

PROJECT MANUAL
FOR
Rising Sun High School
100 Tiger Drive
North East, MD 21901

WATERLINE REPLACEMENT PROJECT



Serving Learners, Families, and the Community

OWNER:
CECIL COUNTY BOARD OF EDUCATION
201 BOOTH STREET
ELKTON, MARYLAND 21921
ATTN: PURCHASING DEPARTMENT

ARCHITECT:
GIPE ASSOCIATES, INC.
1220 A EAST JOPPA RD – SUITE 223
TOWSON, MARYLAND 21286
PHONE 410-832-2420

CCPS RFP #24-10
JANUARY 26, 2024

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SECTION 00 11 13 – ADVERTISEMENT FOR BIDS

NOTICE TO CONTRACTORS

The Board of Education of Cecil County Public Schools is seeking sealed bids for the following until the time and date indicated.

CCPS RFP #24-10 – Rising Sun High School – Waterline Replacement Project
February 29, 2024
2:00 PM (ET) Local Time

Sealed bids for all labor, materials, equipment, transportation, and services necessary for the **Rising Sun High School – Waterline Replacement Project** must be received in the Purchasing Department, Cecil County Public Schools by **Thursday, February 29, 2024, 2:00 PM (ET), Local Time**, at which time they will be publicly opened and read aloud. All bids must be submitted in a sealed envelope addressed to the Cecil County Public Schools George Washington Carver Education Leadership Center, Attention: Purchasing Department, **201 Booth Street, Elkton, MD 21921**. The envelope must be identified on its face with the name of the person, firm, or corporation making the bid and plainly marked **“CCPS RFP #24-10 – Rising Sun High School – Waterline Replacement Project - Due February 29, 2024, – 2:00 PM (ET), Local Time”**. The Cecil County Public Schools will not be responsible for the premature opening of a proposal not properly addressed and identified. Should the **Central office** close due to an unexpected circumstance, the bid opening will be on the next scheduled business day for CCPS Offices, **Friday, March 1, 2024, 2:00 PM (ET), Local Time**. Please check the CCPS website; www.ccps.org, for details on closings and up-to-date schedules.

The project will consist of the construction of the following:

The Rising Sun High School waterline replacement project is a removal of corroded galvanized steel domestic water piping with replacement of copper piping. The project includes the demolition of the existing galvanized piping from the water vault into the mechanical room and adjacent classroom to be replaced with copper piping. A portion of the new piping will be routed below grade from the water vault and back into the building.

Bidders are strongly encouraged to attend a pre-bid meeting to be held on **Thursday, February 1, 2024, at 11:00 AM (ET) Local Time at Rising Sun High School located at 100 Tiger Dr, North East, MD 21901**. Please notify Kay Porter in the Purchasing Department at procurement@ccps.org if you plan on attending the pre-bid meeting. Failure to attend this meeting will under no circumstances be accepted as an excuse for an alleged misunderstanding of the scope of work and bid requirements.

In addition, a 5 percent Bid Bond, Anti-Bribery Affidavit, Certification Regarding Debarment, Non-Collusion Affidavit, and Contractor’s Qualification Statement (AIA Document A305) must accompany all bids. A 100 percent Performance and Payment Bond payable to the Owner and certification of appropriate insurance coverage will be required of the successful Bidder.

Contractors proposing to bid may view and obtain plans beginning **Friday, January 26, 2024**, through Cecil County Public Schools Bids page at www.ccps.org/Page/458. Plans may be downloaded electronically. Printing services may be obtained by contractor through an outside vendor.

Questions regarding this bid may be sent and received by e-mail only by Noon, February 22, 2024, to Kay Porter, Purchasing Agent, Purchasing Department, Cecil County Public Schools at procurement@ccps.org. An acknowledgment of receipt of the e-mail request will be sent by return e-mail to the sender.

Responses to the questions will be addressed in an addendum and posted on eMaryland Marketplace Advantage (eMMA) - <https://procurement.maryland.gov/>.

Board of Education of Cecil County
Jeffrey A. Lawson, Ed.D.
Superintendent of Schools

**END OF SECTION
ADVERTISEMENT FOR BIDS**

SECTION 00 11 14 - IDENTIFICATIONS

This Project Manual dated **January 26, 2024** contains the Bidding and Contract Requirements for **Cecil County Public Schools, Rising Sun High School – Waterline Replacement Project in North East, Maryland**. Review of this Manual is important in fulfilling the Contract Requirements. Any questions regarding this Manual or any of the Bidding or Contract Requirements should be directed to Cecil County Public Schools Purchasing Department.

PROJECT:

**Rising Sun High School
Waterline Replacement Project
100 Tiger Dr
North East, MD 21901**

OWNER:

**Board of Education of Cecil County
201 Booth Street
Elkton, MD 21921**

MEP ENGINEER:

**Gipe Associates, Inc.
1220A East Joppa Rd – Suite 223
Towson, MD 21286**

CIVIL ENGINEER:

**McCrone Engineering
107 Chesapeake Blvd – Suite 104
Elkton, MD 21921**

**END OF SECTION
IDENTIFICATIONS**

SECTION 00 21 13 – INSTRUCTIONS TO BIDDERS

A. DEFINITIONS

1. All definitions set forth in the General Conditions of the Contract for Construction, **AIA Document A201 - 2017, except as amended in the Supplementary Conditions - 2017**, are applicable to these Instructions to Bidders.
2. 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.
3. Addenda are written or graphic instruments issued prior to execution of the Contract, which modify or interpret the bidding documents, including drawings and specifications, by additions, deletions, clarifications or corrections. Addenda will become part of the Contract Documents when the Construction Contract is executed.

B. BIDDING DOCUMENTS

1. **General Trade and/or Prime Bidders may view and obtain plans through Cecil County Public Schools Bids page at www.ccps.org/Page/458, on or after the date specified in the “Notice to Contractors” or as amended in the addenda. Plans may be downloaded electronically. Printing services may be obtained by contractor through an outside vendor Trade specific, non-prime, Bidders must contact potential General Trade or Mechanical Prime Bidders for the contract documents relevant to their specific work. This list is available from the Owner or Construction Reporting Services.**

C. BIDDER'S REPRESENTATION

1. Each bidder, by making their bid, represents that they have read and understands the bidding documents.
2. Each bidder, by making their bid, represents that they have familiarized Themselves with all existing conditions, and verified all dimensions and limitations under which the work is to be performed.

3. The Bid is based upon the materials, equipment and services required by the Bidding Documents without exception.
4. The bid includes a sum to cover all costs of all items necessary to perform the work as set forth in the proposed contract documents.
5. The Bidder has assured themselves of the availability of all labor, materials, and products to meet the completion date.

D. BIDDING PROCEDURES

1. **All bids must be prepared on the forms provided by the Owner and submitted. Awarded bidder must supply two additional copies of the bid within 5 days of bid opening.**
2. All blanks on the bid form should be filled in by typewriter or manually in ink.
3. Where so indicated by the makeup of the bid form, sums should be expressed in both words and figures, and in case of discrepancy between the two, the amount written in words shall govern.
4. Interlineations, alterations and erasures must be initialed by the signer of the **Bid Proposal**.
5. **All requested alternates in the "Bid Form" shall be bid otherwise the entire bid may be rejected. The blank spaces next to each alternate line items must be completely filled in on the "Bid Form" either by entering a dollar amount add or deduct, "No Change" indicating there is no change to the base bid for the Owner taking this alternate or "No Bid" indicating that this alternate does not apply to this project or the scope of work. All alternates must have one of these three items filled in the blank spaces next to each alternates.**
6. Each copy of the Bid shall include the legal name of the Bidder and a statement that the Bidder is a sole proprietor, partnership, corporation or other legal entity. 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.
7. A bid is invalid if it has not been deposited at the designated location prior to the time and date for receipt of bids indicated in the Advertisement or Invitation to Bid, or prior to any extension thereof issued to the bidders.

8. Unless otherwise provided in any supplement to these Instructions to Bidders, no bidder may modify, withdraw or cancel their bid or any part thereof for sixty (60) days after the time designated for receipt of bids in the Advertisement or Invitation to Bid.
9. Prior to the receipt of bids, Addenda will be mailed, emailed, or faxed to each contractor recorded as having received bidding documents and will be available for inspection wherever the bidding documents are kept available for that purpose.

E. SUBMISSION OF BIDS

1. All copies of the Bid, the bid security, if any, and 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 " **CCPS RFP #24-10 – Rising Sun High School – Waterline Replacement Project – (February 29, 2024) as indicated on the “Notice to Contractors”** on the face thereof.
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.
3. The Bidder shall assume full responsibility for timely delivery at the location designated for receipt of Bids.
4. Should the **Central Office** close due to an unexpected circumstance, the bid opening will be the next scheduled business day, **March 1, 2024, 2:00 PM (ET) Local Time**. Note: The closing of schools does not constitute the closing of the Central Office building. Please check the CCPS website; www.ccps.org, for details on closings and up-to-date schedule.
5. Oral, telephonic or electronic Bids are invalid and will not receive consideration.

F. CONSIDERATION OF BIDS

1. Unless stated otherwise in the Advertisement or Notice To Contractor, the properly identified Bids received on time will be opened publicly and will be read aloud.

2. Bids will be evaluated on the basis of price, technical competence and the time period required to complete the jobs.
3. It is the intent of the Owner to award a Contract to the lowest responsible Bidder meeting specifications; provided the Bid has been submitted in accordance with the requirements of the Bidding Documents; and does not exceed the funds available; with consideration given to the quantities involved, the time required for delivery; the purpose for which required, the competency and responsibility of the bidder, the ability of the bidder to perform satisfactory service and the plan for utilization of minority contractors. The Owner shall have the right to reject any or all Bids, reject a Bid not accompanied by a required bid security or by other data required by the Bidding Document, or reject a Bid which is in any way incomplete or irregular. The Owner shall have the right to waive informalities or irregularities in a Bid received and to accept the Bid, which, in the Owner's judgment, is in the Owner's, own best interest.
4. The Owner shall have the right to accept Alternates, if applicable, 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 Bids and Alternates accepted.
5. Conditional bids will not be accepted.

G. BID AWARD

1. **The Board of Education will award in the best interest of Cecil County Public Schools at the Board's regular monthly meeting following the bid opening.**

H. EXAMINATION OF BID DOCUMENTS

1. Each bidder shall examine the bid documents carefully and, **not later than five days prior to the date for receipt of bids**, shall make written request to the Owner for interpretation or correction of any ambiguity, inconsistency or error therein which bidder may discover. Any interpretation or correction will be issued as an Addendum by the Owner. Only a written interpretation or correction by Addendum shall be binding. No bidder shall rely upon any interpretation or correction given by any other method.
2. Failure of any bidder to receive such addenda or interpretation shall not relieve any obligation under their bid as submitted.

3. The Bidder shall be responsible for verifying all existing conditions, quantities, dimensions and limitations under which work is to be performed.
1. No allowance will be made to any Bidder because of lack of knowledge of the bid documents.

I. MATERIALS AND SUBSTITUTIONS

1. Where a standard is set in the specification or on the drawings, if any, by the use of a specific manufacturer's name, trade name, brand, catalogue reference or definite specifications, it shall be the basis upon which any bid or portion thereof is predicated and submitted. The name or reference specified is to set forth the general style, type, character and quality of article desired and are not intended in any way to limit or restrict competition.
2. Please refer to Section 01.25.13 for specific information and directions on requesting substitutions.

J. QUALIFICATION OF BIDDERS

1. **The Owner may make such investigations as they deem necessary to determine the ability of the bidder to perform the work, and the bidder shall furnish to the Owner all such information and data for this purpose as the Owner may request. The Owner reserves the right to reject any bid if the evidence submitted by, or investigation of, such bidder fails to satisfy the Owner that such bidder is properly qualified to carry out the obligations of the Contract and to complete the work contemplated therein.**
2. A bidder licensed in the State of Maryland shall submit a copy of current State of Maryland Contractor's license with the bid submission.
3. Any bidder who is not licensed in the State of Maryland shall submit evidence of application for such License with the bid submission. The successful bidder shall be properly licensed in the State of Maryland at the time of contract award as per the current edition of Article 56, Section 180, Annotated Code of Maryland.
4. A bidder is to submit Cecil County Public Schools Qualification Statement along with an **AIA A305 Contractor's Qualification Statement** with the bid submission. Failure to provide this information **may** result in the bid being considered non-responsive.

5. eMaryland Marketplace Advantage: All bidders must be registered with eMaryland Marketplace Advantage to receive an award of a bid. If not already registered, bidders may register at the following website: <https://procurement.maryland.gov/>. No award will be made to a vendor who is not registered with eMaryland Marketplace Advantage.

K. NAME SUBCONTRACTORS

1. **All Bidders shall be required to name the one (1) Subcontractor for each trade to whom they propose to award subcontracts as set forth on the “Bid Form”.**
2. **Bid proposals submitted without naming the subcontractor as outlined above may result in the bid being considered non-responsive. Once listed in the “Bid Form”, Bidders shall not substitute for another Subcontractor unless approved by the Owner.**

L. SUBMISSION OF POST-BID INFORMATION

1. Upon request of the Owner, the Bidder shall, within ten (10) days of confirmation of contract award approval, furnish to the Owner in writing:
 - a. Statement of costs for each major trade, as indicated in the bid form, of work included in the bid and also those trades to be performed with the Bidder's own forces.
 - b. Names of the manufacturers, products and the suppliers of principal items or systems of materials and equipment proposed for the Work and as requested in the specifications
 - c. Names of persons or entities (including those who are to furnish materials of equipment fabricated to a special design) proposed for the principal portions of the Work.
 - d. Other qualifying documentation specified in the Supplementary Conditions.
 - e. Schedule of values aggregating the total contract sum and divided so as to facilitate payment for work under each section. The schedule shall be prepared on **AIA Form G702 and G703** and shall include data to substantiate its accuracy. Each item in the Schedule of Values shall include its proper share of overhead and profit. **This schedule of values requires the approval of the Architect/Engineer and the Owner and shall be used only as a basis of the Contractor's requests for payment.**

2. The Bidder is specifically advised that any person, firm, or other party to whom it is proposed to award a subcontract under this Contract must be acceptable to the Owner. Subcontractors and other persons and organizations proposed by the bidder and accepted by the Owner must be used on the work for which they were proposed and accepted and shall not be changed except with the written approval of the Owner.

M. PERFORMANCE AND PAYMENT BONDS

1. Simultaneously, with bidders delivery of the executed Contract, the Contractor shall furnish a surety bond or bonds as security for faithful performance of this Contract and for the payment of all persons performing labor on the project under this Contract and furnishing the materials in connection with the Contract, as specified in the General Conditions, included herein. The surety on such bond or bonds shall be a duly authorized surety company, satisfactory to the Owner. Performance Bond and Payment Bond shall be submitted on the type of forms enclosed. The Performance, Labor and Material Payment Bonds shall be payable to the Board of Education of Cecil County.

N. INSURANCE CERTIFICATES

1. Certificates of Insurance acceptable to Owner shall be furnished within ten (10) days of notice of bid award and as specified in the Supplementary Conditions.

O. BID SECURITY

1. It should be understood that each bid submitted must be accompanied by certified check of the bidder, or a bid bond prepared on the **Standard AIA A310 Form**, duly executed by the bidder as principal and having as surety thereon a surety company approved by the Owner, in the amount of five (5) percent of the greatest combination of bids submitted including all alternates accepted by the Owner.
2. **It should be understood that each bid proposal submitted shall be accompanied by a letter from the bonding company guaranteeing to issue Performance, Labor, and Material Payment Bonds. Failure to provide this information may result in the bid being considered non-responsive. The Owner will have the right to retain the bid security of the two lowest Bidders until either (a) the Contract has been executed and required Bonds have been furnished and accepted by Owner, or (b) the specified time has elapsed so that Bids may be withdrawn, or (c) all Bids have been rejected.**

P. LIQUIDATED DAMAGES FOR FAILURE TO ENTER INTO CONTRACT

1. The successful bidder, upon their failure or refusal to execute and deliver the Contract and bonds required within ten (10) days after they have received notice of the acceptance of their bid, shall forfeit to the Owner, as liquidated damages for such failure or refusal, the security deposited with their bid.

Q. ANTI-BRIBERY AFFIDAVIT

1. A person convicted for bribery, or conspiracy to bribe shall be disqualified from entering into a contract with any county or other subdivision of the State. Every business entity upon submitting a bid or otherwise applying for a contract shall submit an affidavit stating whether it, its officers, directors, or partners, or its employees have been convicted of bribery, attempted bribery, or conspiracy to bribe under the laws of any State or Federal Government. **Failure to submit the affidavit may result in the bid being determined non-responsive.**

R. NON-COLLUSION AFFIDAVIT

1. The Non-Collusion Affidavit is to be completed and submitted with the bid. **Failure to submit the affidavit may result in the bid being determined non-responsive.**

S. APPLICABLE REGULATIONS

1. The bid is to be based upon work, which is in compliance with all applicable local, state and federal regulations.

T. MINORITY BUSINESS ENTERPRISE PARTICIPATION PROGRAM

See Section 00 43 39 MBE PROCEDURES FOR STATE FUNDED PUBLIC SCHOOL CONSTRUCTION PROJECTS {Section 6.0 Implementing Procedures – Over \$50,000}

U. NON-DISCRIMINATION CLAUSE

1. The Cecil County Public Schools prohibits discrimination in its educational programs, activities, and employment on the basis of actual or perceived race, color, religion, national origin, sex, age, marital status, sexual orientation, genetic information, gender identity, or disability.

V. CERTIFICATION REGARDING DEBARMENT

1. The form Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion Lower Tier Covered Transactions is required to be submitted as a part of the bid packet.

W. POLICIES OF EMPLOYMENT

1. The contractor shall advise the Cecil County Public Schools (CCPS) of the intention to use any employees that are hired or obtained from any penal pre-release or work-release programs. In the event such employees are used, notification to CCPS shall include name and violation for each individual. The contractor shall take reasonable precautions when selecting such individuals and provide whatever safeguards are necessary for effective supervision. Contractor's employees are not permitted inside school buildings when the nature of the contract is for outside work.

Potential contractors/vendors of CCPS are advised that Maryland law now provides the following mandatory restrictions on registered sex offenders performing work or services on school system property:

"A person who enters into a contract with a county board of education or a nonpublic school may not knowingly employ an individual to work at a school if the individual is a registrant. A 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."

Persons or entities awarded contracts with CCPS are required to certify that no employee, subcontractor, subcontractor employee, or material supplier that is a registered sex offender, will be allowed to enter onto school system property at any time in the performance of the work or services for which the contract is awarded. Such certification is a condition precedent to any contract award, and failure to so certify will be grounds for not awarding a contract. It will be the responsibility of contractors to obtain similar certification from all sub-contractors and material suppliers performing work or services on school system property, and to monitor adherence to this requirement. In the event that CCPS determines that a registered sex offender has entered upon school system property in the performance of work for a contractor/vendor, such will be grounds for termination of the contract.

X. BUY AMERICAN STEEL AND MANUFACTURED GOODS

1. It is the bidders' responsibility to fully acquaint themselves with the provisions of the MARYLAND BUY AMERICAN STEEL and MANUFACTURED GOODS ACT requiring a public body to require that certain contractors and subcontractors use or supply only American manufactured goods under certain procurements.

2. Consistent with the provisions of the Maryland State finance and procurement article of the Annotated Code of Maryland, SF, Sections 17-301 through 17-306, inclusive, of the Finance and Procurement Article known as the “Buy American Steel Act.”
3. Except as otherwise noted in the subtitle, a public body shall require a contractor or subcontractor to use or supply only American Steel Products and American Manufactured Goods in the performance of a contract for:
 - a. Constructing or maintaining a public work; or
 - b. Buying or manufacturing machinery or equipment that:
 - i. is composed of at least 10,000 pounds of steel product: and
 - ii. is installed at a public work site.
4. “American Manufactured Goods” means goods for which:
 - a. All of the manufacturing processes for the final product take place in the United States; and
 - b. All of the components of the final product originate in the United States on account of the manufacturing processes for the component, regardless of the origin of the subcomponents.
5. The **Buy American Steel Act of Maryland** defines “steel products” as any product that is:
 - a. Produced from steel made in any state by the open hearth, basic oxygen, electric furnace, Bessemer, or other steel making process.”
 - b. Rolled, forged, drawn, cast, extruded, or otherwise similarly processed.
6. Wherever in the INSTRUCTIONS TO BIDDERS “steel products”, as hereafter defined, are part of the supplies, services, or constructions required by Owner, for the construction, reconstruction, alternation, repair, improvement, or maintenance of public works, the parties bidding shall predicate their base offer solely upon “steel products” manufactured in the United States of America or one of its territories continental or insular, subject to the jurisdiction of the United States, unless such ”steel products” are not produced in the United States in sufficient quantities to meet the requirements of the Contract, in which even the Base Bid is to contain a certification to this effect.
7. It should be understood that each bid submitted shall include, attached to the BID FORM, the proposed cost of the supplies, services, or construction where foreign “Steel Products” are proposed to be used on this project in

comparison to domestic “Steel Products”. Failure to provide this information may result in the bid being considered non-responsive.

8. The Owner, in addition to all other reservations set forth in the Bidding Requirements shall at the time of issuance of the Award and Contract pursuant thereto, determine whether the supplies, services, or construction required is to utilize steel products of domestic or foreign origin.
9. Note further that in the event the Award and Contract pursuant thereto is predicated upon the utilization of domestic “steel products,” then, in addition to all other requirements mandated for performance hereafter in these INSTRUCTION TO BIDDERS, and all documents issued in conjunction therewith, the person, corporation, partnership, or other business unit or association to whom the Award and Contract pursuant thereto is issued, shall as a further condition precedent to the obtaining of Final Payment from Owner, furnish same with a certificate under oath that all “steel products” supplied, delivered, or constructed were of domestic origin.

Y. REFERENCES

1. Bidder is required to provide references for three projects of similar scope who can speak to bidders performance on the project.

Z. SUPPLEMENTARY GENERAL CONDITIONS

1. The “Supplementary General Conditions” are provided to modify *AIA A201 General Conditions* and will prevail as to the intent of these documents where language in one section conflicts with language in another section.

**END OF SECTION
INSTRUCTIONS TO BIDDERS**

SECTION 00 31 00 – AVAILABLE PROJECT INFORMATION

WORK COMPLETION TIME FRAME

1. Project Schedule:
 - a. 02/29/24 – Bid Opening
 - b. 03/13/24 – Board of Education Approval of Contract
 - c. 03/14/24 – Letter of Intent Provided
 - d. 03/18/24 – Contract Executed
 - e. 06/18/24 – Construction Begins
 - f. 08/16/24 – Project Completed
2. Notes on above:
 - a. Work on this project is to be performed in an orderly progression through the building. School personnel will need to clean and set up the building for the new school year. The Contractor is expected to establish a schedule in cooperation with CCPS and to maintain adherence to the schedule throughout. Completion date indicated is for the final area of work.
 - b. No work will be allowed in portions of the building occupied by students when students are present. This work will have to be completed after school or on weekends. School is out at 3:30 PM.
 - c. Work hours for this project are 7:00 AM – 4:00 PM during the summer, Monday – Friday, except holidays. After school begins, work hours are 3:00 – 11:00 PM. Weekends and holidays are to be agreed upon with CCPS.
 - d. The successful bidder is generally NOT responsible for payment of overtime to CCPS custodial staff in order to accommodate the schedule as outlined above. The contractor is required to work with CCPS to minimize impact of overtime. However, if the Contractor fails to perform work during regular hours and causes excessive overtime for CCPS staff, or if the Contractor arranges for a weekend building opening, but does not show up, the Contractor will be back charged.
3. The Bidder agrees by submission of bid that once work begins, it shall be pursued on a daily basis including some Saturdays, Sundays and holidays as required by the schedule. Any deviation shall have prior approval of the Owner. The successful Contractor may work on Saturday, Sunday and holidays with the approval of, and at no additional cost to the Owner.
4. The Contractor is to notify the Owner at least 72 hours prior to commencing work at the site so that the Owner's representative may be present.

6. A pre-construction meeting to be attended by the Contractor, Engineer and Owner’s representative is to be held prior to commencement of work.
6. For further information, please refer to section *01 10 00 Summary of Work*.

ARRANGEMENTS FOR ON-SITE INSPECTION

1. **A pre-bid meeting will be held on the date, time and place specified in the “Notice to Contractors” or as amended in the addenda. Bidders are strongly encouraged to visit the site in advance of submitting their bids. Failure to view the site will under no circumstances be accepted as an excuse for an alleged misunderstanding of the scope of work and other bid requirements.**
3. Follow up visits to the site may be arranged by contacting the Owner in advanced. If complexity of work indicates follow up; site visits may be necessary; the Owner may establish and additional site visit beyond the pre-bid.

TOBACCO FREE ENVIRONMENT POLICY

1. The policy of the Board of Education of Cecil County prohibits smoking and use of tobacco products in all school buildings and property 24 hours per day, 7 days a week without any exceptions. This policy is in support of State Board of Education regulation mandating tobacco free school environments.

DRUG FREE ENVIRONMENT POLICY

1. The Cecil County Public Schools is supportive of America’s War Against Drugs and committed to a drug free workplace. The system further realizes that the abuse of drugs impacts adversely upon the high standards of safety, security and productivity that we expect of all employees. Therefore, the possession, use, distribution or conspiracy to distribute alcoholic beverages, illegal drugs, other intoxicants, or non-controlled drug look-alike substances in any quantity or drug paraphernalia is prohibited on property owned by the Cecil County Board of Education.

**END OF SECTION
AVAILABLE PROJECT INFORMATION**

SECTION 00 41 00 – BID FORM

DATE: _____

TO: CECIL COUNTY BOARD OF EDUCATION
201 BOOTH STREET
ELKTON, MARYLAND 21921

I/We _____ of _____
Name of Contractor Name of Company

The undersigned, having carefully examined the Contract Documents, having visited the site and examined all conditions affecting the work, and having received clarification of all items of doubt, and all addendums listed below, uncertainty or possible conflict, the undersigned hereby agrees to furnish all plant, labor, materials, supplies, equipment, tools, transportation, permits, services and other facilities necessary for the **Rising Sun High School – Waterline Replacement Project** as required in strict accordance with the contract documents and all applicable local, state and federal regulations as follows:

BASE BID

All labor, materials, bonds, fees, permits, sales taxes, and equipment required to complete the work as specified in project specifications and drawings for the **CCPS RFP #24-10 – Rising Sun High School – Waterline Replacement Project**.

_____ Dollars (\$_____)

ADDENDA(S)

I/We acknowledge receipt of Addenda Nos. ____, ____, ____, ____, ____ and ____.

PERFORMANCE AND LABOR AND MATERIAL PAYMENT BONDS

By signing and submitting this bid, the Bidder certifies that they will furnish Performance and Labor and Material Payment Bonds (AIA A312) in amounts sufficient to cover the total proposed cost of the work. The bonds will be amended and maintained current as required by Owner, with all additions or deletions from the contract work. Bonds shall be payable to the Board of Education of Cecil County.

TIME OF COMMENCEMENT, COMPLETION AND DAMAGES

Work at the sites shall begin and be substantially completed as described in the Project documents. This is expressly declared to be of the essence in completion of the work covered by these contract documents, and liquidated damages **may** be assessed in the amount of **\$1,000.00** per day for each calendar day beyond **the substantial completion date as specified in the Project documents** where the lack of completion of the work is creating a hardship for the Owner and where the Owner is burdened with actual expenses as a result of the Contractor not finishing the work in a timely manner.

BUY AMERICAN STEEL

Please indicate below if your Bid is contingent upon using foreign steel as defined in *17.301 – 17.306 of the Annotated Code of Maryland State Finance and Procurement Article* and as referenced in the Instruction to Bidders Section 27.0 and the Supplementary General Conditions to AIA A201-2017 Section 20.1. If no steel is to be purchased for this project, check N/A.

YES _____ NO _____ N/A _____

ADDITIONAL INFORMATION

1. The Bidder declares that in preparing this bid, they have assured themselves of the availability of all labor, materials, and products to meet the substantial completion date.
2. By signing this bid, the Bidder certifies that they do not or will not discriminate against their employees on the basis of actual or perceived race, color, religion, national origin, sex, age, marital status, sexual orientation, genetic information, gender identity, or disability. Bidder further certifies that they do not maintain or provide for their employees facilities, which are segregated on any of the above categories.
3. By signing of this bid, each Bidder certifies that this bid has been arrived at independently without consultation, communication, or agreement as to any matter relating to this bid with any other Bidder or with any competitor.
4. By signing this bid, the contractor certifies that this bid is in compliance with all local and applicable codes.

5. The Owner reserves the right to approve or reject the Bidder's proposed subcontractor(s) in accordance with the requirements of the general and special conditions.
6. The Bidder declares by signing this bid proposal that they have carefully verified through visual inspection that all dimensions, square footages and quantities shown in the drawings and specification are correct to the best of their knowledge and this information was used in the preparation of this bid proposal.

I/We agree to substantially complete all base bid as well as any alternate work selected by the Owner at the time of contract award at the specified school facility **as described in the project documents.**

I/We enclose herewith Surety Bond \$_____, being 5% of the bid price submitted herewith, together with a letter from the Surety Company whose Bid Bond is enclosed.

I/We enclose herewith Certified Check, payable to the Board of Education of Cecil County, for \$_____ being 5% of the bid price submitted herewith.

I/We attach the following items as indicated below by the Owner with an "X":

<u>X</u>	Anti-Bribery Affidavit
<u>X</u>	Bid Bond / Certified Check as stipulated above.
<u>X</u>	Consent of Surety as stipulated above.
_____	Plan for Utilization of Minority Business Enterprises (If available)
_____	MBE Utilization & Fair Solicitation Affidavit
_____	MBE Schedule of Participation
<u>X</u>	Contractor's Qualification Statement <u>&</u> AIA A305
<u>X</u>	Certification Regarding Debarment
<u>X</u>	Non-Collusion Affidavit
<u>X</u>	Proposed Subcontractors Form
<u>X</u>	Maryland Contractor's License
<u>X</u>	References
<u>X</u>	Sex Offender Certification
<u>X</u>	Bid Form

SIGNATURE OF BIDDER

If submitted by an individual using a trade name:

List individual name, using the phrase, "An individual doing business under the firm name of _____."

_____/_____/_____
Signature of Owner for Individual Firm eMaryland Marketplace # Date

If submitted by a partnership:

List names of partners, using the phrase, "Co-Partners trading and doing business under the firm name of _____".

_____/_____/_____

Signature of Partner for Partnership Firm eMaryland Marketplace #
Date

_____/_____/_____
Signature of Partner for Partnership Firm eMaryland Marketplace #
Date

_____/_____/_____
Signature of Partner for Partnership Firm eMaryland Marketplace # Date

If submitted by a Corporation:

List the site of incorporation, using the phrase, "A Corporation organized under the laws of _____".

Signature of Authorized Personnel
if Firm is a Corporation

Date

Title of Authorized Personnel
if Firm is a Corporation

Telephone

eMaryland Marketplace #

Maryland Business License No.

Employer I.D. No.

END OF SECTION
BID FORM

SECTION 00 43 13 – BID SECURITY

BID BOND

Accompanying this Bid is a 5% bid bond (AIA A310), payable without condition to the Owner which it is agreed shall be retained as liquidated damages for the delay or extra expense caused the Owner if the undersigned fails to execute the contract and furnish the bond required by the contract documents.

**END OF SECTION
BID SECURITY**

SECTION 00 43 30 – CONTRACTOR’S QUALIFICATION STATEMENT

CECIL COUNTY PUBLIC SCHOOLS
DEPARTMENT OF FACILITIES AND ADMINISTRATIVE SERVICES
201 BOOTH STREET
ELKTON, MARYLAND 21921-5684
Telephone: (410) 996-5495 Fax: (410) 996-5695

**CONTRACTOR’S QUALIFICATION STATEMENT FOR PUBLIC SCHOOL
CONSTRUCTION PROJECTS**

The information acquired through the completion of this sheet and an accompanying AIA Document A305 Contractor’s Qualification Statement will be used as a basis for establishing the qualifications of contractors for undertaking construction work under the jurisdiction of the Board of Education of Cecil County.

