Protection
Thermometers and Test Wells
Pressure Gages and Test Connections

- D. Anchor and guide details, locations, and methods of securing to building.

1.5 APPLICABLE PUBLICATIONS

The publications listed in this section form a part of this specification to the extent referenced. The publications are referenced in the text by the basic designation.

1.6 PROJECT CONDITIONS

- A. Workmanship

1. Cut pipes accurately to measurements established at structure.
 2. Install without springing or forcing.
 3. Clear windows, doors, and other openings.
 4. Permit expansion and contraction without misalignment or damage.
 5. During construction, close openings in piping and equipment to keep out foreign matter and to prevent leakage.
 6. Piping shall be concealed unless otherwise indicated.
 7. Provide offsets required to avoid structural or other interference without extra cost to the Owner.
- B. Drainage
1. Grade to low points.
 2. Provide hose end drain valves at bottom of risers, low points, and where indicated.
- C. Access: All valves, unions, flanges, expansion joints, and flow measurement devices shall be installed in accessible locations.

PART 2 - PRODUCTS

2.1 FITTINGS AND ACCESSORIES

- A. Welding Branch Fittings: Welding tees, Bonney Weldolets, or Thredolets, Allied Piping Products Type 1 fittings.
- B. Reducers: Reducing fittings, eccentric type where required to prevent pocketing of air and water.
- C. Unions, Flanges, Mechanical Couplings, and Gaskets
1. Suitable for intended duty and rated for not less than system test pressure.
 2. Dielectric (insulating) type in water piping systems, suitable for intended service.

2.2 PIPE, FITTINGS AND JOINTS

A. Pipe

TYPE	REFERENCE
E	Black Steel Pipe: ASTM A53 Grade B, ERW or seamless; or ASTM A106 Grade B seamless. Sizes through 10 inches, standard weight, 12 inches and larger 3/8-inch wall.
L	Seamless Copper Water Tube: ASTM B88, Type "L" hard temper.

B. Fittings

TYPE	REFERENCE
BB	Wrought Copper Solder Joint Fittings: ANSI/ASME B16.22.
MM	Steel Butt-Welding Fittings: ANSI/ASME B16.9.

C. Joints

TYPE	REFERENCE
2	Welded-Engineering Standards of the Mechanical Contractor Association of America, Inc., Part VII, Standard Procedure Specifications Nos. 1 and 2.
7	Soldered: ASTM B32; Tin-antimony, 95-5, tin silver 96-4, or tin silver 94-6.

2.3 VALVES

- A. Manufacturer's Tests: Each valve shall be given shell and seat tests by the manufacturer and shall carry a permanently affixed indication that tests have been successfully completed.
- B. ASME Boiler Code Compliance: Provide valves, which conform to ASME Boiler Code Specifications, where indicated, or where required by state or local code.
- D. Combination Balancing and Shutoff Valve
 - 1. HVAC Systems
 - (1) Multi-turn adjustment range equal to Armstrong Circuit Balancing Valve Model CBV series.
 - (2) Pressure/temperature ports.
 - (3) Positive shutoff.
 - (4) Memory setting feature.
 - (5) Micrometer-type handwheel adjustment with readable settings.
 - (6) Valve selection shall be sized by flow requirements and not line size.
 - (7) For mechanical coupling applications: Equal to Victaulic TA Hydronics.
 - (8) Manufacturers: Armstrong, Danfoss, Grinnell, Nibco, Red-White Valve Co..
- E. Non-lubricated, Eccentric Plug Valves:
 - 1. Materials and Construction: Semi-steel body, high temperature synthetic faced plugs (suitable for 250 degrees F continuous duty). Nickel alloy seat 2-1/2-inch and larger. Self-lubricating bearings. Valves shall be packable under pressure with valve in open position.
 - 2. Pressure Rating: 150 psi body to 12-inch inclusive, bubble tight shut off for 150 psi differential in either direction.
 - 3. Actuators: Three inches and smaller, non-removable levers. Four to 6-inch removable lever. Eight inches and larger, handwheel actuators with enclosed worm gear or Scotch yoke. Actuators shall have position indicators and adjustable maximum opening stops.
 - 4. Manufacturer: DeZurik or approved equal.
- F. Butterfly Valves
 - 1. Material and Construction: Cast iron full lug wafer body for flanged connection with alignment boltholes or guides. Resilient, mechanically retained, field replaceable seat of Nordel, EPDM or approved elastomer, suitable for continuous duty at 250 degrees F. Stainless steel disc. Stainless steel shaft with teflon self lubricating bearings, "O" ring or chevron stem seals for continuous duty at 250 degrees F. Two-inch extension neck on valves for insulating piping. Thrust bearings or vented shaft end to support or neutralize hydraulic or external axial shaft loads.

2. Pressure Ratings: 150-psi body; bubble tight shut off for 150-psi differential in either direction. Bubble tight dead end service. Factory test each valve for operation, leakage, and pressure in accordance with AWWA Standard C504.
 3. Actuator: For valves under 8 inches, lever with locking trigger with notched quadrant. For valves 8 inches and above, enclosed, self locking worm gear or worm screw with hand wheel. Both types equipped with adjustable maximum opening travel stops.
 4. Installation: Use welding neck or socket type companion flanges. Valves may be connected directly to flanges used as unions to permit equipment, control or check valve removal if equipped with tapped lugs or integral double flanges and secured so that valve remains in service when equipment is removed.
 5. Manufacturers: Stockham, Fisher, NIBCO, Milwaukee, Hammond, Jamesbury, Centerline, Grinnell, Keystone, Continental, Bray, DeZurik, TRW Mission, Crane Monark, Demco.
- G. Drain Valves: Hose end ball valve with cap and chain equal to NIBCO Fig. T-585-70-HC ball with American Standard Garden Hose type threads. Drain valves on potable water systems shall include a vacuum breaker hose connection.
- H. Globe
1. Globe valves designed for repacking under pressure when fully opened, and equipped with packing suitable for the intended service. When the valve is fully opened, the back seat shall protect the packing and the stem threads from the fluid. Each globe valve shall have a gland follower.
 2. Bronze valves with the basic saturated steam rating of 125 psi or 150 psi shall have pressure containing parts of a material having at least the physical properties of ASTM Specification B-62. Metallic seated bronze globe and check valves with a basic steam rating of 200 or 300 psi having pressure containing parts of material conforming to ASTM B-61, for temperatures to 550 degrees F.
 3. Pressure containing parts of iron body valves shall be of material conforming to ASTM A 126 Grade B. If the wedge in OS&Y gate valves is fastened to the stem by threads, it shall be secured by a nickel alloy or monel pin.
 4. Face to face and end to end dimensions of iron body valves to conform to ANSI B16.1. Design, workmanship, materials, and testing to conform to MSS SP 70, MSS SP 71, and MSS-SP-85 (Manufacturers Standardization Society of the Valve and Fitting Industry).
 5. Solid wedge type gate valves, designed and manufactured in such a way that seating surfaces are prevented from contacting until near the point of closure.
 6. Handwheels of ASTM A47 malleable iron or ASTM A126, Class A or B iron.
 7. Manufacturers: Unless otherwise indicated, Crane, Grinnell, Hammond, Kennedy, Milwaukee, NIBCO, Powell or Stockham equal to NIBCO or other listed manufacturer figure numbers as noted in Schedule of Services.
- I. Ball Valves
1. Ball valves shall have stem extension to place handle outside the insulation when valve is to be installed in insulated piping.
 2. Type A: Bronze or brass body, bronze or brass ball and stem, reinforced Teflon seats and seals, full port size, threaded or solder end as required scheduled through 2-inch size and acceptable for 2-1/2-inch size if valve is full port. Valve shall be three-piece or shall have removable cartridge to permit complete access removal, and replacement of components without removal of the valve from the piping system and without disturbing the piping system. NIBCO 595-Y.
 3. Type C: Stainless steel body, ball and stem, reinforced Teflon seats and seals, reduced port, flanged end. NIBCO F510-S6-R-66.

4. Manufacturers: Unless otherwise indicated, Apollo, Contromatic, Crane, Dynaquip, Fairbanks, Hammond, ITT Grinnell, Jamesbury, MarPac, Milwaukee, NIBCO, Powell, Watts, Webstone, Worcester for the types listed in Schedule of Services.
- J. Schedule of Services: Unless otherwise indicated, valves are for aboveground service. Size range indicated is size of pipe where valves are required. Valves shall be pipe size or larger.

HOT WATER HEATING				
TYPE	SIZE RANGE	SPECIFIC REQUIREMENTS	STYLE	FIGURE NO.
Butterfly	4-inch and Larger	250 deg F rated	-	See Specifications
Ball	2-1/2&3-inch	Use 3-inch Valve for Both Pipe Sizes	-	Type C
Ball	2-inch and Smaller	-	-	Type A
Globe	2-1/2-inch and Larger	-	IBBM, OS&Y, FLG	F-718-B
Globe	2-inch and Smaller	-	Screwed End Soldered End	T-235-Y S-235-Y
Check	2-1/2-inch and Larger	-	IBBM, FLG	F-918-B
Check	2-inch and Smaller	-	Screwed End Soldered End	T-433-B S-433-B

2.4 PIPE SUPPORTS

- A. General: Supports shall be plastic coated for plastic pipe, copper plated for copper tubing and brass pipe, galvanized for uninsulated galvanized steel pipe, and black steel for other metallic piping. Outdoor supports shall be copper plated for copper tubing and brass piping, and galvanized for all other piping.
- B. Horizontal Piping
1. Clevis Hangers: Adjustable wrought steel clevis hangers.
 2. Roll Hangers: Adjustable steel yoke roll hangers for hot water heating piping larger than 2-1/2-inch diameter.
 3. Under Supports:
 - a. Where no provision for expansion and contraction is required:
 - (1) Floor Mounted: Adjustable cast iron saddle with floor flanges secured to floor and pipe nipple of suitable length.
 - (2) Trapeze or Metal Frame Mounted: Inverted U bolts with saddle supports for insulated pipe.
 - (3) Wall Mounted: Steel J hooks for pipes 3-inch and smaller; welded steel brackets for larger pipes with hanger or support same as for trapeze.
 - b. Where provision for expansion and contraction is required provide adjustable pipe roller and base secured to support. For floor mounting provide concrete pier under base; for wall mounting provide welded steel bracket.
 4. Metal Frame Supports:
 - a. Provide as required, vertical and horizontal 12 gage galvanized steel channels and fittings bolted together to form a multiple pipe rack secured to the building

structure with post bases and brackets. Equal to Grinnell Power-Struct, ASTM A-446, Grade A, hot dipped zinc coated steel with safety end enclosures.

b. Manufacturers: B-Line, Steel City, Unistrut, Grinnell.

5. Lateral Movement: Provide dual movement type rollers where undersupports are required and where expansion and contraction will cause lateral movement.

C. Vertical Piping

1. Steel extension pipe clamps for piping not subject to vertical movement by expansion or contraction.
2. Variable spring supports for piping subject to vertical movement by expansion or contraction.
3. Base fitting set on concrete, brick pier or pipe stand where necessary at bottom of piping risers.

D. Insulation Protection

1. Saddle: 18 gage galvanized sheet metal.
2. Roller Saddle: Curved steel with protecting lugs or turned up edges.
3. Thermal Shield: 360 degree insert of waterproofed calcium silicate insulation with 100 psi compressive strength encased in galvanized steel jacket equivalent to Pipe Shields, Inc. Model A1000 (CS). Use Model A4000 (CSX-CW) and Model A3000 (CSX) wherever pipe hanger span exceeds 10 feet and for pipe roller applications. Insert shall be same thickness as adjoining pipe insulation. Shield length and minimum sheet metal gages as indicated. Insulation insert shall extend 1-inch beyond sheet metal shield on chilled and dual temperature water piping. Where pipe hanger spacing exceeds 10 feet and where pipe rollers are used, provide double layer shield on bearing surface.

Manufacturers: B-Line, Pipe Shields, Inc., Value Engineered Products.

PIPE SIZE IN INCHES	SHIELD LENGTH IN INCHES	MINIMUM GAGE
1/2 – 1-1/2	4	26
2 – 6	6	20
8 – 10	9	16

2.5 THERMOMETERS AND TEST WELLS

A. Types

1. Direct Mounting: 5-inch dial, externally calibrated, standard industrial bimetal, with stainless steel stems and cases equal to Weston Models 4503 and 4513. Stem length - minimum, 1/2 depth of pipe; maximum, 24 inches.
2. Where indicating points cannot be conveniently read or temperature correctly sensed, provide organic liquid filled protected capillary tube for remote mounting.

B. Ranges

1. For Media Temperatures not Exceeding 100 degrees F: 25 to 125 degrees F.
2. For Media Temperatures above 100 degrees F, but not exceeding 220 degrees F: 30 to 240 degrees F.

- C. Accessories: Provide with separable brass wells with insulation extension on insulated pipe.
- D. Manufacturers: Ashcroft, Marsh, Marshalltown, Moeller, Taylor, Tel-Tru, Trerice, U.S. Gage, Weiss, Weksler, Weston, Winters.
- E. Test Wells: Provide brass thermometer wells with screw cap and chain.

Optional: Provide test plug equivalent to Pete's Plug with solid brass body and gasketed cap with retainer, 1/4-inch NPT size, two Nordel (maximum 275 degrees F) self-closing valve cores, suitable to receive 1/8-inch outside diameter probe, rated for 1000 psig operating pressure. Body length shall be suitable for pipe insulation thickness. Furnish to Owner: One stainless steel pressure gage adapter probe for extra-long test plug, one 3-1/2-inch diameter, 1 percent accuracy, compound gage, 30 inches Hg to 100 psi range, and one 0 to 220 degree F pocket thermometer with 1/2 degree accuracy, 1-inch dial and 5-inch long stainless steel stem contained in protective case. Manufacturers: Peterson Engineering Co., Sisco Co. or approved equal.

2.6 PRESSURE GAGES AND TEST CONNECTIONS

- A. Type: General purpose bronze bourdon tube, bronze bushed movement mounted on socket independent of case, 1 percent minimum accuracy at mid range, 4-1/2-inch white face equal to Ashcroft Catalog No. P2070A.
- B. Ranges: Approximately twice the maximum operating pressure. Provide compound gages wherever negative pressures can occur.
- C. Accessories: Provide gages with Trerice No. 735 or 740 valve suitable for intended pressure, temperature and service and, for steam, brass siphon tubes. For pump and compressor suction and discharge, provide porous core snubbers.
- D. Manufacturers: Ashcroft, Marsh, Marshalltown, Moeller, Taylor, Tel-Tru, Trerice, U.S. Gage, Weiss, Weksler, Weston, Winters.
- E. Test Connections: Provide with Trerice No. 735 or 740 gage valves suitable for intended pressure.