If a contractor has not filled in such a questionnaire setting forth their qualifications and turned it over to the local education agency (Cecil County Public Schools) to the satisfaction of the Superintendent of Schools, they (the contractor) shall be ineligible to receive construction documents for bidding or for contract award for such work as may be handled through the Board of Education of Cecil County. Certification of Qualification shall be valid for one calendar year only, and renewal must be applied for before January 1 of each succeeding calendar year.

1. Is any member of your organization employed by the County or in any way connected with the local government?

If yes, explain: _____

2. NON-DISCRIMINATION

A policy of non-discrimination on the basis of race, color, sex, age, national origin, religion, or disabling condition is maintained by the Cecil County Public Schools.

3. AFFIRMATIVE ACTION

The Cecil County Board of Education requires that a contractor who subcontracts work, services, or products must implement affirmative action programs as outlined in the grants management common rule as codified in 34CFR80.

4. AIA DOCUMENT A305-CONTRACTOR’S QUALIFICATION STATEMENT

AIA Document A305-Contractor’s Qualification Statement shall be completed in its entirety and all information requested (e.g., current financial statement) therein provided and made a part of this contractor qualification statement. Contractors may obtain AIA Document A305 from an authorized local distributor for AIA contracts and forms (for a complete directory of Document Distributors visit <http://www.aia.org/documents/> on the World Wide Web) or by calling 800-365-ARCH (2724).

See (AIA Document A305)

**END OF SECTION
CONTRACTOR’S QUALIFICATION STATEMENT**

SECTION 00 43 36 – PROPOSED SUBCONTRACTORS FORM

LIST OF SUBCONTRACTORS AND SUPPLIERS FOR MAJOR TRADES

Please indicate next to each major trade listed below the Subcontractor/Supplier that will be used for this project. These subcontractors/suppliers shall not be changed without Owner's permission.

Electrical

Subcontractor/Supplier

Other Trade/Material

Subcontractor/Supplier

**END OF SECTION
PROPOSED SUBCONTRACTORS FORM**

SECTION 00 43 37 – SEX OFFENDER CERTIFICATION

REGISTERED SEX OFFENDER/SEXUALLY VIOLENT PREDATOR/CRIMINAL CERTIFICATION

Potential contractors/vendors of Cecil County Public Schools are advised that Maryland law requires certain child sex offenders to register with the State and with the local law enforcement agency in the county in which they will reside, work and/or attend school. Section 11-722(c) of the Criminal Procedure Article of the *Annotated Code of Maryland* states, “[a] person who enters into a contract with a County Board of Education or a non-public school may not knowingly employ an individual to work at a school if the individual is a registrant. A person who violates this section is guilty of a misdemeanor and on conviction is subject to imprisonment not exceeding five years or a fine not exceeding \$5,000 or both”. If a child sex offender, sexually violent predator, or sex offender, as defined in the Criminal Law and Criminal Procedure Articles of the *Annotated Code of Maryland*, is employed by the Award Bidder, the Award Bidder is prohibited from assigning that employee to perform management, delivery, installation, repair, construction or any other type of services on any Cecil County Public Schools’ property, including the project property. Violation of this provision may result in immediate Termination for Cause.

Additionally, in accordance with Md. Ed. Code Ann., §6-113 (b), the Award Bidder and any of its subcontractors will not knowingly assign any employee to work on school premises with direct, unsupervised, and uncontrolled access to children, if that employee has been convicted of a crime identified in Md. Ed. Code Ann., §6-113(a).

1. Effective July 1, 2015, amendments to 6-113 of the Education Article of the Maryland Code further require that the Award Bidder, a Contractor, or Subcontractor for a local school system may not knowingly assign an employee to work on school premises 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. A sexual offense in the third or fourth degree under 3-307 or 3-308 of the Criminal Law Article of the Maryland Code or an offense under the laws of another state that would constitute an offense under 3-307 or 3-308 of the Criminal Law Article if committed in Maryland.
 - b. Child sexual abuse under 3-602 of the Criminal Law Article, or an offense under the laws of another state that would constitute child sexual abuse under 3-602 of the Criminal Law Article if committed in Maryland; or
 - c. A crime of violence as defined in 14-101 of the Criminal Law Article, or an offense under the laws of another state that would be a violation of 14-101 of the Criminal Law Article if committed Maryland, including: (1) abduction; (2) arson in the first degree; (3) kidnapping; (4) manslaughter, except involuntary manslaughter; (5) mayhem; (6) maiming; (7) murder; (8) rape; (9) robbery; (10) carjacking; (11) armed carjacking; (12) sexual offense in the first degree; (13) sexual offense in the second degree; (14) use of a handgun in the commission of a felony or other crime of violence; (15) child abuse in the first degree; (16) sexual abuse of a minor; (17) an attempt to commit any of the crimes described in items (1) through (16) of this list; (18) continuing course of conduct with a child under 3-315 of the Criminal Law Article; (19) assault in the first degree; (20) assault with intent to murder; (21) assault with intent to rape; (22) assault with intent to rob; (23) assault with intent to commit a sexual offense in the first degree; and (24) assault with intent to commit a sexual offense in the second degree.

Also effective July 1, 2015, amendments to 5-561 of the Family Law Article of the Maryland Code mandate that each contractor and subcontractor shall require that any individuals in its work-force must undergo a criminal background check, if the individuals have direct, unsupervised, and uncontrolled access to children.

It shall be the responsibility of the contractor to obtain similar certification from all sub-contractors and material suppliers performing work or services on school system property, and to monitor adherence to this requirement. In the event that Cecil County Public Schools recognize a registered sex offender has entered

upon school system property in the performance of work for a contractor/vendor, such will be grounds for termination of the contract.

I do solemnly declare and affirm under the penalties of perjury that the contents of this Affidavit are true and correct to the best of my knowledge, information, and belief. that no employee, subcontractor, subcontractor employee, or material supplier that is a registered sex offender, sexually violent predator / sex offender will be allowed to enter onto the school system property at any time in the performance of the work or services for which the contract is awarded.

Name (Printed)	Title
----------------	-------

Authorized Signature	Date
----------------------	------

Name of Company, Corporation or Firm

End of Section
Sex Offender Certification

SECTION 00 43 38 - REFERENCES

List below the company, contact person, and telephone number for three projects of a similar nature completed by your firm within the last two years.

Company Name	Contact Person	Telephone
--------------	----------------	-----------

Description of Project Performed

Company Name	Contact Person	Telephone
--------------	----------------	-----------

Description of Project Performed

Company Name	Contact Person	Telephone
--------------	----------------	-----------

Description of Project Performed

**END OF SECTION
REFERENCES**

SECTION 00 43 39 – MINORITY BUSINESS ENTERPRISE

Not applicable – locally funded project

**END OF SECTION
MINORITY BUSINESS ENTERPRISE**

SECTION 00 45 17 - ANTI-BRIBERY AFFIDAVIT

State of Maryland Procurement Article 21, Section 3-405
"Vendor/Contractor Disqualification-Bribery"

A person convicted for bribery, attempted bribery, or conspiracy to bribe shall be disqualified from entering into a contract with any county or other subdivision of the State. Every business entity upon submitting a bid or otherwise applying for a contract shall submit an affidavit stating whether it, its officers, directors, or partners, or its employees have been convicted of bribery, attempted bribery, or conspiracy to bribe under the laws of any State or Federal Government.

TO BE COMPLETED BY BIDDER

_____ affirms that it is in full compliance
with the aforementioned Maryland State Procurement Article 21, Section 3-405.

Authorized Company Representative

Sworn to and subscribed to, before me, on
the ____ day of _____, 20____.

Notary Public

My Commission Expires

END OF SECTION
ANTI-BRIBERY AFFIDAVIT

**SECTION 00 45 18 - CERTIFICATION REGARDING DEBARMENT SUSPENSION,
INELIGIBILITY AND VOLUNTARY EXCLUSION LOWER TIER COVERED TRANSACTIONS**

This certification is required by the regulations implementing Executive Order 12549. Debarment and Suspension 34 CFR Part 85. Section 85.510, Participants' responsibilities. The regulations were published as Part VII of the May 26, 1988 Federal Register (pages 19160-19211). Copies of the regulations may be obtained by contacting the person to whom this proposal is submitted.

(BEFORE COMPLETING CERTIFICATION, READ INSTRUCTIONS ON REVERSE)

1. The prospective lower tier participant certifies, by submission of this proposal, that neither it nor its principals are presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participation in this transaction by any Federal department agency.
2. Where the prospective lower tier participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.

Name and Title of Authorized Representative

Signature

Date

Instructions For Certification

1. By signing and submitting this proposal, the perspective lower tier participant is providing the certification set out below.
2. The certification in this clause is a material representation of fact upon which reliance was placed when this transaction was entered into. If it is later determined that the perspective lower tier participant knowingly entered an erroneous certification, in addition to other remedies available to the Federal Government, the department or agency with which this transaction was originated may pursue available remedies, including suspension and/or debarment.
3. The prospective lower tier participant shall provide immediate written notice to the person to which this proposal is submitted if at any time the prospective lower tier participant learns that its certification was erroneous when submitted or has become erroneous by reason of changed circumstances.
4. The terms "covered transaction," "debarred," "suspended," "ineligible," "lower tier covered transaction," "participant," "person," "primary covered transaction," "principal," "proposal" and "voluntarily excluded," as used in this clause, have the meanings set out in the Definitions and Coverage sections of rules implementing Executive Order 12549. You may contact the person to which this proposal is submitted for assistance in obtaining a copy of those regulations.
5. The prospective lower tier participant agrees by submitting this proposal that, should the proposed covered transaction be entered into, it shall not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction, unless authorized by the department or agency with which this transaction originated.
6. The prospective lower tier participant further agrees by submitting this proposal that it will include the clause "Certification Regarding Debarment, Suspension, Ineligibility, and Voluntary Exclusion—Lower Tier Covered Transaction," without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions.
7. A participant in a covered transaction may rely on a certification of a prospective participant in a lower tier covered transaction that it is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless it knows that the certification is erroneous. A participant may decide the method and frequency by which it determines the eligibility of its principals. Each participant may, but is not required to, check the Non-procurement List.
8. Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render in good faith the certification required by this clause. The knowledge and information of a participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

9. Except for transactions covered under paragraph 5 of these instructions, if a participant in a covered transaction knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available to the Federal Government, the department or agency with which this transaction originated may pursue available remedies, including suspension and / or debarment.

END OF SECTION
CERTIFICATION REGARDING DEBARMENT SUSPENSION, INELIGIBILITY AND
VOLUNTARY EXCLUSION LOWER TIER COVERED TRANSACTIONS

SECTION 00 45 19 - NON-COLLUSION AFFIDAVIT

Contract/Bid No. _____

STATE OF _____:

COUNTY OF _____:

I state that I am _____ of _____
(Title) (Name of my firm)

and that I am authorized to make this affidavit on behalf of my firm, and its owners, directors and officers. I am the person responsible in my firm for the price(s) and the amount of this bid.

I state that:

- (1) The price(s) and amount of this bid have been arrived at independently and without consultation, communication or agreement with any other contractor, bidder or potential bidder.
- (2) Neither the price(s) nor the amount of this bid, and neither the approximate price(s) nor approximate amount of this bid, have been disclosed to any other firm or person who is a bidder or potential bidder; and they will not be disclosed before bid opening.
- (3) No attempt has been made or will be made to induce any firm or person to refrain from bidding on this contract, or to submit a bid higher than this bid, or to submit any intentionally high or noncompetitive bid or other form of complementary bid.
- (4) The bid of my firm is made in good faith and not pursuant to any agreement or discussion with, or inducement from, any firm or person to submit a complementary or other noncompetitive bid.
- (5) _____, its affiliates, subsidiaries,
(Name of my firm)

officers, directors and employees are not currently under investigation by any governmental agency, and have not in the last four years been convicted or found liable for any act prohibited by State or Federal law in any jurisdiction, involving conspiracy or collusion with respect to bidding on any public contract, except as follows:

I state that _____ understands and acknowledges that the

(Name of my firm)

above representations are material and important and will be relied on by CECIL COUNTY PUBLIC SCHOOLS in awarding the contract(s) for which this bid is submitted. I understand and my firm understands that any misstatement in this affidavit is and shall be treated as fraudulent concealment from CECIL COUNTY PUBLIC SCHOOLS of the true facts relating to the submission of bids for this contract.

(Name and company position)

SWORN TO AND SUBSCRIBED, before me, this ____ day of _____, 20__.

Notary Public

My commission expires _____

END OF SECTION
NON-COLLUSION AFFIDAVIT

SECTION 00 45 27 – LABOR RELATIONS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Attention is directed to Bidding and Contract Requirements, and to Division 1, General Requirements, which are hereby made a part of this Section.

PART 2 - SCOPE

2.01 PREVAILING WAGES

- A. Contractors attention is called to the desire of Cecil County Public Schools to ensure that in any contract entered into pursuant to this advertisement, the Contractor shall comply with the provisions of the PREVAILING WAGE LAWS & INSTRUCTIONS.
- B. The Contractor must submit certified weekly payrolls directly to the State of Maryland, Department of Labor, Licensing and Regulation as referenced in the attached instructions.
- C. The labor to perform the work under this contract must comply with the Labor Rates shown on the attached Prevailing Wage Rate Sheets dated **Not Applicable**.
- D. Failure to Comply with State of Maryland Prevailing Wage Laws & Instructions as shown on the subsequent pages and other requirements will be this Contractor's sole responsibility regarding fines or penalties. The Owner, Architect or Construction Manager will not be responsible for this Contractor's failure to comply with these laws.

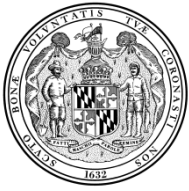
**END OF SECTION
LABOR RELATIONS**

SECTION 00 45 28 – PREVAILING WAGE

Not applicable – locally funded project

**END OF SECTION 00 45 28
PREVAILING WAGE SECTION**

SECTION 00 45 30 – UNSKILLED CONSTRUCTION LABORER’S WORK



STATE OF MARYLAND

DEPARTMENT OF LABOR, LICENSING AND REGULATION

100 N. Eutaw Street, Room 607

Baltimore, MD 21201

410-767-2342 FAX 410-333-7303

DLLR Home Page: <http://www.dllr.state.md.us>

UNSKILLED CONSTRUCTION LABORER’S WORK

Laborers may **NOT** assist mechanics in the performance of the mechanic’s work,
NOR USE TOOLS peculiar to established trades.

Their work should be confined to the following manual tasks:

1. Digging and filling holes and trenches.
2. Loading, unloading and stockpiling materials.
3. Cleaning and sweeping.
4. Driving stakes.
5. Placing concrete and asphalt (not finishing).
6. Stripping forms.
7. Ripping out material which is to be discarded.
8. Clearing and grubbing.

HELPERS AND TRAINEES

ALL contractors shall employ only competent workers and apprentices and may
NOT employ any individual classified as a **HELPER** or **TRAINEE**.

END OF SECTION

UNSKILLED CONSTRUCTION LABORER’S WORK

SECTION 00 61 13 – PERFORMANCE AND PAYMENT BOND FORMS

See (AIA Document A312)

END OF SECTION
PERFORMANCE AND PAYMENT BOND FORMS

SECTION 00 61 14 – BID BOND

See (AIA Document A310)

END OF SECTION
BID BOND
(AIA Document A310)

SECTION 00 71 00 – STANDARD FORM OF AGREEMENT BETWEEN OWNER AND CONTRACTOR

See: AIA Document A101 – 2017 edition

**END OF SECTION
STANDARD FORM OF AGREEMENT BETWEEN OWNER AND CONTRACTOR**

SECTION 00 72 00 – GENERAL CONDITIONS OF THE CONTRACT FOR CONSTRUCTION

See: AIA Document A201 – 2017 edition

**END OF SECTION
GENERAL CONDITIONS OF THE CONTRACT FOR CONSTRUCTION**

**SECTION 00 73 00 - ARTICLE 15 – SUPPLEMENTARY GENERAL CONDITIONS TO A201
(2017 EDITION)**

DEFINITION

The Supplementary Conditions modify, clarify, change, delete from or add to the "General Conditions of the Contract for Construction," AIA Document A201-2017 edition. Where any article, subparagraph or clause of the General Conditions is modified or deleted by these Supplementary Conditions, the unaltered provisions must remain in effect.

ARTICLE 1 - GENERAL PROVISION

1.1.1. The Contract Documents

Delete the last sentence from subparagraph 1.1.1.

1.1.2. The Contract

1.1.2. Add the phrase "Except as set forth in paragraph 5.3 and paragraph 5.4," at the beginning of the fourth sentence of subparagraph 1.1.2.

1.1.7. The Project Manual

Delete subparagraph 1.1.7 in its entirety and substitute the following:

1.1.7. The Project Manual is a volume assembled for the work that includes the General Conditions (AIA Document A201-2017 Edition), the Supplementary General Conditions, the Specifications and all Addenda issued prior to execution of the Contract. The Project Manual also includes bidding requirements in documents, and sample forms.

1.2.1. Add the following language to the end of subparagraph 1.2.1:

In the event of inconsistencies within or between parts of the Contract Documents or between the Contract Documents and applicable standards, codes and ordinances, the Contractor must (1) provide the quality or greater quantity of Work or (2) comply with the more stringent requirement; either or both in accordance with the Architect's/Engineer's interpretation. The terms and conditions of this paragraph 1.2.1, however, must not relieve the Contractor of any of the obligations set forth in paragraphs 3.2 and 3.7.

1.2.1.1. On the Drawings, given dimensions must take precedence over scaled measurements and large-scale drawings over small-scale drawings.

1.2.1.2. Before ordering any materials or doing any Work, the Contractor and each Subcontractor must verify measurements at the Project Site and must be responsible for the correctness of such measurements. No extra charges or compensation will be allowed on account of differences between actual dimensions and the dimensions indicated on the drawings. Any difference, which may be found, must be submitted for resolution by the Architect, if necessary, before proceeding with the Work.

1.2.1.3. If a minor change in the Work is found necessary due to actual field conditions, the Contractor must submit detailed drawings of such departure to the Architect/Engineer for approval before making the change.

1.2.2. Add the following language to the end of subparagraph 1.2.2:

Instruction and other information furnished in the specifications, including, without limitation, items in connection with prefabricated or prefinished items, are not intended to supersede work agreements between employers and employees. Should the specifications conflict with such work, the work agreement must be followed, provided such items are provided and finished as specified. If necessary, such work must be performed on the Project Site, instead of at the shop, by appropriate labor and in accordance with the drawings and specifications.

1.5.2. Add the following language to the end of subparagraph 1.5.2:

The Contractor and each Subcontractor must evaluate and satisfy themselves as to the conditions and limitations under which the Work is to be performed, including, without limitation, (1) the location, condition, layout and nature of the Project Site and surrounding areas, (2) generally prevailing climatic conditions, (3) anticipate labor supply and costs, (4) availability and cost of materials, tools and equipment, and (5) other similar issues. The Owner assumes no responsibility or liability for the physical condition or safety of the Project Site or any improvements located on the Project Site. Except as provided in subparagraph 9.1.2, the Contractor must be solely responsible for providing a safe place for the performance of the Work. The Owner will not be required to make any adjustment in either the Contract Sum or Contract Time in connection of any failure of the Contractor or any Subcontractor to comply with the requirements of this subparagraph 1.5.2.

ARTICLE 2 - OWNER

2.1. "Definitions"

2.1.1. Delete subparagraph 2.1.1 in its entirety and substitute the following:

2.1.1. The "Owner" means the Board of Education of Cecil County, Maryland and its elected officials, agents and employees, and is referred to throughout the Contract Documents as if singular in number and masculine in gender. The term "Owner" means the Owner or their authorized representative.

2.1.2. Delete subparagraph 2.1.2 in its entirety and substitute the following:

2.1.2. The Contractor understands that the Owner is a public agency and no mechanic liens are permitted against its property.

2.2.1. Modify subparagraph 2.2.1 as follows:

In the second line of subparagraph 2.2.1, delete the words "and thereafter." Delete the second and third sentences of subparagraph 2.2.1.

2.2.2. Modify subparagraph 2.2.2 as follows:

In the third line of subparagraph 2.2.2, delete the word "construction" and substitute the phrase "development of real estate."

2.2.3. Delete subparagraph 2.2.3 in its entirety and substitute the following:

2.2.3. The Owner must furnish surveys describing physical characteristics, legal limitations, utility locations and a legal description of the Project Site to the extent reasonably required for the execution of the Work and requested by the Contractor in writing. The Owner does not warrant or undertake responsibility for the location of utilities or the accuracy of tests concerning the soil, surface and subsurface structures and conditions. The Contractor warrants that it has made itself familiar with the Project Site and obtained all information required by it concerning the conditions of the Project Site, including soil, surface and subsurface structures and conditions as well as the location of utilities and the improvements to be constructed. The Contractor is solely responsible for all direct or indirect costs resulting from any conditions differing from those contained in information provided by the Owner as set forth herein.

2.2.5. Delete subparagraph 2.2.5 in its entirety and substitute the following:

2.2.5. General Trade Bidders may secure one (1) set of contract documents, including specifications and drawings, from the Owner on or after the date specified in the "Notice to Contractors" or as amended in the addenda. Trade specific Bidders must contact potential General Trade Bidders. This list is available from the Owner or Construction Reporting Services for the contract documents relevant to their specific work.

2.5. Add the following subparagraph 2.5:

2.5. ACCESS TO THE WORK

2.5.1. The Owner and Architect/Engineer must at all times have access to the Work wherever it is in preparation and progress. The Contractor must provide for such access.

ARTICLE 3 - CONTRACTOR

3.1. "Definitions" - Add the following subparagraph 3.1.4:

3.1.4. Wherever in the specifications there appears a reference to the "contractor" or to 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 thereof, must be deemed a reference to the Contractor. It must not be construed as relieving the Contractor from the duty to perform all of the Work and other obligations provided for under this Contract. Such reference must not be construed as an assumption by the Owner of any responsibility for the relations between the Contractor and their Subcontractors, or between various Subcontractors, or to assign any particular portions of the Work to any one (1) Subcontractor, or a limit on the portions of the Work to any one (1) Subcontractor, or a limit on the obligation of the Contractor to perform all Work as above required, or to coordinate the performance of the Work and the operation of all Subcontractors.

3.2.1. Add the following language to the end of subparagraph 3.2.1:

The exactness of grades, elevations, dimensions or locations given on any Drawings issued by the Architect/Engineer, or the Work installed by other contractors, is not guaranteed by the Architect/Engineer or the Owner. The Contractor must, therefore, satisfy itself as to the accuracy of all grades, elevations, dimensions and locations. In all cases of interconnection of its Work with existing or other work, it must verify at the site all dimensions relating to such existing or other work. Any errors due to the Contractor's failure to so verify all such grades, elevations, locations or dimensions, must promptly be rectified by the Contractor without any additional cost to the Owner.

3.2.4. Add a new subparagraph 3.2.4 as follows:

3.2.4. Except as to any reported errors, inconsistencies or omissions, and to concealed or unknown conditions defined in paragraph 4.3.6, by executing the Agreement, the Contractor represents that the Contract Documents are sufficiently complete and detailed for the Contractor to (1) perform the Work required to produce the results intended by the Contract Documents, and (2) comply with all the requirements of the Contract Documents.

3.3.2. Modify subparagraph 3.3.2 as follows:

In the second line of subparagraph 3.3.2, add the words "any entity or" between the word "and" and "other."

3.5.1. Modify subparagraph 3.5.1 as follows:

In the sixth line of 3.5.1, delete the word "may" and substitute "must."

3.5.2. Add a new subparagraph 3.5.2 as follows:

3.5.2. The warranty provided in Paragraph 3.5.1 must be concurrent with and not in limitation of any other warranty or remedy required by law or by the Contract Documents. The Contractor must repair or replace those products found not to be in compliance with the warranty terms during the period of two years after the date of Substantial Completion of each phase. The Contractor agrees to assign to the Owner at the time of final completion of the Work any and all manufacturer's warranties relating to materials and labor used in the Work, and further agrees to perform the Work in such manner as to preserve any and all such manufacturer's warranties.

3.7.1. Delete subparagraph 3.7.1 in its entirety and substitute the following:

3.7.1. The Owner has applied for the general building permit. Except as set forth in paragraph 2.2.2, the Contractor must secure, pay for, and as soon as practicable, furnish the Owner and the Architect/Engineer with copies or certificates of all permits and fees, licenses and inspections necessary for the proper execution and completion of the Work, including, without limitation, licenses and inspections necessary for the proper execution and completion of the Work which are customarily secured after execution of the Contract and which are legally required at the time bids are received. All direct costs in payment of such permits, fees, licenses and inspections must be included in the Contractor's Contract Sum. All connection charges, assessments or inspection fees as may be imposed by any municipal agency or utility company are included in the Contract Sum and must be the Contractor's responsibility. The Owner must pay for the building permit.

3.9. "Superintendent"

3.9.1. Add the following language to the end of subparagraph 3.9.1:

The Contractor must submit in writing to the Owner the qualifications of the proposed superintendent prior to the beginning of the Work and the proposed superintendent must meet with the approval of the Owner. The superintendent must be on the job site at all times and must not be responsible for any other project being constructed by the Contractor. The superintendent must be permanently assigned to the Project and may not be changed without written consent of the Owner. The Owner must have the right to require the Contractor to remove from the Project any superintendent whose performance the Owner deems to be unsatisfactory. The Contractor will be required to immediately inform the Owner if the superintendent leaves employment. The Contractor's superintendent and foreman are required to have a working command of the English language.

3.10.4. Add a new subparagraph 3.10.4 as follows:

3.10.4. The Construction Schedule must be in a detailed precedent-style critical path method (CPM) or Primavera type format satisfactory to the Owner which must (1) provide a graphic representation of all activities and events that will occur during the performance of the Work; (2) identify each phase of construction and occupancy; (3) provide costs for each activity; and (4) set forth dates that are critical in insuring the timely and orderly completion of the Work in accordance with the requirements of the Contract Documents. An updated copy of the Construction Schedule must be submitted each month with the Contractor's Application for Payment, indicating actual progress of construction through previous months with relation to the original as planned schedules.

3.11. “Documents and Samples at the Site”

3.11.2 Such records must be kept on a set of Contract Drawings and Specifications reserved **exclusively** for this purpose, together with such supplementary sketches and notes as may be required.

3.13. Use of Site

Add the following subparagraphs 3.13.2 through 3.13.4:

3.13.2. The Contractor must be responsible for the security of all parts of the Work not accepted by the Owner, until such time as the Owner accepts said parts of the Work.

3.13.3. During the construction period the Contractor will have reasonable use of the premises for construction operations, including use of the Project Site. The Owner reserves the right to perform construction operations with its own forces or to employ separate contractors on portions of the Project. Under no circumstances will the Contractor's personnel mingle or converse with students. The Contractor will secure the Owner's permission in advance for work to be performed in any occupied portion of any building on the Project Site.

3.13.4. The Contractor must coordinate its work and activities with school activities as follows:

- (a) Coordinate deliveries so as not to conflict with bus arrival/departure schedule.
- (b) Minimize disruption to instructional programs and the operation of the school and provide for occupants' safety.
- (c) Provide Owner access and ability to do Work within the Site/building.

3.14. Cutting and Patching

3.14.3. Add the following subparagraph 3.14.3:

3.14.3. Specific approval must be obtained from the Architect/Engineer for such finish changes to be done by any trade other than the one installing the specific finish material. Failure to obtain the Architect's/Engineer's prior approval must place full responsibility upon the Contractor for extra costs occasioned by unacceptable finish surface changes.

3.15. "Cleanup"

3.15.1. Delete the first sentence of subparagraph 3.15.1 and replace with the following:

The Contractor must keep the Project Site and surrounding area free from accumulations of waste material or rubbish caused by the Work and must maintain all turf areas and landscaping that is not to be disturbed by the Work.

3.15.1.1. Add the following subparagraph 3.15.1.1:

3.15.1.1. The Contractor must undertake cleanup to ensure that all buildings, grounds and public properties located on the Project Site and surrounding area are maintained free from accumulations of waste materials and rubbish at the end of each day's work.

3.15.1.2. Add the following subparagraph 3.15.1.2:

3.15.1.2. Provide final cleaning of the Project consisting of normal "clean" condition expected for a first-class building cleaning and maintenance program. Final Project clean-up to include restoring to conditions existing prior to commencement of work.

3.15.3. Add the following subparagraph 3.15.3:

3.15.3. If the Contractor fails to clean up or maintain turf areas and landscaping, the Owner may do so and the cost thereof will be charged to the Contractor.

3.15.4. Add the following subparagraph 3.15.4:

3.15.4 Additional provisions for cleaning up are included in Division #1 – General Requirements.

ARTICLE 4 - ADMINISTRATION OF THE CONTRACT

Subparagraphs 4.5.1, 4.5.2 and 4.5.3 are deleted in their entirety.

Subparagraphs 4.6.1, 4.6.2, 4.6.3, 4.6.4, 4.6.5 and 4.6.6 are deleted in their entirety.

All language providing for the settlement of disputes through mediation and/or arbitration is deleted from subparagraphs 4.4.1, 4.4.5, 4.4.6, 4.4.8, 8.3.1, 9.7.1 10.5, 11.4.9, 11.4.10, and from any other subparagraph of the General Conditions not specifically cited above.

4.3.7. Modify subparagraph 4.3.7.1 as follows:

In the second sentence of subparagraph 4.3.7.1, strike the words "of cost and." In addition at the end of subparagraph 4.3.7.1, add the following language:

"In no case will any claim for Contract Time extension be construed to allow added charges for Contractor's overhead and Project administration."

ARTICLE 5 - SUBCONTRACTORS

5.1 "Definitions"

5.1.3. Add the following subparagraph 5.1.3:

5.1.3. A Sub-subcontractor is also a person or organization who has a direct or indirect contract with a Subcontractor to supply products or perform any of the Work away from the Site.

5.2. "Award of Subcontracts and Other Contracts for Portion of the Work"

5.2.1. Delete subparagraph 5.2.1 in its entirety and substitute the following:

5.2.1. Within ten (10) days of confirmation of the award of the Contract, the Contractor must submit the names and addresses of all Subcontractors for the review and approval of the Owner. Only Subcontractors so approved will be permitted to perform the Work. All Subcontractors are required to be named on the bidding documents, subject to approval by the Owner and Architect/Engineer, will be used on the Work for which they are proposed. The Architect /Engineer will promptly reply to the Contractor, in writing, stating whether the Owner or Architect/Engineer has reasonable objection to any Subcontractor. Failure of the Owner or Architect/Engineer to reply promptly will constitute notice of no reasonable objection.

5.3. "Sub contractual Relations"

5.3.2. Add the following subparagraph 5.3.2:

- 5.3.2 Require each Subcontractor to obtain and pay for permits, fees and licenses necessary to the execution and completion of the work of their trade.
- 5.3.3. Add the following subparagraph 5.3.3:
- 5.3.3 Require each Subcontractor to review their requirements for cutting, installation, fitting and patching with the Contractor before work is undertaken so that proper sequence is maintained, interferences with other work are resolved beforehand and proper cutting into completed work is minimized.
- 5.4. “Contingent Assignment of Contracts”
- 5.4.2. Delete subparagraph 5.4.2 in its entirety and substitute the following:
- 5.4.2. If the Work in connection with the Subcontract has been suspended for more than thirty (30) days after termination of the Contract by the Owner pursuant to paragraph 14.2 and the Owner accepts assignment of such Subcontract, the Subcontractor's compensation must be equitably adjusted for demonstrable increases in direct costs incurred by the Subcontractor as a result of the suspension.

ARTICLE 7 - CHANGES IN THE WORK

- 7.1.4. Add the following subparagraph 7.1.4:
- 7.1.4. If unit prices stated in the Contract Documents are inequitable to the Owner or Contractor, the applicable unit prices must be equitably adjusted. The determination of inequitableness and the final determination of an equitable unit price must be the responsibility of the Architect/Engineer.
- 7.2. Delete subparagraph 7.2.2 in its entirety and substitute the following subparagraphs 7.2.2 through 7.2.5:
- 7.2.2. The costs associated with any Change Order must be limited to the cost of materials, including sales tax and cost of delivery, cost of labor, including social security, old age and unemployment insurance and fringe benefits under collective bargaining agreements, Workmen's Compensation insurance, bond premiums, and rental value of power tools and equipment. To receive full recognition, labor assigned to perform "Changes in the Work" must, insofar as possible, work continuously on the change, rather than interchanging between the Contract Work and the change. All such "costs" are subject to verification by the Architect/Engineer and Owner. The Contractor will notify the Architect/Engineer when work on change is to start and when said work is completed.
- 7.2.3. No work on proposed changes must be started until the estimate of proposed changes has been approved by the Architect/Engineer and Owner, except in case of "emergencies," as defined in paragraph 10.3.1.

7.2.4. When an emergency requires that changes in the Contract Work be done prior to approval of the Change Order, Contractor will be issued a Notice to Proceed Order and must maintain an accurate account of all labor and material involved in the change. To receive full recognition, labor assigned to Contract changes must, insofar as possible, work continuously on the change, rather than interchanging between Contract Work and the change. All such time and material is subject to verification by the Architect/Engineer and Owner. The Contractor will notify the Architect/Engineer and Owner when work on changes is to start and when it should be completed. Engineering and stake-out changes will not be considered unless performed by certified engineers on instructions from the Architect.

7.2.5. Should it be desired at any time or times during the progress of Work to make any alterations or changes, or to add to or delete Work, the Owner must have the undisputed right to make such changes, omissions, additions or alterations by written order. Any Work performed by the Contractor without prior written authorization of the Owner must not be subject to additional payment.

A written request for a change in the Work may be made by the Owner, Architect or Contractor, but only the Owner must authorize and approve the change.

The change will be issued in the form of a written "Change Order," signed by the Owner, Architect/Engineer and Contractor, which authorizes the change in the Work, indicates the mutually agreed upon price which must be added to or deducted from the Contract Price and the extent to which the Contract Time must be increased or decreased.

The Contractor must furnish in quadruplicate, to the Owner and Architect/Engineer, a fully itemized breakdown of the quantities and prices used in computing the value of any change that might be requested. All written requests for a change in the Work must include the full explanation and justification for the change, regardless of its nature.

All proposals and breakdowns must be submitted promptly.

When changes, alterations, deductions or additions are so ordered, the value of such Work will be determined in accordance with the following:

1. When unit prices are stated in the Contract or have been subsequently agreed upon, by application of those unit prices.
2. A lump sum price agreed to by both the Owner and the Contractor.

3. If job conditions or the extent of the change prohibit the use of either of the above 1 or 2, a price arrived at by performing the Work on a cost plus not to exceed basis.
4. If a change involves merely a credit, the Contract Price will be reduced by the amount it would have cost the Contractor if the omitted item of Work had not been eliminated, including overhead and profit; however, the Contractor and the Subcontractor will be allowed to retain a sum not in excess of three (3%) percent of the amount of the change for handling.
5. If a change involves both an extra and a credit, both sums must be shown and the two sums balanced to determine the adjusted total cost or credit. No allowance to the Contractor must be made or allowed for loss of anticipated profits on account of any changes in the Work.
6. For any adjustments to the Contract Sum which are based on other than the unit prices method, the following percentages of costs attributable to the change in the Work must apply as stipulated in paragraph 7 through 12 below:

Value of Work	Combined Overhead and Profit
\$ 1 - \$ 1,000	20%
1,001 - 5,000	18%
5,001 - 10,000	15%
10,001 - 25,000	12%
Over - 25,000	Negotiated but not more than 10%

7. For work performed by a Subcontractor with its own organization, the percentages for combined overhead and profit will be as outlined in item 6, above. On Work partly or solely performed by a Subcontractor, the Contractor will be allowed ten (10%) percent overhead and profit of total Subcontractor's cost for charges under \$25,000. The overhead and profit for charges over \$25,000 will be negotiated but will in no event exceed eight (8%) percent of the total cost of the Subcontractor's labor, materials, overhead and profit associated with the change.
8. On all Work as defined in Article 7, no Subcontractor will be allowed any expenses, overhead or profit for employment of another Subcontractor to perform the Work.
9. Overhead and profit for Contractors and Subcontractors includes cost of bond, insurance, administrative costs, and all charges related to the change including general conditions.

10. The cost of foremen and superintendents may be added only when the change order makes necessary the hiring of additional supervisory personnel.
11. The Contractor will be allowed the actual cost for rental of machine power tools or special equipment, including fuel and lubricants, which are necessary to execute the Work required on the change, but no percentages must be added to this cost. The rental rate is to be agreed upon by the Owner and the Contractor.
12. If the Contractor and the Owner cannot agree as to the extent the Contract Time must be increased for extra work or the extent the Contract Time must be reduced for Work omitted by the Owner, the increase or decrease, as the case may be, must be in the same proportion of the original Contract as the cost of the additional Work, including overhead and profit, or the amount of the omitted work including overhead and profit, would have cost as foresaid bears to the total Contract Price.
13. No order for change at any time or place must in any manner or to any extent relieve the Contractor of any of their obligations under the Contract.
14. Owner's Verification Rights
 - (i) If the Contractor has submitted cost, negotiated pricing data, or time and material costs in connection with the pricing of any modification to this contract, unless the pricing was based on unit prices excluded in the Contract, the Owner will have the right to examine records, documents, and other data of the Contractor related to negotiating, pricing or performing the modification, in order to evaluate the reasonableness, accuracy, completeness, and currency of the cost or pricing data.
 - (ii) The Contractor must make available at its office the materials described in item above, for examination until final payment is made under this Contract.
 - (iii) The provisions of items (i) and (ii) above apply to all Subcontractors under this Contract.

- 7.3. Delete subparagraph 7.3.6. in its entirety and substitute the following:

7.3.6. If the Contractor does not respond promptly or disagrees with the method for adjustment in the Contract Sum, the method and the adjustment for a Construction Change Directive must be determined by the Architect/Engineer on the basis of actual costs and expenses of those performing the Work attributable to the change, including, in the case of an increase in the Contract Sum, an allowance for overhead

and profit based on the provisions of subparagraph 7.2.2. The Contractor must keep and present, in such form as the Architect/Engineer may prescribe, an itemized accounting, together with appropriate supporting data.

7.3.8. Delete subparagraph 7.3.8 in its entirety and substitute the following:

7.3.8. Pending execution of a Change Order pursuant to subparagraph 7.3.9, amounts covered by the Construction Change Directive may not be included in Applications for Payment.

7.3.10 In order to facilitate checking quotations for extra work or credits, all proposals must be accompanied by a complete itemization of costs including labor, materials, and subcontractors. Labor and materials must be itemized in the manner prescribed above. Where major cost items are subcontractors, they must be itemized also. In no case will a change involving over \$500.00 be approved without such itemization.

ARTICLE 8 - TIME

8.2. "Progress and Completion" - Add the following subparagraphs 8.2.4 and 8.2.5:

8.2.4. If necessary to complete the Work within the Contract Time, the Contractor, and any of its Subcontractors, must work overtime without addition to the Contract Sum. The Contractor must be responsible for all incidental costs in connection with such overtime work.

8.2.5. Should the progress of the Work be delayed by any fault, neglect, act or omission of the Contractor, and Subcontractors or any person or firm employed by either of them, the Contractor must, at their 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 must compensate the Owner for, and hold him harmless against, any and all costs, expenses, losses, liability and damages which the Owner may sustain or incur by reason of such delay.

8.3.1. Delete subparagraph 8.3.1 in its entirety and substitute the following:

8.3.1. Should the progress of the Work be delayed by any fault, neglect, act or omission of the Contractor and Subcontractors or any person or firm employed by them, the Contractor must, at their 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 further agrees to compensate the Owner for and hold it harmless against any and all costs, expenses, losses, liability and damages, which the Owner may sustain or incur by reason of such delay. If, in the opinion of the Architect/Engineer and Owner, the progress of the Work is unsatisfactory, the Contractor must perform overtime, weekend and holiday work to meet the Construction Schedule at no additional cost to the Owner. The Contractor must

submit, within 10 calendar days of notice by the Owner, a recovery schedule indicating how the delay will be remedied. All claims for extension of time must be made in writing to the Architect/Engineer and Owner no more than five (5) calendar days after the occurrence of the delay. The written request for an extension of time must be a condition precedent to the Contractor's right to claim an extension of time.

8.3.3. Delete subparagraph 8.3.3 in its entirety and substitute the following:

8.3.3. If the Contractor is delayed at any time in the progress of the Work by any act or omission of the Owner or Architect/Engineer, or by an employee or representative of the Owner or Architect/Engineer, or by any separate Contractor employed by the Owner, or by the Contractor on a separate project of the Owner, or by delay in the Owner furnishing the Work site of any Notice to Proceed or any changes in the Work, or by labor disputes, fire, unusual delay in transportation, unavoidable casualties or any other cause beyond the Contractor's control, then the Contract Time must be extended for such reasonable period as the Architect/Engineer must determine. An extension of the Contract Time must be the Contractor's sole and exclusive remedy. The Contractor will have no cause of action against the Owner, Architect/Engineer or separate contractor for delay, impact or acceleration damages.

8.3.4. Add the following subparagraph 8.3.4:

8.3.4. In order for the Owner to agree to a time extension under this Contract related to severe weather, the following conditions must be satisfied:

8.3.4.1. The weather experienced at the Project Site during the Contract Time must be found to be unusually severe, that is, more severe than the adverse weather anticipated for the Project location during any given month.

8.3.4.2. The unusually severe weather must actually cause a delay to the completion of the Project. The delay must be beyond the control and without the fault or negligence of the Contractor.

8.3.4.3. The following schedule of monthly anticipated adverse weather delays is based on National Oceanic and Atmospheric Administration (NOAA) or similar data for the Project location and will constitute the base line for monthly weather time evaluations. The Contractor's progress schedule must reflect these anticipated adverse weather delays in all-weather dependent activities:

MONTHLY ANTICIPATED ADVERSE WEATHER DELAY
WORK DAYS BASED ON FIVE-DAY WORK WEEK

JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.
7	6	6	7	7	6	4	5	3	5	4	4

8.3.4.4. Actual adverse weather delay days must prevent Work on critical path activities for 50% or more of the Contractor's scheduled workday. The number of actual adverse weather delay days must include days impacted by actual adverse weather, be calculated chronologically from the first to the last day of each month and be recorded as full days. The record of actual adverse weather days must be submitted by the Contractor on a monthly basis. If the number of actual adverse weather delay days exceeds the number of days anticipated in paragraph 8.3.4.3 above, the Owner and Architect will agree to a corresponding extension of time.

8.4. Add the following subparagraph 8.4:

8.4. LIQUIDATED DAMAGES

8.4.1. The time in which the Contractor agrees to complete the Work is of the essence of the Contract, and the Owner will suffer financial loss if the Project is not substantially completed on the date(s) set forth in the Contract Documents. The Owner and the Contractor specifically agree that it would be extremely difficult or impractical to quantify the actual damages to the Owner in the event of delay by the Contractor, and that the liquidated damages stated herein is a reasonable estimate of such actual damages, and not a penalty. The Contractor and their Surety must be liable and must pay to the Owner the sums hereinafter stipulated as fixed, agreed upon liquidated damages for each calendar day, including Saturday and Sunday and Legal Holidays, of delay until the Work is Substantially Completed:

One thousand (\$1,000.00) Dollars for each calendar day beyond the required date for Substantial Completion for each phase of the Project. It is expressly acknowledged and understood that liquidated damages can stack; i.e. liquidated damages can be incurred by the Contractor for failure to complete each phase of the Project by the required date of Substantial Completion.

ARTICLE 9 - PAYMENTS AND COMPLETION

9.3. "Applications for Payment"

9.3.1. Delete subparagraph 9.3.1 in its entirety and substitute the following:

9.3.1. On or about the last day of each month, the Owner will make payments on account of the Contract as follows: Ninety (90%) percent of the value of the Work completed up to the first day of the following month, as approved by the Architect/Engineer and Owner, including the value of material suitably stored at the Project Site (or other approved location in accordance with subparagraph 9.3.2), less the aggregate of any previous payments. At the time the Contractor is preparing each monthly requisition, it will be required that, upon completion of their rough draft covering a payment request, and prior to preparing the final draft, the rough draft be reviewed by the Owner and the Architect/engineer. The Contractor must not include any changes in the Contract Sum until approved and executed by the Owner. Agreement must be reached among these two prior to the requisition being forwarded formally to the Architect for approval and to the Owner for payment. **Each request for payment must be prepared by the Contractor on Maryland Public School Construction Program (IAC/PSCP) Form 306.4.** Each such requisition must bear the signature of the Contractor, the Architect/Engineer and the Owner, and must be notarized by the Contractor. The Contractor must present two originals, plus two (2) copies (total of 4) to the Owner for acceptance.

Delete subparagraph 9.3.2 in its entirety and substitute the following:

9.3.2. When the Application for Payment includes material or equipment stored off the Project Site, accompany the application with a certified statement including:

1. Description of items;
2. Bill of sale;
3. Location of bonded warehouse where materials are tagged for the Project and stored;
4. That items are currently covered by all contractual requirements, including liability and fire insurance; and
5. That items, or any part thereof, will not be installed in any other construction project other than Work under this Contract.

9.8. "Substantial Completion"

9.8.1. Add the following language to the end of subparagraph 9.8.1:

“provided, however, that as a condition precedent to Substantial Completion, the Owner has received all certificates of occupancy and any other permits, approval, licenses and other documents from any governmental authority having jurisdiction thereof, necessary for the beneficial occupancy of the Project.”

9.8.2. Delete subparagraph 9.8.2 in its entirety and substitute the following:

9.8.2. When the Contractor considers that the Work, or a portion thereof which the Owner agrees to accept separately, is substantially complete in accordance with paragraph 9.8.1, the Contractor must prepare and submit to the Architect/Engineer a comprehensive list of items to be completed or corrected. The Contractor must proceed promptly to complete and correct items on the list within the standard allotted time specified within the AIA General Conditions Document. Failure to include an item on such list does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents.

9.8.3. Delete subparagraph 9.8.3 in its entirety and substitute the following:

9.8.3. Upon receipt of the Contractor's list, the Architect will observe the work to determine whether the Work or designated portion thereof is substantially complete. If the Architect's/Engineer's review discloses any items, whether or not included on the Contractor's list of items, which are not in accordance with the requirements of the Contract Documents, the Architect/Engineer will notify the Contractor in writing generally stating the reasons they will not certify Substantial Completion. The Contractor must, within fourteen (14) calendar days of receipt of the letter, complete or correct such items. The Contractor must then submit a request for another review by the Architect/Engineer to determine Substantial Completion.

9.8.4. Delete subparagraph 9.8.4 in its entirety and substitute the following:

9.8.4. Upon the Architect's/Engineer's approval of the Work, the Architect/Engineer will prepare a Certificate of Substantial Completion which must establish the date of Substantial Completion and must establish responsibilities of the Owner and Contractor for security, maintenance, heat, utilities, damage to the Work, and insurance. The Certificate of Substantial Completion must be submitted to the Owner and Contractor for their written acceptance of responsibilities assigned to them in such Certificate. The Architect/engineer will have ten (10) working days from the date of the issuance of the Certificate to provide the Contractor with a list of items which do not conform to the Contract Documents. The Contractor must, within sixty (60) calendar days of receipt of the Architect's/Engineer's list of items, complete all items of listed Work and additions thereto unless otherwise agreed to on the Certificate of Substantial Completion. If the Contractor fails to complete all listed Work within the time allotted, the Owner may terminate the Contract pursuant to paragraph 14.2. If the Contractor fails to complete all listed Work within the time

allotted, and the Owner allows the Contractor to complete the Work beyond the 60-day period, all regular progress payments will be suspended until such Work is complete as certified by the Architect/Engineer. Warranties required by the Contract Documents must commence on the date of Substantial Completion of the Work or designated portion thereof unless otherwise provided in the Certificate of Substantial Completion. If the Owner, due to failure of the Contractor, has the listed Work completed by another contractor, the responsibility of the Contractor for the warranties required under the Contract Documents will continue, and the Contractor will obtain for the Owner all requested assurances from the manufacturers and suppliers.

9.8.6. Add the following subparagraph 9.8.6:

9.8.6. Except as stated in subparagraph 9.8.5, after the payment due the Contractor at Substantial Completion has been made by the Owner, no other payment must be made until the Contract has been fully performed.

9.10. Add the following subparagraphs 9.10.3.1 and 9.10.3.2:

9.10.3.1. Release of liens must be required of the Contractor, each Subcontractor and each material supplier prior to final payment, or any part of the retained percentage becoming due. The Contractor must execute and forward the "Contractor's Affidavit of Release of Liens and Payment of Debts and Claims," AIA Form G-706, "Consent of Surety to Final Payment," along with the lien releases of each Subcontractor and material supplier.

9.10.3.2. The final payment to the Contractor must not become due until all close-out documents, including manufacturer's warranties, if applicable, have been received and certified by the Architect.

ARTICLE 10 - PROTECTION OF PERSONS AND PROPERTY

10.1. Safety Precautions and Programs:

10.1.1. Add the following phrase to the end of the first sentence of subparagraph 10.1.1:

"as specified in Contract Documents and as required by all applicable federal, state, county and local rules and regulations."

10.2. "Safety of Persons and Property"

10.2.3. Add the following language to the end of subparagraph 10.2.3:

The Contractor must also be responsible, at the Contractor's sole cost and expense, for all measures necessary to protect any property adjacent to the Project and improvements thereon. Any damage to such property or improvements must be promptly repaired by the Contractor.

Add the following new subparagraphs 10.2.8 through 10.2.11:

10.2.8. The Contractor must continuously maintain adequate protection of all Work from damage, and must protect the Owner's property from injury to loss arising in connection with this Contract. The Contractor must make good any such damage, injury or loss, except such as may be directly due to errors in the Contract Documents or caused by agents or employees of the Owner. The Contractor must adequately protect adjacent property as provided by law and the Contract Documents.

10.2.9. The Contractor must erect and properly maintain at all times, as required by the conditions and progress of the Work, all necessary safeguards for the protection of workmen and the public and must post danger signs warning against the hazards created by the Work.

10.2.10. The Contractor must erect and maintain barricades as required by applicable laws at all building hazards for protection of persons and property, operate warning lights with barricades as recommended by authorities having jurisdiction, and remove barricades when directed or no longer required.

10.2.11. Students, school and recreation personnel, as well as the general public, may be on the Project Site and in the immediate vicinity of the Work indicated. The Contractor must provide suitable barriers, warning signs and devices and take other protective measures that may be required to protect students, other persons, and vehicles in the vicinity of the Work. It must be the Contractor's responsibility to stop any operations immediately, which could be considered as dangerous to any person in the vicinity of the Contractor's operations at the Project Site. The Contractor must immediately advise the Owner and the Architect/engineer of the situation, which caused the Work to be stopped so that administrative steps can be taken by the Owner to prevent reoccurrence of the situation.

10.3.2. Delete subparagraph 10.3.2 in its entirety and substitute the following:

10.3.2. The Owner must 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. The Work in the

affected areas must be resumed immediately following the occurrence of any one of the following events: (1) The Owner causes remedial Work to be performed which results in the absence of asbestos, polychlorinated biphenyl (PCB) or other hazardous material or substance, or (2) the Owner and the Contractor, by written agreement, decide to resume performance of the Work, or (3) the Work may safely and lawfully proceed, as determined by an appropriate governmental authority or is evidenced by a written report to both the Owner and the Contractor, which is prepared by an environmental engineer reasonably satisfactory to both the Owner and the Contractor.

10.3.3. Delete subparagraph 10.3.3 in its entirety.

10.6. "Emergencies"

10.6.1. Delete subparagraph 10.6.1 in its entirety and substitute the following:

10.6.1. In any emergency which could potentially cause death or serious personal injury, or could cause damage to the Work or the adjoining property, the Contractor, without special instruction or authorization, is permitted to act, at their discretion, to prevent such threatened loss or injury. However, if they are specifically instructed by proper authority, they must so act without appeal. Any compensation claimed by the Contractor on account of emergency work must be only as authorized by the Owner.

Add the following subparagraphs 10.6.2 and 10.6.3:

10.6.2. In case of emergencies, immediately notify the Architect/Engineer and the Owner in writing by the most expeditious means available. The notice must describe the date, time and location of the emergency, the nature of the emergency, and actions taken in response to the emergency.

10.6.3. Additional compensation or extension of time will not be considered or permitted for emergencies arising from delay, damage or loss as stipulated in subparagraphs 8.2.4 and 10.2.5.

ARTICLE 11 - INSURANCE

11.1. "Contractor's Liability Insurance"

Delete subparagraphs 11.1.1, 11.1.2 and 11.1.3 in their entirety substitute the following:

11.1.1. General Insurance Requirements

.1 The Contractor must not commence the Work until they have obtained at their own expense all of the insurance required hereunder, and such insurance has been approved by the Owner; nor must the Contractor allow any Subcontractor to commence Work on their 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 and Subcontractors will be granted only after submission to the Owner of original, signed certificates of insurance or, alternately, at the Owner's request, certified copies of the required insurance policies.

.2 The Contractor must require all Subcontractors to maintain during the term of this Contract, commercial general liability insurance, business automobile liability insurance, and workers' compensation and employees' liability insurance in the same manner as specified for the Contractor. The Contractor must furnish Subcontractors' certificates of insurance to the Owner immediately upon request.

.3 All insurance required hereunder must include the following provisions: "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 Cecil County Board of Education."

The phrases "endeavor to" and "...but failure to mail such notice must 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.

.4 No acceptance and/or approval of any insurance by the Owner must be construed as relieving or excusing the Contractor, or the surety, or their bond, from any liability or obligation imposed upon either or both of them by the provisions of the Contract Documents.

.5 The Owner and its elected 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, must list The Owner as an additional insured. Coverage afforded under this paragraph must be primary as respects the Owner, its agents and employees.

.6 The Contractor covenants to save, defend, hold harmless and indemnify the Owner and all of its elected or appointed officials, agents and employees from and against any and all claims, loss, damage, injury, cost (including court costs and attorneys' fees), charge, liability or exposure, however caused, resulting from or arising out of or in any way connected with the Work, the Contractor's performance or non-

performance of the terms of the Contract Documents or its obligations under the Contract. This indemnification must continue in full force and effect until the Contractor completes all of the Work required under the Contract, except that indemnification must continue for all claims involving products or completed operations after final acceptance of the Work by the Owner for which the Owner gives notice to the Contractor after final acceptance of the Work.

.7 The Contractor will 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 risks 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 operations under the Contract, or in connection in any way whatsoever with the contracted Work, until final acceptance of the Work by the Owner.

.8 Insurance coverage required in these specifications must be in force throughout the Contract Term. Should the Contractor fail to provide acceptable evidence of current insurance within seven (7) days of written notice at any time during the Contract Term, the Owner will have the absolute right to terminate the Contract without any further obligation to the Contractor, and the Contractor will be liable to the Owner for the entire additional cost of procuring performance and the cost of performing the incomplete portion of the Contract at time of termination.

.9 Contractual and other liability insurance provided under this Contract must not contain a supervision, inspection or engineering services exclusion that would preclude the Owner or the Architect/Engineer from supervising or observing the Project as to the end result. The Contractor will 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 Subcontractors.

.10 If the Contractor does not meet the insurance requirements of the specifications, alternative insurance coverage satisfactory to the Owner may be considered. **Written requests for consideration of alternate coverages must be received by the Owner at least five (5) working days prior to the date set for submittal of bids or proposals. If the Owner denies the request for alternative coverages, the specified coverages will be required to be submitted.**

.11 All required insurance coverages must be acquired from insurers authorized 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 edition of Best's Insurance Reports, unless the Owner grants specific approval for an exception.

.12 The Owner will consider any deductible amounts as part of its review of the financial stability of the Contractor. Any deductibles must be disclosed by the Contractor, and any deductible amounts are the responsibility of the Contractor.

For the duration of this Contract, the Contractor must purchase and maintain the below listed insurance as will protect themselves and the Owner from claims set forth below which may arise out of, or result from, the Work and the Contractor's operations under the Contract, whether on-site or off-site, or whether such operations be by themselves 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. Without limiting the obligations or liabilities of the Contract, the Contractor must purchase the following coverages:

11.1.2. Contractor's Liability Insurance - "Occurrence" Basis:

.1 Commercial general liability insurance with a minimum limit of \$1,000,000 per occurrence and \$2,000,000 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;
- viii. Broad Form Property Damage including completed operations.

.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 (minimum statutory limits for uninsured motorists).

.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 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 \$100,000 disease policy limit.

.4 Umbrella Excess Liability of \$5,000,000 over primary insurance for each occurrence and \$5,000,000 over primary insurance aggregate.

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

.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 must 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 purpose of this extended reporting period endorsement by means of a certificate of insurance or a copy of the endorsement itself.

11.4. "Property Insurance"

11.4.1. Delete subparagraph 11.4.1 in its entirety and substitute the following:

11.4.1. The Owner must purchase and maintain property insurance written on a builder's risk "all risk" policy form with a limit equal to the initial Contract Sum and any amendments to the Contract which affect the Contract Sum on a replacement cost basis. Insurance must be maintained until final payment under the Contract has been made or until no person or entity other than the Owner has

an insurable interest in the covered property, whichever is earlier. The builders risk insurance must include the Owner and the Contractor as named insureds.

The Contractor will be responsible for payment for any deductible applicable to the coverages. The Owner's coverage includes a \$10,000 deductible per occurrence, the payment of which will be the Contractor's responsibility.

11.4.1.1. Add the following language to the end of subparagraph 11.4.1.1:

Property insurance purchased by the Owner must not cover any tools, apparatus, machinery, scaffolding, hoists, forms, staging, surring and other similar items commonly referred to as construction equipment, which may be on the site and the capital value of which is not included in the Work. The Contractor must make its own arrangements for any insurance it may require on such construction equipment. Any such policy obtained by the Contractor under this subparagraph 11.4.1 must include a waiver of subrogation in accordance with the requirements of subparagraph 11.4.7.

11.4.1.4. Delete subparagraph 11.4.1.4 in its entirety.

11.4.7. Modify subparagraph 11.4.7 as follows:

In the fifth line of subparagraph 11.4.7, delete the words "covered by" and substitute the words "...of actual recovery of any insurance proceeds under any..."

11.5. "Performance Bond and Labor and Material Payment Bond"

Delete subparagraph 11.5.1 and 11.5.2 in their entirety and substitute the following:

11.5.1. The Contractor must 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. Both bonds must be in the amount of 100% of the Contract Sum and must name the Owner and State of Maryland. The surety company issuing the bonds must be licensed to write bonds in the State of Maryland. The Contractor must be responsible for the payment of the premiums for all required bonds. The Contractor must provide five (5) copies of all required bonds to the Owner prior to starting the Work. The issuance of the required bonds by the Contractor's surety must be a condition precedent to effectuation of Contract between Owner and Contractor. If additional work is authorized, the amounts of the bonds must be increased to cover the value of the increased Contract Sum.

11.6. "Subcontractor Insurance" - Add the following subparagraph 11.6.1:

11.6.1. The Contractor must require each Subcontractor and lower tier contractor to procure and maintain in force during the period of such Contract, the same

insurance required to be maintained in force by the Contractor under paragraph 11.1. The Contractor must obtain from each Subcontractor and lower tier contractor and file with the Owner duly executed certificates of all required insurance an AIA Form G-705 (latest edition).

11.7. "Miscellaneous Requirements" - Add the following subparagraph 11.7.1:

11.7.1. Certificates of Insurance and Surety Bonds acceptable to the Owner must be furnished to the Owner within ten (10) days after Notice of Award is issued to the successful Bidder. Notice to Proceed will not be issued and the Contractor will not be authorized to commence Work under this Contract until they have obtained all of the minimum amounts of insurance and surety bonds required by this Article 11 and such insurance certificates and surety bonds have been approved by the Owner. The Contractor must not allow such Subcontractor or lower tier contractor to commence work on their subcontract or lower tier contract until the insurance required by subparagraph 11.5.1 has been obtained by the Subcontractor for lower tier contractor and approved by the Owner. Use AIA Form G-705 (latest edition).

"General Conditions of the Contract for Construction Where the Construction Manager is NOT a Contractor," AIA Document A201/CMA 2017 edition. Where any article, subparagraph or clause of the General Conditions is modified or deleted by these Supplementary Conditions, the unaltered provisions must remain in effect.

ARTICLE 12 - UNCOVERING AND CORRECTION OF WORK

12.2. "Correction of Work"

Add the following subparagraphs 12.2.1.2 through 12.2.1.6:

12.2.1.2. Defective Work must include 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 manufacture or fabrication; or improper execution of the Work.

12.2.1.3. Costs of correcting such rejected Work also includes all contingent damages arising therefrom, including damages to other work (whether installed by the Contractor or another) and to other property of the Owner.

12.2.1.4. Such warranties as provided herein must not limit the Owner's right to prosecute any claims or causes of action for changes caused by, arising out of or related to the defective Work.

12.2.1.5. Any defective or non-conforming Work causing a hazard to life, property or use of Work must be corrected immediately without regard to normal working hours. The Owner will immediately endeavor to make

telephone notification followed by written notice to the Contractor the next normal working day.

12.2.6.1. The Owner may deal directly with Subcontractors in order to expedite emergency repairs. The Contractor will not be relieved of responsibility by this procedure and must have a continuing obligation to supervise and direct correction of defects as obligated by the Contract Documents.

12.2.2. Add the following sentence to the end of subparagraph 12.2.2.1:

"Except as otherwise specified, all Work must be guaranteed by the Contractor against defects resulting from the use of inferior materials, equipment or workmanship for two years from the date of substantial completion and acceptance of all phases of the Work. If, within any guarantee period, repairs or changes are required in connection with the Work which, in the opinion of the Owner, is rendered necessary as the result of the use of materials, equipment or workmanship which are inferior, defective or not in accordance with the terms of the Contract, the Contractor must promptly correct such Work upon receipt of notice from the Owner or Architect."

12.2.6. Add the following subparagraph 12.2.6:

12.2.6. Review, failure to review, approval or acceptance of any part of the Work, or any payment on account thereof, must not in any way limit the Architect's/Engineer's right to reject materials or equipment later found by the Architect/Engineer to be defective or not in accordance with requirements of the Contract Documents.

ARTICLE 13 - MISCELLANEOUS PROVISIONS

13.3. "Written Notice" - Add the following subparagraph 13.3.2:

13.3.2. All proposals, approvals, instruction, requests, claims, demands and other notices must be made in writing. Written notice must be deemed to have been duly served if entered in minutes of progress meetings.

13.7. Delete subparagraph 13.7 in its entirety.

ARTICLE 14 - TERMINATION OR SUSPENSION OF THE CONTRACT

14.2.1. Add the following language to subparagraph 14.2.1:

.5 Breaches any warranty made by the Contractor under or pursuant to the Contract Documents;

.6 Fails to furnish the Owner with assurances satisfactory to the Owner evidencing the Contractor's ability to complete the Work in compliance with all the requirements of the Contract Documents;

.7 Fails after commencement of the Work to proceed continuously with the construction and completion of the Work for more than ten (10) days, except as permitted in the Contract Documents.

14.4. Delete subparagraph 14.4 in its entirety and substitute the following:

14.4. Owner's Termination for Convenience

14.4.1. The Owner may, at any time, terminate the Contract in whole or in part for the Owner's convenience and without cause. Termination by the Owner under this paragraph must be by a notice of termination delivered to the Contractor specifying the extent of termination and the effective date.