Optional: Provide test plug equivalent to Pete's Plug with 316 stainless steel body and gasketed cap with retainer, 1/4-inch NPT size, two Nordel (maximum 275 degrees F) self-closing valve cores, suitable to receive 1/8-inch outside diameter probe, rated for 1000 psig operating pressure. Body length shall be suitable for pipe insulation thickness. Furnish to Owner: One stainless steel pressure gage adapter probe for extra-long test plug and one 3-1/2-inch diameter, 1 percent accuracy, compound gage, 30 inches Hg to 100 psi range contained in protective case. Manufacturers: Peterson Engineering Co., Sisco Co. or approved equal.

PART 3 - EXECUTION

3.1 FITTINGS AND ACCESSORIES

- A. Welding: Make changes in direction and size with welding fittings. Use welded branch fittings in joining a branch to a main. Finish exposed galvanized welds with Galv-Weld.
- B. Brazing: Provide a dry nitrogen purge during brazing operations for copper pipe. Pass nitrogen gas through the pipe or tubing to prevent oxidation as each joint is brazed. Cap the system with

a reusable plug after each brazing operation to retain the nitrogen and prevent entrance of air and moisture.

- C. Reducers: Use reducing fittings to make changes in pipe sizes.
- D. Unions, Flanges, Mechanical Couplings, and Gaskets
 - 1. Install at each piece of equipment, in bypasses, and long piping runs to permit disassembly for alteration and repairs.
 - 2. Equipment Connections: Provide piping connections which conform to indicated sizes, details, reviewed shop drawings, and printed installation instructions furnished by manufacturer.
 - 3. Dielectric (Insulating) Type: Install in water piping systems where pipes of dissimilar metals are joined and where unions are required by contract documents.
- E. Threads: Remove burrs and ream to full inside diameter.

3.2 PIPE, FITTINGS AND JOINTS

A. Schedule

SYSTEM	PIPE	FITTINGS	JOINTS
Hot Water Heating			
1. 2-1/2-inch and larger	E	MM	2
2. 2-inch and smaller	L	BB	7

3.3 VALVES

- A. Adjust for smooth and easy operation.
- B. Install in locations where valve can easily be adjusted.
- C. Install valves full size of pipe before reducing size to make connection to equipment and controls.
- D. Remove excess solder and other foreign matter from valve interior after installation before operating valve.
- E. Provide chainwheel operators for valves in equipment rooms mounted greater than 7 feet above floor level. Extend chain to 7 feet 0 inches above floor level.
- F. Cut Off or Stop Service: Ball, as specified, except butterfly valves for chilled, heating, and dual temperature water service 4 inch and larger. Series 100 DeZurik as specified under "Non-lubricated Plug Valves" may be used in lieu of ball, or butterfly valves.
- G. Throttling or Control Valve Bypass: Globe or non-lubricated plug valves.
- H. Balancing Valves:
 - 1. Three-inch and Smaller: Combination balancing and shutoff valve.
 - 2. Four inches and larger. Non lubricated plug valve.
- I. Preset Balancing valve to be preset to indicated pressure drop.

- J. Silent Check Valves: Install in pump discharge piping where check valves are indicated.
- K. Set field adjustable flow set point of balancing valves.

3.4 PIPE SUPPORTS

A. Preparation and Application

1. Provide supports to maintain required slope and alignment.
2. Secure hangers to rods with double nuts.
3. Make allowance for expansion and contraction.
4. Do not support pipes from ducts or other pipes.
5. Use trapeze hangers for parallel runs of pipe with same slope.
6. Provide bracing to prevent lateral motion of horizontal or vertical piping.
7. Provide supports at or near changes in direction.
8. Do not pierce ducts with hanger rods.
9. Provide strength and rigidity suitable for loads imposed.
10. Support piping so there is no strain on the connection to pumps and other equipment.
11. Support piping using mechanical couplings in accordance with manufacturer's instructions and recommendations.

B. Horizontal Piping

1. Adjustment: Provide vertical adjustment of supports for horizontal piping after installation.
2. Maximum Support Spacing:
 - a. Steel Lines: 1-1/2-inch and smaller, 6 feet; 2-inch and larger, 10 feet.
 - b. Copper Lines: 1-1/2-inch and smaller, 5 feet; 2-inch and larger, 8 feet.
3. Metal Frame Supports: Space frames in accordance with smallest pipe requirements and design for a maximum deflection of 1/360 of the span.

C. Vertical Piping

1. Support vertical lines at locations indicated. Where not indicated, support plastic, and copper pipe at every floor, steel pipe at every other floor. Brace plastic piping on maximum 6-foot centers.
2. Where supports are necessary at bottom of risers, provide a base fitting set on either concrete or brick pier or a pipe stand. In lieu of using a base fitting, a hanger at bottom horizontal connection may be used. Locate hanger as close to riser as possible, but permitting sufficient free offset where allowance for expansion and contraction is necessary.

D. Insulation Protection

1. Roller Saddle: Provide where insulated piping are supported on rollers. Weld lugs to pipe.

3.5 THERMOMETERS AND TEST CONNECTIONS

- A. Install thermometers at temperature control points (except individual room thermostats); water entering and leaving condensers, chillers, and converters, and elsewhere as indicated.
- B. Install test connections or Pete's Plugs where indicated on the drawings, located above horizontal position in pipe with 12-inch minimum clearance above well.

3.6 PRESSURE GAGES AND TEST CONNECTIONS

- A. Install pressure gages at pressure control points, pump suction and discharge, water entering and leaving heat exchangers and elsewhere as indicated.
- B. Install test connections or Pete's Plugs suitable for intended pressure in piping entering and leaving chillers and condensers and where indicated for testing.

3.7 PIPE TESTING

A. Preparation and Application

- 1. Test piping to prove tightness.
- 2. Test concealed piping before enclosing.
- 3. Replace and re-test pipe or fittings broken or damaged under test.
- 4. Remove or protect from damage items not designed to withstand testing pressure; e.g., control devices, air vents, and boilers.
- 5. Advise Owner prior to tests.

B. Pressure Testing

- 1. Test pressures shall be 1-1/2 times the system working pressures and a minimum of 100-psi, unless otherwise indicated.
- 2. Test water piping hydrostatically protecting traps, seals, etc. from excess pressure.
- 3. Valves shall be open, but not backseated for packing check. However, it is permissible to test against a closed valve if the test pressure does not exceed the valve pressure rating at test temperature.
- 4. Blind flanges, or the equivalent, shall be used instead of valves for dead-end shutoff.
- 5. Inspect each joint for leakage while under test.
- 6. Maintain pressure tests for a minimum of four hours.
- 7. Perform refrigeration-piping tests in compliance with the American Standard Safety Code for Mechanical Refrigeration, ASA B9.1.
- 8. Maintain applicable safety methods while performing tests. These methods shall include but shall not be limited to applying pressure at increments of 25 psi, providing sufficient time to allow the piping to equalize strains, until specified test pressure is attained. The piping system shall be examined only when the pressure in it is not increasing.

END OF SECTION 232000

SECTION 232923 - VARIABLE FREQUENCY DRIVES

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

Separately enclosed, pre-assembled, combination variable frequency drives (VFD) and associated integral supports, accessories, and integral controls. Units are rated 6000 volts and less for speed control of three-phase, squirrel-cage induction motors.

1.2 RELATED DIVISIONS AND SECTIONS

- A. Division 01 - General Requirements
- B. Section 230500 - Basic Mechanical Materials and Methods
- C. Section 230553 – Identification for Mechanical Ductwork and Equipment
- D. Section 230593 - Testing, Adjusting, and Balancing
- E. Section 230923 - HVAC Instrumentation and Controls
- F. Division 26 - Electrical

1.3 QUALITY ASSURANCE

- A. Manufacturer shall have a minimum of ten years' experience in design, construction, and application of VFDs.
- B. Provide UL label on electric powered equipment or certification that equipment has been tested by a testing agency approved by local authority and is equivalent in safety to UL labeled equipment.
 - 1. VFD with bypass configurations shall be UL listed by the drive manufacturer as a complete assembly and carry a UL 508 label.
 - 2. All option features specified shall be UL listed by the drive manufacturer as a complete assembly and carry a UL 508 label.
- C. Comply with the following Standards and Guidelines:
 - 1. IEEE 519 - Guide for Harmonic Content and Control
 - 2. EN/IEC 61800-3 (Category C2).

1.4 ACTION SUBMITTALS

- A. Submit in accordance with Division 01 and Section 230500, "Basic Mechanical Materials and Methods"..

- B. Manufacturer's technical product data, including installation instructions, performance data, accessories, supports, fittings, finishes, construction details, wiring details, and dimensions.

1.5 INFORMATIONAL SUBMITTALS

- A. Harmonic Analysis Report: Provide Project-specific calculations and manufacturer's statement of compliance with IEEE 519.
- B. Operation and Maintenance Data: For VFDs to include in emergency, operation, and maintenance manuals.
 - 1. In addition to items specified in Section 017823 "Operation and Maintenance Data," include the following:
 - a. Manufacturer's written instructions for testing and adjusting thermal-magnetic circuit breaker and motor-circuit protector trip settings.
 - c. Manufacturer's written instructions for testing, adjusting, and reprogramming microprocessor control modules.
 - d. Manufacturer's written instructions for setting field-adjustable timers, controls, and status and alarm points.
- C. Submit with Material and Equipment List, variable speed drive manufacturer and name of local service organization located within 50 miles of this site which can provide 24-hour complete system service, and which stocks spare parts for this equipment.

1.6 APPLICABLE PUBLICATIONS

The publications form a part of this specification to the extent referenced. The publications are referenced in the text by the basic designation.

1.7 PROJECT CONDITIONS

- A. Provide all material and equipment in this section with performance requirements as stated herein or on the drawings.
- B. Except where specified, equipment and system capacities and performance requirements are scheduled on the drawings.

1.8 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace VFDs that fail in materials or workmanship within specified warranty period.
 - 1. Warranty Period: Five years from date of acceptance of Commissioning Tests.

1.7 DELIVERY, STORAGE, AND HANDLING

If stored in space that is not permanently enclosed and air conditioned, remove loose packing and flammable materials from inside controllers and install temporary electric heating, with at least 250W per controller.

PART 2 - PRODUCTS

2.1 SYSTEM DESCRIPTION

A. General Requirements for VFDs:

1. VFDs must be compatible with existing BAS, including all interface and communication requirements with existing BAS. Refer to Section 230923, "HVAC Instrumentation and Controls" for existing BAS information.
2. VFDs and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
3. Comply with UL 508A and UL 1995.
4. All circuit boards shall be coated to protect against corrosion.
5. VFD shall utilize pre-programmed application macros specifically designed to facilitate start-up. The application macros shall provide one command to reprogram all parameters and customer interfaces for a particular application to reduce programming time.
 - a. The VFD shall have minimum two user macros to allow customer to create and save settings.
6. Input current rating of VFMC shall not be greater than output current rating.

B. Application: variable torque.

C. VFD Description:

1. For HVAC application variable-frequency drive, consisting of power converter that employs pulse-width-modulated inverter, factory built and tested in an enclosure, with integral disconnecting means and overcurrent and overload protection; listed and labeled by an NRTL as a complete unit; arranged to provide self-protection, protection, and variable-speed control of one or more three-phase induction motors by adjusting output voltage and frequency.
 - a. Units suitable for operation of inverter-duty motors as defined by NEMA MG 1, Section IV, Part 31, "Definite-Purpose Inverter-Fed Polyphase Motors."
 - b. Listed and labeled for integrated short-circuit current (withstand) rating by an NRTL acceptable to authorities having jurisdiction.
 - c. VFD shall provide an adjustable AC voltage and frequency output for stepless motor control from 10 to 105 percent of base speed. Drive shall be constant voltage source (PWM inverter) type. Current source inverters (SCR's and companion communication circuits) are not acceptable. A regulator shall control converter and inverter functions and interface with external speed commands. Control functions and user interface functions shall be completely isolated from all line voltage components by protective barriers.

D. Design and Rating: Match load type, such as fans; and type of connection used between motor and load such as direct or through a power-transmission connection.

1. VFD shall have same horsepower as the motor it serves.

- E. Output Rating: Three phase; 10 to 60 Hz, with voltage proportional to frequency throughout voltage range; maximum voltage equals input voltage.
- F. Unit Operating Requirements:
1. Input AC Voltage Tolerance: Plus 10 and minus 10 percent of VFD input voltage rating.
 2. Input AC Voltage Unbalance: Not exceeding 5 percent.
 3. Input Frequency Tolerance: Plus or minus 3 percent of VFD frequency rating.
 4. Minimum Efficiency: 98 percent at 60 Hz, full load.
 5. Minimum Displacement Primary-Side Power Factor: 100 percent under full load.
 6. Minimum Short-Circuit Current (Withstand) Rating: 100 kA.
 7. Ambient Temperature Rating: Not less than 32 degrees F and not exceeding 104 degrees F.
 8. Humidity Rating: Less than 95 percent (non-condensing).
 9. Altitude Rating: Not exceeding 3300 feet.
 10. Vibration Withstand: Comply with NEMA ICS 61800-2.
 11. Overload Capability: 1.35 times the base load current for 2 seconds.
 12. Starting Torque: Minimum 100 percent of rated torque from 3 to 60 Hz.
 13. Speed Regulation: Plus or minus 10 percent.
 14. Output Carrier Frequency: Selectable; 1.0 to 12.5 kHz.
 15. Stop Modes: Programmable; includes fast, free-wheel, and dc injection braking.
- G. Inverter Logic: Microprocessor based, 32 bit, isolated from all power circuits minimum.
- H. Isolated Control Interface: Allows VFDs to follow remote-control signal over a minimum 40:1 speed range.
1. Signal: Electrical.
- I. Internal Adjustability Capabilities:
1. Minimum Speed: 5 to 25 percent of maximum rpm.
 2. Maximum Speed: 80 to 100 percent of maximum rpm.
 3. Acceleration: 0 to 6000 seconds.
 4. Deceleration: 0 to 6000 seconds.
 5. Current Limit: 30 to minimum of 150 percent of maximum rating.
 6. Seven programmable preset speeds.
 7. Maximum frequency (55 to 120 hertz) factory set at 60 hertz.
 8. Minimum frequency (15 to 35 hertz) factory set at 15 hertz.
 9. Volts/hertz ratio factory set for rated voltage at 60 hertz.
 10. Voltage offset or boost factory set at 100 percent torque.
 11. A minimum of two frequency lockouts so that VFD can bypass locked out frequency.
 12. A minimum of two frequency setpoints so that VFD can be operated at a fixed frequency.
- J. Self-Protection and Reliability Features:
1. Surge Suppression shall be Factory installed as an integral part of the VFD, complying with UL 1449 SPD, Type 1 or Type 2.
 2. Loss of Input Signal Protection: Selectable response strategy, including speed default to a percent of the most recent speed, a preset speed, or stop; with alarm.
 3. Under- and overvoltage trips.
 4. Inverter overcurrent trips.
 5. VFD and Motor-Overload/Overtemperature Protection: Microprocessor-based thermal protection system for monitoring VFDs and motor thermal characteristics, and for

- providing VFD overtemperature and motor-overload alarm and trip; settings selectable via the keypad.
6. Critical frequency rejection, with three selectable, adjustable deadbands.
 7. Instantaneous line-to-line and line-to-ground overcurrent trips.
 8. Loss-of-phase protection.
 9. Reverse-phase protection.
 10. Short-circuit protection.
 11. Motor-over-temperature fault.
 12. Loss-of-load output for broken belt or coupling with alarm and programmable time delay to allow for motor acceleration from zero speed without signaling a false loss-of-load condition.
 13. Output phase-to-phase short circuit condition.
 14. External fault due to safety device trip.
- K. Automatic Reset/Restart: Attempt three restarts after drive fault or on return of power after an interruption and before shutting down for manual reset or fault correction; adjustable delay time between restart attempts.
- L. Bidirectional Autospeed Search: Capable of starting VFD into rotating loads spinning in either direction and returning motor to set speed in proper direction, without causing damage to drive, motor, or load.
- M. Torque Boost: Automatically varies starting and continuous torque to at least 1.5 times the minimum torque to ensure high-starting torque and increased torque at slow speeds.
- N. Motor Temperature Compensation at Slow Speeds: Adjustable current fall-back based on output frequency for temperature protection of self-cooled, fan-ventilated motors at slow speeds.
- O. VFD shall allow soft start at the motor it serves.
- P. Integral Input Disconnecting Means and OCPD: UL 489 thermal magnetic or cast breaker.
1. Disconnect Rating: Not less than 115 percent of NFPA 70 motor full-load current rating or VFD input current rating, whichever is larger.
 2. Auxiliary Contacts: NO or NC, arranged to activate before switch blades open.
 3. NO or NC alarm contact that operates only when circuit breaker has tripped.
 4. Provide individual motor overload protection, as defined by the NEC, for each motor served by the VFD, properly sized to protect the motor served.
- Q. Provide output contactor in the VFD to provide a positive disconnect between the output terminals and the motor. Provide control interlock when the drive is remote from the motor and disconnect is located at the motor. When a "stop" command is initiated, the contactor shall immediately open if coast-to-rest operation is selected. The VFD shall first bring the motor a controlled stop, after which the contactor shall open. In either mode of operation, when a "start" command is initiated, the contactor shall first close before the converter or inverter sections begin operation.

2.2 CONTROLS AND INDICATION

- A. Status Lights: Door-mounted LED or LCD indicators displaying the following conditions:
1. Power on.
 2. Run.

3. Overvoltage.
 4. Input line fault (overvoltage and phase loss).
 5. Overcurrent.
 6. External fault.
 7. Drive fault.
 8. Motor overcurrent.
- B. Panel-Mounted Operator Station: Manufacturer's standard front-accessible, sealed keypad and plain-English-language digital display for programming and fault diagnostics (alphanumeric codes are not acceptable); allows complete programming, program copying, operating, monitoring, and diagnostic capability.
1. Keypad: In addition to required programming and control keys, include keys for HAND, OFF, and AUTO modes.
 2. Security Access: Provide electronic security access to controls through identification and password with at least three levels of access: View only; view and operate; and view, operate, and service.
 - a. Control Authority: Supports at least four conditions: Off, local manual control at VFD, local automatic control at VFD, and automatic control through a remote source.
- C. Historical Logging Information and Displays:
1. Real-time clock with current time and date.
 2. Running log of total power versus time.
 - a. Clock shall have a battery backup with 10 years minimum life span.
 3. Total run time.
 4. Fault log, maintaining last four faults with time and date stamp for each.
- D. Door-mounted LED or LCD display and additional readout required, but not limited to:
1. Output frequency (Hz).
 2. Motor speed (rpm).
 3. Motor status (running, stop, fault).
 4. Motor current (amperes).
 5. Motor torque (percent).
 6. Fault or alarming status (code).
 7. PID feedback signal (percent).
 8. DC-link voltage (V dc).
 9. Set point frequency (Hz).
 10. Motor output voltage (V ac).
 11. Motor power (kW).
 12. Output voltage.
- E. Control Signal Interfaces:
1. Electric Input Signal Interface:
 - a. A minimum of two programmable analog inputs: parameters.
 - b. A minimum of six multifunction programmable digital inputs.

2. Output Signal Interface: A minimum of two programmable analog output signal 4- to 20-mA dc.
 3. Remote Indication Interface: A minimum of three programmable dry-circuit relay outputs (120-V ac, 1 A).
- F. PID Control Interface: Provides closed-loop set point, differential feedback control in response to dual feedback signals. Allows for closed-loop control of fans and pumps for pressure, flow, or temperature regulation.
1. Number of Loops: Two.
- G. Interface with DDC System for HVAC: Factory-installed hardware and software shall interface with DDC system for HVAC to monitor, control, display, and record data for use in processing reports. VFD settings shall be retained within VFD's nonvolatile memory and is not dependent on battery power.

2.3 LINE CONDITIONING AND FILTERING

- A. Input Line Conditioning: Based on the manufacturer's harmonic analysis study and report, provide input filtering, as required, to limit total demand (harmonic current) distortion and total harmonic voltage demand at the defined point of common coupling to meet IEEE 519 recommendations.
1. VFD shall have internal swinging (non-linear) chokes providing impedance equivalent to 5 percent to reduce harmonics to the power line. The 5 percent impedance may be from dual (positive and negative DC bus) chokes or 5 percent swinging AC line chokes.
- B. EMI/RFI Filtering: CE marked; certify compliance with IEC 61800-3 for Category C2. Second environment (Category C3, C4) is not acceptable.

2.4 BYPASS SYSTEMS

- A. Bypass Operation: Safely transfers motor between power converter output and bypass circuit, manually, automatically, or both. Selector switches set modes and indicator lights indicate mode selected. Unit is capable of stable operation (starting, stopping, and running) with motor completely disconnected from power converter.
- B. Bypass Mode: Field-selectable automatic or manual, allows local and remote transfer between power converter and bypass contactor and retransfer, either via manual operator interface or automatic-control system feedback.
- C. Bypass Controller: Three-contactor-style bypass allows motor operation via the power converter or the bypass controller; with input isolating switch and barrier arranged to isolate the power converter input and output and permit safe testing and troubleshooting of the power converter, both energized and de-energized, while motor is operating in bypass mode.
1. System safeties shall be operational in the bypass mode.
 2. Bypass Contactor: Load-break, NEMA-rated contactor.
 3. Output Isolating Contactors: Non-load-break, NEMA-rated contactors.
 4. Isolating Switch: Non-load-break switch arranged to isolate power converter and permit safe troubleshooting and testing of the power converter, both energized and de-

energized, while motor is operating in bypass mode; pad-lockable, door-mounted handle mechanism.

- D. Bypass Contactor Configuration: Full-voltage (across-the-line) type.
1. NORMAL/BYPASS selector switch.
 2. HAND/OFF/AUTO selector switch.
 3. NORMAL/TEST Selector Switch: Allows testing and adjusting of VFD while the motor is running in the bypass mode.
 4. Contactor Coils: Pressure-encapsulated type with coil transient suppressors.
 - a. Operating Voltage: Depending on contactor NEMA size and line-voltage rating, manufacturer's standard matching control power or line voltage.
 - b. Power Contacts: Totally enclosed, double break, and silver-cadmium oxide; assembled to allow inspection and replacement without disturbing line or load wiring.
 5. Control Circuits: 24-VAC or 120-VAC obtained from integral CPT with primary and secondary fuses of sufficient capacity to operate all integral devices and remotely located pilot, indicating, and control devices.
 - a. CPT Spare Capacity: 100 VA.
 6. Overload Relays: NEMA ICS 2.
 - a. Solid-State Overload Relays:
 - 1) Switch or dial selectable for motor-running overload protection.
 - 2) Sensors in each phase.
 - 3) Class 10/20/30 tripping characteristic selected to protect motor against voltage and current unbalance and single phasing.
 - 4) Class II ground-fault protection, with start and run delays to prevent nuisance trip on starting.
 - b. NC isolated overload alarm contact.
 - c. External overload, reset push button.

2.5 ADDITIONAL FEATURES

- A. Sleep Function: Senses a minimal deviation of a feedback signal and stops the motor. On an increase in speed-command signal deviation, VFD resumes normal operation.
- B. Motor Preheat Function: Preheats motor when idle to prevent moisture accumulation in the motor.
- C. Communication Port: RS-232 port, USB 2.0 port, or equivalent connection capable of connecting a printer and a notebook computer.
- D. Remote Indicating Circuit Terminals: Make selection, controller status and controller fault.

2.6 ENCLOSURES

- A. VFD Enclosures: NEMA 250, to comply with environmental conditions at installed location.
 - 1. Dry and Clean Indoor Locations: Type 1.
 - 2. Outdoor Locations: Type 3R. Refer to floor plans for locations.
 - 3. Indoor Locations Subject to Dust, Falling Dirt, and Dripping Noncorrosive Liquids: Type 12.
- B. Isolate high voltage components within the enclosure with steel covers.

2.7 ACCESSORIES

- A. Control Relays: Auxiliary and adjustable solid-state time-delay relays.
- B. Phase-Failure, Phase-Reversal, and Undervoltage and Overvoltage Relays: Solid-state sensing circuit with isolated output contacts for hard-wired connections. Provide adjustable undervoltage, overvoltage, and time-delay settings.
 - 1. Current Transformers: Continuous current rating, basic impulse insulating level (BIL) rating, burden, and accuracy class suitable for connected circuitry. Comply with IEEE C57.13.
- C. Supplemental Digital Meters:
 - 1. Elapsed-time meter.
 - 2. Kilowatt meter.
 - 3. Kilowatt-hour meter.
- D. Breather and drain assemblies, to maintain interior pressure and release condensation in NEMA 250, Type 12 enclosures installed outdoors or in unconditioned interior spaces subject to humidity and temperature swings.
- E. Space heaters, with NC auxiliary contacts, to mitigate condensation in NEMA 250, Type 12 enclosures installed outdoors or in unconditioned interior spaces subject to humidity and temperature swings.
- F. Cooling Fan and Exhaust System: For NEMA 250, Type 1, Type 12; UL 508 component recognized: Supply fan, with composite intake and exhaust grills and filters; 120 V ac; obtained from integral CPT.
- G. Spare control-wiring terminal blocks; wired.

2.8 SOURCE QUALITY CONTROL

- A. Testing: Test and inspect VFDs according to requirements in NEMA ICS 61800-2.
 - 1. Test each VFD while connected to its specified motor.
 - 2. Verification of Performance: Rate VFDs according to operation of functions and features specified.
- B. VFDs will be considered defective if they do not pass tests and inspections.
- C. Prepare test and inspection reports.

2.9 MANUFACTURERS

ABB, Cutler-Hammer.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas, surfaces, and substrates to receive VFDs, with Installer present, for compliance with requirements for installation tolerances, and other conditions affecting performance of the Work.
- B. Examine VFD before installation. Reject VFDs that are wet, moisture damaged, or mold damaged.
- C. Examine roughing-in for conduit systems to verify actual locations of conduit connections before VFD installation.
- D. Prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.
- E. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Wall-Mounting Controllers: Install with tops at uniform height and with disconnect operating handles not higher than 60 inches above finished floor, unless otherwise indicated, and by bolting units to wall or mounting on lightweight structural-steel channels bolted to wall. Verify the adequacy of the wall construction to support the weight of the VFD.
- B. Suspended Controllers: Install according to manufacturer recommendations providing channel supports supported from structure above ceiling.
- C. Free-standing Controllers: In cases where the wall cannot support the VFD or is not near a wall, provide channel supports extending from floor to structural ceiling.
- C. Floor-Mounting Controllers: Install VFDs on 4-inch nominal thickness concrete base.
 - 1. 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.
 - 2. For supported equipment, install epoxy-coated anchor bolts that extend through concrete base and anchor into structural concrete floor.
 - 3. Place and secure anchorage devices. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
 - 4. Install anchor bolts to elevations required for proper attachment to supported equipment.
- D. Temporary Lifting Provisions: Remove temporary lifting eyes, channels, and brackets and temporary blocking of moving parts from enclosures and components.
- E. Comply with NECA 1.

3.3 CONTROL WIRING INSTALLATION

- A. Install wiring between VFDs and remote devices and facility's central-control system. Coordinate with Electrical Contractor.
 - 1. For drives remotely located from the motor served, provide the necessary devices when the distance exceeds the manufacturer's recommended standard maximum.
- B. Bundle, train, and support wiring in enclosures. Install wiring to the drive and from the drive, each in their own separate conduits.
 - 1. Control wiring shall be in conduits separate from power wiring conduits.
- C. Connect automatic-control devices where applicable.

3.4 IDENTIFICATION

- A. Identify VFDs, components, and control wiring.
 - 1. Identify field-installed conductors, interconnecting wiring, and components; provide warning signs.
 - 2. Label each VFD with engraved nameplate.
 - 3. Label each enclosure-mounted control and pilot device.
- B. Operating Instructions: Frame printed operating instructions for VFDs, including control sequences and emergency procedures. Fabricate frame of finished metal, and cover instructions with clear acrylic plastic. Mount on front of VFD units.

3.5 FIELD QUALITY CONTROL

- A. Perform tests and inspections with the assistance of a factory-authorized service representative.
- B. Acceptance Testing Preparation:
 - 1. Test insulation resistance for each VFD element, bus, component, connecting supply, feeder, and control circuit.
 - 2. Test continuity of each circuit.
- C. Tests and Inspections:
 - 1. Inspect VFD, wiring, components, connections, and equipment installation. Test and adjust controllers, components, and equipment.
 - 2. Test insulation resistance for each VFD element, component, connecting motor supply, feeder, and control circuits.
 - 3. Test continuity of each circuit.
 - 4. Verify that voltages at VFD locations are within 10 percent of motor nameplate rated voltages. If outside this range for any motor, notify Contracting Officer's Representative before starting the motor(s).
 - 5. Test each motor for proper phase rotation.
 - 6. Perform tests according to the Inspection and Test Procedures for Adjustable Speed Drives stated in NETA Acceptance Testing Specification. Certify compliance with test parameters.