14.4.2. Upon receipt of a notice of termination for convenience, the Contractor must immediately, in accordance with instructions from the Owner, proceed with performance of the following duties regardless of delay in determining or adjusting amounts due under this paragraph:

.1 Cease operation as specified in the notice;

.2 Place no further orders and enter into no further subcontracts for materials, labor, services or facilities except as necessary to complete continued portions of the Contract;

.3 Terminate all subcontracts and orders to the extent they relate to the Work terminated;

.4 Proceed to complete the performance of Work not terminated; and

.5 Take actions that may be necessary or that the Owner may direct, for the protection and preservation of the terminated Work.

14.4.3. Upon such termination for convenience, the Contractor must recover as its sole remedy payment for Work properly performed in connection with the terminated portion of the Work prior to the effective date of termination and for items properly and timely fabricated off the Project Site, delivered and stored in accordance with the Owner's instructions. The Contractor hereby waives and forfeits all other claims for payment and damages, including, without limitation, anticipated profits.

14.4.4. The Owner will be credited for (1) payments previously made to the Contractor for the terminated portion of the Work, (2) claims which the Owner has against the Contractor under the Contract, and (3) the value of the materials,

supplies, equipment or other items that are to be disposed of by the Contractor that are part of the Contract Sum.

Add the following Article 15 to the General Conditions of the Contract:

ARTICLE 15 - APPLICABLE LOCAL, STATE AND FEDERAL REGULATIONS

15.1. The Contractor is responsible for compliance with all local, state and federal regulations applicable to the Work to be completed under this Contract.

Add the following Article 16 to the General Conditions of the Contract:

ARTICLE 16 - EQUAL OPPORTUNITY

16.1. Policies of Employment

16.1.1. The Contractor and all Subcontractors must not discriminate against any employee or applicant for employment because of race, religion, color, sex, national origin, age or disability. The Contractor must take affirmative action to insure that applicants are employed, and that employees are treated during employment, without regard to their race, religion, color, sex, national origin, age or disability. Such action must include, but not be limited to employment, promotions, demotion, transfer, recruitment or recruitment advertising, layoff or termination, rate of pay or other forms of compensation, and selection of training including apprenticeship. The Contractor must post in conspicuous places, available to employee and applicants for employment, notices setting forth the policies of nondiscrimination.

16.1.2. The Contractor and all Subcontractors must, 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, age or disability.

Add the following Article 17 to the General Conditions of the Contract:

ARTICLE 17 - QUALITY ASSURANCE

17.1. Quality Assurance

During the performance of the Work, the Contractor must be responsible for maintaining safety among persons in their employ in accordance with the standards set by the Occupational Safety and Health Act of 1970, including any and all related amendments thereto, and any and all other regulations and industry standards

related to such work. The Owner must be held harmless for any accident, injury or any other incident resulting from non-compliance with these standards.

Add the following Article 18 to the General Conditions of the Contract:

ARTICLE 18 - BUILDING PROTECTION

18.1. Building Protection

All structures covered by this Contract must be kept in a watertight condition throughout the execution of all Work on this Contract. At no time or for any reason will any roof surface encompassed in the Work be left open to the damages caused by water infiltration or other elements. Any damages to any building, its interior or interior contents during execution of the Work specified in this Contract must be corrected by the Contractor to the satisfaction of the Owner at no cost to the Owner.

Add the following Articles 19 and 20 to the General Conditions of the Contract:

ARTICLE 19 - GOVERNMENTAL STIPULATIONS

BUY AMERICAN STEEL

- 19.1 Consistent with the provisions of the Maryland State finance and procurement article of the Annotated Code of Maryland, SF, Sections 17- 301 through 17-306, inclusive, of the Finance and Procurement Article known as the “Buy American Steel Act.”
- 19.2 Wherever in these INSTRUCTIONS TO BIDDERS “steel products”, as hereafter defined, are part of the supplies, services or constructions required by Owner, for the construction, reconstruction, alternation, repair, improvement or maintenance of public works, the parties bidding must predicate their base offer solely upon “steel products” manufactured in the United States of American or one of its territories continental or insular, subject to the jurisdiction of the United States, unless such “steel products” are not produced in the United States in sufficient quantities to meet the requirements of the Contract, in which case the Base Bid is to contain a certification to this effect.
- 19.3 It should be understood that each bid submitted must include, attached to the BID FORM, the proposed cost of the supplies, services or construction where foreign “Steel Products” are proposed to be used on this project in comparison to domestic “Steel Products”. Failure to provide this information may result in the bid being considered non-responsive
- 19.4 The Owner, in addition to all other reservations set forth in the Bidding Requirements must at the time of issuance of the Award and Contract pursuant thereto, determine whether the supplies, services or construction required is to utilize steel products of domestic or foreign origin.

- 19.5 Note further that in the event the Award and Contract pursuant thereto is predicated upon the utilization of domestic “steel products,” then, in addition to all other requirements mandated for performance hereafter in these INSTRUCTION TO BIDDERS, and all documents issued in conjunction therewith, the person, corporation, partnership, or other business unit or association to whom the Award and Contract pursuant thereto is issued, must as a further condition precedent to the obtaining of Final Payment from Owner, furnish same with a certificate under oath that all “steel products” supplied, delivered or constructed were of domestic origin.
- 19.6 The “Buy American Steel” Act of Maryland defines “steel products” as any product “rolled, formed, shaped, drawn, extruded, forged, cast, fabricated, or otherwise similarly processed, or processed by a combination of two or more of such operation, from steel made in the United States by the open hearth, basic oxygen, electric furnace, Bessemer, or other steel making process.”

20.1 Asbestos-Free Certification

The Contractor must submit a letter certifying that no asbestos-containing materials were used in the construction of the work of this Project.

**END OF SECTION
ARTICLE 15 – SUPPLEMENTARY GENERAL CONDITIONS TO A201
(2017 EDITION)**

DIVISION 1 – GENERAL REQUIREMENTS

SECTION 01 10 00 – SUMMARY OF WORK

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 PROJECT DESCRIPTION

- A. This section outlines the scope of work for **Rising Sun High School Waterline Replacement Project at 100 Tiger Dr., North East, MD 21901.**

The project will consist of the construction of the following:

The Rising Sun High School waterline replacement project is a removal of corroded galvanized steel domestic water piping with replacement of copper piping. The project includes the demolition of the existing galvanized piping from the water vault into the mechanical room and adjacent classroom to be replaced with copper piping. A portion of the new piping will be routed below grade from the water vault and back into the building.

- B. Provide without additional compensation, any apparatus, material and labor not specifically mentioned in specifications or indicated on Drawings that is necessary to complete or perfect any portion of work in a substantial manner and in compliance with requirements implied or intended in these Contract Documents. This includes materials, devices or methods peculiar to the apparatus or system provided.
- C. The Contractor shall and will, in good workmanlike manner, do and perform all work and furnish all supplies and materials, machinery, equipment, facilities, and means, except as herein otherwise expressly specified, necessary or proper to perform and complete all the work required by this contract, within the time herein specified, in accordance with the provisions of this contract and said specifications and in accordance with the plans and drawings covered by this contract and any and all supplemental plans and drawings, and in accordance with the directions of the Board of Education, as given from time to time during the progress of the work. He shall furnish, erect, maintain, and remove such construction plant and such temporary works as may be required. He alone shall be responsible for the safety, efficiency, and adequacy of his plant, appliances, and methods, and for any damage which may result from their failure due to their improper

construction, maintenance, or operation. The Contractor shall observe, comply with, and be subject to all terms, conditions, requirements, and limitations of the contract and specifications and shall do, carry on, and complete the entire work to the complete satisfaction of the Board of Education.

It is understood that, except as otherwise specifically stated in the contract documents, the Contractor shall provide and pay for all materials, labor, tools, equipment, transportation, superintendence, temporary construction of every nature, and all other services and facilities of every nature whatsoever necessary to execute, complete, and deliver the work within the specified time. The Owner shall provide water and power with the usage cost to be paid by the Owner.

- D. The Contractor shall maintain all areas under construction clean and free of debris at the end of each and every work day.
- E. Cecil County Public Schools has first right of refusal for salvaged equipment and components shown to be removed as part of this work. Contractor to coordinate with CCPS for specifics. CCPS will not require additional work of Contractor in order to facilitate any such salvage efforts.

1.3 PHASING PLAN

- A. The Contractor shall develop and prepare a phasing plan, for acceptance and approval by the Owner, Cecil County Public Schools (CCPS). The Contractor shall utilize the indicated requirements in developing the plan. The Contractor's Phasing Plan shall include provisions for ensuring that all areas are safe and habitable prior to the return of teachers from summer break. All work shall take place during summer break while the school is not fully occupied, however, the school remains open to the public and people will be working in the building throughout the summer. The Contractor must provide a written narrative, fully explaining his methodology, along with the graphic Phasing Plan. Coordination meetings shall be required to ensure the Contractor's plan shall be submitted and approved prior to processing of the first payment application. Contractor's approved phasing schedule shall be the basis of the contract schedule, and shall include intermediate and final milestone dates as outlined in Section 00 31 00.
- B. The Contractor shall be responsible for all costs to ensure that the existing building systems (HVAC, utilities, fire alarm, life safety, security, hot and cold water service and treatment, etc.) remain in service while the new systems are installed. All additional equipment and materials (panels, fuses, breakers, conduit, piping, wiring, connectors, fixtures, valves, labor, etc.)

required to maintain the existing services are the responsibility of the Contractor. The Owner shall not pay for any materials for equipment to maintain the existing services.

- C. Phased work shall not commence until the Owner is assured in writing that the materials are available to complete the current phase.
- D. Contractor shall not install any materials that adversely affect occupied areas such as paint fumes, glue fumes, roofing applications, etc. At no additional cost, all such materials shall be installed when the school is unoccupied for extended periods of time as determined and approved by the Owner.
- E. Contractor operations shall not adversely affect the ongoing instructional process to be determined by the Owner and school officials. Contractor may be required to relocate workers, tools, and equipment to areas on the site that reduces the disruption to the instructional program. In some cases, and at no additional cost, the Contractor shall be required to stop the current operation which is disrupting to the school.
- F. Contractor shall maintain access to the building for use by the School. Contractor shall construct safe and secure temporary barricade enclosures through construction areas (if any). Contractors shall maintain adequate and clearly marked fire exits, to be determined by Fire Marshall. If requested, the Contractor shall submit drawings indicating egress path from the building. Contractor shall install all required barricades and signs.

1.4 WORK NOT INCLUDED

- A. Any clarification to work not included in the Contract shall be submitted by the Contractor in writing prior to bids.

1.5 WORK HOURS

- A. The Contractor will be allowed to work at the project site as follows:
 - 1. School Year: Between the hours of 3:00 p.m. and 11:00 p.m., local time, Monday through Friday. Exterior building work and work in the Mechanical Equipment Room shall be between the hours of 7:00 AM and 5:00 PM.
 - 3. Summer work hours are 7 AM – 4 PM, Monday – Friday; except legal holidays.
 - 4. Any work necessary to be performed after regular working hours, on Sundays, or legal holidays, shall be performed without additional

expense to the Board of Education. Work outside the specified hours may be allowed with 72 hours minimum written notice to the Owner. The Owner reserves the right to disapprove or suspend a request to work outside of normal working hours. The Owner also reserves the right to determine when building coverage by Cecil County Public Schools personnel is required to accommodate such off hours work. Should the Contractor perform work requiring the attendance of Cecil County Public School inspectors, maintenance personnel, or custodians at times other than their typical work hours, the Contractor **may** be required to bear such additional costs as necessary to pay the wages of the Cecil County Public Schools personnel. Examples of when the Contractor may be required to bear such costs include, but are not limited to, (a) CCPS personnel reporting to the school at the Contractor's request, and the Contractor not showing up; (b) when work is scheduled off hours merely for the convenience of the Contractor.

1.6 PERMITS AND FEES

- A. Each Contractor shall file, obtain and pay for all permits required by law or the Contract Documents for execution of this work unless otherwise noted. Submit to the Owner and the Architect copies of permits required within seven days of receipt, including, but not limited to, the following:
 - 1. Building.
 - 2. Mechanical.
 - 3. Plumbing.
 - 4. Sprinkler.
 - 5. Electrical.
 - 6. Fire Alarm.
 - 7. Low Voltage Wiring.
- B. The Contractor shall give all notices and comply with all laws, ordinances, rules, regulations, and lawful orders of any public authority bearing on the performance of the work. The Contractor shall pay legally required sales, consumer, and use taxes. Immediately upon Contract award, Contract Documents required for Permit Review shall be submitted to the proper authorities for the entire project. As soon after award as possible, the Contractor shall apply for and obtain permits for construction.

1.7 PROJECT SCHEDULING:

- A. The project shall be completed, including commissioning and training, and the school is to be fully functional by **August 16, 2024**.

- B. This project is primarily a summer project. The work is to be completed in an orderly, sequential manner to allow for turnover to the school in sections for cleaning and preparation for school opening. All sections of the work are to be completed no later than August 16, 2024.
- C. After the school year begins, work will be done in one area at a time, after school hours. The Contractor will be expected to work with the school and project team to develop a mutually agreeable schedule and plan for work activities while school is in session.
- D. Shop Drawing Submissions and ordering of equipment shall begin after the Contract has been executed so as to have all materials available when work is to be performed.
- E. The Contractor shall be required to develop a detailed project schedule, appropriately sequencing all required work, including Shop Drawing submittals, equipment fabrication periods, etc.
- F. Refer to the Drawings for other requirements.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

**END OF SECTION
SUMMARY OF WORK**

SECTION 01 23 00 - ALTERNATES

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including Instructions to Bidders, Supplemental Instructions to Bidders, General Conditions, Supplementary Conditions and Division 1 Specification Sections apply to this section.

1.02 SUMMARY

- A. This Section includes administrative and procedural requirements for the following Alternates:
- B. Related Sections: The following sections contain requirements that relate to this section:
 - 1. Section 00 41 00: “Bid Form” – the method for stating the proposed Contract Sum is described on the “Form of Proposal”
 - 2. Section 01 33 00: “Submittals”
 - 3. Pertinent Sections of the specifications describe the materials and methods required for the various alternates.

- C. **DEFINITIONS**

The term “Alternate” is an amount proposed by Bidders and stated on the Form of Proposal for certain construction activities in the Building Requirements that may be added to or deducted from the Base Bid Amount if the Owner decides to accept a corresponding change in either the amount of construction to be completed, or in the products, materials, equipment, system, or installation methods described in the Contract Documents.

1.03 FORM OF PROPOSAL REQUIREMENTS

- A. A value shall be entered for each Alternate on the Form of Proposal. If an Alternate presents no change in cost, Contractor shall enter “ZERO” in the space provided. Terms such as “N/A”, “Not Applicable”, and “No Change” shall not be used.

- B. Do not submit Alternates other than those described in the Section. Provisions for substitutions noted in the Bidding Requirements and Conditions of the Contract are not to be considered alternates.

1.04 COORDINATION

- A. All requirements of Drawings and specifications shall govern as for Base Bid except where specifically modified by Alternates. Prices quoted shall include all deletions, additions and adjustments to work of all trades which will be affected by Alternates. Alternates include all labor, materials, equipment, services and guarantees as specified and/or required to provide complete installation.
- B. Coordinate related Work and modify or adjust adjacent Work as necessary, to the approval of the Architect, and at no additional cost to the Owner, to ensure that Work affected by each accepted Alternate is complete and fully integrated into the project.

PART 2 – PRODUCTS (Not applicable)

PART 3 – EXECUTION

- A. If accepted all alternates would be completed concurrent with other contract work.
- B. The owner reserves the right not to accept any alternates.

**END OF SECTION
ALTERNATES**

SECTION 01 24 00 – UNIT PRICES

PART 1-GENERAL

1.01 RELATED DOCUMENTS

Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division-) Specification Sections, apply to this Section.

1.02 SUMMARY

- A. This Section specifies administrative and procedural requirements for unit prices.
- B. A unit price is the amount stated on the Bid Form as a price per unit of measurement for materials and services that will be added to or deducted from the Contract Sum by Change Order in the event the estimated quantities of Work required by the Contract Documents are increased or decreased.
- C. Unit prices include all necessary material, overhead, profit, and applicable taxes. (This includes mark-ups by the General Contractor, Sub-Contractor, suppliers, etc.)
- D. Schedule: A “Unit Price Schedule” is included at the end of this Section.
- E. The Owner reserves the right to reject the Contractor’s measurement of work-in-place that involves use of established unit prices, and to have this Work measured by an independent surveyor acceptable to the Contractor at the Owner’s expense.

PART 2-PRODDUCTS (NOT APPLICABLE)

PART 3- EXECUTION

3.01 UNIT PRICE SCHEDULE

**END OF SECTION
UNIT PRICES**

SECTION 01 25 13 – PRODUCT SUBSTITUTION PROCEDURES

DIVISION 1 – GENERAL REQUIREMENTS

SECTION 01631 - PRODUCT SUBSTITUTIONS

PART 1 - GENERAL

1.1 SUBSTITUTIONS

- A. 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:
 - 1. No substitutions will be made prior to receipt of Bids. The Contract Award will be made solely on the basis of the Base Bid and Alternate Bids.
 - 2. After the Contract Award, only where less than three (3) products are listed will substitutions be considered and reviewed by the Architect/Engineer, who will make acceptance or rejection recommendations to the Owner. The burden of proof of equivalency rests with the Contractor and evidence shall be submitted to the Architect/Engineer and approved by the Architect/Engineer with the final approval by the Owner. If the Specification has listed three (3) or more product lines, substitutions will not be considered after the Bid opening. The Owner reserves the right to request a substitute at any time in the project.

1.2 RELATED DOCUMENTS

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

1.3 SUMMARY

- A. This Section specifies administrative and procedural requirements for handling requests for substitutions made after Award of Contract.
- B. The Contractor's Construction Schedule and the Schedule of Submittals are included under Section "Submittals".
- C. Standards: Refer to Section "Definitions and Standards" for applicability of industry standards to products specified.

- D. Procedural requirements governing the Contractor's selection of products and product options are included under Section "Materials and Equipment."

1.4 DEFINITIONS

- A. Definitions used in this Article are not intended to change or modify the meaning of other terms used in the Contract Documents.
- B. Substitutions: Requests for substitutions in products, materials, equipment, and methods of construction required by Contract Documents proposed by the Contractor after Award of Contract are considered requests for substitutions. The following are not considered substitutions:
 - C. Revisions to Contract Documents requested by the Owner or Engineer.
 - D. Specified options of products and construction methods included in Contract Documents.
 - E. The Contractor's determination of and compliance with governing regulations and orders issued by governing authorities.

1.5 SUBMITTALS

- A. Substitution Request Submittal: Complete requests for substitution will be considered after Award of Contract.
- B. Submit 3 copies of each request for substitution for consideration. Submit requests in the form and in accordance with procedures required for Change Order proposals.
- C. Identify the product, or the fabrication or installation method to be replaced in each request. Include related Specification Section and Drawing numbers. Provide complete documentation showing compliance with the requirements for substitutions, and the following information, as appropriate:
 - 1. Product Data, including Drawings and descriptions of products, fabrication and installation procedures.
 - 2. Samples, where applicable or requested.
 - 3. A detailed comparison of significant qualities of the proposed substitution with those of the Work specified. Significant qualities may include elements such as size, weight, durability, performance and visual effect.

4. Coordination information, including a list of changes or modifications needed to other parts of the Work and to construction performed by the Owner and separate Contractors, that will become necessary to accommodate the proposed substitution.
 5. A statement indicating the substitution's effect on the Contractor's Construction Schedule compared to the schedule without approval of the substitution. Indicate the effect of the proposed substitution on overall Contract Time.
 6. Cost information, including a proposal of the net change, if any in the Contract Sum.
 7. Certification by the Contractor that the substitution proposed is equal-to or better in every significant respect to that required by the Contract Documents, and that it will perform adequately in the application indicated. Include the Contractor's waiver of rights to additional payment or time, that may subsequently become necessary because of the failure of the substitution to perform adequately.
- D. Architect's Action: If a decision on use of a proposed substitute cannot be made or obtained within the time allocated, use the product specified by name.

PART 2 - PRODUCTS

2.1 SUBSTITUTIONS

- A. Conditions: The Owner will not consider substitutions of products specified in the proposed Contract during the Bidding Period. The Contractor's substitution request will be received and considered by the Engineer when all of the mandatory conditions are satisfied and one or more of the following optional conditions are satisfied, as determined by the Engineer; otherwise requests will be returned without action except to record noncompliance with these requirements.
- B. Mandatory Conditions:
1. Extensive revisions to Contract Documents are not required.
 2. Proposed changes are in keeping with the general intent of Contract Documents.
 3. The request is timely, fully documented and properly submitted.

C. Optional Conditions:

1. The request is directly related to an "or equal" clause or similar language in the Contract Documents.
2. The specified product or method of construction cannot be provided within the Contract Time. The request will not be considered if the product or method cannot be provided as a result of failure to pursue the Work promptly or coordinate activities properly.
3. The specified product or method of construction cannot receive necessary approval by a governing authority, and the requested substitution can be approved.
4. A substantial advantage is offered the Owner, in terms of cost, time, energy conservation or other considerations of merit, after deducting offsetting responsibilities the Owner may be required to bear. Additional responsibilities for the Owner may include additional compensation to the Engineer for redesign and evaluation services, increased cost of other construction by the Owner or separate Contractors, and similar considerations.
5. The specified product or method of construction cannot be provided in a manner that is compatible with other materials, and where the Contractor certifies that the substitution will overcome the incompatibility.
6. The specified product or method of construction cannot be coordinated with other materials, and where the Contractor certifies that the proposed substitution can be coordinated.
7. The specified product or method of construction cannot provide a warranty required by the Contract Documents and where the Contractor certifies that the proposed substitution provide the required warranty.

- D. The Contractor's submittal and Engineer's acceptance of Shop Drawings, Product Data or Samples that relate to construction activities not complying with the Contract Documents does not constitute an acceptable or valid request for substitution, nor does it constitute approval.

2.2 FAILURE OF TIMELY ORDER

- A. The Contractor is responsible for assuring the timely order of all materials specified. If a specified material, or color of material cannot be delivered

by the contract completion date, due to failure to order the material in a timely manner, the contractor shall be responsible for supplying an equal or better material. The Architect shall be the sole determinant of the approved substitute material. The contractor shall also be charged an amount equal to 5% of the value of the specified material. This amount shall be credited to the owner through a change order to the contract. The word "material", as used in this section, includes all items specified in the specifications or shown on the drawings.

PART 3 - EXECUTION (Not Applicable).

FORM FOR SUBSTITUTION OF MATERIALS

BIDDER: _____

DATE: _____

TO: _____

FOR: _____

I (we) propose for the Engineer's consideration the following substitutions for the specified products set forth in the Bidding Documents. In the event any of the substitutions are accepted, I (we) hereby agree to adjust the Base Bid amount accordingly prior to execution of the Agreement.

Brand or Make Specified	Proposed Substitution	Amount of Change to the Base Bid

(Continue on separate page if necessary)

**END OF SECTION
PRODUCT SUBSTITUTION PROCEDURES**

SECTION 01 26 00 – CONTRACT MODIFICATION PROCEDURES

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division 1 Specification sections, apply to this section.

1.02 SUMMARY

- A. This section specifies administrative and procedural requirements for handling and processing Contract modifications.
- B. Related Sections: The following sections contain requirements that relate to this section:
 - 1. Division 1 Section "Submittals" for requirements for the Contractor's Construction Schedule.
 - 2. Division 1 Section "Application for Payment" for administrative procedures governing applications for payment.
 - 2. Division 1 Section "Product Substitutions" for administrative procedures for handling requests for substitutions made after award of the Contract.

1.03 MINOR CHANGES IN THE WORK

- A. Instructions authorizing minor changes in the Work, not involving an adjustment to the Contract Sum or Contract Time, will be issued by the Architect as part of a request for information on a Request for Information Form as included in the Division-1 Section "Submittals".

1.04 CHANGE ORDER PROPOSAL REQUESTS

- A. Owner-Initiated Proposal Requests: Proposed changes in the Work that will require adjustment to the Contract Sum or Contract Time will be issued by the Architect, with a detailed description of the proposed change and supplemental or revised Drawings and Specifications, if necessary.
 - 1. Proposal requests issued by the Architect are for information only. Do not consider them an instruction either to stop work in progress, or to execute the proposed change.

2. Unless otherwise indicated in the proposal request, within 20 days of receipt of the proposal request, submit to the Architect for the Owner's review an estimate of cost necessary to execute the proposed change.
 3. Include a list of quantities of products to be purchased and unit costs, along with the total amount of purchases to be made. Where requested, furnish survey data to substantiate quantities.
 4. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
 5. Include a statement indicating the effect the proposed change in the Work will have on the Contract Time.
- B. Contractor-Initiated Change Order Proposal Requests: When latent or other unforeseen conditions require modifications to the Contract, the Contractor may propose changes by submitting a request for a change to the Architect.
1. Include a statement outlining the 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 Contract Time. Include a list of quantities of products to be purchased and unit costs along with the total amount of purchases to be made. Where requested, furnish survey data to substantiate quantities.
 2. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
 3. Comply with requirements in Section "Product Substitutions" if the proposed change in the Work requires the substitution of one product or system for a product or system specified.
- C. Proposal Request Form: Use AIA Document G 709 for Change Order Proposal Requests.

1.05 CONSTRUCTION CHANGE DIRECTIVE

- A. Construction Change Directive: When the Owner and Contractor are not in total agreement on the terms of a Change Order Proposal Request, the Architect may issue a Construction Change Directive on AIA Form G714, instructing the Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order.

- B. The Construction Change Directive will contain a complete description of the change in the Work and designate the method to be followed to determine change in the Contract Sum or Contract Time.
- C. Documentation: Maintain detailed records on a time and material basis of work required by the Construction Change Directive.
- D. After completion of the change, submit an itemized account and supporting data necessary to substantiate cost and time adjustments to the Contract.

1.06 CHANGE ORDER PROCEDURES

- A. Upon the Owner's approval of a Change Order Proposal Request, the Architect will issue a Change Order for signatures of the Owner and Contractor on AIA Form G701, as provided in the Conditions of the Contract.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION
CONTRACT MODIFICATION PROCEDURES

SECTION 01 26 57 – CHANGE ORDER REQUESTS

PART 1 - GENERAL

1.01 SUMMARY

- A. Each Change Order Request will be assigned a change order request number. The change order request form (attached) will include a brief description of the change and copies of the written quotation from the trade contractor. Specific changes initiated by the Owner, Architect, or Contractor will be processed as follows:
1. The Owner will authorize the Architect to prepare sufficient documents to establish an accurate price. These documents to be forwarded to the Contractor and Owner “for pricing only, not authorized for construction.” The Contractor will develop the estimate (within 2 weeks) showing a breakdown by trades with all trade contractor quotes. The Owner will approve or reject the change request within two (2) weeks. If the Owner elects to proceed with the change, the Architect will prepare formal change order and reference in all formal change orders the original change order request number.
 2. Field Change: The Owner and Architect shall be immediately notified of a change due to field conditions or site conditions. If the Owner and Architect agree that certain field changes should be handled on a time and material basis, the Contractor will closely monitor the his labor and material affecting this change. At the completion of the work a formal change order will be issued.
 3. Contractor Change: If a contractor initiates a change order for work not included in the contract, the Architect will research the validity of the request, verify quantities and pricing and submit to the Owner for approval on a change order request.
 4. It is to be clearly stated that no extra work shall commence without an approval change order from the Owner or Owner’s representative.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION CHANGE ORDER REQUESTS

Change Order Request Form

Project Name:

Prime Contractor:

Subcontractor:

Sub-Subcontract:

Change Order Scope

SAMPLE

A Labor, Materials & Equipment

A1 Direct Payroll - less fringes, insurances, taxes (Burden)

A2 Material Cost

A3 Equipment Rental

A4 Direct Equipment Costs

Total A - Labor, Material & Equipment

-

B Overhead & Profit

Allowable O&P = Total "A" multiplied by O&P % listed

* below

B1 20% \$0.00 - \$1,000.00

B2 18% \$1001.00 - \$5,000.00

B3 15% \$5,001.00 - \$10,000.00

B4 12% \$10,001.00 - \$25,000.00

B5 over \$25,000 negotiable not to exceed 10%

Total B - Overhead & Profit

C Sales Tax

D Sub-contractor Cost

E1 Sub-contractor cost (Provide detailed breakdown)

Sub-contractor Overhead & Profit (as listed)

-

E2.1 15% \$0.00 - \$1,000.00

E2.2 10% \$1001.00 - \$5,000.00

E2.3 7% \$5,001.00 - \$10,000.00

E2.4 5% \$10,001.00 - \$25,000.00

E2.5 over \$25,000 negotiable not to exceed 5%

F Total Cost - F + G

SECTION 01 29 00 – PAYMENT PROCEDURES

PART 1 GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

- A. This Section specifies administrative and procedural requirements governing the Contractor's Applications for Payment.

1.03 CONTRACT SUM

- A. The Contract Sum is as stated in the Contract, including adjustments thereto, and is the total amount payable to the Contractor for the performance of the Work under the Contract Documents.

1.04 SCHEDULE OF VALUES

- A. Coordinate preparation of the Schedule of Values with the Architect.
 - 1. Correlate line items in the Schedule of Values with other required administrative schedules and forms, including:
 - a. Contractor's construction schedule
 - b. List of subcontractors with special designation and totals
 - c. List of MBE/WBE subcontractors and their percentage of subcontract
 - d. Alternates
 - e. Allowances
 - f. Unit prices
 - g. List of products
 - h. List of principal suppliers and fabricators
 - i. Schedule of submittals
 - 2. Submit the Schedule of Values through the Architect to the Cecil County Public school within seven (7) days of Contract Award or written Notice to Proceed, but in no case later than fifteen (15) days before the date scheduled for submittal of the initial Application for Payment. The Architect and Owner will review the Schedule of Values and approve or reject as appropriate.

- B. Format and Content: Submit in a format as prescribed by and to the level of detail specified by the Construction Manager. Use *The Standard Monthly Contractor's Requisition for Payment*, IAC/PSCP Form 306.4. The sum of the parts of the Schedule of Values shall aggregate to the total Contract Sum.
1. Identification: Include the following Project identification on the Schedule of Values:
 - a. Project name and location
 - b. Name of Architect / Engineer
 - c. Project number
 - d. Contractor's name and address
 - e. Date of submittal
 2. Format: Arrange the Schedule of Values in a tabular form with separate columns to indicate the following for each item listed:
 - a. Generic name
 - b. Related specification section
 - c. Name of subcontractor (special designation for MBE firms)
 - d. Name of manufacturer or fabricator
 - e. Name of supplier
 - f. Change Orders (numbers) that have affected value
 - g. Dollar value
 - h. Percentage of Contract Sum to nearest one-hundredth percent, adjusted to total 100 percent
 3. Provide a breakdown of the Contract Sum in sufficient detail to facilitate continued evaluation of Applications for Payment and progress reports. The minimum level of breakdown will normally be: Bond cost (if applicable); General Conditions Line Items; Division 1 Cost Breakdown as required; major portions of the Work shall be broken down into labor and material line items for specific areas of the facility; stored material projections; change orders to the Contract (if any). Break principal subcontract amounts down into a similar level of detail.
 4. Round amounts off to the nearest whole dollar; the total shall equal the Contract Sum.
 5. Unit Cost Allowances: Show line item value of unit cost allowances as a product of unit cost times measured quantity as estimated from the best indication in the Contract Documents.
 6. Margins of Cost: Show line items for indirect costs, and margins on actual costs, only to the extent that such items will be listed

individually in Applications for Payment. Each item in the Schedule of Values and Applications for Payment shall be complete including its total cost and proportionate share of general overhead and profit margin.