7. Correct malfunctioning units on-site, where possible, and retest to demonstrate compliance; otherwise, replace with new units and retest.
 8. Test and adjust controls, remote monitoring, and safeties. Replace damaged and malfunctioning controls and equipment.
- D. VFDs will be considered defective if they do not pass tests and inspections.
- E. Prepare test and inspection reports. Include notation of deficiencies detected, remedial action taken, and observations made after remedial action.

3.6 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.

3.7 ADJUSTING

- A. Program microprocessors for required operational sequences, status indications, alarms, event recording, and display features. Clear events memory after final acceptance testing and prior to Substantial Completion.
- B. Set field-adjustable switches, auxiliary relays, time-delay relays, timers, and overload-relay pickup and trip ranges.
- C. Adjust the trip settings of instantaneous-only circuit breakers and thermal-magnetic circuit breakers with adjustable, instantaneous trip elements. Initially adjust to 6 times the motor nameplate full-load amperes and attempt to start motors several times, allowing for motor cool-down between starts. If tripping occurs on motor inrush, adjust settings in increments until motors start without tripping. Do not exceed 8 times the motor full-load amperes (or 11 times for NEMA Premium Efficient motors if required). Where these maximum settings do not allow starting of a motor, notify Contracting Officer's Representative before increasing settings.
- D. Set the taps on reduced-voltage autotransformer controllers.

3.8 PROTECTION

- A. Temporary Heating: Apply temporary heat to maintain temperature according to manufacturer's written instructions until controllers are ready to be energized and placed into service.
- B. Replace VFDs whose interiors have been exposed to water or other liquids prior to Substantial Completion.

3.9 DEMONSTRATION

- A. Engage a factory-authorized service representative to train County's maintenance personnel to adjust, operate, reprogram, and maintain VFDs for two hours.
1. System concepts.
 2. Basic operating instructions.
 3. Basic troubleshooting instructions.

END OF SECTION 232923

SECTION 233113 - DUCTS AND DUCT ACCESSORIES

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

Sheet metal ductwork, insulated flexible ductwork, flexible ductwork, and leakage testing.

1.2 RELATED DIVISIONS AND SECTIONS

- A. Division 01 – General Requirements
- B. Section 230500 - Basic Mechanical Materials and Methods
- C. Section 230553 – Identification of Mechanical Ductwork and Equipment
- D. Section 230593 - Testing, Adjusting, and Balancing
- E. Section 230700 - Mechanical Insulation
- F. Section 237000 - Heating, Ventilating and Air Conditioning

1.3 QUALITY ASSURANCE

- A. For details not specified, such as hangers, elbow construction, offsets, obstruction streamlining, branch connections, dampers, sealing, the following reference applies:

Sheet Metal and Air Conditioning Contractors National Association "HVAC Duct Construction Standards, Metal and Flexible," Third Edition, 2005 referred to herein as SMACNA-HVAC.
- B. Flexible duct and insulated flexible duct including vapor barrier shall be Class I in accordance with NFPA 90A.

1.4 ACTION SUBMITTALS

- A. Submit in accordance with Division 01 and Section 230500, "Basic Mechanical Materials and Methods".
- B. Manufacturer's technical product data, installation instructions and accessories for the following:

Electric Duct Heaters
Hot Water Heating Coils
Access Doors
Balancing Volume Dampers
Barometric Relief Dampers
Round Duct and Fittings
Insulated Flexible Duct
Sealant Compound

1.5 INFORMATIONAL SUBMITTALS

Statement indicating compliance with SMACNA standards and specified system pressure ratings.

1.6 APPLICABLE PUBLICATIONS

The publications form a part of this specification to the extent referenced. The publications are referenced in the text by the basic designation.

1.7 PROJECT CONDITIONS

- A. Physical Interference: Provide offsets or changes in duct shape required to avoid structural or other interference without additional cost to the County.
- B. Ductwork dimensions indicated on the drawings are internal.
- C. System Pressure Rating: Construct systems in accordance with the following pressure rating.

SYSTEM	PRESSURE RATING (INCHES- W.G.)
AHU Return and Outdoor Air Ductwork	(-)4
AHU Supply Ductwork	4

PART 2 – PRODUCTS

2.1 ELECTRIC DUCT HEATERS

- A. Heaters shall be UL listed for zero clearance.
- B. Heaters and controls shall meet current National Electrical Code requirements.
- C. Submit coordinated wiring diagrams for Contracting Officer's Representative's (COR) review.
- D. Factory test wiring and control operation.
- E. Capacities as indicated on drawings.
- F. Sizes shall be equal to indicated duct or casing sizes.
- G. Type A: Open helical coils of 80 percent nickel, 20 percent chromium alloy resistance wire supported by ceramic insulating bushings mounted in brackets spaced on 4-inch maximum centers. Maximum density of 35 watts per square inch of outside wire surface area.
- H. Stainless steel element terminals and nuts.
- I. Galvanized or aluminized steel casing and supports, spot welded to form rigid frame. Casings shall have continuous flanged connections independent of terminal box except for single duct heaters, which shall be slip-in type.

- J. Provide automatic reset high limit thermal cutout to de-energize all circuits. Where heater rating or multiple circuiting exceeds control capacity, provide magnetic contactor(s), UL listed for 100,000 cycles, for pilot control by cutout. Control sensor on hot deck heaters and other heaters of 72 inches or greater width shall span heater width and respond to highest temperature on any 12-inch portion.
- K. Provide high limit thermal cutout(s) with manual reset button external to box, to deenergize circuits. Where heater ratings or multiple circuiting exceeds control capacity provide magnetic contactor(s), UL listed for 100,000 cycles, for pilot control by cutout. Replaceable thermal cutouts may be employed in lieu of manual reset type. If replaceable cutouts are provided, opening shall be detectable without removal from terminal box and shall be replaceable without disturbing heater. Identical cutouts shall be used in all heaters and one spare shall be furnished to County for every ten cutouts up to a maximum of ten. Setting shall be higher than that for automatic reset cutout.
- L. Where rating of heater exceeds permissible single circuit limit, provide properly rated fuses for each circuit in fuse block.
- M. Circuit heaters for SCR control. Where multiple steps are required adjacent rows of elements shall be connected to different circuits in progressive sequence to minimize stratification during part load operation.
- N. Power source voltage as indicated on the Electrical Drawings. Provide integral disconnect.
- O. Circuit 3-phased heaters for balanced phase loading.
- P. If power voltage exceeds 240 volts, provide 120-volt control transformer; with primary fuse protection if total heater load exceeds 16 amperes.
- Q. Provide NEMA 1 control panel enclosures with automatic temperature control device furnished by the automatic control system subcontractor, switches, cutouts, fuse blocks, contactors, and controls mounted and factory wired to terminal blocks for connection to power and external control. Provide integral panel for each heater.

Furnish remote control panel enclosures for heaters. Remote panels shall contain all items other than automatic and manual reset cutouts, thermal cutouts and air flow switches, which shall be contained in the heater terminal enclosure.

Heater terminal and panel enclosures shall have hinged covers. Insulate inside panel of enclosures to prevent condensation. Provide adequate ventilation for temperature sensitive or heat producing equipment, such as SCR controller. Provide unfused disconnect switch for each control panel enclosure interlocked to prevent door from being opened unless switch is open, and where control panel is remote from heater, means of padlocking switch in open position.

Remote control panels shall be provided with fuses in all phases of each sub-circuit to protect wiring between panel and heater terminal enclosure.

Provide pilot light in remote panel door of each heater functioning as central air handling unit equipment and as indicated. Pilot light shall glow when heater is energized.

- R. Manufacturers: Brasch, Indeeco.

2.2 HEATING COILS

- A. Coil ratings shall be ARI certified /or certified by the manufacturer to provide ratings in accordance

with ARI Standard 410.

- B. Protect coils from damage during shipment. Replace coils that have loose or damaged fins or tubes.
- C. Refer to drawings for duty and other physical requirements.
- D. Coils: Smooth helical or plate fins of 0.0085-inch minimum thickness aluminum. Helical copper fins shall be solder bonded to tubes. Working pressure ratings: 200 psi (1380 kPa) for water coils.
- E. Casings: Minimum 16 gage galvanized steel except minimum 20 gage galvanized steel for single heating coils not exceeding 3-foot-6-inch tube length.
- F. Headers: Supply and return connections at same ends. Construct headers of steel, cast iron, or copper. Paint cast iron and steel headers after fabrication with primer coat of aluminum paint.
- G. Water Coils: Serpentine type with vent and drain header connection.
- H. Manufacturers: Aerofin, Bohn, Carrier, Dunham-Bush, Heat-craft, McQuay, Miller-Picking, Pace, Temptrol, Trane, York.

2.3 FITTINGS AND ACCESSORIES

- A. Elbows
 - 1. Provide 90-degree elbows of radius construction wherever space permits and elsewhere of square construction. Construct 90-degree square elbows with double radius turning vanes unless otherwise indicated. If throat radius on curved elbows must be less than duct width, provide full-length metal turning vanes. Provide 3/4-inch trailing edge on turning vanes of 90 degree square elbows wherever elbow is less than one duct perimeter upstream of change in duct size or direction.
 - 2. Where a size change must occur at a square elbow, extend runners from throat to heel and secure vanes on runners parallel with duct sides.
 - 3. Unless otherwise indicated, provide offsets with 30-degree full radius elbows as maximum.
- B. Flexible Collars: Provide 6-inch wide neoprene impregnated glass fabric collars between fans and ducts or casings, and wherever ducts cross building expansion joints. Collars shall have flame retardant to have flame spread index not over 25 and a smoke developed index not over 50.
- C. Duct Access Door Construction: SMACNA-HVAC, Fig. 7-2, Door A, Frame 1, Hinge Position 1 for 2-inch w.g. static pressure rating and less.
- D. Barometric Relief Dampers
 - 1. Suitable for horizontal or vertical mounting.
 - 2. Maximum Air Velocity: 1000 fpm.
 - 3. Maximum System Pressure: 0.35-inch wg.
 - 4. Frame: Hat-shaped, 0.05-inch thick, galvanized sheet steel, with welded corners and mounting flange.
 - 5. Blades:
 - a. Multiple, 0.025-inch thick, roll-formed aluminum sheet.
 - b. Maximum Width: 6 inches.

- c. Action: Parallel.
 - d. Balance: Gravity.
 - e. Eccentrically pivoted, Off-center pivoted, or End pivoted.
- 6. Blade Seals: Neoprene.
- 7. Blade Axles: Galvanized steel.
- 8. Tie Bars and Brackets:
 - a. Material: Galvanized steel.
 - b. Rattle free with 90-degree stop.
- 9. Return Spring: Adjustable tension.
- 10. Bearings: Synthetic.
- 11. Accessories:
 - a. Flange on intake.
 - b. Adjustment device to permit setting for varying differential static pressures.
- 12. Manufacturers: Air Balance, American Warming and Ventilating, Cesco, Greenheck, Nailor, Ruskin.

E. Balancing Volume Dampers

- 1. Pressure Rating 2 inch W.G. and Less: SMACNA-HVAC, 7-4 A, B, C, 12-inch maximum blade width no internal frame. Fig. 7-5, multi opposed blade larger than 12-inch duct height, 8-inch maximum blade width. Recess frame totally out of airstream. Limit stop penetration into airstream to 1/2-inch. Dampers less than 5 feet upstream of outlets, equivalent to Young Regulator No. 820.
- 2. Locate where accessible for adjusting after completion of work. Provide access panels where regulators are concealed. Provide damper regulators equal to "Ventlok" models listed.
 - a. Concealed or Exposed in Unfinished Space: No. 641.
 - b. Manufacturers: Linx Industries, Ventfabrics, Young Regulator.

- F. Instrument Test Holes: Locate where accessible in main or major branch ducts and upstream of smoke detectors to permit measurement of fan air quantities according to ASHRAE Pitot tube method. Locate holes on more than two sides of larger duct if required by available Pitot tube length. Provide holes with 1-inch high Ventlok No. 699 instrument ports.

- G. Plenum Connections: Provide bellmouth type for round supply ducts connecting to apparatus casings; maximum 20 degrees transition angle for rectangular ducts.

2.4 RECTANGULAR DUCTWORK - PRESSURE RATED 4-INCH W.G. AND LOWER

G90 Galvanized steel sheets, reinforcing and companion angles, and hangers. Provide metal specification, gages and construction of seams, joints and reinforcing according to SMACNA-HVAC.

2.5 ROUND DUCTWORK - PRESSURE RATED 4-INCH W.G. AND LOWER

- A. G90 Galvanized steel ducts, reinforcing, joining angles and hangers. Metal specification, gages and construction of ducts according to SMACNA-HVAC.
- B. Unless otherwise indicated, 90 degree elbows shall be 5 sections or die formed; and 90 degree branch connections shall be long or bell formed conical.

- C. Manufacturers: Spiral conduit and fittings - Eastern Sheetmetal, Hamlin, Lindab, McGill Airflow Corp., Monroe, Semco.

2.6 INSULATED FLEXIBLE DUCT

- A. Spiral wound metal reinforced coated glass fabric, factory insulated with 1-inch, 3/4 pound density insulation with flexible outer vapor barrier, equal to Thermaflex M-KC.
- B. Duct shall be rated for 10-inch w.g. positive, 2-inch w.g. negative pressure, 0 to 180 degrees F continuous temperature, and 4000 fpm air velocity.
- C. Manufacturers: Flexmaster, Genflex, Thermaflex, Wiremold.

2.7 GASKETS

3M Company EC-1202 tape sealer. Minimum size and thickness 1 by 1/8-inch.

2.8 SEALING COMPOUND

Childers CP-146, McGill Airseal Corp. "United Duct Sealer," Foster 32-19, Hardcast, Inc.

PART 3 - EXECUTION

3.1 ELECTRIC DUCT HEATERS

- A. Locate heaters at least two times duct width plus height downstream of fans, elbows, branch connections.
- B. Install heaters with coils in vertical position.
- C. Allow clearance for removal of slip-in heaters and terminal box door swing.
- D. Maintain NEC clearance.
- E. Connect wiring in accordance with Division 26.

3.2 HEATING AND COOLING COILS

- A. Protect coils from damage during installation. Replace coils that have loose or damaged fins or tubes.
- B. Accurately level water coils on supports.

3.3 FITTINGS AND ACCESSORIES

- A. Damper and Coil Frames: Bolt and seal damper and coil frames to duct.
- B. Provide duct accessories of materials suited to duct materials; use galvanized steel accessories in galvanized steel ducts.
- C. Vibration: Brace or reinforce ducts where necessary to overcome vibration, buckling or breathing.

- D. Install flexible connectors immediately adjacent to equipment in ducts associated with fans and motorized equipment supported by vibration isolators.
- E. Barometric Relief Dampers: Install in accordance with manufacturer's instructions and recommendations.
- F. Balancing Volume Dampers
 - 1. Install a minimum of two duct widths from air inlet or outlet device.
 - 2. Mark balanced position.
 - 3. Elevate dial to face of insulation.
- G. Secondary Drain Pans
 - 1. Locate top of secondary drain pan 6 inches below bottom of air handling unit.
 - 2. Wire water level detection device to local alarm shown on drawings. Send an alarm signal to building automation system.
- H. Install airtight duct access doors in casings, plenums, and ducts to allow for inspecting, adjusting, and maintaining accessories as follows:
 - 1. On both sides of duct coil.
 - 2. Downstream from dampers, turning vanes and equipment.
 - 3. Adjacent to fire dampers, providing access to reset or reinstall fusible link.
 - 4. To interior of casings, plenums, and ducts for cleaning; before and after each change in direction, at maximum 50-foot spacing.
 - 5. Locate on sides of ducts where adequate clearance is available, otherwise locate on bottom of ducts.
 - 6. Install the following sizes for duct-mounting, rectangular access doors:
 - a. One-Hand or Inspection Access: 8 by 5 inches.
 - b. Two-Hand Access: 12 by 6 inches.
 - c. Head and Hand Access: 18 by 10 inches.
 - d. Head and Shoulders Access: 21 by 14 inches.
 - e. Body Access: 25 by 14 inches.
 - f. Body Plus Ladder Access: 25 by 17 inches.
 - 6. Install the following sizes for duct-mounting, round access doors:
 - a. One-Hand or Inspection Access: 8 inches in diameter.
 - b. Two-Hand Access: 10 inches in diameter.
 - c. Head and Hand Access: 12 inches in diameter.
 - d. Head and Shoulders Access: 18 inches in diameter.
 - e. Body Access: 24 inches in diameter.

3.4 RECTANGULAR DUCTWORK - PRESSURE RATED 2-INCH W.G. AND LOWER

- A. Construct ducts true to indicated dimensions, straight and smooth on inside with neatly finished airtight joints.
- B. Where rigid board insulation is applied, do not use cross break or bead construction.
- C. Construct the sides of a section of duct of gage specified for its maximum dimension.

- D. Seal seams and joints in outdoor ductwork with sealing compound protected with weather resistant tape.
- E. Seal transverse joints, fitting connections and snaplock seams in indoor ductwork with sealing compound and tape.

3.5 ROUND DUCTWORK - PRESSURE RATED 2-INCH W.G. AND LOWER

- A. Clean and paint welds with zinc dust paint.
- B. Seal transverse joints, fitting connections and snaplock seams in indoor ductwork with sealing compound and tape.

3.6 INSULATED FLEXIBLE DUCT

- A. Provide on connection to round neck supply air ceiling diffusers.
- B. Runs of insulated flexible duct shall not to exceed five feet in length.
- C. Install without kinks and compressions. Support duct with minimum 1-inch wide band hangers to avoid sagging. Supports shall conform to SMACNA Fig. 3-10.
- D. Provide bends with throat radius not less than outside diameter of insulated flexible duct.
- E. Provide duct elbow support at locations where an elbow connection is provided.
- F. Seal insulation at ends and other openings to maintain continuity of vapor barrier. Secure joints with pressure sensitive tape and clamps. Insert high-density sections of insulation between vapor barriers and duct under clamps to maintain insulation thickness.
- G. Install in accordance with manufacturer's instructions and recommendations.

3.7 GASKETS

Overlap gaskets at corners and ends.

3.8 SEALING COMPOUND

Follow manufacturer's recommendations. If necessary to achieve an airtight joint, additionally apply duct tape to wet sealant compatible with the sealer used. Allow adequate curing time before pressurizing system.

3.9 TESTING

- A. Test 2-inch w.g. and higher pressure (minus 2 inches and greater negative pressure) rated ductwork for leaks.
- B. Test setup and procedure shall be generally in accordance with SMACNA HVAC Air Duct Leakage Test Manual, First Edition, 1985, with the following exceptions:
 - 1. Test each duct section at rated pressure.

- C. Seal leaks and openings and retest after sealer has cured.
- D. After completing successful testing of a duct section, demonstrate duct tightness to COR by repeating test.

END OF SECTION 233113

SECTION 233713 - AIR OUTLETS AND INLETS

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

Air distribution grilles, with application for air outlets and inlets.

1.2 RELATED DIVISIONS AND SECTIONS

- A. Section 230500 - Basic Mechanical Materials and Methods
- B. Section 230593 - Testing, Adjusting, and Balancing
- C. Section 230700 - Mechanical Insulation
- D. Section 233113 - Ducts and Duct Accessories

1.3 QUALITY ASSURANCE

- A. Grilles: Test and rate in accordance with ASHRAE Standard 70 and AHRI Standard 890.

1.4 SUBMITTALS

- A. Submit in accordance with Division 01 and Section 230500, "Basic Mechanical Materials and Methods."
- B. Statement indicating compliance with ASHRAE and AHRI standards.
- C. Manufacturer's technical product data, installation instructions and accessories:
Grilles

1.5 APPLICABLE PUBLICATIONS

The publications form a part of this specification to the extent referenced. The publications are referenced in the text by the basic designation.

1.6 PROJECT CONDITIONS

- A. Coordinate with ceiling and wall construction and materials.
- B. Coordinate with lights, speakers, sprinklers, and other ceiling elements.
- C. Where grilles are installed within a UL assembly rated ceiling, provide a ceiling radiation damper to maintain UL floor-ceiling and roof-ceiling assembly rating.

PART 2 - PRODUCTS

2.1 GRILLES

Factory-fabricated steel or aluminum without volume-control damper.

2.2 OUTLET/INLET TYPE

Air delivery, performance, noise level, function, and type suitable for the duty intended and equal in these respects to the following:

A. Return or Exhaust Air, Side-Wall Registers, Aluminum Construction:

1. Type G-1: Titus 350 F vertical split face, aluminum register with 0 degrees stationary vanes set on 3/4-inch centers. Complete flat 1-1/4-inch margin, continuous gasket, and baked white finish (confirm with owner).

B. Manufacturers:

1. All types: Anemostat, Carnes, Krueger, Metalaire, Nailor, Price, Titus, Tuttle & Bailey.

PART 3 - EXECUTION

3.1 GRILLES

- A. Provide grilles to distribute the quantity of air specified evenly over the intended space without causing dead spots or air velocities exceeding 50 fpm in the occupied zone.
- B. Coordinate location with lighting and ceiling pattern. Perform minor duct modifications to suit.
- C. Add internal baffles where necessary to avoid drafts due to air impingement on nearby partitions, columns, etc.
- D. The installing contractor shall examine all openings, mechanical and electrical work, and adjoining and adjacent construction to receive diffusers and plaster frames prior to commencing this work.
- E. Gasket tape provided by manufacturer shall be field installed on the top side of all horizontal ceiling grid surfaces as per manufacturer's installation instructions. Gasketing to be installed after framing surfaces have been wiped clean, free from any construction dust.

END OF SECTION 233713

SECTION 233723 - HVAC GRAVITY VENTILATION

PART 1 GENERAL

1.1 DESCRIPTION OF WORK

Outdoor relief air exhaust equipment and associated integral support and accessories.

1.2 RELATED DIVISIONS AND SECTIONS

- A. Division 01 - General Requirements
- B. Section 230500 - Basic Mechanical Materials and Methods
- C. Section 233113 – Ducts and Duct Accessories

1.3 SUBMITTALS

- A. Submit in accordance with Division 01 and Section 230500.
- B. Manufacturer's technical product data, including installation instructions, performance data, accessories, supports, fittings, finishes, construction details, and dimensions of components:
Gravity Ventilation

1.4 APPLICABLE PUBLICATIONS

The publications form a part of this specification to the extent referenced. The publications are referenced in the text by the basic designation.

1.5 PROJECT CONDITIONS

- A. Provide all material and equipment specified in this section with performance requirements as stated herein or on the drawings.
- B. Except where specified, equipment and system capacities and performance requirements are scheduled on the drawings.

PART 2 PRODUCTS

2.1 ROOF VENTILATORS

- A. Provide where located and as sized on drawings. See drawings for performance.
- B. Weatherproof louvered housing with extruded aluminum blades, mitered welded corners, concealed aluminum structural supports.
- C. Equip with aluminum or galvanized bird screen, balanced backdraft damper, internally insulated roof, removable roof or access louver section.
- D. Provide prefabricated 18 gage galvanized steel roof curb with built in cant strip, 2-inch minimum thickness internal insulation inside vapor barrier cover.
- E. Twenty-four-inch minimum height from roof to intake opening.

F. Manufacturers: Breidert, Greenheck, Jenn-Air, Loren-Cook, Penn.

PART 3 EXECUTION

3.1 ROOF VENTILATORS

Bolt ventilators to curbs. Secure curbs to roof.

END OF SECTION 233723

SECTION 260050 - COMMON WORK RESULTS FOR ELECTRICAL

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Electrical equipment coordination and installation.
2. Common electrical installation requirements.

1.2 DESCRIPTION OF WORK

A. Requirements of this Section are applicable to work in Division 26.

B. Contract Documents

1. Contract drawings for electrical work are diagrammatic, intended to convey scope and general arrangement.
2. Refer questions involving document interpretation or discrepancies to Engineer for review and direction.
3. Correct faulty work due to resolving discrepancies without proper approval.
4. Specifications establish quality of materials, equipment, workmanship and methods of construction.
5. Follow drawings and specifications in laying out work. Consult other applicable contract drawings and specifications, become familiar with conditions affecting work.

C. Scope

1. Furnish and install the electrical work complete and ready for satisfactory service.

D. Definitions: The following are definitions of terms and expressions used in Divisions 26.

1. "Accessible" – Capable of being removed or exposed without damaging the building or structure or finish or not permanently closed in by other equipment or by the structure or finish of the building.
2. "Approve" - To permit use of material, equipment or methods conditional upon compliance with contract document requirements.
3. "Concealed" - Hidden from normal sight; includes work in crawl spaces, above ceilings, and in building shafts.
4. "Directed" - directed by Engineer.
5. "Equal, equivalent" - possessing the same performance qualities and characteristics and fulfilling the same utilitarian function.
6. "Exposed" - not concealed.
7. "Furnish" - Supply and deliver to project site, ready for unloading, unpacking, assembly, installation, and similar operations.
8. "Indicated" - indicated in Contract Documents.
9. "Install" - Operations at project site including unloading, temporarily storing, unpacking, assembling, erecting, placing, anchoring, applying, working to dimensions, finishing, curing, protecting, cleaning and similar operations.
10. "Provide" - furnish and install, complete and ready for the intended use.
11. "Removable" - detachable from the structure or system without physical alteration of materials or equipment and without disturbance to other construction.

12. "Review" - limited observation or checking to ascertain general conformance with design concept of the work and with information given in contract documents. Such action does not constitute a waiver or alteration of the contract requirements.

1.3 QUALITY ASSURANCE

- A. Regulations: Comply with regulations of NFPA, state, county, and municipal building ordinances, and other applicable codes and regulations.
- B. Provide UL label on electric powered equipment or certification that equipment has been tested by a testing agency approved by the local authority as equivalent in safety to UL labeled equipment.
- C. Material and Equipment Requirements
 1. All materials and equipment shall be new and free from defects.
 2. Use products of one manufacturer where two or more items of same kind of equipment are required.
 3. For certain items of equipment, the specification and the project design are based upon the specified manufacturer's product. Other manufacturers' names are listed. Contractor may purchase, conditional upon meeting project requirements, equipment from the listed manufacturers.
 4. Only the manufacturer's equipment upon which the specification and the project design has been based, has been checked for this project. Check allocated space and structure for suitability of equipment of other listed manufacturers, including parts replacement and servicing.
- D. Workmanship
 1. Remove and replace, at no extra cost, work not in conformance with contract requirements.
 2. Coordinate with Other Trades
 - a. Coordinate work and cooperate with other trades to facilitate execution of work.
 - b. Give full cooperation and coordination with other trades and furnish information necessary to permit the work of all trades to be installed satisfactorily with the least possible interference or delay.
 - c. Furnish to other trades, as required, necessary templates, patterns, setting plans and shop details for the proper installation of the work and for the purpose of coordinating adjacent work.
 3. Accessible Equipment and Systems: Consider all materials and equipment installations and coordinate with the work of other trades to ensure equipment or systems are accessible for operations, maintenance, repairs, and replacement. Install materials and equipment, including but not limited to, supports and electrical conduit, to permit complete unobstructed access to panelboards, transformers, and other items requiring access for inspection, maintenance, and operations. The installation of new equipment or materials which renders new or existing equipment inaccessible will be disapproved by the Engineer and shall be corrected by the Contractor.

1.4 COORDINATION

- A. Coordinate arrangement, mounting, and support of electrical equipment as follows:
 - 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 that connecting raceways, cables, wireways, cable trays, and busways will be clear of obstructions and of the working and access space of other equipment.
- B. Coordinate installation of required supporting devices and set sleeves in cast-in-place concrete, masonry walls, and other structural components as they are constructed.
- C. Coordinate location of access panels and doors for electrical items that are behind finished surfaces or otherwise concealed.
- D. Coordinate sleeve selection and application with selection and application of firestopping specified in Division 7 Section "Penetration Firestopping."

1.5 SHOP DRAWINGS AND SUBMITTALS

- A. Refer to Division 01 for complete requirements.
- B. Submit all products for a single specification section as a complete submittal. All products specified within a division shall be included, otherwise submittal will be returned as incomplete.
- C. Clearly mark submittals to indicate actual intended products to be utilized. Marks may include highlighting, circling, boxing, checking, etc. Do not provide submittal data which lists multiple product's options and features without clearly indicating which data applies to the products intended to be used on project.
- D. Coordinate drawings and data before submitting and certify that provisions of the contract documents have been met.
- E. Call attention, in writing, to deviations from contract requirements.
- F. Do not fabricate, deliver to site, or install items requiring shop drawing review, until the review has been completed by the Engineer and the shop drawing has been marked to indicate "No Exception Taken" or "Make Corrections Noted."
- G. Use only final or corrected drawings and data for construction. This includes all Addendums, Architectural Supplemental Information (ASIs), and Change Bulletins.
- H. The Engineer's review of submittals shall not be construed as a complete check, but will indicate only that the general method of construction, materials, detailing and other information are satisfactory. Approval will not relieve the Contractor of the responsibility for any error which may exist, as the Contractor under the requirements of this contract is responsible for dimensions, the design of adequate connections and details, and the satisfactory construction of all work.