7. Temporary facilities and other major cost items that are not direct cost of actual work-in-place shall be shown as separate line items in the Schedule of Values.
8. Schedule Updating: The Owner or Architect shall have the right to require the Contractor to alter the value or add/delete categories listed on the Schedule of Values at any time for the following reasons: the Schedule of Values appears to be incorrect or unbalanced; a revision of the segregation of values is required due to the Contractor revising the sequence of construction or assembly of building components which in turn invalidates the Schedule of Values; and/or Change Orders or Construction Change Directives that result in a change in the Contract Sum.
9. Stored Materials: The Contractor is required to correlate the documentation for payment of stored materials requested in the Application for Payment against the agreed upon breakdown of the Schedule of Values. The Construction Manager reserves the right to not process the Application for Payment if the correlation has not been submitted in conjunction with the Application. Invoices are required for all stored materials, both on-site and off-site. No mark-up is allowed on invoice amounts.

1.05 APPLICATIONS FOR PAYMENT

- A. Each Application for Payment shall be consistent with previous applications and payments as approved and certified by the Architect, and paid for by the Owner.
 1. The initial Application for Payment, the Application for Payment at time of Substantial Completion, and the final Application for Payment involve additional requirements.
- B. Payment Application Times: Each progress payment date and the period of work covered for each Application for Payment is as indicated in the General Conditions. Example of Payment Application Times:
 1. The Owner will make partial payments to the Contractor on the basis of a duly certified and approved estimate of the Work completed through the last day of each calendar month, as approved by the

Architect, provided the estimate was submitted in accordance with the following requirements:

- a. The Applications for Payment shall be itemized as directed by the Architect. Applications for Payment are to serve as certification of status of the Work.
 - b. Prior to the 25th day of each month, the Contractor will prepare and review with the Architect a preliminary, itemized application for payment, supported by such data substantiating the Contractor's right to payment as the Owner and Architect may require. This includes, but is not limited to all sworn statements, waivers and releases of liens and claims, including those required of subcontractors or subcontractors of any tier as may be requested by the Owner or Architect, reflecting all retainages, previous applications for payment, payment for labor and material, payment for materials stored and other documentation and requirements related to work performed as provided elsewhere in the Contract Documents or required by the Owner or Architect.
 - c. Subject to the acceptance of the preliminary application for payment noted above, on or before the last day of each month the Contractor shall submit to the Architect an itemized notarized applications for Payment for Work completed during the current month (from the end date of the prior application until the last day of the current month).
- C. Payment Application Forms: Use IAC/PSCP Form 306.4.
- D. Application Preparation: Complete every entry on the form, including notarization and final execution by the Owner. Incomplete applications will be returned by the Architect without action.
- E. Application for Stored Materials:
1. The Contractor must notify the Architect in writing at least fifteen (15) days prior to the submission of the payment request that specific items will be stored off the site. Payments made for materials or equipment stored on or off the site shall be conditioned upon submission by the Contractor of bills of sale or such other procedures satisfactory to the Architect to establish the Owner's title to such materials or equipment or otherwise protect the Owner's interest, including but not limited to, applicable insurance and transportation provided by the Contractor to the site for those materials and equipment stored off the site.

2. The Contractor shall indicate in the notification, and in the payment request, that he agrees that loss of materials stored off the site shall not relieve him of the obligation to furnish these types and quantities of materials for the Work and on a schedule to meet the progress and completion requirements referenced in this agreement.
 3. The notification and payment request shall indicate that the Surety on the Performance Bond and the Labor and Material Payment Bond has been notified of the request for payment of materials stored off the site, and written consent of Surety shall be provided to the Owner or Architect if requested.
 4. The Architect shall be notified by the Contractor when the materials are to be transferred to the site and when the materials are received at the site.
- F. Transmittal: Submit two (2) notarized originals and two (2) copies of each Application for Payment (total of four copies) to the Architect by means ensuring receipt within 24 hours; including waivers of lien and similar attachments, as required.
- G. Retainage: Retainage will be calculated in accordance with Article 5 Payments and Completion of the AIA Contract Document A101.
- H. Waivers of Mechanics Lien: With each Application for Payment submit waivers of mechanics liens from subcontractors or sub-subcontractors and suppliers for the construction period covered by the previous application.
1. Submit partial waivers on each item for the amount requested, prior to deduction for retainage, on each item.
 2. When an application shows completion of an item, submit final or full waivers.
 3. The Owner reserves the right to designate which entities involved in the Work must submit Waivers.
 4. Submit each Application for Payment with the Contractor's waiver of mechanics lien for the period of construction covered by the application.
 5. Submit final Application for Payment with or preceded by the final waivers from every entity involved with performance of Work covered by the application that could lawfully be entitled to a lien.

6. Forms: Submit waiver of lien on forms and executed in a manner acceptable to the Owner.

Progress Payments: If the Contractor has made Application for Payment as detailed, the Architect will review, authorize and forward to the Owner. No approval of any application for progress payment, nor any progress payment, shall constitute an acceptance of any Work not in accordance with the Contract Documents.

- I. Except in cases of bona fide disputes, or where the Contractor has some other justifiable reason for delay, the Contractor shall pay:

1. To each of his subcontractors or suppliers, not later than seven (7) days after each payment is made to the Contractor, the representative amount allowed the Contractor on account of the Work performed by his subcontractors, the amount to which said subcontractor is entitled; and as for retainage, only reflecting the percentage actually retained, if any, from payments to the Contractor on account of such subcontractor's Work. The Contractor shall, by an appropriate agreement with each subcontractor also require each subcontractor of any tier to make payments to his subcontractors in a similar manner.
2. For all materials, tools and other expendable equipment to the extent of 90% of the cost thereof not later than the end of the calendar month following the month in which such materials, tools and equipment are delivered to the Site of the Project.
3. For all transportation and utility services not later than the end of the calendar month following the month in which the services are rendered.
4. All material and Work covered by partial payments made shall thereupon become the sole property of the Owner, but this provision shall not be construed as relieving the Contractor from the sole responsibility for all materials and Work upon which payments have been made, the correction and completion of defective or incomplete Work of the restoration of any damaged Work or as a waiver of the right of the Construction Manager to require the fulfillment of the terms of Contract.

- J. Initial Application for Payment: Administrative actions and submittals that must precede or coincide with submittal of the first Application for Payment include the following:

1. List of subcontractors

2. List of principal suppliers and fabricators
3. Submittal register
4. Schedule of Values
5. Contractor's Construction Schedule (preliminary, if not final)
6. List of Contractor's staff assignments
7. List of Contractor's principal consultants
8. Copies of permits
9. Copies of authorizations and licenses from governing authorities for performance of the Work
10. Certificates of insurance
11. Performance and payment bonds

K. Application for Payment at Substantial Completion: Following issuance of the Certificate of Substantial Completion, submit an Application for Payment; this application shall reflect any Certificates of Partial Substantial Completion issued previously for Owner occupancy of designated portions of the Work.

1. Administrative actions and submittals that shall precede or coincide with this application include:
 - a. Occupancy permits and similar approvals
 - b. Warranties (guarantees) and maintenance agreements
 - c. Test/adjust/balance records
 - d. Maintenance instructions
 - e. Start-up performance reports
 - f. Change-over information related to Owner's occupancy, use, operations and maintenance
 - g. Final cleaning
 - h. Application for reduction of retainage, and consent of surety
 - i. List of incomplete Work, recognized as exceptions to Construction Manager's Certificate of Substantial Completion

L. Final Payment Application: Administrative actions and submittals which must precede or coincide with submittal of the final Application for Payment include the following:

1. Completion of Project close-out requirements
2. Completion of items specified for completion after Substantial Completion
3. Assurance that unsettled claims will be settled
4. Assurance that work not complete and accepted will be completed without undue delay
5. Transmittal of required Project Records to Owner
6. Proof that taxes, fees, and similar obligations have been paid
7. Removal of temporary facilities and services

8. Removal of surplus materials, rubbish, and similar elements
9. Consent of Surety for Final Payment (AIA Document G707)
10. Contractor's Affidavit of Payment of Debts and Claims (AIA Document G706)
11. Contractor's Affidavit of Release of Liens (AIA Document G706A)

2.01 PRODUCTS (Not Applicable)

3.01 EXECUTION (Not Applicable)

**END OF SECTION
PAYMENT PROCEDURES**

SECTION 01 31 13 – PROJECT COORDINATION

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

- A. This Section specifies administrative and supervisory requirements necessary for Project coordination including, but not necessarily limited to:
 - 1. Coordination.
 - 2. Administrative and supervisory personnel.
 - 3. General installation provisions.
 - 4. Cleaning and protection.
- B. Field engineering is included in Division 1 Section "Field Engineering".
- C. Progress meetings, coordination meetings and pre-installation conferences are included in Section "Project Meetings".
- D. Requirements for the Contractor's Construction Schedule are included in Section "Submittals".

1.03 COORDINATION

- A. Coordination: Coordinate construction activities included under various Sections of these Specifications to assure efficient and orderly installation of each part of the Work. Coordinate construction operations included under different Sections of the Specifications that are dependent upon each other for proper installation, connection, and operation.
 - 1. Where installation of one part of the Work is dependent on installation of other components, either before or after its own installation, schedule construction activities in the sequence required to obtain the best results.
 - 2. Where availability of space is limited, coordinate installation of different components to assure maximum accessibility for required maintenance, service and repair.

3. Make adequate provisions to accommodate items scheduled for later installation.
 4. Where necessary, prepare memoranda for distribution to each party involved outlining special procedures required for coordination. Include such items as required notices, reports, and attendance at meetings.
 5. Prepare similar memoranda for the Owner and separate Contractors where coordination of their Work is required.
- B. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities to avoid conflicts and ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:
1. Preparation of schedules.
 2. Installation and removal of temporary facilities.
 3. Delivery and processing of submittals.
 4. Progress meetings.
 5. Project Close-out activities.
- C. Conservation: Coordinate construction activities to ensure that operations are carried out with consideration given to conservation of energy, water, and materials.
- D. Salvage materials and equipment involved in performance of, but not actually incorporated in, the Work. Refer to other sections for disposition of salvaged materials that are designated as Owner's property.

1.04 SUBMITTALS

- A. Coordination Drawings: Prepare and submit coordination Drawings where close and careful coordination is required for installation of products and materials fabricated off-site by separate entities, and where limited space availability necessitates maximum utilization of space for efficient installation of different components.
1. Show the interrelationship of components shown on separate Shop Drawings.
 2. Indicate required installation sequences.
 3. Comply with requirements contained in Section "Submittals."

4. Refer to Division-15 Section "General Mechanical Requirements," and Division-16 Section "General Electrical Requirements" for specific coordination Drawing requirements for mechanical and electrical installations.
- B. Staff Names: Within 15 days of Notice to Proceed, submit a list of the Contractor's principal staff assignments, including the Superintendent and other personnel in attendance at the site; identify individuals, their duties and responsibilities; list their addresses and telephone numbers.
 1. Post copies of the list in the Project meeting room, the temporary field office, and at each temporary telephone.

PART 2 - PRODUCTS (Not Applicable).

PART 3 - EXECUTION

3.01 GENERAL INSTALLATION PROVISIONS

- A. Inspection of Conditions: Require the Installer of each major component to inspect both the substrate and conditions under which Work is to be performed. Do not proceed until unsatisfactory conditions have been corrected in an acceptable manner.
- B. Manufacturer's Instructions: Comply with manufacturer's installation instructions and recommendations, to the extent that those instructions and recommendations are more explicit or stringent than requirements contained in Contract Documents.
- C. Inspect materials or equipment immediately upon delivery and again prior to installation. Reject damaged and defective items.
- D. Provide attachment and connection devices and methods necessary for securing Work. Secure Work true to line and level. Allow for expansion and building movement.
- E. Visual Effects: Provide uniform joint widths in exposed Work. Arrange joints in exposed Work to obtain the best visual effect. Refer questionable choices to the Architect for final decision.
- F. Recheck measurements and dimensions, before starting each installation.
- G. Install each component during weather conditions and Project status that will ensure the best possible results. Isolate each part of the completed construction from incompatible material as necessary to prevent deterioration.

- H. Coordinate temporary enclosures with required inspections and tests, to minimize the necessity of uncovering completed construction for that purpose.
- I. Mounting Heights: Where mounting heights are not indicated, install individual components at standard mounting heights recognized within the industry for the particular application indicated and in accordance with all applicable codes, laws, and ordinances. Refer questionable mounting height decisions to the Architect for final decision.

3.02 CLEANING AND PROTECTION

- A. During handling and installation, clean and protect construction in progress and adjoining materials in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion. This includes protective covering of open ductwork to prevent dust infiltration once system is operational.
- B. Clean and maintain completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.
- C. Limiting Exposures: Supervise construction activities 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. Where applicable, such exposures include, but are not limited to, the following:
 - 1. Excessive static or dynamic loading.
 - 2. Excessive internal or external pressures.
 - 3. Excessively high or low temperatures.
 - 4. Thermal shock.
 - 5. Excessively high or low humidity.
 - 6. Air contamination or pollution.
 - 7. Water or ice.
 - 8. Solvents.
 - 9. Chemicals.
 - 10. Light.
 - 11. Radiation.
 - 12. Puncture.
 - 13. Abrasion.
 - 14. Heavy traffic.
 - 15. Soiling, staining and corrosion.
 - 16. Bacteria.
 - 17. Rodent and insect infestation.

18. Combustion.
19. Electrical current.
20. High speed operation.
21. Improper lubrication.
22. Unusual wear or other misuse.
23. Contact between incompatible materials.
24. Destructive testing.
25. Misalignment.
26. Excessive weathering.
27. Unprotected storage.
28. Improper shipping or handling.
29. Theft.
30. Vandalism.

**END OF SECTION
PROJECT COORDINATION**

SECTION 01 31 19 – PROJECT MEETINGS

PART 1 - GENERAL

The drawings, General Conditions, any supplementary General Conditions, and Division 1, General Requirements are hereby made a part of this Section as fully as if written herein.

1.1 DESCRIPTION:

Meetings shall include pre-construction meeting, periodic progress meetings, and special meetings. Additional meetings which may be required, based on the size and complexity of the job include site mobilization meeting, pre-installation meetings, and foremen's meetings.

1.2 PRE-CONSTRUCTION MEETING:

A. Pre-construction meeting shall be held within fourteen (14) days after the date of Contract Notice To Proceed at a time and place designated by the General or Prime Contractor's Project Manager. Those in attendance shall include:

1. Owner's Representative
2. Architect, engineer, and professional consultants as required
3. Contractor's project manager and superintendent
4. Others as appropriate or as requested by the Architect or Engineer

B. Agenda for pre-construction meeting will generally include discussion of:

1. List of major subcontractors and suppliers with list distributed by contractors to all concerned
2. Construction schedule and critical work sequencing
3. Major equipment deliveries and priorities
4. Project Coordination
 - a. Designation of responsible personnel
5. Procedure and processing of:
 - a. Field decisions
 - b. Proposal requests
 - c. Submittals
 - d. Change Orders
 - e. Application For Payment
6. Procedures for maintaining Record Documents
7. Use of premises:
 - a. Office, work, and storage areas
 - b. Owner's requirements
8. Construction facilities and controls
9. Temporary utilities

- C. Record significant discussions and agreements and disagreements of the conference, along with the tentative schedule. Distribute the record of the meeting to everyone concerned, promptly, including the Owner and Architect or Engineer.

1.3 SITE MOBILIZATION CONFERENCE

Owner will schedule a conference at the Project Site prior to Contractor occupancy.

Attendance Required: Owner, Architect, Contractor's Project Manager, Contractor's Superintendent, and major Subcontractors.

Note: Depending on the size and complexity of the project, this meeting MAY be combined with the pre-construction meeting.

Agenda shall include, but is not limited to:

1. Use of premises by Owner and Contractor.
2. Owner's requirements.
3. Construction facilities and controls provided by Owner.
4. Temporary utilities provided by Owner.
5. Security and housekeeping procedures.
6. Schedules.
7. Procedures for testing.
8. Procedures for maintaining record documents.
9. Requirements for start-up of equipment.
10. Inspection and acceptance of equipment put into service during construction period.
11. Warranty period and procedures.
12. Other matters.

1.4 PROGRESS MEETING:

- A. Progress meetings shall be held regularly as designated by agreement between the Architect, Contractor and Owner. Those in attendance shall include;
 1. Owner's representative
 2. Architect, engineers, and professional consultants as required
 3. Contractor's project manager and superintendent
 4. Others as appropriate or as requested by Project Manager
 5. Progress meeting attendance is required by all contractors who have mobilized on site, or will mobilize prior to next regularly scheduled progress meetings.

- B. Contractors shall give adequate notice to appropriate subcontractors and suppliers and be responsible for their attendance at progress meetings.
- C. The General or Prime Contractor will preside at progress meetings. Agenda will generally include discussion of:
 - 1. Work progress since previous meeting
 - 2. Field observations and problems
 - 3. Problems which affect Construction Schedule
 - 4. Corrective measures and procedures as required to maintain Construction Schedule
 - 5. Work scheduled for succeeding work period
 - 6. Progress of submittals
 - 7. Proposed changes
 - 8. Any other appropriate business
 - 9. Status of shop drawings
- D. Representatives of Contractors, subcontractors, and suppliers attending the meeting shall be qualified and authorized to discuss issues and act on behalf of the entity each represents.
- E. The General or Prime Contractor will prepare minutes of progress meetings and distribute one copy to Owner, Architect, Engineers, Professional Consultants, and Contractors. Contractors shall copy and distribute minutes to subcontractors, suppliers, and other as appropriate.

1.5 SPECIAL MEETINGS:

- A. Contractor, Architect or Owner will call for special meetings whenever deemed that such a meeting is important to the progress of the work. Requirements listed above for progress meetings shall apply to special meetings.

1.6 FOREMAN'S MEETING:

- A. The General or Prime Contractor's Superintendent will conduct weekly Foreman's Meetings, the purpose of which will be to plan and discuss scheduling and coordination of immediate work at hand, sequential access to specific areas of work, logistics of major deliveries and storage of material to avoid conflicts with other trades, and other jobsite issues which may be pertinent to daily access and execution of the work by all contractors.

Attendance by the Field Foreman is required of all Contractors who are working on site.

1.7 PRE-INSTALLATION CONFERENCES

Conduct a pre-installation conference at the site before each construction activity that requires coordination with other construction. The Installer and representatives of manufacturers and fabricators involved in or affected by the installation, and its coordination or integration with other materials and installations that have preceded or will follow, shall attend the meeting. Advise the Architect and Owner of scheduled meeting dates.

Review the progress of other construction activities and preparations for the particular activity under consideration at each pre-installation conference, including requirements for:

1. Contract Documents.
2. Options.
3. Related Change Orders.
4. Purchases.
5. Deliveries.
6. Shop Drawings, Product Data and Quality Control Samples.
7. Possible conflicts.
8. Compatibility problems.
9. Time schedules.
10. Weather limitations.
11. Manufacturer's recommendations.
12. Compatibility of materials.
13. Acceptability of substrates.
14. Temporary facilities.
15. Space and access limitations.
16. Governing regulations.
17. Safety.
18. Inspection and testing requirements.
19. Required performance results.
20. Recording requirements.
21. Protection.

Record significant discussions and agreements and disagreements of each conference, along with the approved schedule. Distribute the record of the meeting to everyone concerned, promptly, including the Owner and Engineer.

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

**END OF SECTION
PROJECT MEETINGS**

SECTION 01 32 13 – SCHEDULING OF WORK

PART 1 - GENERAL

1.01 PRE-BID CONSTRUCTION SCHEDULE

- A. Time is a critical element of this Project. By entering a bid, the Contractor agrees to adhere to the intermediate Milestone Dates and Dates of Substantial and Final Completion established herein. The Contractor also understands that all work must be performed in an orderly and closely coordinated sequence in order to achieve the specified Milestones and Completion Dates, and the Contractor hereby agrees to perform his work in conformance with the Pre-Bid Construction Schedule established herein, or with the then current and approved Project Construction Schedule.
- B. The Pre-Bid Construction Schedule includes allowances for time lost due to adverse and abnormal weather conditions, other than floods, hurricanes, tornadoes, lightening and other like acts of God. The Contractor understands and agrees that the Contractor shall not be entitled to any extensions of the Contract Time, except as allowed in the General Conditions of the Contract for Construction. The Contractor further acknowledges that the Work may be required to be performed during the winter season, that conditions during this season may be adverse and abnormal, but that such conditions will not be the basis for an extension of the Contract Time.

1.02 SCHEDULING OF THE WORK AFTER AWARD OF CONTRACT

- A. After award of Contract, or issuance of a Notice to Proceed, the Contractor will meet with the Owner and Architect to review the Pre-Bid Construction Schedule, and the overall project plan for construction. Following the above review the Contractor will meet with each subcontractor and supplier to view the detailed plans for performing his Work. Following these meetings and within fourteen (14) days after award of the Contract or issuance of a Notice to Proceed, the Contractor shall prepare and submit for the Owner's approval a Work Schedule providing for the expeditious, timely and practical execution of the Work. The Contractor's Work Schedule shall include activity descriptions and durations for shop drawings, fabrication, delivery and installation. If so requested, the Contractor shall provide adequate explanation regarding crew sizes, production rates and similar data used to arrive at the durations and sequences.
- B. The Contractor shall submit proposed schedule revisions and obtain the written approval of the Owner and Architect before deviating from the Project Construction Schedule.

1.03 ADHERENCE TO THE SCHEDULE

- A. The Contractor shall start each part of this work on the date designated for start in the approved Project Construction Schedule. He shall carry the work forward expeditiously with adequate forces, equipment and materials, and shall complete each part of his work on or before the date designated in the approved Project Construction Schedule.
- B. If the Owner determines that the Contractor is behind schedule, the Owner shall have the right to require that the Contractor take steps to accelerate his Work. Such steps shall include increases in manpower, equipment and materials as the Owner and Architect may deem necessary. If the Contractor fails to comply with the Owner's or Architect's instructions relating to improved rate of progress, the Contractor may be held in default under the appropriate provisions of the General Conditions of the Contract.

PART 2 - PRODUCTS (Not Applicable).

PART 3 – EXECUTION (Not Applicable).

END OF SECTION SCHEDULING OF WORK

SECTION 01 33 00 – SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

- A. This Section includes administrative and procedural requirements for submitting Shop Drawings, Product Data, Samples, and other miscellaneous submittals.

1.03 DEFINITIONS

- A. Informational Submittals: Written information that does not require Architect/Engineer's or Owner's representative's approval. Submittals may be rejected for not complying with requirements of applicable sections.

1.04 SUBMITTAL PROCEDURES

- 1.5 General: Contractor will not assume electronic copies of CAD Drawings of the Contract Drawings will be provided by Architect/Engineer for Contractor's use in preparing submittals.

- 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. Coordinate transmittal of different types of submittals for related parts of the Work so processing will not be delayed because of need to review submittals concurrently for coordination.

- a. Architect/Engineer reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.

- C. Submittals Schedule: Comply with requirements in Division 1 Section 01320 "Construction Progress Documentation" for list of submittals and time requirements for scheduled performance of related construction activities.

- D. Processing Time: Allow enough time for submittal review, including time for re-submittals, as follows. Time for review shall commence on Architect/Engineer's receipt of submittal.
1. Initial Review: Allow 14 days for initial review of each submittal. Allow additional time if processing must be delayed to permit coordination with subsequent submittals. Architect/Engineer will advise Contractor and Owner's representative when a submittal being processed must be delayed for coordination.
 2. Number of Samples for Initial Selection: Submit one full set of available choices where color, pattern, texture, or similar characteristics are required to be selected from manufacturer's product line. Architect/Engineer will return submittal with options selected.
 3. Concurrent Review: Where concurrent review of submittals by Architect/Engineer's consultants, Owner, or other parties is required, allow 21 days for initial review of each.
 4. If intermediate submittals necessary, process in same manner as initial submittal.
 5. Allow 14 days for processing each resubmittal.
 6. No extension of the Contract Time will be authorized because of failure to transmit submittals in full compliance of this and related sections or enough in advance of the Work to permit processing.
- E. Identifications: Place a permanent label or title block on each submittal for identification.
1. Indicate name of firm or entity that prepared each submittal on label or title block.
 2. Provide a space approximately 4 by 5 inches on label or beside title block to record contractor's review and approval markings and action taken by Architect/Engineer.
 3. Include the following information on label for processing and recording action taken:
 - a. Project name
 - b. Date
 - c. Name and address of Architect/Engineer
 - d. Name and address of Contractor
 - e. Name and address of subcontractor
 - f. Name and address of supplier
 - g. Name of manufacturer
 - h. Unique identifier, including revision number
 - i. Number and title of appropriate Specification Section
 - j. Drawing number and detail references, as appropriate
 - k. Other necessary identification
- F. Deviations: Highlight, encircle, or otherwise identify deviations from the Contract Documents on submittals.

- G. Additional Copies: Unless additional copies are required for final submittal, and unless Architect/Engineer observes noncompliance with provisions of the Contract Documents, initial submittal may serve as final submittal.
 - 1. Submit one (1) copy of submittal to concurrent reviewer in addition to specified number of copies to Architect/Engineer.
 - 2. Additional copies submitted for maintenance manuals will not be marked with action taken and will be returned.
- H. Transmittal: Package each submittal individually and appropriately for transmittal and handling. Transmit each submittal using a transmittal form. The Owner's representative will return submittals without review received from sources other than Contractor.
 - 1. On an attached separate sheet, prepare on Contractor's letterhead, record relevant information, requests for data, revisions other than those requested by Architect/Engineer on previous submittals, and deviations from requirements of the Contract Documents, including minor variations and limitations. Include the same label information as the related submittal.
 - 2. Include Contractor's certification stating that information submitted complies with requirements of the Contract Documents.
 - 3. Transmittal Form: Provide locations on contractor's typical transmittal form for the following information:
 - a. Project name
 - b. Date
 - c. Destination (To)
 - d. Source (From)
 - e. Names of subcontractor, manufacturer, and supplier
 - f. Category and type of submittal
 - g. Submittal purpose and description
 - h. Submittal and transmittal distribution record
 - i. Remarks
 - j. Signature of transmitter
- I. 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.
- J. Use for Construction: Use only final submittals with mark indicating action taken by Architect/Engineer in connection with construction.

PART 2 – PRODUCTS

2.01 ACTION SUBMITTALS

- A. General: Prepare and submit Action Submittals required by individual Specification Sections.

1. Number of copies: Submit to Owner's representative eight copies of each submittal, unless otherwise indicated. The Owner's representative will return three copies. Mark up and retain one returned copy as a Project Record Document.
- B. 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 printed data are not suitable 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 written recommendations.
 - b. Manufacturer's product specifications.
 - c. Manufacturer's installation instructions.
 - d. Standard color charts.
 - e. Manufacturer's catalog cuts.
 - f. Wiring diagrams showing factory-installed wiring.
 - g. Printed performance curves.
 - h. Operational range diagrams.
 - i. Mill reports.
 - j. Standard product operating and maintenance manuals.
 - k. Compliance with recognized trade association standards.
 - l. Compliance with recognized testing agency standards.
 - m. Application of testing agency labels and seals.
 - n. Notation of coordination requirements.
- C. 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: Include the following information, as applicable:
 - a. Dimensions.
 - b. Identification of products.
 - c. Fabrication and installation drawings
 - d. Roughing-in and setting diagrams.
 - e. Wiring diagrams showing field-installed wiring, including power, signal, and control wiring.
 - f. Shop work manufacturing instructions.
 - g. Templates and patterns.
 - h. Schedules.
 - i. Design calculations
 - j. Compliance with specified standards
 - k. Notation of coordination requirements
 1. Notation of dimensions established by field measurement.

2. Wiring Diagrams: Differentiate between manufacturer-installed and field-installed wiring.
 3. 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 24 by 36 inches.
 4. Number of Copies: Submit copies of each submittal, as follows: Submit to Owner's representative eight copies of each submittal, unless otherwise indicated. The Owner's representative will return three copies. Mark up and retain one returned copy a project Record Document.
- D. Coordination Drawings: Comply with requirements in Division 1 Section 01310 "Project Management and Coordination".
- E. Samples: Prepare physical units of materials or products, including the following:
1. Samples for Initial Selection: Submit manufacturer's color charts consisting of units or sections of units showing the full range of colors, textures, and patterns available.
 2. Samples for Verification: Submit full-size units or Samples of size indicated, prepared from the same material to be used for the Work, cured and finished in manner specified, and physically identical with the product proposed for use, and that show full range of color and texture variations expected. Samples include, but are not limited to, the following: partial sections of manufactured or fabricated components; small cuts or containers of materials, complete units of repetitively used materials; swatches showing color, texture, and pattern' color range sets; and components used for independent testing and inspection.
 3. Preparation: Mount, display, or package Samples in manner specified to facilitate review of qualities indicated. Prepare Samples to match Architect/Engineer's same where so indicated. Attach label on unexposed side that includes the following:
 - a. Generic description of Sample
 - b. Product name or name of manufacturer.
 - c. Sample source
 4. Additional Information: On an attached separate sheet, prepared on Contractor's letterhead, provide the following:
 - a. Size limitations
 - b. Compliance with recognized standards
 - c. Availability
 - d. Delivery time
 5. Submit samples for review of kind, color, pattern, and texture for a final check of these characteristics with other elements and for a comparison of these characteristics between final submittal and actual component as delivered and installed.

- a. If variation in color, pattern, texture, or other characteristic is inherent in the product represented by a Sample, submit at least three sets of paired units that show approximate limits of the variations.
 - b. Refer to individual Specification sections for requirements for Samples that illustrate workmanship, fabrication techniques, details of assembly, connections, operation, and similar construction characteristics.
6. Number of Samples for Initial Selection: submit three full sets of available choices where color, pattern, texture, or similar characteristics are required to be selected from manufacturer's product line. The Owner's representative will return submittal with options selected.
7. Number of Samples for Verification: Submit three (3) sets of Samples. The Owner's representative will retain two.
 - a. Submit a single Sample where assembly details, workmanship, fabrication techniques, connections, operation, and other similar characteristics are to be demonstrated.
8. Disposition: Maintain sets of approved Samples at Project site, available for quality-control comparisons throughout the course of construction activity. Sample sets may be used to determine final acceptance of construction associated with each set.
 - a. Samples that may be incorporated into the Work are indicated in individual Specification Sections. Such Samples must be in an undamaged condition at time of use.
 - b. Samples not incorporated into the Work, or otherwise designated as Owner's property, are the property of Contractor.
- F. Product Schedule or List: 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.
 2. Number and name of room or space.
 3. Location within room or space.
- G. Delegated-Design Submittal: Comply with requirements in Division 1 Section 01400 "Quality Requirements."
- H. Submittals Schedule: Comply with requirements in Division 1 Section 01320 "Construction Progress Documentation."

- I. Application for Payment: Comply with CCPS Application for Payment requirements.
- J. 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, and telephone number of entity performing subcontract or supplying products.
 - 2. Number and title of related Specification Section(s) covered by subcontract.
 - 3. Drawing number and detail references, as appropriate, covered by subcontract.

2.01 INFORMATIONAL SUBMITTALS

- A. General: Prepare and submit Informational Submittals required by other Specification Sections.
 - 1. Number of Copies: Submit four copies of each submittal, unless otherwise indicated. The Owner's representative will not return copies.
 - 2. Certificates and Certifications: Provide a notarized 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.
 - 3. Test and Inspection Reports: Comply with requirements outlined throughout the specifications.
- B. Contractor's Construction Schedule: Comply with requirements in Division 1 Section 01320 "Construction Progress Documentation."
- C. Qualification Data: Prepare written information that demonstrates capabilities and experience of firm or person. Include lists of completed projects with project names and addresses, names and addresses of Architect/Engineers and owners, and other information specified.
- D. Product Certificates: Prepare written statements on manufacturer's letterhead certifying that product complies with requirements.
- E. Welding Certificates: Prepare written certification that welding procedures and personnel comply with requirements. Submit record of Welding Procedure Specification (WPS) and Procedure Qualification Record (PQR) on AWS forms. Include names of firms and personnel certified.
- F. Installer Certificates: Prepare written statements on manufacturer's letterhead certifying that Installer complies with requirements and, where required, is authorized for this specific Project.