PART 2 - PRODUCTS (NOT USED)

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 to center of unit for wall-mounted 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.
- F. Conditions of Occupancy
 - 1. This building will be occupied during the life of this contract. Execute work in a manner to impose minimal interference with the normal functioning of the building and its occupants. When interference is unavoidable, schedule work 14 days in advance with the Owner.
 - 2. Make temporary connections where necessary to maintain uninterrupted electrical service.
 - 3. Provide adequate protection for the building, its contents, and occupants.
 - 4. Perform work as quietly as possible to avoid unnecessary disturbance. Unusual precaution may be necessary in the conduct or work in some areas to achieve satisfactory compliance.
 - 5. Coordinate with Owner to Perform work producing high noise levels, dust, or hazards to occupants in occupied during non-business hours of the facility.
 - 6. Comply with regulations of Owner pertaining to circulation, sanitation, and behavior of Contractor's personnel.

3.2 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 7 Section "Penetration Firestopping."

END OF SECTION 260050

SECTION 260519 - LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Copper building wire.
 - 2. Connectors and splices.

1.2 ACTION SUBMITTALS

- A. Product Data:
 - 1. Copper building wire.

1.3 INFORMATIONAL SUBMITTALS

- A. Field quality-control reports.

PART 2 - PRODUCTS

2.1 COPPER BUILDING WIRE

- A. Description: Flexible, insulated and uninsulated, drawn copper current-carrying conductor with an overall insulation layer or jacket, or both, rated 600 V or less.
- B. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - 1. Alpha Wire; brand of Belden, Inc.
 - 2. Belden Inc.
 - 3. Cerro Wire LLC.
 - 4. Encore Wire Corporation.
 - 5. General Cable; Prysmian Group North America.
 - 6. Okonite Company (The).
 - 7. Service Wire Co.
 - 8. Southwire Company, LLC.
 - 9. WESCO.
- C. Standards:
 - 1. Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and use.
 - 2. Conductor and Cable Marking: Comply with wire and cable marking according to UL's "Wire and Cable Marking and Application Guide."

- D. Conductors: Copper, complying with ASTM B3 for bare annealed copper and with ASTM B8 for stranded conductors.
- E. Conductor Insulation:
 - 1. Type THHN and Type THWN-2. Comply with UL 83.

2.2 CONNECTORS AND SPLICES

- A. Description: Factory-fabricated connectors, splices, and lugs of size, ampacity rating, material, type, and class for application and service indicated; listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and use.
- B. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - 1. 3M Electrical Products.
 - 2. ABB, Electrification Business.
 - 3. AFC Cable Systems; Atkore International.
 - 4. Gardner Bender.
 - 5. Hubbell Utility Solutions; Hubbell Incorporated.
 - 6. ILSCO.
 - 7. Ideal Industries, Inc.
 - 8. NSi Industries LLC.
 - 9. O-Z/Gedney; brand of Emerson Electric Co., Automation Solutions, Appleton Group.
 - 10. Service Wire Co.
 - 11. TE Connectivity Ltd.
- C. Jacketed Cable Connectors: For steel and aluminum jacketed cables, zinc die-cast with set screws, designed to connect conductors specified in this Section.
- D. Lugs: One piece, seamless, designed to terminate conductors specified in this Section.
 - 1. Material: Copper.
 - 2. Type: Two hole with long barrels.
 - 3. Termination: Crimp.

PART 3 - EXECUTION

3.1 CONDUCTOR MATERIAL APPLICATIONS

- A. Branch Circuits:
 - 1. Copper. Solid for No. 10 AWG and smaller; stranded for No. 8 AWG and larger.

3.2 CONDUCTOR INSULATION AND MULTICONDUCTOR CABLE APPLICATIONS AND WIRING METHODS

- A. Branch Circuits Concealed in Ceilings, Walls, and Partitions: Type THHN/THWN-2, single conductors in raceway.

3.3 INSTALLATION, GENERAL

- A. Conceal cables in finished walls, ceilings, and floors unless otherwise indicated.
- B. Complete raceway installation between conductor and cable termination points in accordance with Section 260533.13 "Conduits for Electrical Systems" prior to pulling conductors and cables.
- C. 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.
- D. Use pulling means, including fish tape, cable, rope, and basket-weave wire/cable grips, that will not damage cables or raceway.
- E. Support cables according to Section 260529 "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-486B.
- B. Make splices, terminations, and taps that are compatible with conductor material and that possess equivalent or better mechanical strength and insulation ratings than unspliced conductors.
- C. Wiring at Outlets: Install conductor at each outlet, with at least 12 inch of slack.

3.5 IDENTIFICATION

- A. Identify and color-code conductors and cables according to Section 260553 "Identification for Electrical Systems."
- B. Identify each spare conductor at each end with identity number and location of other end of conductor, and identify as spare conductor.

3.6 SLEEVE AND SLEEVE-SEAL INSTALLATION FOR ELECTRICAL PENETRATIONS

- A. Install sleeves and sleeve seals at penetrations of exterior floor and wall assemblies. Comply with requirements in Section 260544 "Sleeves and Sleeve Seals for Electrical Raceways and Cabling."

3.7 FIRESTOPPING

- A. Apply firestopping to electrical penetrations of fire-rated floor and wall assemblies to restore original fire-resistance rating of assembly according to Section 078413 "Penetration Firestopping."

END OF SECTION 260519

SECTION 260526 - GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Grounding and bonding conductors.
 - 2. Grounding and bonding connectors.

1.2 ACTION SUBMITTALS

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

PART 2 - PRODUCTS

2.1 GROUNDING AND BONDING CONDUCTORS

- A. Equipment Grounding Conductor:
 - 1. General Characteristics: 600 V, THHN/THWN-2, copper wire or cable, green color, in accordance with Section 260519 "Low-Voltage Electrical Power Conductors and Cables."
- B. ASTM - Bare Copper Grounding and Bonding Conductor:
 - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. ERICO; brand of nVent Electrical plc.
 - b. Harger Lightning & Grounding; business of Harger, Inc.
 - 2. Referenced Standards: Complying with one or more of the following:
 - a. Soft or Annealed Copper Wire: ASTM B3
 - b. Concentric-Lay Stranded Copper Conductor: ASTM B8.
 - c. Tin-Coated Soft or Annealed Copper Wire: ASTM B33.
 - d. 19-Wire Combination Unilay-Stranded Copper Conductor: ASTM B787/B787M.

2.2 GROUNDING AND BONDING CONNECTORS

- A. Source Limitations: Obtain products from single manufacturer.
- B. Performance Criteria:

1. Regulatory Requirements:
 - a. Listed and labeled in accordance with NFPA 70, by qualified electrical testing laboratory recognized by authorities having jurisdiction, and marked for intended location and application.
2. Listing Criteria:
 - a. Grounding and Bonding Equipment: UL CCN KDER; including UL 467.

PART 3 - EXECUTION

3.1 SELECTION OF GROUNDING AND BONDING CONDUCTORS

- A. Conductors: Install solid conductor for 8 AWG and smaller, and stranded conductors for 6 AWG and larger unless otherwise indicated.

3.2 SELECTION OF CONNECTORS

- A. Conductor Terminations and Connections:
 1. Pipe and Equipment Grounding Conductor Terminations: Bolted connectors.

3.3 INSTALLATION

- A. Comply with manufacturer's published instructions.
- B. Special Techniques:
 1. Conductors:
 - a. 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.
 2. Connections: Make connections so possibility of galvanic action or electrolysis is minimized. Select connectors, connection hardware, conductors, and connection methods so metals in direct contact are galvanically compatible.
 - a. Use electroplated or hot-tin-coated materials to ensure high conductivity and to make contact points closer in order of galvanic series.
 - b. Make connections with clean, bare metal at points of contact.
 - c. Make aluminum-to-steel connections with stainless steel separators and mechanical clamps.
 - d. Make aluminum-to-galvanized-steel connections with tin-plated copper jumpers and mechanical clamps.
 - e. Coat and seal connections having dissimilar metals with inert material to prevent future penetration of moisture to contact surfaces.
 - f. 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 adjacent parts.
 - 2) Bonding to Equipment Mounted on Vibration Isolation Hangers and Supports: Install bonding so vibration is not transmitted to rigidly mounted equipment.
 - 3) Use exothermic-welded connectors for outdoor locations; if disconnect-type connection is required, use bolted clamp.
- g. Bonding Interior Metal Ducts: Bond metal air ducts to equipment grounding conductors of associated fans, blowers, electric heaters, and air cleaners. Install bonding jumper to bond across flexible duct connections to achieve continuity.
- h. Grounding for Steel Building Structure: Install driven ground rod at base of each corner column and at intermediate exterior columns at distances not more than 60 ft apart.
3. Equipment Grounding:
- a. Install insulated equipment grounding conductors with feeders and branch circuits.
 - b. Install insulated equipment grounding conductors with the following items, in addition to those required by NFPA 70:
 - 1) Feeders and branch circuits.
 - 2) Receptacle circuits.
 - 3) Single-phase motor and appliance branch circuits.
 - 4) Three-phase motor and appliance branch circuits.
 - c. 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.

3.4 PROTECTION

- A. After installation, protect grounding and bonding cables and equipment from construction activities. Remove and replace items that are contaminated, defaced, damaged, or otherwise caused to be unfit for use prior to acceptance by Owner.

END OF SECTION 260526

SECTION 260529 - HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Support, anchorage, and attachment components.

PART 2 - PRODUCTS

2.1 SUPPORT, ANCHORAGE, AND ATTACHMENT COMPONENTS

A. Steel Slotted Support Systems: Preformed steel channels and angles with minimum 13/32 inch diameter holes at a maximum of 8 inch on center in at least one surface.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. ABB, Electrification Business.
 - b. Allied Tube & Conduit; Atkore International.
 - c. CADDY; brand of nVent Electrical plc.
 - d. Cooper B-line; brand of Eaton, Electrical Sector.
 - e. Flex-Strut Inc.
 - f. G-Strut.
 - g. Gripple Inc.
 - h. Haydon Corporation.
 - i. MIRO Industries.
 - j. Metal Ties Innovation.
 - k. Rocket Rack; Robroy Industries.
 - l. Unistrut; Atkore International.
 - m. Wesanco, Inc.
2. Standard: Comply with MFMA-4 factory-fabricated components for field assembly.
3. Material for Channel, Fittings, and Accessories: Galvanized steel.
4. Channel Width: Selected for applicable load criteria.
5. Metallic Coatings: Hot-dip galvanized after fabrication and applied according to MFMA-4.
6. Protect finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

B. Conduit and Cable Support Devices: Steel and malleable-iron hangers, clamps, and associated fittings, designed for types and sizes of raceway or cable to be supported.

C. Support for Conductors in Vertical Conduit: Factory-fabricated assembly consisting of threaded body and insulating wedging plug or plugs for nonarmored electrical conductors or cables in riser conduits. Plugs must have number, size, and shape of conductor gripping pieces as

required to suit individual conductors or cables supported. Body must be made of malleable iron.

- D. Structural Steel for Fabricated Supports and Restraints: ASTM A36/A36M steel plates, shapes, and bars; black and galvanized.
- E. Mounting, Anchoring, and Attachment Components: Items for fastening electrical items or their supports to building surfaces include the following:
 - 1. Powder-Actuated Fasteners: Threaded-steel stud, for use in hardened portland cement concrete, steel, or wood, with tension, shear, and pullout capacities appropriate for supported loads and building materials where used.
 - a. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - 1) Hilti, Inc.
 - 2) ITW Ramset/Red Head; Illinois Tool Works, Inc.
 - 3) MKT Fastening, LLC.
 - 2. Mechanical-Expansion Anchors: Insert-wedge-type, zinc-coated or stainless steel, for use in hardened portland cement concrete, with tension, shear, and pullout capacities appropriate for supported loads and building materials where used.
 - a. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - 1) Cooper B-line; brand of Eaton, Electrical Sector.
 - 2) Empire Industries, Inc.
 - 3) Hilti, Inc.
 - 4) ITW Ramset/Red Head; Illinois Tool Works, Inc.
 - 5) MKT Fastening, LLC.
 - 3. Concrete Inserts: Steel or malleable-iron, slotted support system units are similar to MSS Type 18 units and comply with MFMA-4 or MSS SP-58.
 - 4. Clamps for Attachment to Steel Structural Elements: MSS SP-58 units are suitable for attached structural element.
 - 5. Through Bolts: Structural type, hex head, and high strength. Comply with ASTM F3125/F3125M, Grade A325.
 - 6. Toggle Bolts: Stainless steel springhead type.
 - 7. Hanger Rods: Threaded steel.

PART 3 - EXECUTION

3.1 SELECTION

- A. Comply with the following standards for selection and installation of hangers and supports, except where requirements on Drawings or in this Section are stricter:
 - 1. NECA NEIS 101

- B. Comply with requirements in Section 078413 "Penetration Firestopping" for firestopping materials and installation for penetrations through fire-rated walls, ceilings, and assemblies.
- C. Comply with requirements for raceways specified in Section 260533.13 "Conduits for Electrical Systems."
- D. Comply with requirements for boxes specified in Section 260533.16 "Boxes and Covers for Electrical Systems."
- E. Spring-steel clamps designed for supporting single conduits without bolts may be used for 1-1/2 inch and smaller raceways serving branch circuits and communication systems above suspended ceilings, and for fastening raceways to trapeze supports.

3.2 INSTALLATION OF SUPPORTS

- A. Comply with NECA NEIS 101 for installation requirements except as specified in this article.
- B. 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 must be weight of supported components plus 200 lb.
- C. 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. Instead of expansion anchors, powder-actuated driven threaded studs provided with lock washers and nuts may be used in existing standard-weight concrete 4 inch thick or greater. Do not use for anchorage to lightweight-aggregate concrete or for slabs less than 4 inch thick.
 - 6. To Steel: Welded threaded studs complying with AWS D1.1/D1.1M, with lock washers and nuts.
 - 7. To Light Steel: Sheet metal screws.
 - 8. 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.
- D. Drill holes for expansion anchors in concrete at locations and to depths that avoid the need for reinforcing bars.

3.3 PAINTING

- A. Touchup:
 - 1. 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.

- a. Apply paint by brush or spray to provide minimum dry film thickness of 2.0 mils.
- B. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas and apply galvanizing-repair paint to comply with ASTM A780.

END OF SECTION 260529

SECTION 260533.13 - CONDUITS FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Type EMT-S duct raceways and elbows.
2. Type ERM-C-A and Type ERM-C-SS duct raceways, elbows, couplings, and nipples.
3. Type FMC-S and Type FMC-A duct raceways.
4. Type LFMC duct raceways.
5. Fittings for conduit, tubing, and cable.
6. Electrically conductive corrosion-resistant compounds for threaded conduit.
7. Solvent cements.

B. Products Installed, but Not Furnished, under This Section:

1. See Section 260553 "Identification for Electrical Systems" for electrical equipment labels.

1.2 DEFINITIONS

A. Conduit: A structure containing one or more duct raceways.

B. Duct Raceway: A single enclosed raceway for conductors or cable.

1.3 ACTION SUBMITTALS

A. Product Data:

1. Type EMT-S duct raceways and elbows.
2. Type ERM-C-A duct raceways, elbows, couplings, and nipples.
3. Type FMC-S duct raceways.
4. Type LFMC duct raceways.
5. Fittings for conduit, tubing, and cable.

PART 2 - PRODUCTS

2.1 TYPE EMT-S DUCT RACEWAYS AND ELBOWS

A. Performance Criteria:

1. Regulatory Requirements: Listed and labeled in accordance with NFPA 70, by qualified electrical testing laboratory recognized by authorities having jurisdiction, and marked for intended location and application.
2. Listing Criteria: UL CCN FJMX; including UL 797.

B. Source Quality Control:

1. Product Data: Prepare and submit catalog cuts, brochures, and performance data illustrating size, physical appearance, and other characteristics of product.

C. UL FJMX - Steel Electrical Metal Tubing (EMT-S) and Elbows:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. Allied Tube & Conduit; Atkore International.
 - b. Calconduit; Atkore International.
 - c. Emerson Electric Co., Automation Solutions.
 - d. Picoma; Zekelman Industries.
 - e. Republic Conduit; Nucor Corporation, Nucor Tubular Products.
 - f. Topaz Lighting & Electric.
 - g. Western Tube; Zekelman Industries.
 - h. Wheatland Tube; Zekelman Industries.
2. Material: Steel.
3. Options:
 - a. Exterior Coating: Zinc.
 - b. Interior Coating: Zinc with organic top coating.
 - c. Minimum Trade Size: trade size 3/4.

2.2 TYPE ERMCA DUCT RACEWAYS, ELBOWS, COUPLINGS, AND NIPPLES

A. Performance Criteria:

1. Regulatory Requirements: Listed and labeled in accordance with NFPA 70, by qualified electrical testing laboratory recognized by authorities having jurisdiction, and marked for intended location and application.
2. Listing Criteria: UL CCN DYWV; including UL 6A.

B. Source Quality Control:

1. Product Data: Prepare and submit catalog cuts, brochures, and performance data illustrating size, physical appearance, and other characteristics of product.

C. UL DYWV - Aluminum Electrical Rigid Metal Conduit (ERMC-A), Elbows, Couplings, and Nipples:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. ABB, Electrification Business.
 - b. Allied Tube & Conduit; Atkore International.
 - c. American Conduit; Norsk Hydro ASA, Hydro Extrusion USA LLC.
 - d. Appleton; Emerson Electric Co., Automation Solutions.
 - e. Calconduit; Atkore International.

- f. Crouse-Hinds; brand of Eaton, Electrical Sector.
 - g. Killark; brand of Hubbell Electrical Solutions; Hubbell Incorporated.
 - h. Patriot Aluminum Products, LLC.
 - i. Penn Aluminum Conduit & EMT; Penn Aluminum International LLC; Berkshire Hathaway.
 - j. Republic Conduit; Nucor Corporation, Nucor Tubular Products.
 - k. Topaz Lighting & Electric.
 - l. Western Tube; Zekelman Industries.
 - m. Wheatland Tube; Zekelman Industries.
- 2. Material: Aluminum.
 - 3. Options:
 - a. Protective Coating: Provide protective coating for use in severely corrosive environment.
 - b. Minimum Trade Size: trade size 3/4.

2.3 TYPE FMC-S DUCT RACEWAYS

A. Performance Criteria:

- 1. Regulatory Requirements: Listed and labeled in accordance with NFPA 70, by qualified electrical testing laboratory recognized by authorities having jurisdiction, and marked for intended location and application.
- 2. Listing Criteria: UL CCN DXUZ; including UL 1.

B. Source Quality Control:

- 1. Product Data: Prepare and submit catalog cuts, brochures, and performance data illustrating size, physical appearance, and other characteristics of product.

C. UL DXUZ - Steel Flexible Metal Conduit (FMC-S):

- 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. ABB, Electrification Business.
 - b. Anaconda Sealtite; Anamet Electrical, Inc.
 - c. Electri-Flex Company.
 - d. International Metal Hose Co.
 - e. Penn Aluminum Conduit & EMT; Penn Aluminum International LLC; Berkshire Hathaway.
 - f. Topaz Lighting & Electric.
- 2. Material: Steel.
- 3. Options:
 - a. Minimum Trade Size: trade size 3/4.

2.4 TYPE LFMC DUCT RACEWAYS

A. Performance Criteria:

1. Regulatory Requirements: Listed and labeled in accordance with NFPA 70, by qualified electrical testing laboratory recognized by authorities having jurisdiction, and marked for intended location and application.
2. Listing Criteria: UL CCN DXHR; including UL 360.

B. Source Quality Control:

1. Product Data: Prepare and submit catalog cuts, brochures, and performance data illustrating size, physical appearance, and other characteristics of product.

C. UL DXHR - Steel Liquidtight Flexible Metal Conduit (LFMC-S):

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. ABB, Electrification Business.
 - b. Anaconda Sealtite; Anamet Electrical, Inc.
 - c. Electri-Flex Company.
 - d. International Metal Hose Co.
2. Material: Steel.
3. Options:
 - a. Minimum Trade Size: trade size 3/4.

2.5 FITTINGS FOR CONDUIT, TUBING, AND CABLE

A. Performance Criteria:

1. Regulatory Requirements: Listed and labeled in accordance with NFPA 70, by qualified electrical testing laboratory recognized by authorities having jurisdiction, and marked for intended location and application.

B. Source Quality Control:

1. Product Data: Prepare and submit catalog cuts, brochures, and performance data illustrating size, physical appearance, and other characteristics of product.

C. UL DWTT - Fittings for Type ERM C Duct Raceways:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. ABB, Electrification Business.
 - b. Appleton; Emerson Electric Co., Automation Solutions.
 - c. Crouse-Hinds; brand of Eaton, Electrical Sector.
 - d. Konkore Fittings; Atkore International.

- e. O-Z/Gedney; brand of Emerson Electric Co., Automation Solutions, Appleton Group.
 - f. Penn Aluminum Conduit & EMT; Penn Aluminum International LLC; Berkshire Hathaway.
 - g. Raco Taymac Bell; brand of Hubbell Electrical Solutions; Hubbell Incorporated.
 - h. Southwire Company, LLC.
 - i. Topaz Lighting & Electric.
 - 2. Listing Criteria: UL CCN DWTT; including UL 514B.
 - 3. Options:
 - a. Material: Die cast.
 - b. Coupling Method: Raintight compression coupling with distinctive color gland nut.
 - c. Expansion and Deflection Fittings: UL 651 with flexible bonding jumper.
- D. UL FKA V - Fittings for Type EMT Duct Raceways:
- 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. ABB, Electrification Business.
 - b. Allied Tube & Conduit; Atkore International.
 - c. Appleton; Emerson Electric Co., Automation Solutions.
 - d. Calconduit; Atkore International.
 - e. Crouse-Hinds; brand of Eaton, Electrical Sector.
 - f. O-Z/Gedney; brand of Emerson Electric Co., Automation Solutions, Appleton Group.
 - g. Raco Taymac Bell; brand of Hubbell Electrical Solutions; Hubbell Incorporated.
 - h. Southwire Company, LLC.
 - i. Topaz Lighting & Electric.
 - 2. Listing Criteria: UL CCN FKA V; including UL 514B.
 - 3. Options:
 - a. Material: Steel or Die cast.
 - b. Coupling Method: Compression coupling.
 - c. Expansion and Deflection Fittings: UL 651 with flexible bonding jumper.
- E. UL ILNR - Fittings for Type FMC Duct Raceways:
- 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. American Fittings Corp. (AMFICO).
 - b. Liquid Tight Connector Co.
 - c. Southwire Company, LLC.
 - 2. Listing Criteria: UL CCN ILNR; including UL 514B.
- F. UL DXAS - Fittings for Type LFMC Duct Raceways:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. Arlington Industries, Inc.
 - b. Liquid Tight Connector Co.
 2. Listing Criteria: UL CCN DXAS; including UL 514B.
- 2.6 ELECTRICALLY CONDUCTIVE CORROSION-RESISTANT COMPOUNDS FOR THREADED CONDUIT
- A. Performance Criteria:
1. Regulatory Requirements: Listed and labeled in accordance with NFPA 70, by qualified electrical testing laboratory recognized by authorities having jurisdiction, and marked for intended location and application.
 2. Listing Criteria: UL CCN FOIZ; including UL Subject 2419.
- 2.7 SOLVENT CEMENTS
- A. Performance Criteria:
1. Regulatory Requirements: Listed and labeled in accordance with NFPA 70, by qualified electrical testing laboratory recognized by authorities having jurisdiction, and marked for intended location and application.
 2. Listing Criteria: UL CCN DWTT; including UL 514B.

PART 3 - EXECUTION

- 3.1 SELECTION OF CONDUITS FOR ELECTRICAL SYSTEMS
- A. Unless more stringent requirements are specified in Contract Documents or manufacturers' published instructions, comply with NFPA 70 for selection of duct raceways. Consult Architect for resolution of conflicting requirements.
- B. Outdoors:
1. Exposed and Not Subject to Physical Damage: ERMFC.
 2. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): LFMC.
- C. Indoors:
1. Exposed and Not Subject to Physical Damage: EMT.
 2. Concealed in Ceilings and Interior Walls and Partitions: EMT.
 3. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): FMC.
- D. Duct Fittings: Select fittings in accordance with NEMA FB 2.10 guidelines.

1. ERM: Provide threaded-type fittings unless otherwise indicated.

3.2 INSTALLATION OF CONDUITS FOR ELECTRICAL SYSTEMS

- A. Comply with manufacturer's published instructions.
- B. Reference Standards for Installation: Unless more stringent installation requirements are specified in Contract Documents or manufacturers' published instructions, comply with the following:
 1. Type EMT-S: Article 358 of NFPA 70 and NECA NEIS 101.
 2. Type ERM-A: Article 344 of NFPA 70 and NECA NEIS 102.
 3. Type FMC-S: Article 348 of NFPA 70 and NECA NEIS 101.
 4. Type LFM: Article 350 of NFPA 70 and NECA NEIS 101.
 5. Expansion Fittings: NEMA FB 2.40.
- C. Special Installation Techniques:
 1. General Requirements for Installation of Duct Raceways:
 - a. Complete duct raceway installation before starting conductor installation.
 - b. Provide stub-ups through floors with coupling threaded inside for plugs, set flush with finished floor. Plug coupling until conduit is extended above floor to final destination or a minimum of 2 ft above finished floor.
 - c. Install no more than equivalent of three 90-degree bends in conduit run except for control wiring conduits, for which no more than equivalent of two 90-degree fewer bends are permitted. Support within 12 inch of changes in direction.
 - d. Make bends in duct raceway using large-radius preformed ells except for parallel bends. Field bending must be in accordance with NFPA 70 minimum radii requirements. Provide only equipment specifically designed for material and size involved.
 - e. Conceal conduit within finished walls, ceilings, and floors unless otherwise indicated. Install conduits parallel or perpendicular to building lines.
 - f. Support conduit within 12 inch of enclosures to which attached.
 - g. Install duct sealing fittings at accessible locations in accordance with NFPA 70 and fill them with listed sealing compound. For concealed duct raceways, install fitting in flush steel box with blank cover plate having finish similar to that of adjacent plates or surfaces. Install duct sealing fittings in accordance with NFPA 70.
 - h. Install devices to seal duct raceway interiors at accessible locations. Locate seals so no fittings or boxes are between the seal and the following changes of environments. Seal interior of duct raceways at the following points:
 - 1) Where conduits pass from warm to cold locations, such as boundaries of refrigerated spaces.
 - 2) Where an underground service duct raceway enters a building or structure.
 - 3) Conduit extending from interior to exterior of building.
 - 4) Conduit extending into pressurized duct raceway and equipment.
 - 5) Conduit extending into pressurized zones that are automatically controlled to maintain different pressure set points.
 - 6) Where otherwise required by NFPA 70.
 - i. Do not install conduits within 2 inch of the bottom side of a metal deck roof.

- j. Keep duct raceways at least 6 inch away from parallel runs of flues and steam or hot-water pipes. Install horizontal duct raceway runs above water and steam piping.
 - k. Cut conduit perpendicular to the length. For conduits metric designator 53 (trade size 2) and larger, use roll cutter or a guide to make cut straight and perpendicular to the length. Ream inside of conduit to remove burrs.
 - l. Install pull wires in empty duct raceways. Provide polypropylene or monofilament plastic line with not less than 200 lb tensile strength. Leave at least 12 inch of slack at both ends of pull wire. Cap underground duct raceways designated as spare above grade alongside duct raceways in use.
 - m. Install duct raceways square to the enclosure and terminate at enclosures without hubs with locknuts on both sides of enclosure wall. Install locknuts hand tight, plus one-quarter turn more.
 - 1) Termination fittings with shoulders do not require two locknuts.
 - n. Terminate threaded conduits into threaded hubs or with locknuts on inside and outside of boxes or cabinets. Install bushings on conduits up to trade size 1-1/4 and insulated throat metal bushings on trade size 1-1/2 and larger conduits terminated with locknuts..
- 2. Types ERMC-A: Do not install aluminum duct raceways or fittings in contact with concrete or earth.
 - 3. Types FMC and LPMC:
 - a. Provide a maximum of 36 inch of flexible conduit for equipment subject to vibration, noise transmission, or movement; and for transformers and motors.
 - 4. Duct Raceway Terminations at Locations Subject to Moisture or Vibration:
 - a. Provide insulating bushings to protect conductors, including conductors smaller than 4 AWG..
 - 5. Duct Fittings: Install fittings in accordance with NEMA FB 2.10 guidelines.
 - a. EMT: Provide compression, steel or cast-metal fittings. Comply with NEMA FB 2.10.
 - b. Flexible Conduit: Provide only fittings listed for use with flexible conduit type. Comply with NEMA FB 2.20.
 - 6. Expansion-Joint Fittings:
 - a. Install type and quantity of fittings that accommodate temperature change listed for the following locations:
 - 1) Outdoor Locations Not Exposed to Direct Sunlight: 125 deg F temperature change.
 - 2) Outdoor Locations Exposed to Direct Sunlight: 155 deg F temperature change.
 - 3) Indoor Spaces Connected with Outdoors without Physical Separation: 125 deg F temperature change.