- G. Manufacturer Certificates: Prepare written statements on manufacturer's letterhead certifying that manufacturer complies with requirements. Include evidence of manufacturing experience where required.
- H. Material Certificates: Prepare written statements on manufacturer's letterhead certifying that material complies with requirements.
- I. Material Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements.
- J. Preconstruction Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of tests performed before installation of product, for compliance with performance requirements.
- K. Compatibility Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of compatibility tests performed before installation of product. Include written recommendations for primers and substrate preparation needed for adhesion.
- L. Field Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of field tests performed either during installation of product or after product is installed in its final location, for compliance with requirements.
- M. Product Test Reports: Prepare written reports indicating current product produced by manufacturer complies with requirements. Base reports on evaluation of tests performed by manufacturer and witnessed by a qualified testing agency, or on comprehensive tests performed by a qualified testing agency.
- N. Research/Evaluation Reports: Prepare 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:
 - 1. Name of evaluation organization.
 - 2. Date of evaluation.
 - 3. Time period when report is in effect.
 - 4. Product and manufacturers' names.
 - 5. Description of product.
 - 6. Test procedures and results.
 - 7. Limitations of use.
- O. Maintenance Data: Prepare written and graphic instructions and procedures for operation and normal maintenance of products and equipment. Comply with requirements for "Operation and Maintenance Data."

- P. Design Data: Prepare written and graphic information, including, but not limited to, performance and design criteria, list of applicable codes and regulations, and calculations. Include list of assumptions and other performance and design criteria and a summary of loads. Include load diagrams if applicable. Provide name and version of software, if any, used for calculations. Include page numbers.
- Q. Manufacturer's Instructions: Prepare written or published information that documents manufacturer's recommendations, guidelines, and procedures for installing or operating a product or equipment. Include name of product and name, address, and telephone number of manufacturer. Include the following, as applicable:
1. Preparation of substrates.
 2. Required substrate tolerances.
 3. Sequence of installation or erection.
 4. Required installation tolerances.
 5. Required adjustments.
 6. Recommendations for cleaning and protection.
- R. Manufacturer's Field Reports: Prepare written information documenting factory-authorized service representative's tests and inspections. Include the following, as applicable:
1. Name, address, and telephone number of factory-authorized service representative making report.
 2. Statement on condition of substrates and their acceptability for installation of product.
 3. Statement that products at Project site comply with requirements.
 4. Summary of installation procedures being followed, whether they comply with requirements and, if not, what corrective action was taken.
 5. Results of operational and other tests and a statement of whether observed performance complies with requirements.
 6. Statement indicating whether conditions, products, and installation will affect warranty.
 7. Other required items indicated in individual Specification Sections.
- S. Insurance Certificates and Bonds: Prepare written information indicating current status of insurance or bonding coverage. Include name of entity covered by insurance or bond, limits of coverage, amounts of deductibles, if any, and term of the coverage.
- T. Construction Photographs: Comply with requirements in Specification Section "Construction Photographs."
- U. Material Safety Data Sheets: Submit information directly to Owner. If submitted to Architect/Engineer, Architect/Engineer will not review this information but will return it with no action taken.

PART 3 - EXECUTION

3.01 CONTRACTOR'S REVIEW

- A. Review each submittal and check for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to Architect/Engineer.
- B. Approval Stamp: Stamp each submittal with a uniform, approval stamp. Include Project name and location, submittal number, Specification Section title and number, name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents.

3.02 ARCHITECT/ENGINEER/ENGINEER'S ACTION

- A. General: The Owner's representative will not review submittals that do not bear Contractor's approval stamp and will return them without action after noting date originally received and returned.
- B. Action Submittals: Architect/Engineer will review each submittal, make marks to indicate corrections or modifications required, and return it to the Owner's representative. Architect/Engineer will stamp each submittal with an action stamp and will mark stamp appropriately to indicate action taken, as follows:
 - 1. Final Unrestricted Release: When the Architect/Engineer marks a submittal "No Exceptions Taken," the Work covered by the submittal may proceed provided it complies with requirements of the Contract Documents. Final payment depends on that compliance.
 - 2. Final-But-Restricted Release: When the Architect/Engineer marks a submittal "Exceptions Noted," the Work covered by the submittal may proceed provided it complies with notations or corrections on the submittal and requirements of the Contract Documents. Final payment depends on that compliance.
 - 3. Returned for Resubmittal: When the Architect/Engineer marks a submittal "Revise and Resubmit," do not proceed with Work covered by the submittal, including purchasing, fabrication, delivery, or other activity. Revise or prepare a new submittal according to the notations; resubmit without delay. Repeat if necessary to obtain different action mark.
 - a. Do not use, or allow others to use, submittals marked "Revise and Resubmit" at the Project Site or elsewhere where Work is in progress.
 - 4. Rejected: When Architect/Engineer marks submittal "rejected," submittal material is in noncompliance with the contract documents. Prepare new submittal in accordance with the contract documents.

5. Other Action: Where a submittal is for information or record purposes or special processing or other activity, the Architect/Engineer will return the submittal marked “Action Not Required.”
-
- C. Informational Submittals: Architect/Engineer will review each submittal and return it, or will reject and return it if it does not comply with requirements. Architect/Engineer will forward each submittal to the Owner’s representative.
 - D. Submittals not required by the Contract Documents will not be reviewed and may be discarded.

END OF SECTION
SUBMITTAL PROCEDURES

SECTION 01 35 23 – OWNER SAFETY REQUIREMENTS

PART 1 - GENERAL

1.01 SUMMARY

- A. The Contractor shall be responsible for initiating, maintaining and supervising all safety activities and programs in connection with the Work.
- B. Each Contractor shall be responsible for the safety of his personnel.
- C. Hard hats and safety glasses must be worn by all personnel on the jobsite, except in contractor's administrative office/trailer. All equipment must comply with OSHA standards. All job site personnel shall wear long pants, shirts (no tank tops) and work boots.

1.07 REPORTS

- A. Contractors shall report all accidents or injuries on a timely basis in accordance with all applicable regulations.
- B. Contractors shall promptly complete an accident investigation report of all accidents.

1.10 EMERGENCY PROCEDURES

- A. The Contractor shall establish a central meeting location for the assembly of all Contractors' employees in the event of a major job site emergency. This location and procedure shall be reviewed with the Owner in advance.

1.11 FALL PROTECTION PROCEDURES

- A. All Contractors are responsible, in accordance with federal, state, local laws and regulations including OSHA, to provide and enforce their own site specific fall protection program and equipment. The following fall protection procedures shall be enforced by all Contractors as a minimum standard.
- B. All workers on walking/working surfaces with unprotected sides or edges six feet (6') or higher above the next lower level must be protected from falls by the use of guardrail systems, net systems, fall arrest systems or control access zone programs, or monitoring programs. It is intended that when fall protection is required, it is required 100% of the time. All

contractors are reminded that relevant industry regulations require that contractors comply with the following standards.

1. Workers constructing or working near leading edges must be protected.
 2. Workers on the face of formwork or reinforcing steel must be protected at a height of 6 feet (6') or greater.
 3. Scaffolds shall be guarded at 6 feet (6') above next lower level.
 4. Brick layers performing overhand bricklaying and related work six feet (6') or higher above lower levels must be protected from falls.
 5. Roofers must comply with OSHA standards for roof work.
 6. The Contractor's controlled access and/or monitoring program shall be included in their site-specific safety program and shall be submitted prior to the start of work. Contractors are responsible for assuring programs are OSHA compliant.
- C. Each Contractor is responsible to provide their own fall protection. Fall protection may be provided by guardrail systems, net systems, or personal fall arrest systems. All fall protection systems must comply with OSHA standards.
- D. Stepladders, exposed to shafts or edges of the building, greater than six feet (6') above the next lower level, must be tied off or otherwise secured. Employee must wear fall protection, i.e. harness/lanyard.
- E. Fall protection will be enforced for Structural Steel Erectors.
1. As for a Contractor engaged in structural steel erection, the Contractor is specifically advised that structural steel erectors shall comply with all protection requirements for all work at a height of six feet (6') or greater above the next lower level, 100 percent of the time, by any of the following means.
 - a. Standard guardrail system.
 - b. Personal Fall Arrest System (PFAS) – full body harness with shock absorbing lanyard. Maximum free fall distance permitted, with lanyard and lanyard attachment shall not exceed six feet (6'). Anchor point must be capable of supporting five thousand pounds. Perimeter guard cables or alignment cables may not be used for anchor points.
 - c. Access to work area shall be provided by ladders. There shall be sufficient number of ladders available to reduce the amount of "beam walking." When it is absolutely necessary to traverse a beam, 100% fall protection must be utilized.

- d. Steel erection Contractors must, at all times, be able to certify in writing that each of his employees has been properly trained in both OSHA fall protection standards and the Contractor's site specific project fall protection procedures.
- e. Prior to the erection of the steel, the Contractor shall meet with the Project Manager and Safety Representatives to review and document site specific procedures.

PART 2 - PRODUCTS (Not Applicable).

PART 3 – EXECUTION (Not Applicable).

**END OF SECTION
OWNER SAFETY REQUIREMENTS**

SECTION 01 42 00 - REFERENCES

PART 1- GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including Instructions to Bidders, Supplemental Instructions to Bidders, General Conditions, Supplementary Condition and Division 1 Specifications Sections, apply to this section.

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Specification format and content explanation,
 - 2. Definition,
 - 3. Drawing Symbols,
 - 4. Industry Standards,
 - 5. Submittals- Permits, Licenses and Certificates.

1.3 SPECIFICATION FORMAT AND CONTENT EXPLANATION

- A. Specification Format: These Specifications are organized into Divisions and Sections based on the Construction Specifications Institute's 16-Division format and MASTERFORMAT numbering system.
- B. Specification Content: This Specification uses certain conventions in the use of language and the intended meaning of certain terms, words, and phrases when used in particular situations of circumstances. These conventions are explained as follows:
 - 1. Abbreviated Language: Language used in the Specifications and other Contract Documents is the abbreviated type. Implied words and meanings will be appropriately interpreted. Singular words will be interpreted as plural and plural words interpreted as singular where applicable and where the full context of the Contract Documents so indicates.
 - 2. Imperative and streamlined language is used generally in the Specifications. Requirements expressed in the imperative mood are to be performed by the Contractor. At certain locations in the text,

for clarity, subjective language is used to describe responsibilities that must be fulfilled indirectly by the Contractor, or by others when so noted.

- C. Assignment of Specialist: The Specification requires that certain specific construction activities shall be performed by specialists who are recognized experts in the operations to be performed. The specialists must be engaged for those activities, and assignments are requirements over which the Contractor has choice or option. Nevertheless, the ultimate responsibility for fulfilling Contract requirements remains with the Contractor.
 - 1. This requirements shall not be interpreted to conflict with enforcement of building codes and similar regulations governing the Work. It is also not intended to interfere with local trade union jurisdictional settlements and similar conventions.
 - 2. Trades: Use of titles such as “carpentry” is not intended to imply that certain construction activities must be performed by accredited or unionized individuals of a corresponding generic name, such as “carpenter”. It also does not imply that requirements specified apply exclusively to tradespersons of the corresponding generic names.

1.6 DEFINITIONS

- A. Basic contract definitions are included in the General Conditions and Supplementary Conditions. In addition certain terms used in the Contract Documents are defined in this article. The definitions and explanations contained in this section are not necessarily complete, but are general for the work to the extent that they are not stated more explicitly in the General Conditions and Supplementary Conditions and other sections of those specifications.
 - 1. The term “Furnish” means to purchase, obtain, or otherwise secure at the Contractor’s expense complete with applicable taxes, insurance, delivery charges to the jobsite, and storage.
 - 2. The term “Install” means to properly place, anchor or fasten, align and completely finish specified items, equipment or material into the Project at the expense of the Contractor in a superior workmanship manner in strict accordance with manufacturer’s instructions and specifications.
 - 3. The term “Provide” means to “furnish and install” (as defined hereinabove) all such items, equipment, and materials complete in all respects at the sole expense of the Contractor.

4. The term “Installer” is the Contractor or an entity engaged by the Contractor, either as an employee, subcontractor, or sub-subcontractor for performance of a particular construction activity, including installation, erection, application, and similar operations. Installers are required to be experienced in the operations they are engaged to perform.
5. The term “Product” includes all natural materials and manufactured materials, fixture, systems, equipment, devices, articles, furnishings, fastenings, anchorages, etc., to be incorporated into this Project.
6. The term “Building Code” and the term “Code” refers to regulations of governmental agencies having jurisdiction.
7. The term “Project Site” is the space available to the Contractor for performance of construction activities, either exclusively or in conjunction with others performing as part of the Project. The extent of the Project Site is shown on the Drawings and may or may not be identical with the description of the land upon which the Project is to be built.
8. The term “Testing Laboratory” is an independent entity engaged to perform specific inspections or tests, either at the Project Site or elsewhere, and to report on and, if required, to interpret, results of those inspections or tests.
9. The term “Regulations” includes laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, as well as rules, conventions, and agreements within the construction industry that control performance of the Work, whether lawfully imposed by authorities having jurisdiction or not.
10. The term “Reviewed”, where used in conjunction with the Engineer’s action on the Contractor’s submittals, applications, and request, is limited to the duties and responsibilities of the Architect as stated in General and Supplementary Conditions. Such approval shall not release the Contractor from responsibility to fulfill Contract requirements unless otherwise provided in the Contract Documents.
11. The term “Similar” means in its general sense and not necessarily identical.
12. Terms such as “directed”, “requested”, “selected”, “approved”, “required”, and “permitted” mean “directed by the Architect”, “requested by the Architect”, and similar phrases. However, no

implied meanings shall be interpreted to extend the Architect's responsibility into the Contractor's area of construction supervision.

13. The terms "Shown", "Indicated", "Detailed", "Noted", "Schedules", and terms of similar import, refer to requirements contained in the Contract Documents.

1.5 DRAWING SYMBOLS

- A. Architectural, Civil, and Structural Graphic Symbols: Where not otherwise noted, symbols are defined by "Architectural Graphic Standards," published by John Wiley & Sons, Inc., eighth edition.
 1. Refer instances of uncertainty to the Engineer for clarification before proceeding.
- B. Mechanical/Electrical Graphic Symbols: Where not otherwise noted, symbols used on Mechanical and Electrical Drawings are generally aligned with symbols recommended by ASHRAE. Where appropriate, they are supplemental by more specific symbols recommended by technical associations including ASME, ASPE, IEEE, and similar organizations.
 1. Refer instances of uncertainty to the Engineer for clarification before proceeding.

1.6 INDUSTRY STANDARDS

- A. Applicability of Standards: Except where 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. Such standards are made a part of the Contract Documents by reference. Individual Sections indicate which codes and standards the Contractor must keep available at the Project Site for reference.
- B. Publication Dates: Where the date of issue of a referenced standard is not specified, comply with the standard in effect as of date of Contract Documents.
 1. Update Standards: At the request of the Engineer, Contractor, or authority having jurisdiction, submit a Change Order Proposal where an applicable code of standard has been revised and reissued after the date of the Contract Documents and before performance of Work affected. The Engineer will decide whether to issue a Change Order to proceed with the updated standard.

- C. **Conflicting Requirements:** Where compliance with two or more standards is specified, and they establish different or conflicting requirements for minimum quantities or quality levels, the most stringent requirement will be enforced. Refer requirements that are different, but apparently, equal, and uncertainties as to which quality level is more stringent to the Engineer for a decision before proceeding.
 - 1. **Minimum Quantity or Quality Levels:** In every instance the quantity or quality level shown or specified shall be the minimum to be provided or performed. The actual installation may comply exactly, within specified tolerances, with the minimum quality or quantity specified or it may exceed that minimum within reasonable limits. In complying with these requirements, indicated numeric values are minimum or maximum requirements. Refer instances of uncertainty to the Engineer for a decision before proceeding.
- D. **Copies of Standards:** Each entity engaged in construction of the Project is required to be familiar with industry standards applicable to the entity's construction activity. Copies of applicable standards are not bound with the Contract Documents.
 - 1. Where copies to standards are needed for performance of required construction activity, the Contractor shall obtain copies directly from the publication source.

1.7 SUBMITTALS, PERMITS, LICENSES, AND CERTIFICATES

- A. For the Owner's records, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payment, judgments, and similar documents, correspondence, and records established in conjunction with compliance with standards and regulations bearing upon performance of the Work.

PART 2- PRODUCTS (Not Applicable)

PART 3- EXECUTION (Not Applicable)

END OF SECTION REFERENCES

SECTION 01 42 16 - DEFINITIONS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 DEFINITIONS

- A. General: Basic Contract definitions are included in the Conditions of the Contract.
- B. Indicated: The term "indicated" refers to graphic representations, notes or schedules on the Drawings, or other Paragraphs or Schedules in the Specifications, and similar requirements in the Contract Documents. Where terms such as "shown," "noted," "scheduled," and "specified" are used, it is to help the reader locate the reference; no limitation on location is intended.
- C. Directed: Terms such as "directed," "requested," "authorized," "selected," "approved," "required," and "permitted" mean "directed by the Architect," "requested by the Architect," and similar phrases.
- D. Approve: The term "approved," where used in conjunction with the Architect's action on the Contractor's submittals, applications, and requests, is limited to the Architect's duties and responsibilities as stated in the Conditions of the Contract.
- E. Regulation: The term "Regulations" includes laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, as well as rules, conventions, and agreements within the construction industry that control performance of the Work.
- F. Furnish: The term "furnish" is used to mean "supply and deliver to the Project site, ready for unloading, unpacking, assembly, installation, and similar operations."
- G. Install: The term "install" is used to describe operations at project site including the actual "unloading, unpacking, assembly, erection, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations."

- H. Provide: The term "provide" means "to furnish and install, complete and ready for the intended use."
- I. Installer: An "Installer" is the Contractor or an entity engaged by the Contractor, either as an employee, subcontractor, or contractor of lower tier for performance of a particular construction activity, including installation, erection, application, and similar operations. Installers are required to be experienced in the operations they are engaged to perform.

The term "experienced," when used with the term "Installer," means having a minimum of five previous projects similar in size and scope to this Project, being familiar with the special requirements indicated, and having complied with requirements of the authority having jurisdiction.

- J. Trades: Use of titles such as "carpentry" is not intended to imply that certain construction activities must be performed by accredited or unionized individuals of a corresponding generic name, such as "carpenter." It also does not imply that requirements specified apply exclusively to tradespersons of the corresponding generic name.
- K. Assignment of Specialists: Certain Sections of the Specifications require that specific construction activities shall be performed by specialists who are recognized experts in the operations to be performed. The specialists must be engaged for those activities, and assignments are requirements over which the Contractor has no choice or option. Nevertheless, the ultimate responsibility for fulfilling Contract requirements remains with the Contractor.

This requirement shall not be interpreted to conflict with enforcement of building codes and similar regulations governing the Work. It is also not intended to interfere with local trade union jurisdictional settlements and similar conventions.

- L. Project Site is the space available to the Contractor for performance of construction activities, either exclusively or in conjunction with others performing other work as part of the Project. The extent of the Project Site is shown on the Drawings and may or may not be identical with the description of the land on which the Project is to be built.
- M. Testing Laboratories: A "testing laboratory" is an independent entity engaged to perform specific inspections or tests, either at the Project Site or elsewhere, and to report on and, if required, to interpret results of those inspections or tests.

**END OF SECTION
DEFINITIONS**

SECTION 01 45 00 – QUALITY CONTROL

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

- A. This Section specifies administrative and procedural requirements for quality control services.
- B. Quality control services include inspections and tests and related actions including reports, performed by independent agencies, governing authorities, and the Contractor. They do not include Contract enforcement activities performed by the Architect.
- C. Inspection and testing services are required to verify compliance with requirements specified or indicated. These services do not relieve the Contractor of responsibility for compliance with Contract Document requirements.
- D. Requirements of this Section relate to customized fabrication and installation procedures, not production of standard products.
- E. Specific quality control requirements for individual construction activities are specified in the Sections that specify those activities. Those requirements, including inspections and tests, cover production of standard products as well as customized fabrication and installation procedures.
- F. Inspections, test and related actions specified are not intended to limit the Contractor's quality control procedures that facilitate compliance with Contract Document requirements.
- G. Requirements for the Contractor to provide quality control services required by the Architect, Owner, or authorities having jurisdiction are not limited by provisions of this Section.

1.03 RESPONSIBILITIES

- A. Contractor Responsibilities: The Contractor shall provide inspections, tests and similar quality control services, as specified in individual Specification Sections and as otherwise required by governing authorities. These services

include those specified to be performed by an independent agency. Costs for these services shall be included in the Contract Sum.

1. The Contractor shall retain and pay an independent testing laboratory to perform the following (continuous) inspections as required, including testing, engineering and associated services:
 - a. Soils: Inspect and test excavations, placement and compaction of fills.
 - b. Concrete: Design all mixes to contract requirements and test same.
 - c. Inspect forms and reinforcement.
 - d. Inspect placement.
 - e. Perform seven (7) and twenty-eight (28) day test on specimen cylinders.
 - f. Reports: Prepare and distribute inspection and test reports.
 2. Miscellaneous: Perform any additional inspections or test required by the legal authorities having jurisdiction.
 3. The Contractor shall employ a geotechnical engineering firm to inspect the soils prior to any foundations or footings being placed. The firm shall monitor the subsurface conditions encountered during construction, inspection proof rolling, and backfill.
 4. The geotechnical engineer shall determine the manner of the placement of all fill and confirm the placement of compact fill, including the removal of any required subsurface conditions encountered. All fill shall be done in compliance with the compacted fill requirements of this project manual.
- B. Associated Services: The Contractor shall cooperate with agencies performing required inspections, tests and similar services and provide reasonable auxiliary services as requested. Notify the agency sufficiently in advance of operations to permit assignment of personnel. Auxiliary services required include but are not limited to:
1. Providing access to the Work and furnishing incidental labor and facilities necessary to facilitate inspections and tests.
 2. Taking adequate quantities of representative samples of materials that require testing or assisting the agency in taking samples.
 3. Providing facilities for storage and curing of test samples, and delivery of samples to testing laboratories.

3. Providing the agency with a preliminary design mix proposed for use for materials mixes that require control by the testing agency.
 4. Security and protection of samples and test equipment at the Project site.
- C. Retesting: The Contractor is responsible for retesting where results of required inspections, tests or similar services prove unsatisfactory and do not indicate compliance with Contract Document requirements.

Cost of retesting construction revised or replaced by the Contractor is the Contractor's responsibility, where required tests were performed on original construction.

- D. Access and Inspection by Owner, Architect, and/or Engineers: The Owner, Architect, and/or Engineers shall be allowed access to the Contractor's shops and those of the Contractor's suppliers to inspect and/or expedite the work and workmanship and to obtain other desired information. The Contractor shall furnish to the Owner, if so requested, at no additional cost, shop and mill test reports when specified. The Contractor shall inform the Architect of progress of the work and shall give the Architect ample advance notice of appropriate times for inspections and tests. When specific inspections are required by the Architect, the work involved shall not proceed beyond that point until the Architect has made or waived such inspections or tests.
1. The Contractor shall provide at least twenty-four (24) hours advance notice to the Architect prior to any test or concrete placement to allow for inspection by the Architect. Inspection will be made after notification that all items have been installed for the test or preparatory for concrete placement. Should the inspection reveal that corrective measures are required or that the work is not complete, an additional twenty-four hours will be allowed to complete the inspection after all work has been corrected or completed.
 2. All work, all materials, whether incorporated in the work or not, all processes of manufacture, and all methods of construction, shall be at all times and places subject to the inspection of the Board of Education, who shall be the final judge of the quality and suitability of the work, materials, processes of manufacture, and methods of construction for the purposes for which they are used. Should they fail to meet the Owner's approval, they shall be forthwith reconstructed, made good, replaced and/or corrected, as the case may be, by the Contractor, at his own expense. Rejected material shall immediately be removed from the site. If, in the opinion of the

Board of Education, it is undesirable to replace any defective or damaged materials, or to reconstruct or correct any portion of the work injured or not performed in accordance with the Contract Documents, the compensation to be paid to the Contractor hereunder shall be reduced by such amount as in the judgment of the Board of Education shall be equitable.

- E. Duties of the Testing Agency: The independent testing agency engaged to perform inspections, sampling and testing of materials and construction specified in individual Specification Sections shall cooperate with the Architect and Contractor in performance of its duties, and shall provide qualified personnel to perform required inspections and tests.
1. The agency shall notify the Architect and Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.
 2. The agency is not authorized to release, revoke, alter or enlarge requirements of the Contract Documents, or approve or accept any portion of the Work.
 3. The agency shall not perform any duties of the Contractor.
- F. Coordination: The Contractor and each agency engaged to perform inspections, tests and similar services shall coordinate the sequence of activities to accommodate required services with a minimum of delay. In addition to Contractor and each agency shall coordinate activities to avoid the necessity of removing and replacing construction to accommodate inspections and tests.

The Contractor is responsible for scheduling times for inspections, tests, taking samples and similar activities.

1.04 SUBMITTALS

- A. The independent testing agency shall submit through the Contractor a certified written report of each inspection, test or similar service, to the Architect, in duplicate, and submit an additional copy to the Owner, unless the Contractor is responsible for the service.

Submit additional copies of each written report directly to the governing authority, when the authority so directs.

- B. Report Data: Written reports of each inspection, test or similar service shall include, but not be limited to:

1. Date of issue.
2. Project title and number.
3. Name, address and telephone number of testing agency.
4. Dates and locations of samples and tests or inspections.
5. Names of individuals making the inspection or test.
6. Designation of the Work and test method.
7. Identification of product and Specification Section.
8. Complete inspection or test data.
9. Test results and an interpretation of test results.
10. Ambient conditions at the time of sample-taking and testing.
11. Comments or professional opinion as to whether inspected or tested Work complies with Contract Document requirements.
12. Name and signature of laboratory inspector.
13. Recommendations on retesting.

1.05 QUALITY ASSURANCE

- A. Qualification for Service Agencies: Engage inspection and testing service agencies, including independent testing laboratories, which are prequalified as complying with "Recommended Requirements for Independent Laboratory Qualification" by the American Council of Independent Laboratories, and which specialize in the types of inspections and tests to be performed.

Each independent inspection and testing agency engaged on the Project shall be authorized by authorities having jurisdiction to operate in the State in which the Project is located.

1.06 OTHER QUALITY CONTROL PROVISIONS REQUIRED OF THE CONTRACTOR

- A. Measurements: The Contractor shall, before ordering any materials or doing any work, verify the accuracy of all dimensions to his satisfaction. No extra charge or compensation will be considered for any construction performed prior to this verification. Commencement of construction for each portion of the work will act as concurrence that the Contractor has determined that the dimensional information provided for that portion of the work and portions related thereto is accurate, adequate, and properly coordinated to satisfactorily perform the work. Any additional dimensional information required or differences encountered shall be submitted to the Architect for clarification prior to proceeding with that portion of the work.
- B. Substrate Preparation: The Contractor shall inspect all surfaces prior to application of finishes, including applied finishes and sealers with the subcontractor responsible for application of finishes, to confirm that the surface is properly prepared for the application of finishes. Unacceptable

surfaces shall be properly prepared for acceptance by finish applicator. Application of finishes will act as confirmation that the finish applicator and the Contractor have both accepted the substrate for finish application. No additional compensation will be considered for the cost associated with replacement of finish systems required as a result of poorly prepared or unacceptable subsurface conditions.

PART 2 - PRODUCTS (Not Applicable).

PART 3 - EXECUTION

3.01 REPAIR AND PROTECTION

- A. General: Upon completion of inspection, testing, sample-taking and similar services, repair damaged construction and restore substrates and finishes to eliminate deficiencies, including deficiencies in visual qualities of exposed finishes. Comply with Contract Document requirements for "Cutting and Patching."
- B. Protect construction exposed by or for quality control service activities, and protect repaired construction.
- C. Repair and protection is the Contractor's responsibility, regardless of the assignment of responsibility for inspection, testing or similar services.

END OF SECTION
QUALITY CONTROL

SECTION 01 50 00 – TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.01 SUMMARY

A. DESCRIPTION

1. Contractors shall provide all temporary facilities throughout the construction period unless otherwise indicated in the Contract Documents.
2. Contractors shall pay all costs for providing, maintaining and removing of all temporary facilities unless otherwise indicated in the Contract Documents.

B. RELATED WORK SPECIFIED ELSEWHERE

1. Temporary Electric: Section 01511

1.02 FACILITIES

A. TEMPORARY SANITATION FACILITIES

1. Contractor will provide and maintain sanitary facilities for all personnel on the project.
2. The number of sanitary facilities required shall be based on the total number of workers employed on the site and shall be in accordance with the provisions of the applicable code.
3. Contractor will maintain sanitary facilities in a sanitary and clean condition at all times.

B. TEMPORARY WATER

1. Drinking Water: Contractor shall provide potable water for drinking purposes for all his personnel on the site. He shall furnish disposable drinking cups at water stations. Each water station shall be equipped with a suitable trash container for disposal of the drinking cups.
2. Construction Water: Owner will provide access to tap locations for construction water of sufficiently pure and potable quality to avoid deleterious effect on any materials used. Location of construction water tap locations will be determined by the Owner depending on the stage of construction of the incoming water service. Each

Contractor shall provide and maintain all hoses, piping and valves as required for obtaining construction water from taps provided by the Owner.

C. TEMPORARY TELEPHONES

1. Owner will not provide telephones or faxes for calls or faxes by Contractor's personnel. Contractor is responsible for his own phones and/or faxes.

D. FIELD OFFICE

1. Contractors shall make provisions for their own field office, subject to approval by the Owner.

E. FIRE PROTECTION

1. The Contractor will provide and maintain portable fire extinguishers on each floor level and building area under construction. Number to conform to applicable codes and OSHA regulations.
2. Fire extinguishers shall be Multi-Purpose (ABC) dry chemical, UL labeled.

F. ACCESS ROADS AND PARKING AREAS

1. Access to the Site is provided by the Owner except in the case of inclement weather where schools are closed.
2. All parking provisions required for Contractors will be coordinated in advance with the Owner. Contractor parking must not interfere with school activities or bus traffic. Contractor parking in non-designated areas may result in the vehicle(s) being towed at Contractor's expense.

G. STORAGE AREAS

1. Each Contractor shall provide all storage space required for this work at off-site locations.
3. All combustible or flammable materials will be safely stored in a secured area in strict accordance with regulations, codes and laws enforced by local, State or Federal agencies, whatsoever is the most stringent.

H. SECURITY MEASURES

1. All safety and security measures shall be the responsibility of the Contractor. These measures shall include but are not limited to the provision of secured storage for tools, construction equipment, and materials and equipment scheduled for installation in the building.

L. TEMPORARY AND PROJECT SIGNS

1. The Contractor shall display no signs other than specified herein.
2. The Contractor shall furnish, erect and maintain such signs as may be required by safety regulations or as necessary to safeguard life and property.
3. Project Signs: Furnish, erect, maintain, and remove when directed, project signs consisting of painted exterior plywood and pressure treated braced 4x4 posts and back bracing. Signs shall be securely anchored in place by approved methods and located where directed.
 - a. 6'x8' project sign and text shall be in accordance with the State of Maryland IAC standard construction sign requirements. Submit mock-up of sign for approval by Architect and Owner prior to fabrication. Contact MCE Sign Plant (410-799-5102 or 5103) for the latest approved sign information.
 - b. Sign locations to be approved by the Owner.
 - c. Remove signs at completion of project and repair any damage.

M. SCAFFOLDING AND WORKING PLATFORMS

1. Contractor shall provide all scaffolding required to perform his work.

N. SAFETY BARRICADES AND RAILINGS

1. Contractor shall provide for his own barricades at all trenches, excavations, and locations as required.

O. PROTECTION OF ADJACENT MATERIALS

1. Contractor shall protect adjacent materials and finishes.

P. CLEAN UP

1. Contractor shall arrange for clean-up and removal of debris resulting from his operations, and shall dispose of debris. Clean up shall be scheduled on a continual basis to ensure that building, grounds and public properties are maintained free from accumulations of waste materials and trash. Work site must be cleaned daily during school year to allow for opening of school each day.
2. The Contractor will ensure that all waste materials that are combustible or flammable will be removed from the building at the end of each work day. All trash considered to be edible by rodent will be disposed of in metal containers and removed by the end of the work day.
3. At completion of his Work, each Contractor shall remove waste materials, rubbish, tools, equipment, and clean up all exposed surfaces in preparation for final cleaning.

W. DUST PROTECTION

1. Each Contractor shall erect and maintain dust proof protection whenever his operations will produce dust and dirt that will filter through the building into occupied or finished areas. Each Contractor shall be responsible for all cleaning required due to his failure to provide such dust protection.

X. PROTECTION OF EXISTING CONSTRUCTION

1. Each Contractor shall be responsible for all damage that he may cause to materials and equipment stored or installed by other Contractors.

PART 2 – PRODUCTS (Not Applicable).

PART 3 - EXECUTION

**END OF SECTION
TEMPORARY FACILITIES AND CONTROLS**

SECTION 01 60 00 – PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

- A. This Section includes the following administrative and procedural requirements: selection of products for use in Project; product delivery, storage, and handling; manufacturers' standard warranties on products; special warranties; product substitutions; and comparable products.

1.03 DEFINITIONS

- A. Products: Items purchased 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, except that products consisting of recycled-content materials are allowed, unless explicitly stated otherwise. Products salvaged or recycled from other projects are not considered new products.
 - 3. Comparable Product: Product that is demonstrated and approved through submittal process, or where indicated as a product substitution, 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. Substitutions: Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents and proposed by Contractor.
- C. Basis-of-Design Product Specification: Where a specific manufacturer's product is named and accompanied by the words "basis of design," including make or model number or other designation, 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 other named manufacturers.

- D. Manufacturer's Warranty: Preprinted written warranty published by individual manufacturer for a particular product and specifically endorsed by manufacturer to Owner.
- E. Special Warranty: Written warranty required by or incorporated into the Contract Documents, either to extend time limit provided by manufacturer's warranty or to provide more rights for Owner.

1.04 SUBMITTALS

- A. Product List: Submit a list, in tabular form, showing specified products. Include generic names of products required. Include manufacturer's name and proprietary product names for each product.
 - 1. Coordinate product list with Contractor's Construction Schedule and the Submittals Schedule.
 - 2. Completed List: Within fifteen (15) days after date of Notice to Proceed, submit four (4) copies of completed product list. Include a written explanation for omissions of data and for variations from Contract requirements.
- B. Substitution Requests: Unless otherwise noted in the particular specification section, substitutions will not be considered and reviewed. Submit three (3) 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. Substitutions must be clearly identified as such on the transmittal and cover page of the request.
 - 1. Documentation: Show compliance with requirements for substitutions and the following:
 - a. Statement indicating why specified material or product cannot be provided.
 - b. Coordination information, including a list of changes or modifications needed to other parts of the Work and to construction performed by Owner and separate contractors that will be necessary to accommodate proposed substitution.
 - c. Detailed comparison of significant qualities of proposed substitution with those of the Work specified. Significant qualities may include attributes such as performance, weight, size, durability, visual effect, and specific features and requirements indicated. Clearly and completely describe how the proposed substitution is equal to or better than the specified product.
 - d. Product Data, including drawings and descriptions of products and fabrication and installation procedures.

- e. Samples, where applicable or requested.
- f. List of similar installations for completed projects with project names and addresses and names and addresses of A/E's and owners.
- g. Material test reports from a qualified testing agency indicating and interpreting test results for compliance with requirements indicated.
- h. Research/evaluation reports evidencing compliance with building code in effect for Project, from a model code organization acceptable to authorities having jurisdiction.
- i. Detailed comparison of Contractor's Construction Schedule using proposed substitution with products specified for 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 lack of availability or delays in delivery.
- j. Cost information, including a proposal of change, if any, in the Contract Sum.
- k. Contractor's certification that proposed substitution complies with requirements in the Contract Documents and is appropriate for applications indicated.
- l. Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of failure of proposed substitution to produce indicated results.
- m. Substitution requests that do not strictly comply with the requirements of this section and related sections will be determined unresponsive and returned to the contractor with no action.

1.05 QUALITY ASSURANCE

- A. Compatibility of Options: If Contractor is given option of selecting between two or more products for use on Project, product selected shall be compatible with products previously selected by the Contractor, even if previously selected products were also options. It is the Contractor's responsibility to assure compatibility of Contractor selected products.

1.06 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, and handle products using means and methods that will prevent damage, deterioration, and loss, including theft. Comply with manufacturer's written instructions.

1. Schedule delivery to minimize long-term storage at Project site and to prevent overcrowding of construction spaces.
 2. Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.
 3. Deliver products to Project site in an undamaged condition in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
 4. Inspect products on delivery to ensure compliance with the Contract Documents and to ensure that products are undamaged and properly protected.
 5. Store products to allow for inspection and measurement of quantity or counting of units.
 6. Store materials in a manner that will not endanger Project structure.
 7. Store products that are subject to damage by the elements, under cover in a weathertight enclosure above ground, with ventilation adequate to prevent condensation.
 8. Comply with product manufacturer's written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage.
 9. Protect stored products from damage or vandalism.
- B. Storage: Provide a secure location and enclosure at Project site for storage of materials and equipment by Owner's construction forces. Coordinate location with Owner. Products may not be stored in the building without prior, written approval by the Owner.

1.07 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.
- B. Special Warranties: Prepare a written document that contains appropriate terms and identification, ready for execution. Submit a draft for approval before final execution.
1. Manufacturer's Standard Form: Modified to include Project-specific information properly executed.

2. Specified Form: Forms are included with the Specifications. Prepare a written document using appropriate form properly executed.
3. Refer to Divisions 02 through 26 Sections and the General Terms and Conditions for specific content requirements and particular requirements for submitting special warranties.

PART 2 - PRODUCTS

2.01 PRODUCT OPTIONS

- A. General Product Requirements: Provide products that comply with the Contract Documents, that are undamaged, and unless otherwise indicated, that are new at time of installation.
 1. Provide products complete with accessories, trim, finish, fasteners, and other items needed for a complete installation and indicated use and effect.
 2. Standard Products: If available, and unless custom products or nonstandard options are specified, provide standard products of types that have been produced and used successfully in similar situations on other projects.
 3. Owner reserves the right to limit selection to products with warranties not in conflict with requirements of the Contract Documents.
 4. Where products are accompanied by the term "as selected," A/E and Owner will make selection.
 5. Where products are accompanied by the term "match sample," sample to be matched is A/E's.
 6. Descriptive, performance, and reference standard requirements in the Specifications establish "salient characteristics" of products.
 7. Or Equal: Where products are specified by name and accompanied by the term "or equal" or "or approved equal" or "or approved," comply with provisions in "Comparable Products" Article to obtain approval for use of an unnamed product.
- B. Product Selection Procedures: Procedures for product selection include the following:
 1. Product: Where Specification paragraphs or subparagraphs titled "Product" name the product and manufacturer, provide the product named.
 2. Manufacturer/Source: Where Specification paragraphs or subparagraphs titled "Manufacturer" or "Source" name three (3) or more manufacturers

or sources, provide a product by the manufacturer or from the source named that complies with requirements.

3. Products: Where Specification paragraphs or subparagraphs titled "Products" introduce a list of names of both products and manufacturers, provide one of the products listed that complies with requirements.
4. Manufacturers: Where Specification paragraphs or subparagraphs titled "Manufacturers" introduce a list of manufacturers' names, provide a product by one of the manufacturers listed that complies with requirements.
5. Available Products: Where Specification paragraphs or subparagraphs titled "Available Products" introduce a list of names of both products and manufacturers, provide one of the products listed.
6. Available Manufacturers: Where Specification paragraphs or subparagraphs titled "Available Manufacturers" introduce a list of manufacturers' names, provide a product by one of the manufacturers listed.
7. Product Options: Where Specification paragraphs titled "Product Options" indicate that size, profiles, and dimensional requirements on Drawings are based on a specific product or system, provide either the specific product or system indicated.
8. Basis-of-Design Products: Where Specification paragraphs or subparagraphs titled "Basis-of-Design Product[s]" are included and also introduce or refer to a list of manufacturers' names, provide either the specified 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.
9. Visual Matching Specification: Where Specifications require matching an established Sample, select a product (and manufacturer) that complies with requirements and matches A/E's sample. A/E's and Owner's decision will be final on whether a proposed product matches satisfactorily.
 - a. If no product available within specified category matches satisfactorily and complies with other specified requirements, comply with provisions of the Contract Documents on "substitutions" for selection of a matching product.
10. Visual Selection Specification: Where Specifications include the phrase "as selected from manufacturer's colors, patterns, textures" or a similar phrase, select a product (and manufacturer) that complies with other specified requirements.
 - a. Standard Range: Where Specifications include the phrase "standard range of colors, patterns, textures" or similar phrase, A/E

and Owner will select color, pattern, or texture from manufacturer's product line that does not include premium items.

- b. Full Range: Where Specifications include the phrase "full range of colors, patterns, textures" or similar phrase, A/E and Owner will select color, pattern, or texture from manufacturer's product line that includes both standard and premium items.

2.02 PRODUCT SUBSTITUTIONS

- A. Timing: The A/E will consider requests for substitution if received within five (5) days after the Notice to Proceed. Requests received after that time may be considered or rejected at discretion of the A/E.
- B. Conditions: Owner will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Owner will return requests without action, except to record noncompliance with these requirements:
 - 1. Requested substitution offers Owner a substantial advantage in cost, time, energy conservation, or other considerations, after deducting additional responsibilities Owner must assume. Owner's additional responsibilities may include compensation to A/E for redesign and evaluation services, increased cost of other construction by Owner, and similar considerations.
 - 2. Requested substitution does not require revisions to the Contract Documents.
 - 3. Requested substitution is consistent with the Contract Documents and will produce indicated results.
 - 4. Substitution request is fully documented and properly submitted.
 - 5. Requested substitution will not affect Contractor's Construction Schedule.
 - 6. Requested substitution has received necessary approvals of authorities having jurisdiction.
 - 7. Requested substitution is compatible with other portions of the Work.
 - 8. Requested substitution has been coordinated with other portions of the Work.
 - 9. Requested substitution provides specified warranty.
 - 10. If requested substitution involves more than one contractor or subcontractor, 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 or subcontractors involved.

11. Substitution is in keeping with Owners standardization and/or inventory control/stocking procedures.

2.03 COMPARABLE PRODUCTS

- A. Where products or manufacturers are specified by name, submit the following, in addition to other required submittals, to obtain approval of an unnamed product:
 1. Evidence that the proposed product does not require extensive revisions to the Contract Documents that it is consistent with the Contract Documents and will produce the indicated results, and that it is compatible with other portions of the Work.
 2. Detailed comparison of significant qualities of proposed product with those named in the Specifications. Significant qualities include attributes such as performance, weight, size, durability, visual effect, and specific features and requirements indicated.
 3. Evidence that proposed product provides specified warranty.
 4. List of similar installations for completed projects with project names and addresses and names and addresses of A/E's and owners, if requested.
 5. Samples, if requested.
 6. Comparable products may be rejected without explanation at the sole discretion of the owner.

PART 3 - EXECUTION (Not Applicable)

END OF SECTION PRODUCT REQUIREMENTS

SECTION 01 73 10 – SPECIAL PROJECT CONDITIONS

PART 1- GENERAL

1.1 RELATED DOCUMENTS:

- A. Drawings and general provisions of the Contract, including Instruction to Bidders, Supplemental Instructions to Bidders, General Conditions, Supplementary Conditions and Division 1 Specifications Sections, apply to this section.

1.2 SUMMARY

- C. This section includes Special Project Conditions.
- D. **RELATED SECTIONS:** The following sections contain requirements that relate to this section.
 - 5. Section 01 10 00, Summary of Work
 - 6. Section 01 73 29, Cutting and Patching
 - 7. Section 01 33 00, Submittal Procedures

1.3 PROTECTION:

- F. Perform removal, cutting, and patching in a manner to minimize damage.
- G. Protect existing work and salvage items from weather and extremes of temperature and humidity. Insulate or heat as necessary to prevent condensation, damage to existing, or adverse conditions for occupancy.

1.4 EXISTING CONDITIONS:

- A. Coordinate alteration to complete sequentially, to accommodate Owner occupancy and maintain security.
- B. Give advance notice for unusual operations, interruption of services, and use of heavy noise producing equipment.
- C. Examine existing construction affected; determine interdependence of components.
- D. Provide necessary temporary measures to preserve integrity of existing work to remain.

- E. When concealed or unknown conditions at variance with the Contract Documents are encountered during operations, report conditions and obtain further instructions before proceeding.

PART 2 – PRODUCTS

2.1 MATERIALS: As specified in individual sections.

2.2 PRODUCT FOR PATCHING AND EXTENDING WORK

- A. Matching existing products to patch and extend existing.
- B. Determine type and quality of existing products by inspection and any necessary testing by use.
- C. Presence of a product, finish, or type of work, requires that patching, extending, or matching shall be performed as necessary to make Work complete and consistent with existing in-place products.

2.3 USE OF SALVAGE MATERIALS

- A. Refer to related sections.
- B. Use salvage materials only to the extent indicated.
- C. Disposition: Do not assume that any equipment, materials, or other items of value will become the Contractor's property. Those items declared "Debris" or "Excess" will become the property of the Contractor and must be removed from the site.

PART 3 – EXECUTION

3.1 PREPARATION:

- A. Advise Owner and occupants of operations involving use of hazardous materials.
- B. Verify disposition of utilities and services in areas to be altered.
- C. Perform exploratory work for examination and determination of interdependent components.
- D. Determine extent of adjustments and temporary measures.

- E. Beginning of alteration work means acceptance of existing conditions.

3.2 ALTERATION:

- A. Cut, move, or remove items as necessary for access to alterations and renovation work. Replace and restore at completion.
- B. Remove unsuitable material not indicated as salvage, repair, or replace such materials as required for finished work.
- C. Remove debris and abandoned items from area and from concealed spaces.
- D. Extend existing to new lines of termination.
- E. Repair surfaces and components to provide for installation of new work and finishes, and to provide means of restoring existing to original condition.
- F. Install products in accordance with requirements of individual sections.

3.3 RELOCATION AND REUSE OF MATERIALS AND EQUIPMENT:

- A. Carefully remove materials and equipment to be reused.
- B. Perform work indicated and reinstall at location indicated.
- C. Return temporarily removed items to original location upon completion of related work as indicated.
- D. Reinstall relocated items at new location indicated.
- E. Install salvage materials in accordance with “execution” requirements of similar new products.

3.4 PATCHING AND MATCHING:

- A. Patch surfaces and areas altered to produce uniform finish and texture over entire area. Use material and workmanship matching original construction.
- B. Where new work abuts or aligns with existing, make smooth and even transition without noticeable change in plane or material. Patched work shall match existing adjacent work in texture and appearance.
- C. When finished surfaces are cut so that a smooth transition with new work is not possible, terminate existing surfaced along a straight line at a natural line of division and provide trim appropriate to materials and approved by Engineer.

3.5 ADJUSTMENTS FOR TRANSITIONS:

- A. Where removal of elements results in adjacent spaces becoming one, rework surfaces to a smooth plane without breaks and steps. Where a change of plane ¼” or more occurs submit recommendation for providing a smooth transition to the Engineer for review.
- B. Install permanent supplemental support and back up where openings are created.
- C. Trim existing materials as necessary for clearance of new finishes and other obstructions, refinish trimmed edges.

3.6 REPAIR OF EXISTING

- A. Patch or repair portions of existing surfaces which are damaged, discolored, or showing other imperfections.
- B. Repair substrate prior to patching finish.
- C. Refinish visible existing surfaces to remain in renovated rooms and spaces to specified condition for each material, with smooth and even transition to adjacent new finishes.
- D. Clean, adjust and retrofit operational functions and systems.

3.7 FINISHING:

- A. Prepare surfaces as recommended by manufacturers of finishes to be applied. Include necessary cleaning, preparation, and sealing of existing surfaces.
- B. Finish surfaces in accordance with requirements of individual section.
- C. When finish cannot be matched, refinish entire surface to nearest intersections (e.g. next corner).

3.8 PROTECTION OF EXISTING SYSTEMS DURING DEMOLITION AND RENOVATIONS

- A. Prior to commencement of construction, at the request of the Contractor, the Owner will demonstrate for the contractor the operating capabilities of the following systems: Public Address System, Security System Telecommunications, Fire Detection and Alarms, HVAC and Controls.

- B. During Construction, the Contractor will make every effort to protect the above listed systems, including but not limited to, providing temporary supports for devices located in ceilings to be removed, providing plastic bags for protection of devices from dust and debris, and repositioning of system wiring to avoid damage.
- C. When the new ceiling installation is sufficiently complete, reinstall all devices.

**END OF SECTION
SPECIAL PROJECT CONDITIONS**

SECTION 01 73 29 – CUTTING AND PATCHING

PART 1- GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provision of the Contract including Instructions to Bidders, Supplemental Instructions to Bidders, General Conditions, Supplementary Conditions and Division 1 Specifications Sections, apply to this section.

1.2 SUMMARY

- A. This section includes the following administrative and procedural requirements for cutting, excavating fitting, and patching of the Work required to:
 - 1. Make the several parts fit properly.
 - 2. Uncover ill-timed work for installing and/or inspecting.
 - 3. **Remove and replace work not conforming to requirements of the Contract Documents.**
 - 4. Remove and replace defective work.
- B. Related Sections: The following sections contain requirements that relate to this section.
 - 1. Division 15, “Mechanical”

1.3 SUBMITTALS

- A. General: Submit the following in accordance with Conditions of the Contract and Section 01300.
- B. Cutting and Patching Proposal: Where prior approval for cutting and patching is required, submit proposal describing proposed procedures well in advance of the time cutting and patching will be performed, and request approval to proceed. Include the following information, as applicable, in the proposal:
 - 1. Describe the extent of cutting and patching required and how it is to be performed; indicate why it cannot be avoided.

2. Describe anticipated results in terms of changes to existing construction; include changes to structural elements and operating components as well as changes in the building's appearance and other significant visual elements.
 3. List products to be used and firms or entities that will perform Work.
 4. Indicate dates when cutting and patching is to be performed.
 5. List utilities that will be disturbed or affected, including those that will be relocated and those that will be temporarily out-of-service. Indicate how long service will be disrupted.
 6. Where cutting and patching involves addition of reinforcement to structural elements, submit details and engineering calculations to show how reinforcement is integrated with the original structure.
- C. Approval by the Architect to proceed with proposed cutting and patching does not waive the Architects' right to later require complete removal and replacement of work found to be cut and patched in an unsatisfactory manner.

1.4 QUALITY ASSURANCE

- A. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of this work of this Section.
- B. Do not cut and patch structural elements in a manner that would reduce their load-carrying capacity or load-deflection ratio. Obtain approval of the cutting and patching proposal before cutting and patching the following structural elements:
1. Foundation construction;
 2. Bearing and retaining walls;
 3. Structural concrete;
 4. Structural steel;
 5. Lintels;
 6. Structural decking;

7. Staircases
 8. Miscellaneous structural metals;
 9. Exterior curtain wall construction; and
 10. Equipment supports.
- C. Do not cut and patch operating elements or safety related components, in a manner that would result in reducing their capacity to perform as intended, or result in increased maintenance or decreased operational life or safety.
1. Obtain approval of the cutting and patching proposal before cutting and patching the following operating elements or safety related systems:
 - a. Shoring, bracing, and sheeting.
 - b. Primary operational systems and equipment.
 - c. Air or smoke barriers.
 - d. Water, moisture, or vapor barriers.
 - e. Membranes and flashings.
 - f. Fire protection systems.
 - g. Noise and vibration control elements and systems.
 - h. Control systems.
 - i. Communication systems.
 - j. Conveying systems.
 - k. Electrical wiring systems.
- D. Do not cut and patch construction exposed on the exterior or in occupied spaces, in a manner that would, in the Architect's opinion, reduce the building's aesthetic qualities, or result in visual evidence of cutting and patching.
1. Remove and replace Work that has been cut and patched in a visually unsatisfactory manner.
 2. Any differences in alignment, color, texture or light reflection, or any surface defects, including but not limited to build up of patching or painting materials, drips, scrapes, air bubbles blemishes, cracks, peels or ripples shall be considered unsatisfactory.
 3. If possible retain the original installer or fabricator to cut and patch the following categories of exposed Work, or if it is not possible to engage the original installer or fabricator, engage another recognized experienced and specialized firm:

- a. Window wall system.
 - b. Acoustical ceilings.
 - c. Terrazzo
 - d. Carpeting.
 - e. HVAC enclosures, cabinets or covers.
- E. Any cost incurred by defective or ill-timed work shall be borne by the party responsible for such work.

PART 2- PRODUCTS

2.1 MATERIALS

- A. Use materials that are identical to existing materials being cut and patched.
- B. Use materials whose installed performance will equal or surpass that of materials being cut and patched.

PART 3- EXECUTION

3.1 PREPARING PRIOR TO CUTTING

- A. Provide required protection including, but not necessarily limited to, shoring, bracing, and support to maintain structural integrity of the Work.
- B. Protect existing construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of the Project that might be exposed during cutting and patching operations.

3.2 PERFORMANCE

- A. Cutting: Cut existing construction using methods least likely to damage elements to be retained or adjoining construction. Where possible review proposed procedures with the original installer, comply with the original installer's recommendations.
 - 1. In general, where cutting is required use hand or small power tools designed for sawing or grinding, not hammering and chopping. Cut holes and slots neatly to size required with minimum disturbance of adjacent surfaces. Temporarily cover openings when work is not in progress.

2. To avoid marring existing finished surfaces, cut or drill from the exposed of finished side into concealed surfaces.
 3. Cut through concrete and masonry using a cutting machine such as carborundum saw or diamond core drill.
 4. Comply with requirements of applicable Sections of Division 2 where cutting and patching requires excavating and backfilling.
 5. By-pass utility services such as pipe or conduit, before cutting, where services are shown or required to be removed, relocated or abandoned. Cut-off pipe or conduit in walls or partitions to be removed. Cap, valve or plug and seal the remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after by-passing and cutting.
- B. Patching: Patch with durable seams that are as invisible as possible. Comply with specified tolerances.
1. Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will eliminate evidence of patching and refinishing.
 2. Where patching occurs in a smooth painted surface, extend final paint coat over entire unbroken surface containing the patch, after the patched area has received primer and second coat.
 3. Patch, repair, or rehang existing ceilings as necessary to provide an even plane surface of uniform appearance.

3.3 CLEANING

- A. Thoroughly clean areas and spaces where cutting and patching is performed or used as access. Remove completely waste materials, paint, mortar, oils, putty, and items of similar nature.

END OF SECTION CUTTING AND PATCHING

SECTION 01 77 00 – PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

- A. This Section includes administrative and procedural requirements for Project Record Documents, including the following:
 - 1. Record Drawings
 - 2. Record Specifications
 - 3. Record Product Data

1.03 SUBMITTALS

- A. Record Drawings: Comply with the following:
 - 1. Number of Copies: Submit copies of Record Drawings as follows:
 - a. Submittal: Submit one set of marked-up Record Prints. A/E will review and note whether general scope of changes, additional information recorded, and quality of drafting are acceptable. Owner will return prints for organizing into sets, printing, binding, and final submittal.
- B. Record Specifications: Submit one copy of marked-up Project's Specifications, including addenda and contract modifications.
- C. Record Product Data: Submit one (1) copy of each Product Data submittal.
 - 1. Where Record Product Data is required as part of operation and maintenance manuals, submit marked-up Product Data as an insert in the manual instead of submittal as Record Product Data.

PART 2 - PRODUCTS

2.01 RECORD DRAWINGS

- A. Record Prints: Maintain one set of blue- or black-line white prints of the Contract Drawings and Shop Drawings.
 - 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 prepare the 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 understandable drawing technique.
 - c. Record data as soon as possible after obtaining it. Record and check the markup before enclosing concealed installations.
 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. Depths of foundations below first floor.
 - d. Locations and depths of underground utilities.
 - e. Revisions to routing of piping and conduits.
 - f. Revisions to electrical circuitry.
 - g. Actual equipment locations.
 - h. Duct size and routing.
 - i. Locations of concealed internal utilities.
 - j. Changes made by Change Order or Construction Change Directive.
 - k. Changes made following Owner's written orders.
 - l. Details not on the original Contract Drawings.
 - m. Field records for variable and concealed conditions.
 - n. Record information on the Work that is shown only schematically
 3. Mark the Contract Drawings or Shop Drawings, whichever is most capable of showing actual physical conditions, completely and accurately. If Shop Drawings are marked, show cross-reference on the Contract Drawings.
 4. Mark record sets with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at the 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 Transparencies: Immediately before inspection for Certificate of Substantial Completion, review marked-up Record Prints with Owner and A/E.
1. Incorporate changes and additional information previously marked on Record Prints. Erase, redraw, and add details and notations where applicable.
 2. Refer instances of uncertainty to Owner for resolution.

3. Print the Contract Drawings and Shop Drawings for use as Record Transparencies. Owner will make the Contract Drawings available to Contractor's print shop.
- C. Newly Prepared Record Drawings: Prepare new Drawings instead of preparing Record Drawings where Owner and A/E determines that neither the original Contract Drawings nor Shop Drawings are suitable to show actual installation.
1. New Drawings may be required when a Change Order is issued as a result of accepting an alternate, substitution, or other modification.
 2. Consult with Owner and A/E for proper scale and scope of detailing and notations required to record the actual physical installation and its relation to other construction. Integrate newly prepared Record Drawings into Record Drawing sets; comply with procedures for formatting, organizing, copying, binding, and submitting.
- D. Format: Identify and date each Record Drawing; include the designation "PROJECT RECORD DRAWING" in a prominent location.
1. Record Prints: Organize Record Prints and newly prepared Record Drawings into manageable sets. Bind each set with durable paper cover sheets. Include identification on cover sheets.
 2. Record Transparencies: Organize into unbound sets matching Record Prints. Place transparencies in durable tube-type drawing containers with end caps. Mark end cap of each container with identification. If container does not include a complete set, identify Drawings included.
 3. Identification: As follows:
 - a. Project name.
 - b. Date.
 - c. Designation "PROJECT RECORD DRAWINGS."
 - d. Name of A/E.
 - e. Name of Contractor.
- E. See additional Record Drawing requirements for all work associated with Divisions 15 and 16.

2.02 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 the 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 Drawings where applicable.

2.03 RECORD PRODUCT DATA

- A. 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 Drawings where applicable.

2.04 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.

PART 3 - EXECUTION

3.01 RECORDING AND MAINTENANCE

- A. Recording: Maintain one copy of each submittal during the construction period for Project Record Document purposes. Post changes and modifications to Project Record Documents as they occur; do not wait until the end of Project.
- B. Maintenance of Record Documents and Samples: Store Record Documents and Samples 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 A/E's reference during normal working hours.
- C. Provide access to Project Record Documents for Owner's reference during normal working hours.

END OF SECTION
PROJECT RECORD DOCUMENT

SECTION 01 77 10-CLOSEOUT PROCEDURES

PART 1-GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

A. This Section specifies administrative and procedural requirements for project closeout, including but not limited to:

1. Inspection procedures.
2. Project record document submittals.
3. Operating and maintenance manual submittal.
4. Submittal of warranties.
5. Final cleaning.
6. Closeout requirements for specific construction activities are included in the appropriate Sections in Divisions 2 through 16.

1.03 SUBSTANTIAL COMPLETION

A. Preliminary Procedures: Before requesting inspection for certification of Substantial Completion, complete the following. List exceptions in the request.

1. In the Application for Payment that coincides with, or first follows, the date Substantial Completion is claimed, show 100 percent completion for the portion of the Work claimed as substantially complete. Include supporting documents for completion as indicated in these Contract Documents and a statement showing an accounting of changes to the Contract Sum.
2. If 100 percent cannot be shown, include a list of incomplete items, the value of incomplete construction, and reasons the Work is not complete.
3. Advise Owner of pending insurance change-over requirements.

4. Submit specific warranties, workmanship bonds, maintenance agreements, final certifications, and similar documents.
 5. Obtain and submit releases enabling the Owner unrestricted use of the Work and access to services and utilities; include occupancy permits, operating certificates, and similar releases.
 6. Submit record drawings, maintenance manuals, damage or settlement survey, property survey, and similar final record information.
 7. Deliver tools, spare parts, extra stock, and similar items.
 8. Make final changeover of permanent locks and transmit keys to the Owner. Advise the Owner's personnel of changeover in security provisions.
 9. Complete start-up testing of systems, and instruction of the Owner's operating and maintenance personnel. Discontinue or change over and remove temporary facilities from the site, along with the construction tools, mock-ups, and similar elements.
- B. Inspection Procedures: On receipt of a request for inspection, the Architect will either proceed with inspection or advise the Contractor of unfilled requirements. The Architect will prepare the Certificate of Substantial Completion following inspection, or advise the Contractor of construction that must be completed or corrected before the certificate will be issued.
1. The Architect will repeat inspection when requested and assured that the Work has been substantially completed.
 2. Results of the completed inspection will form the basis of requirements for final acceptance.

1.04 FINAL ACCEPTANCE

- A. Preliminary Procedures: Before requesting final inspection for certification of final acceptance and final payment, complete the following. List exceptions in the request.
1. Submit the final payment request with releases and supporting documentation not previously submitted and accepted. Include certificates of insurance for products and completed operations where required.

2. Submit an updated final statement, accounting for final additional changes to the Contract Sum.
 3. Submit a certified copy of the Architect's final inspection list of items to be completed or corrected, stating that each item has been completed or otherwise resolved for acceptance and the list has been endorsed and dated by the Architect.
 4. Submit final meter readings for utilities, a measured record of stored fuel, and similar data as of the date of Substantial Completion, or when the Owner took possession of and responsibility for corresponding elements of the Work.
 5. Submit consent of surety to final payment.
 6. Submit a final liquidated damages settlement statement, if any.
 7. Submit evidence of final, continuing insurance coverage complying with insurance requirements.
 8. Complete final clean up requirements, including touch-up painting. Touch-up and otherwise repair and restore marred exposed finishes.
- B. Reinspection Procedure: The Architect will reinspect the Work upon receipt of notice that the Work, including inspection list items from earlier inspections, has been completed, except items whose completion has been delayed because of circumstances acceptable to the Architect.
1. Upon completion of reinspection, the Architect will prepare a certificate of final acceptance, or advise the Contractor of Work that is incomplete or of obligations that have not been fulfilled but are required for final acceptance.

If necessary, reinspection will be repeated.
 2. Should the Architect perform reinspections, due to failure of the Work to comply with the claims of status of completion made by the Contractor, the Owner shall compensate the Architect for additional services; and the Owner shall deduct the amount of the compensation from the final payment to the Contractor.

1.04 RECORD DOCUMENT SUBMITTALS

- A. General: Do not use record documents for construction purposes; protect from deterioration and loss in a secure, fire-resistive location; provide

access to record documents for the Architect's reference during normal working hours.