- b. Install expansion fittings at locations where conduits cross building or structure expansion joints.
 - c. Install expansion-joint fitting with position, mounting, and piston setting selected in accordance with manufacturer's published instructions for conditions at specific location at time of installation. Install conduit supports to allow for expansion movement.
- 7. Identification: Provide labels for conduit assemblies, duct raceways, and associated electrical equipment.
 - a. Provide warning signs.
- D. Interfaces with Other Work:
 - 1. Coordinate installation of new products for with existing conditions.
 - 2. Coordinate with Section 078413 "Penetration Firestopping" for installation of firestopping at penetrations of fire-rated floor and wall assemblies.
 - 3. Coordinate with Section 260529 "Hangers and Supports for Electrical Systems" for installation of conduit hangers and supports.

3.3 PROTECTION

- A. Protect coatings, finishes, and cabinets from damage and deterioration.
 - 1. Repair damage to galvanized finishes with zinc-rich paint recommended by manufacturer.
 - 2. Repair damage to PVC coatings or paint finishes with matching touchup coating recommended by manufacturer.

END OF SECTION 260533.13

SECTION 260544 - SLEEVES AND SLEEVE SEALS FOR ELECTRICAL RACEWAYS AND CABLING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Round sleeves.
2. Rectangular sleeves.
3. Sleeve-seal systems.
4. Sleeve-seal fittings.
5. Grout.
6. Pourable sealants.
7. Foam sealants.

PART 2 - PRODUCTS

2.1 ROUND SLEEVES

A. Round, Galvanized-Steel, Sheet Metal Sleeves:

1. General Characteristics: Galvanized-steel sheet; thickness not less than 0.0239 inch; round tube closed with welded longitudinal joint, with tabs for screw-fastening the sleeve to the board.

2.2 SLEEVE-SEAL FITTINGS

- A. General Characteristics: Manufactured plastic, sleeve-type, waterstop assembly made for embedding in concrete slab or wall. Unit must have plastic or rubber waterstop collar with center opening to match piping OD.

2.3 GROUT

- A. General Characteristics: Nonshrink; recommended for interior and exterior sealing openings in non-fire-rated walls or floors.
 1. Standard: ASTM C1107/C1107M, Grade B, post-hardening and volume-adjusting, dry, hydraulic-cement grout.
 2. Design Mix: 5000 psi, 28-day compressive strength.
 3. Packaging: Premixed and factory packaged.

PART 3 - EXECUTION

3.1 INSTALLATION OF SLEEVES FOR NON-FIRE-RATED ELECTRICAL PENETRATIONS

- A. Sleeves for Conduits Penetrating Above-Grade, Non-Fire-Rated, Concrete and Masonry-Unit Floors and Walls:
1. Interior Penetrations of Non-Fire-Rated Walls and Floors:
 - a. Seal space outside of sleeves with mortar or grout. Pack sealing material solidly between sleeve and wall or floor so no voids remain. Tool exposed surfaces smooth; protect material while curing.
 - b. Seal annular space between sleeve and raceway or cable, using joint sealant appropriate for size, depth, and location of joint. Comply with requirements in Section 079200 "Joint Sealants."
 2. Use pipe sleeves unless penetration arrangement requires rectangular sleeved opening.
 3. Size pipe sleeves to provide 1/4 inch annular clear space between sleeve and raceway or cable, unless sleeve-seal system is to be installed.
 4. Install sleeves for wall penetrations unless core-drilled holes or formed openings are used. Install sleeves during erection of walls. Cut sleeves to length for mounting flush with both surfaces of walls. Deburr after cutting.
- B. Sleeves for Conduits Penetrating Non-Fire-Rated Wall Assemblies:
1. Use circular metal sleeves unless penetration arrangement requires rectangular sleeved opening.
 2. Seal space outside of sleeves with approved joint compound for wall assemblies.
- C. Roof-Penetration Sleeves: Seal penetration of individual raceways and cables with flexible boot-type flashing units applied in coordination with roofing work.
- D. Aboveground, Exterior-Wall Penetrations: Seal penetrations using steel pipe sleeves and mechanical sleeve-seal systems. Size sleeves to allow for 1 inch annular clear space between pipe and sleeve for installing mechanical sleeve seals.

END OF SECTION 260544

SECTION 260553 - IDENTIFICATION FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Labels.
 - 2. Bands and tubes.
 - 3. Tapes and stencils.
 - 4. Signs.
 - 5. Cable ties.
 - 6. Miscellaneous identification products.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Comply with 29 CFR 1910.144 for color identification of hazards; 29 CFR 1910.145 for danger, caution, warning, and safety instruction signs and tags; and the following:
 - 1. Ceiling-mounted hangers, supports, cable trays, and raceways must be finished, painted, or suitably marked safety yellow where less than 7.7 ft above finished floor.
- B. Signs, labels, and tags required for personnel safety must comply with the following standards:
 - 1. Safety Colors: NEMA Z535.1.
 - 2. Facility Safety Signs: NEMA Z535.2.
 - 3. Safety Symbols: NEMA Z535.3.
 - 4. Product Safety Signs and Labels: NEMA Z535.4.
 - 5. Safety Tags and Barricade Tapes for Temporary Hazards: NEMA Z535.5.
- C. Adhesive-attached labeling materials, including label stocks, laminating adhesives, and inks used by label printers, must comply with UL 969.

2.2 COLOR AND LEGEND REQUIREMENTS

- A. Raceways and Cables Carrying Circuits at 1000 V or Less:
 - 1. Black letters on orange field.
 - 2. Legend: Indicate voltage and system or service type.
- B. Color-Coding for Phase- and Voltage-Level Identification, 1000 V or Less: Use colors listed below for branch-circuit conductors.
 - 1. Colors for 208Y/120 V Circuits:

- a. Phase A: Black.
 - b. Phase B: Red.
 - c. Phase C: Blue.
 2. Colors for 480Y/277 V Circuits:
 - a. Phase A: Brown.
 - b. Phase B: Orange.
 - c. Phase C: Yellow.
 3. Color for Neutral: White or gray.
 4. Color for Equipment Grounds: Green.
- C. Warning Label Colors:
1. Identify system voltage with black letters on orange background.
- D. Warning labels and signs must 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 3 FEET MINIMUM."
- E. Equipment Identification Labels:
1. Black letters on white field.

2.3 LABELS

- A. Self-Adhesive Labels: Polyester or Vinyl, thermal, transfer-printed, 3 mil thick, multicolor, weather- and UV-resistant, pressure-sensitive adhesive labels, configured for intended use and location.
1. Minimum Nominal Size:
 - a. 1-1/2 by 6 inch for raceway and conductors.
 - b. 3-1/2 by 5 inch for equipment.
 - c. As required by authorities having jurisdiction.

2.4 BANDS AND TUBES

- A. Heat-Shrink Preprinted Tubes: Flame-retardant polyolefin tubes with machine-printed identification labels, sized to suit diameter and shrunk to fit firmly. Full shrink recovery occurs at maximum of 200 deg F. Comply with UL 224.

2.5 TAPES AND STENCILS

- A. Self-Adhesive Vinyl Tape: Colored, heavy duty, waterproof, fade resistant; not less than 3 mil thick by 1 to 2 inch wide; compounded for outdoor use.

2.6 SIGNS

A. Laminated Acrylic or Melamine Plastic Signs:

1. Engraved legend.
2. Thickness:
 - a. For signs up to 20 sq. inch, minimum 1/16 inch thick.
 - b. For signs larger than 20 sq. inch, 1/8 inch thick.
 - c. Engraved legend with black letters on white face.
 - d. Framed with mitered acrylic molding and arranged for attachment at applicable equipment.

2.7 CABLE TIES

A. General-Purpose Cable Ties: Fungus inert, self-extinguishing, one piece, self-locking, and Type 6/6 nylon.

1. Minimum Width: 3/16 inch.
2. Tensile Strength at 73 deg F in accordance with ASTM D638: 12,000 psi.
3. Temperature Range: Minus 40 to plus 185 deg F.
4. Color: Black, except where used for color-coding.

B. UV-Stabilized Cable Ties: Fungus inert, designed for continuous exposure to exterior sunlight, self-extinguishing, one piece, self-locking, and Type 6/6 nylon.

1. Minimum Width: 3/16 inch.
2. Tensile Strength at 73 deg F in accordance with ASTM D638: 12,000 psi.
3. Temperature Range: Minus 40 to plus 185 deg F.
4. Color: Black.

C. Plenum-Rated Cable Ties: Self-extinguishing, UV stabilized, one piece, and self-locking.

1. Minimum Width: 3/16 inch.
2. Tensile Strength at 73 deg F in accordance with ASTM D638: 7000 psi.
3. UL 94 Flame Rating: 94V-0.
4. Temperature Range: Minus 50 to plus 284 deg F.
5. Color: Black.

2.8 MISCELLANEOUS IDENTIFICATION PRODUCTS

A. Paint: Comply with requirements in painting Sections for paint materials and application requirements. Retain paint system applicable for surface material and location (exterior or interior).

B. 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 PREPARATION

- A. Self-Adhesive Identification Products: Before applying electrical identification products, clean substrates of substances that could impair bond, using materials and methods recommended by manufacturer of identification product.

3.2 INSTALLATION

- A. Verify and coordinate identification names, abbreviations, colors, and other features with requirements in other Sections requiring identification applications, Drawings, Shop Drawings, manufacturer's wiring diagrams, and operation and maintenance manual. Use consistent designations throughout Project.
- B. Install identifying devices before installing acoustical ceilings and similar concealment.
- C. Verify identity of item before installing identification products.
- D. Coordinate identification with Project Drawings, manufacturer's wiring diagrams, and operation and maintenance manual.
- E. Apply identification devices to surfaces that require finish after completing finish work.
- F. Install signs with approved legend to facilitate proper identification, operation, and maintenance of electrical systems and connected items.
- G. System Identification for Raceways and Cables under 1000 V: Identification must completely encircle cable or conduit. Place identification of two-color markings in contact, side by side.
 - 1. Secure tight to surface of conductor, cable, or raceway.
- H. Auxiliary Electrical Systems Conductor Identification: Identify field-installed alarm, control, and signal connections.
- I. Accessible Fittings for Raceways: Identify cover of junction and pull box of the following systems with wiring system legend and system voltage. System legends must be as follows:
 - 1. "EMERGENCY POWER."
 - 2. "POWER."
- J. Vinyl Wraparound Labels:
 - 1. Secure tight to surface of raceway or cable at location with high visibility and accessibility.
 - 2. Attach labels that are not self-adhesive type with clear vinyl tape, with adhesive appropriate to location and substrate.
- K. Self-Adhesive Wraparound Labels: Secure tight to surface at location with high visibility and accessibility.
- L. Self-Adhesive Labels:

1. Install unique designation label that is consistent with wiring diagrams, schedules, and operation and maintenance manual.
 2. Unless otherwise indicated, provide single line of text with 1/2 inch high letters on 1-1/2 inch high label; where two lines of text are required, use labels 2 inch high.
- M. Heat-Shrink, Preprinted Tubes: Secure tight to surface at location with high visibility and accessibility.
- N. Marker Tapes: Secure tight to surface at location with high visibility and accessibility.
- O. Self-Adhesive Vinyl Tape: Secure tight to surface at location with high visibility and accessibility.
1. Field-Applied, Color-Coding Conductor Tape: Apply in half-lapped turns for minimum distance of 6 inch where splices or taps are made. Apply last two turns of tape with no tension to prevent possible unwinding.
- P. Laminated Acrylic or Melamine Plastic Signs:
1. Attach signs that are not self-adhesive type with mechanical fasteners appropriate to location and substrate.
 2. Unless otherwise indicated, provide single line of text with 1/2 inch high letters on 1-1/2 inch high sign; where two lines of text are required, use labels 2 inch high.
- Q. Cable Ties: General purpose, for attaching tags, except as listed below:
1. Outdoors: UV-stabilized nylon.
 2. In Spaces Handling Environmental Air: Plenum rated.

3.3 IDENTIFICATION SCHEDULE

- A. Install identification materials and devices at locations for most convenient viewing without interference with operation and maintenance of equipment. Install access doors or panels to provide view of identifying devices.
- B. Identify conductors, cables, and terminals in enclosures and at junctions, terminals, pull points, and locations of high visibility. Identify by system and circuit designation.
- C. Accessible Fittings for Raceways and Cables within Buildings: Identify cover of junction and pull box of the following systems with self-adhesive labels containing wiring system legend and system voltage. System legends must be as follows:
1. "EMERGENCY POWER."
 2. "POWER."
- D. Control-Circuit Conductor Identification: For conductors and cables in pull and junction boxes, manholes, and handholes, use self-adhesive labels with conductor or cable designation, origin, and destination.
- E. Control-Circuit Conductor Termination Identification: For identification at terminations, provide self-adhesive labels with conductor designation.
- F. Auxiliary Electrical Systems Conductor Identification: Self-adhesive vinyl tape that is uniform and consistent with system used by manufacturer for factory-installed connections.

1. Identify conductors, cables, and terminals in enclosures and at junctions, terminals, and pull points. Identify by system and circuit designation.
- G. Equipment Identification Labels:
1. Indoor Equipment: Laminated acrylic or melamine plastic sign.
 2. Outdoor Equipment: Laminated acrylic or melamine sign.
 3. Equipment to Be Labeled:
 - a. Panelboards: Typewritten directory of circuits in location provided by panelboard manufacturer. Panelboard identification must be in form of self-adhesive, engraved, laminated acrylic or melamine label.
 - b. Enclosures and electrical cabinets.
 - c. Access doors and panels for concealed electrical items.
 - d. Switchboards.
 - e. Motor-control centers.
 - f. Enclosed switches.
 - g. Variable-speed controllers.
 - h. Monitoring and control equipment.

END OF SECTION 260553