- B. Record Drawings: Maintain a clean, undamaged set of blue or black line white-prints of Contract Drawings and Shop Drawings. Mark the set to show the actual installation where the installation varies substantially from the Work as originally shown. Mark whichever drawing is most capable of showing conditions fully and accurately; where Shop Drawings are used, record a cross-reference at the corresponding location on the Contract Drawings. Give particular attention to concealed elements that would be difficult to measure and record at a later date.
1. Mark record sets with colored erasable pencil; use other colors to distinguish between variations in separate categories of the Work; use the following color code:
 - a. Red for Architectural Work
 - b. Blue for Structural Work
 - c. Green for Plumbing
 - d. Orange for HVAC Work
 - e. Brown for Electrical Work
 - f. Black for other written notations.
 2. Mark new information that is important to the Owner, but was not shown on Contract Drawings or Shop drawings.
 3. Note related Change Order numbers where applicable.
 4. At completion of project, transfer all Project Record Data to one complete set of mylar sepias using mylar compatible colored pencils or ink. Organize record drawing sheets into manageable sets, bind with durable paper cover sheets, and print suitable titles, dates, and other identification on the cover of each set. Deliver one complete set of mylar sepias of all drawings to the Architect for the Owner's records. The cost of printing the mylar sepias shall be paid by the Contractor.
- C. Record Specifications: Maintain one complete copy of the Project Manual, including addenda, and one copy of other written construction documents such as Change Orders and modifications issued in printed form during construction. Mark these documents to show substantial variations on actual Work performed in comparison with the text of the Specifications and modifications. Give particular attention to substitutions, selection of options and similar information on elements that are concealed or cannot

otherwise be readily discerned late by direct observation. Note related record drawing information and Product Data.

Upon completion of Work, submit record Specifications to the Architect for the Owner's records.

- D. Record Product Data: Maintain one copy of each Product Data submittal. Mark these documents to show significant variations in the actual Work performed in comparison with information submitted. Include variations in products delivered to the site, and from the manufacturer's installation instructions and recommendations. Give particular attention to concealed products and portions of the Work which cannot otherwise be readily discerned later by direct observation. Note related Change Orders and mark-up of record drawings and Specifications.

Upon completion of mark-up, submit complete set of record Product Data to the Architect for the Owner's records.

- E. Record Sample Submitted: Immediately prior to the date or dates of Substantial Completion, the Contractor will meet at the site with the Architect and the Owner's personnel to determine which of the submitted Samples have been maintained during the progress of the Work are to be transmitted to the Owner for record purposes. Comply with delivery to the Owner's Sample storage area.
- F. Miscellaneous Record Submittals: Refer to other Specification Sections for requirements of miscellaneous record-keeping and submittals in connection with actual performance of the Work. Immediately prior to the date or dates of Substantial Completion, complete miscellaneous records and place in good order, properly identified and bound or filed, ready for continued use and reference. Submit to the Architect for the Owner's records.
- G. Maintenance Manuals: Organize operating and maintenance data into three (3) suitable sets of manageable size. Bind properly indexed data in heavy-duty 3-ring vinyl-covered binders, with each page or chart protected by a transparent plastic envelope. Mark appropriate identification on front and spine of each binder. Include the following types of information:
1. Emergency instructions
 2. Spare parts list
 3. Copies of warranties
 4. Wiring diagrams
 5. Recommended "turn around" cycles
 6. Inspection procedures

7. Shop Drawings and Product Data
8. Fixture lamping schedule

- H. Subcontractor List: List all subcontractors. Provide their addresses, phone numbers, and describe scope of work.

PART 2-PRODUCTS (Not Applicable)

PART 3-EXECUTION

3.01 CLOSEOUT PROCEDURES

- A. Operating and Maintenance Instructions: Arrange for each installer of equipment that requires regular maintenance to meet with the Owner's personnel to provide instruction in proper operation and maintenance. If installers are not experienced in procedures, provide instruction by manufacturer's representatives. Include a detailed review of the following items:
1. Maintenance manuals
 2. Record documents
 3. Spare parts and materials
 4. Tools
 5. Lubricants
 6. Fuels
 7. Identification systems
 8. Control sequences
 9. Hazards
 10. Cleaning
 11. Warranties and bonds
 12. Maintenance agreements and similar continuing commitments.
- B. As part of instruction for operating equipment, demonstrate the following procedures:
1. Start-up
 2. Shut down
 3. Emergency operations
 4. Noise and vibration adjustments
 5. Safety procedures
 6. Economy and efficiency adjustments
 7. Effective energy utilization

3.02 FINAL CLEANING

- A. General: General cleaning during construction is required by the General Conditions and included in section “Temporary Facilities”.
- B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to the condition expected in a normal, commercial building cleaning and maintenance program. Comply with manufacturer’s instructions.
 - 1. Complete the following cleaning operations before requesting inspection for Certification of Substantial Completion.
 - a. Remove labels that are not permanent labels.
 - b. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compound and other substances that are noticeable vision-obscuring materials. Replace scratched, chipped, or broken glass and other damaged transparent materials.
 - c. Clean exposed exterior and interior hard-surfaced finishes to a dust-free condition, free of stains, films and similar foreign substances. Restore reflective surfaces to their original reflective condition. Leave concrete floors broom clean. Vacuum carpeted surfaces. Clean, repolish, and wax vinyl composition tile surfaces.
 - d. Wipe surfaces of mechanical and electrical equipment. Remove excess lubrication and other substances. Clean plumbing fixtures to a sanitary condition. Clean light fixtures and lamps.
 - e. Clean the site, including landscape development areas, of rubbish, litter, and foreign substances. Sweep paved areas broom clean; remove stains, spills, and other foreign deposits. Rake grounds that are neither paved nor planted, to a smooth even-textured surface.
- C. Pest Control: Engage an experienced exterminator to make a final inspection, and rid the Project of rodents, insects, and other pests.
- D. Removal of Protection: Remove temporary protection and facilities installed for protection of the Work during construction.
- E. Compliance: Comply with regulations of authorities having jurisdiction and safety standards for cleaning. Do not burn waste materials. Do not bury debris or excess materials on the Owner’s property. Do not

discharge volatile, harmful, or dangerous materials into drainage systems.
Remove waste materials from the site and dispose of in a lawful manner.

- F. Where extra materials of value remaining after completion of associated Work have become the Owner's property, arrange for disposition of these materials as directed.

**END OF SECTION
CLOSEOUT PROCEDURES**

SECTION 01 77 20 – OPERATION & MAINTENANCE DATA

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

- A. This Section includes administrative and procedural requirements for preparing operation and maintenance manuals, including the following:
 - 1. Operation and maintenance documentation directory.
 - 2. Emergency manuals.
 - 3. Operation manuals for systems, subsystems, and equipment.
 - 4. Maintenance manuals for the care and maintenance of products, materials, finishes, systems and equipment.

1.03 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.

1.04 SUBMITTALS

- A. Initial Submittal: Submit one (1) draft copies of each manual at least 7 days before requesting inspection for Substantial Completion. Include a complete operation and maintenance directory. Owner will return copy of draft and mark whether general scope and content of manual are acceptable.
- B. Final Submittal: Submit three (3) copies of each manual in final form.
 - 1. Correct or modify each manual to comply with A/E's comments. Submit three (3) copies of each corrected manual within fifteen (15) days of receipt of A/E's comments.

1.05 COORDINATION

- A. Where operation and maintenance documentation includes information on installations by more than one factory-authorized service representative, assemble and coordinate information furnished by representatives and prepare manuals.

PART 2 – PRODUCTS

2.01 OPERATION AND MAINTENANCE DOCUMENTATION DIRECTORY

- A. Organization: Include a section in the directory for each of the following:
 - 1. List of documents.
 - 2. List of systems.
 - 3. List of equipment.
 - 4. Table of contents.
- B. List of Systems and Subsystems: List systems alphabetically. Include references to operation and maintenance manuals that contain information about each system.
- C. 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.
- D. Tables of Contents: Include a table of contents for each emergency, operation, and maintenance manual.
- E. Identification: In the documentation directory and in each operation and maintenance manual, identify each system, subsystem, and piece of equipment with the 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."

2.02 MANUALS, GENERAL

- A. Organization: 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: Enclose title page in transparent plastic sleeve. Include the following information:
 - 1. Subject matter included in manual.
 - 2. Name and address of Project.
 - 3. Name and address of Owner.
 - 4. Date of submittal.
 - 5. Name, address, and telephone number of Contractor.
 - 6. Name and address of A/E.
 - 7. 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.
 - 1. Binders: Heavy-duty, 3-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. Indicate volume number for multiple-volume sets.
 - 2. Dividers: Heavy-paper dividers with plastic-covered tabs for each section. 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 diskettes for computerized electronic equipment.
 - 4. Supplementary Text: Prepared on 8-1/2-by-11-inch (115-by-280-mm), 20-lb/sq. ft. (75-g/sq. m) 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

2.03 EMERGENCY MANUALS

- A. Content: Organize manual into a separate section for each of the following:
 1. Type of emergency.
 2. Emergency instructions.
 3. Emergency procedures.
- B. 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.
- C. Emergency Instructions: Describe and explain warnings, trouble indications, error messages, and similar codes and signals. Include responsibilities of Owner's operating personnel for notification of Installer, supplier, and manufacturer to maintain warranties.
- D. 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.

2.04 OPERATION MANUALS

- A. 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.
 2. Performance and design criteria if Contractor is 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.

B. Descriptions: Include the following:

1. Product name and model number.
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.

C. 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.

D. Systems and Equipment Controls: Describe the sequence of operation, and diagram controls as installed.

E. Piped Systems: Diagram piping as installed, and identify color-coding where required for identification.

2.05 PRODUCT MAINTENANCE MANUAL

- A. 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.
- B. 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.

- C. 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.
- D. 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.
- E. Repair Materials and Sources: Include lists of materials and local sources of materials and related services.
- F. 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.

2.06 SYSTEMS AND EQUIPMENT MAINTENANCE MANUAL

- A. 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 warranty and bond information, as described below.
- B. Source Information: List each system, subsystem, and piece of equipment included in the 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.
- C. Manufacturers' Maintenance Documentation: Manufacturers' maintenance documentation, including the following information for each component part or piece of equipment:
 - 1. Standard printed maintenance instructions and bulletins.

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.
- D. 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 videotape, if available.
- E. 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.
- F. 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.
- G. Maintenance Service Contracts: Include copies of maintenance agreements with name and telephone number of service agent.
- H. 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 any required notifications for warranty claims.

PART 3 - EXECUTION

3.01 MANUAL PREPARATION

- A. Operation and Maintenance Documentation Directory: Prepare a separate manual that provides an organized reference to emergency, operation, and maintenance manuals.

- B. Emergency Manual: Assemble a complete set of emergency information indicating procedures for use by emergency personnel and by Owner's operating personnel for types of emergencies indicated.
- C. Product Maintenance Manual: Assemble a complete set of maintenance data indicating care and Maintenance of each product, material, and finish incorporated into the Work.
- D. Operation and Maintenance Manuals: Assemble a complete set of operation and maintenance data indicating operation and maintenance of each system, subsystem, and piece of equipment not part of a system.
 - 1. Engage a factory-authorized service representative to assemble and prepare information for each system, subsystem, and piece of equipment not part of a system.
 - 2. Prepare a separate manual for each system and subsystem, in the form of an instructional manual for use by Owner's operating personnel.
- E. Manufacturers' Data: Where manuals contain manufacturers' standard printed data, 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.
 - 1. 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.
- F. 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 operation and maintenance manuals.
 - 2. Comply with requirements of newly prepared Record Drawings.

END OF SECTION
OPERATION & MAINTENANCE DATA

SECTION 01 78 33 – BONDS AND WARRANTIES

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

- A. This Section specifies general administrative and procedural requirements for warranties and bonds required by the Contract Documents, including manufacturer's standard warranties on products and special warranties.
- B. Refer to the General Conditions for terms of the Contractor's special warranty of workmanship and materials.
- C. General closeout requirements are included in Section "Project Closeout."
- D. Specific requirements for warranties for the Work and products and installation that are specified to be warranted, are included in the individual Sections of Divisions-2 through -16.
- E. Certifications and other commitments and agreements for continuing services to Owner are specified elsewhere in the Contract Documents.
- F. Disclaimers and Limitations: Manufacturer's disclaimers and limitations on product warranties do not relieve the Contractor of the warranty on the Work that incorporates the products, nor does it relieve suppliers, manufacturers, and subcontractors required to countersign special warranties with the Contractor.

1.03 DEFINITIONS

- A. Standard Product Warranties are preprinted written warranties published by individual manufacturers for particular products and are specifically endorsed by the manufacturer to the Owner.
- B. Special Warranties are written warranties required by or incorporated in the Contract Documents, either to extend time limits provided by standard warranties or to provide greater rights for the Owner.

1.04 WARRANTY REQUIREMENTS

- A. Related Damages and Losses: When correcting warranted Work that has failed, remove and replace other Work that has been damaged as a result of such failure or that must be removed and replaced to provide access for correction of warranted Work.
- B. Reinstatement of Warranty: When Work covered by a warranty has failed and been corrected by replacement or rebuilding, reinstate the warranty by written endorsement. The reinstated warranty shall be equal to the original warranty with an equitable adjustment for depreciation.
- C. Replacement Cost: Upon determination that Work covered by a warranty has failed, replace or rebuild the Work to an acceptable condition complying with requirements of Contract Documents. The Contractor is responsible for the cost of replacing or rebuilding defective Work regardless of whether the Owner has benefited from use of the Work through a portion of its anticipated useful service life.
- D. Owner's Recourse: Written warranties made to the Owner are in addition to implied warranties, and shall not limit the duties, obligations, right and remedies otherwise available under the law, nor shall warranty periods be interpreted as limitations on time in which the Owner can enforce such other duties, obligations, rights, or remedies.
- E. Rejection of Warranties: The Owner reserves the right to reject warranties and to limit selections to products with warranties not in conflict with requirements of the Contract Documents.
- F. The Owner reserves the right to refuse to accept Work for the Project where a special warranty, certification, or similar commitment is required on such Work or part of the Work, until evidence is presented that entities required to countersign such commitments are willing to do so.

1.05 SUBMITTALS

- A. Submit written warranties to the Architect prior to the date certified for Substantial Completion. If the Architect's Certificate of Substantial Completion designates a commencement date for warranties other than the date of Substantial Completion for the Work, or a designated portion of the Work, submit written warranties upon request of the Architect.
 - 1. When a designated portion of the Work is completed and occupied or used by the Owner, by separate agreement with the Contractor during the construction period, submit properly executed warranties to the Architect within fifteen days of completion of that designated portion of the Work.

2. When a special warranty is required to be executed by the Contractor, or the Contractor and a subcontractor, supplier or manufacturer, prepare a written document that contains appropriate terms and identification, ready for execution by the required parties. Submit a draft to the Owner through the Architect for approval prior to final execution.
 3. Refer to individual Sections of Divisions-2 through -16 for specific content requirements, and particular requirements for submittal of special warranties.
- B. Form of Submittal: At Final Completion compile two copies of each required warranty and bond properly executed by the Contractor, or by the Contractor, subcontractor, supplier, or manufacturer. Organize the warranty documents into an orderly sequence based on the table of contents of the Project Manual.
1. Bind warranties and bonds in heavy-duty, commercial quality, durable 3-ring vinyl covered loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2" by 11" paper.
 2. Provide heavy paper dividers with celluloid covered tabs for each separate warranty. Mark the 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 the installer.
 3. Identify each binder on the front and the spine with the typed or printed title "WARRANTIES AND BONDS," the Project title or name, and the name of the Contractor.
 4. When operating and maintenance manuals are required for warranted construction, provide additional copies of each required warranty, as necessary, for inclusion in each required manual.

PART 2 - PRODUCTS (not applicable).

PART 3 – EXECUTION

- 3.01 Provide warranties and bonds on products and installations as required under the various sections of this specification.

**END OF SECTION
BONDS AND WARRANTIES**

SECTION 01 82 00 – DEMONSTRATION & TRAINING

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

- A. This Section includes administrative and procedural requirements for instructing Owner's personnel, including the following:
 - 1. Demonstration of operation of systems, subsystems, and equipment.
 - 2. Training in operation and maintenance of systems, subsystems, and equipment.
- B. Related Sections include the following:
 - 1. Specification Section "Project Management and Coordination" for requirements for pre-instruction conferences.

1.03 SUBMITTALS

- A. Instruction Program: Submit three (3) copies of outline of instructional program for demonstration and training, including 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. At completion of training, submit three (3) complete training manuals for Owner's use.
- B. Qualification Data: For firms and persons specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of A/E's and owners, and other information specified.
- 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.
- E. Demonstration and Training DVD: Submit two (2) copies at end of each training module.

1.04 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 experienced in operation and maintenance procedures and training.
- C. Pre-instruction Conference: Conduct conference at Project site to comply with requirements in Specification Section "Project Management and Coordination." Review methods and procedures related to demonstration and training including, but not limited to, the following:
 - 1. Inspect and discuss locations and other facilities required for instruction.
 - 2. Review and finalize instruction schedule and verify availability of educational materials, instructors' personnel, audiovisual equipment, and facilities needed to avoid delays.
 - 3. Review required content of instruction.
 - 4. For instruction that must occur outside, review weather and forecasted weather conditions and procedures to follow if conditions are unfavorable.

1.05 COORDINATION

- A. Coordinate instruction schedule with Owner's operations. Adjust schedule as required to minimize disrupting Owner's operations.
- B. Coordinate instructors, including providing notification of dates, times, length of instruction time, and course content.
- C. Coordinate content of training modules with content of approved emergency, operation, and maintenance manuals. Do not submit instruction program until operation and maintenance data has been reviewed and approved by A/E.

PART 2 - PRODUCTS

2.01 INSTRUCTION PROGRAM

- A. Program Structure: Develop an instruction program that includes individual training modules for each system and equipment not part of a system, as required by individual Specification Sections, and as follows:
 - 1. Heat generation including boilers, pumps and distribution piping.
 - 2. Refrigeration systems, including split system air conditioning units, air cooled chillers, pumps and distribution piping.

3. HVAC systems, including air handling equipment, air distribution systems and unit ventilators.
 4. HVAC instrumentation and controls.
 5. Electrical distribution equipment.
- 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:
1. Basis of System Design, Operational Requirements, and Criteria: Include the following:
 - a. System, subsystem, and equipment descriptions.
 - b. Performance and design criteria if Contractor is delegated design responsibility.
 - c. Operating standards.
 - d. Regulatory requirements.
 - e. Equipment function.
 - f. Operating characteristics.
 - g. Limiting conditions.
 - h. Performance curves.
 2. Documentation: Review the following items in detail:
 - a. Emergency manuals.
 - b. Operations manuals.
 - c. Maintenance manuals.
 - d. Project Record Documents.
 - e. Identification systems.
 - f. Warranties and bonds.
 - g. Maintenance service agreements and similar continuing commitments.
 3. Emergencies: Include the following, as applicable:
 - a. Instructions on meaning of warnings, trouble indications, and error messages.
 - b. Instructions on stopping.
 - c. Shutdown instructions for each type of emergency.
 - d. Operating instructions for conditions outside of normal operating limits.
 - e. Sequences for electric or electronic systems.
 - f. Special operating instructions and procedures.
 4. Operations: Include the following, as applicable:
 - a. Startup procedures.
 - b. Equipment or system break-in procedures.

- c. Routine and normal operating instructions.
 - d. Regulation and control procedures.
 - e. Control sequences.
 - f. Safety procedures.
 - g. Instructions on stopping.
 - h. Normal shutdown instructions.
 - i. Operating procedures for emergencies.
 - j. Operating procedures for system, subsystem, or equipment failure.
 - k. Seasonal and weekend operating instructions.
 - l. Required sequences for electric or electronic systems.
 - m. Special operating instructions and procedures.
5. Adjustments: Include the following:
- a. Alignments.
 - b. Checking adjustments.
 - c. Noise and vibration adjustments.
 - d. Economy and efficiency adjustments.
6. Troubleshooting: Include the following:
- a. Diagnostic instructions.
 - b. Test and inspection procedures.
7. Maintenance: Include the following:
- a. Inspection procedures.
 - b. Types of cleaning agents to be used and methods of cleaning.
 - c. List of cleaning agents and methods of cleaning detrimental to product.
 - d. Procedures for routine cleaning
 - e. Procedures for preventive maintenance.
 - f. Procedures for routine maintenance.
 - g. Instruction on use of special tools.
8. Repairs: Include the following:
- a. Diagnosis instructions.
 - b. Repair instructions.
 - c. Disassembly; component removal, repair, and replacement; and reassembly instructions.
 - d. Instructions for identifying parts and components.
 - e. Review of spare parts needed for operation and maintenance.

PART 3 - EXECUTION

3.01 PREPARATION

- A. Assemble educational materials necessary for instruction, including documentation and training module. Assemble training modules into a combined training manual.
- B. Set up instructional equipment at instruction location.

3.02 INSTRUCTION

- A. Facilitator: Engage a qualified facilitator to prepare instruction program and training modules, to coordinate instructors, and to coordinate between Contractor and Owner for number of participants, instruction times, and location.
- B. Engage qualified instructors to instruct Owner's personnel to adjust, operate, and maintain systems, subsystems, and equipment not part of a system.
 - 1. Owner will furnish Contractor with names and positions of participants.
- C. Scheduling: Provide instruction at mutually agreed on times. For equipment that requires seasonal operation, provide similar instruction at start of each season.
 - 1. Schedule training with Owner with at least seven (7) days' advance notice.
- D. Demonstration and Training DVD: 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.
- E. Cleanup: Collect used and leftover educational materials and give to Owner. Remove instructional equipment. Restore systems and equipment to condition existing before initial training use.

END OF SECTION DEMONSTRATION & TRAINING

Gipe Associates, Inc.

CECIL COUNTY PUBLIC SCHOOLS
RISING SUN HIGH SCHOOL

SPECIFICATIONS

Bid Submission

SECTION 22 05 00 - COMMON WORK RESULTS FOR PLUMBING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Piping materials and installation instructions common to most piping systems.
 - 2. Transition fittings.
 - 3. Dielectric fittings.
 - 4. Mechanical sleeve seals.
 - 5. Sleeves.
 - 6. Escutcheons.
 - 7. Grout.
 - 8. Painting and finishing.
 - 9. Supports and anchorages.
- B. Provide all labor, materials, equipment, and services necessary for and incidental to the complete installation and operation of all mechanical work.
- C. Unless otherwise specified, all submissions shall be made to, and acceptances and approvals made by the Architect and the Engineer.
- D. Contract Drawings are generally diagrammatic and all offsets, fittings, transitions and accessories are not necessarily shown. Furnish and install all such items as may be required to fit the work to the conditions encountered. Arrange piping, equipment, and other work generally as shown on the contract drawings, providing proper clearance and access. Where departures are proposed because of field conditions or other causes, prepare and submit detailed shop drawings for approval in accordance with "Submittals" specified below. The right is reserved to make reasonable changes in location of equipment, piping, and ductwork, up to the time of rough-in or fabrication.
- E. Conform to the requirements of all rules, regulations and codes of local, state and federal authorities having jurisdiction.
- F. Coordinate the work under Division 22 with the work of all other construction trades.
- G. Be responsible for all construction means, methods, techniques, procedures, and phasing sequences used in the work. Furnish all tools, equipment and materials necessary to properly perform the work in first class, substantial, and workmanlike manner, in accordance with the full intent and meaning of the contract documents.

1.3 DEFINITIONS

- A. Finished Spaces: Spaces other than mechanical and electrical equipment rooms, furred spaces, pipe chases, unheated spaces immediately below roof, spaces above ceilings, unexcavated spaces, crawlspaces, and tunnels.
- B. Exposed, Interior Installations: Exposed to view indoors. Examples include finished occupied spaces and mechanical equipment rooms.
- C. Exposed, Exterior Installations: Exposed to view outdoors or subject to outdoor ambient temperatures and weather conditions. Examples include rooftop locations.
- D. Concealed, Interior Installations: Concealed from view and protected from physical contact by building occupants. Examples include above ceilings and in chases.
- E. Concealed, Exterior Installations: Concealed from view and protected from weather conditions and physical contact by building occupants but subject to outdoor ambient temperatures. Examples include installations within unheated shelters.
- F. The following are industry abbreviations for plastic materials:
 - 1. CPVC: Chlorinated polyvinyl chloride plastic.
 - 2. PE: Polyethylene plastic.
 - 3. PVC: Polyvinyl chloride plastic.
- G. The following are industry abbreviations for rubber materials:
 - 1. EPDM: Ethylene-propylene-diene terpolymer rubber.
 - 2. NBR: Acrylonitrile-butadiene rubber.

1.4 SUBMITTALS

- A. Product Data: For the following:
 - 1. Transition fittings.
 - 2. Dielectric fittings.
 - 3. Mechanical sleeve seals.
 - 4. Escutcheons.
- B. Welding certificates.

1.5 QUALITY ASSURANCE

- A. Steel Support Welding: Qualify processes and operators according to AWS D1.1, "Structural Welding Code--Steel."
- B. Steel Pipe Welding: Qualify processes and operators according to ASME Boiler and Pressure Vessel Code: Section IX, "Welding and Brazing Qualifications."

1. Comply with provisions in ASME B31 Series, "Code for Pressure Piping."
 2. Certify that each welder has passed AWS qualification tests for welding processes involved and that certification is current.
- C. Electrical Characteristics for Plumbing Equipment: Equipment of higher electrical characteristics may be furnished provided such proposed equipment is approved in writing and connecting electrical services, circuit breakers, and conduit sizes are appropriately modified. If minimum energy ratings or efficiencies are specified, equipment shall comply with requirements.
- 1.6 DELIVERY, STORAGE, AND HANDLING
- A. Deliver pipes and tubes with factory-applied end caps. Maintain end caps through shipping, storage, and handling to prevent pipe end damage and to prevent entrance of dirt, debris, and moisture.
 - B. Store plastic pipes protected from direct sunlight. Support to prevent sagging and bending.
- 1.7 COORDINATION
- A. Arrange for pipe spaces, chases, slots, and openings in building structure during progress of construction, to allow for plumbing installations. Coordinate the work under Division 22 with work of all other construction trades. Conform to the requirements of all rules, regulations, and Codes of local, state, and Federal Authorities Having Jurisdiction.
 - B. Coordinate installation of required supporting devices and set sleeves in poured-in-place concrete and other structural components as they are constructed.
 - C. Coordinate requirements for access panels and doors for plumbing items requiring access that are concealed behind finished surfaces.
- 1.8 PERMITS AND FEES
- A. Obtain all permits and pay taxes, fees and other costs in connection with the work. File necessary plans, prepare documents, give proper notices and obtain necessary approvals. Deliver inspection and approval certificates to Owner prior to final acceptance of the work.
 - B. Permits and fees shall comply with the General Requirements of the specification.
- 1.9 EXAMINATION OF SITE:
- A. Examine the site, determine all conditions and circumstances under which the work must be done, and make all necessary allowances for same. No additional cost to the Owner will be permitted for Contractor's failure to do so.

1.10 CONTRACTOR QUALIFICATION

- A. Any Contractor or Subcontractor performing work under Division 22 shall be fully qualified and acceptable to the Engineer/Owner. Submit the following evidence if requested.
 - 1. A list of not less than five comparable projects that the Contractor completed.
 - 2. Letter of reference from not less than three registered professional engineers, Contractors or building owners.
 - 3. Local and/or State License, where required.
 - 4. Membership trade or professional organizations where required.
- B. A Contractor is any individual, partnership, or corporation, performing work by contract or subcontract on this project.
- C. Acceptance of a Contractor or Subcontractor will not relieve the Contractor or subcontractor of any contractual requirements or his responsibility to supervise and coordinate the work, of various trades.

1.11 MATERIALS AND EQUIPMENT

- A. Materials and equipment installed as a permanent part of the project shall be new, unless otherwise indicated or specified, and of the specified type and quality. This Contractor shall be responsible for connecting all utilities as shown on the drawings, to equipment identified as "under another Division".
- B. Where material or equipment is identified by proprietary name, model number and/or manufacturer, furnish named item, or its equal only of other manufacturers who are indicated in this specification, subject to approval by the Engineer and Cecil County Public Schools. Alternate manufacturers or items other than the first-named shall be equal or better in quality and performance and must be suitable for available space, required arrangement, and application. Submit all data necessary to determine suitability of substituted items, for approval.
- C. The suitability of named item only has been verified. Where more than one item is named, only the first named item has been verified as suitable. Alternate manufacturers/items are items other than first named which shall be equal or better in quality and performance to that of specified items, and must be suitable for available space, required arrangement and application. Manufacturers not named are not acceptable and shall not be submitted.
- D. Substitution will not be permitted for specified items of material or equipment where only one manufacturer is identified.
- E. The Contractor shall only submit those manufacturers indicated in the specification. Proposed alternate manufacturers must be approved by Cecil County and be included into the specifications by Addenda. Substitutions are for materials or manufacturers not listed in this specification. For each substitution proposed by the Contractor, the Contractor shall clearly indicate all differences from the specified item, change in Contract cost, benefit to the Owner and a brief description why the substitution is being proposed. Refer to the Division 1 for additional information. The Owner shall ultimately accept/reject all substitution requests. Refer to the Division 1 of this specification for additional information.

- F. All plumbing devices, fixtures, piping, etc. shall comply with NSF.61, Annex G and MD372 Contractor shall submit certificates proving compliance for each plumbing fixture for review.

1.12 FIRE SAFE MATERIALS

- A. Unless otherwise indicated, materials and equipment shall conform to UL, NFPA OR ASTM Standards for Fire Safety with Smoke and Fire Hazard Rating not exceeding flame spread of 25 and smoke developed of 50.

1.13 REFERENCED STANDARDS, CODES AND SPECIFICATIONS:

- A. Specifications, Codes and Standards listed below are included as part of this specification, latest edition.

AABC	-	Associated Air Balance Council
ABMA	-	American Boiler Manufacturers Association
AIHA	-	American Industrial Hygiene Association
AGA	-	American Gas Association
AMCA	-	Air Movement and Control Association
ANSI	-	American National Standards Institute
ARI	-	Air Conditioning and Refrigeration Institute
ASHRAE	-	American Society of Heating, Refrigerating and Air Conditioning Engineers
ASME	-	American Society of Mechanical Engineers
ASTM	-	American Society for Testing and Materials
AWWA	-	American Water Works Association
CABO	-	Council of American Building Officials
CAGI	-	Compressed Air and Gas Institute
CS	-	Commercial Standard
CSA	-	Canadian Standards Association
HEI	-	Heat Exchanger Institute
HI	-	Hydraulic Institute
HYDI	-	Hydronics Institute
IAPMO	-	International Association of Plumbing and Mechanical Officials
IBC	-	International Building Code
ICBO	-	International Conference of Building Officials
IEEE	-	Institute of Electrical and Electronics Engineers
IFCI	-	International Fire Code Institute
IMC	-	International Mechanical Code
NSPC	-	National Standard Plumbing Code
MSSP	-	Manufacturers Standards Society of the Valve and Fittings Industry
NEC	-	National Electrical Code
NEMA	-	National Electrical Manufacturers Association
NFPA	-	National Fire Protection Association
NSF International-	-	National Sanitation Foundation
SMACNA	-	Sheet Metal and Air Conditioning Contractors National Association
TEMA	-	Tubular Exchanger Manufacturers Association
UL	-	Underwriters' Laboratories

- B. All mechanical equipment and materials shall comply with the Codes and Standards listed in the latest ASHRAE Handbook.
- C. The entire potable water system and all its components shall comply with NSF 61 – Annex G, NSF 372, and all Maryland State “Lead Free” plumbing laws and guidelines.

1.14 SUBMITTALS, REVIEW AND ACCEPTANCE:

- A. Equipment, materials, installation, workmanship and arrangement of work are subject to review and acceptance. No substitution will be permitted after acceptance of equipment or materials except where such substitution is considered by the Engineer to be in best interest of Owner.
- B. With 30 calendar days after award of contract, submit a complete Material and Equipment List for approval. List all proposed materials and equipment, indicating proposed manufacturer, type, class, model and other general identifying information.
- C. After acceptance of Material and Equipment List, submit complete descriptive data for all items. Data shall consist of specifications, data sheets, samples, capacity ratings, performance curves, operating characteristics, catalog cuts, dimensional drawings, wiring diagrams, installation instructions, and any other information necessary to indicate complete compliance with Contract Documents. Edit submittal data specifically for application to this project.
- D. Thoroughly review and stamp all submittals to indicate compliance with contract requirements prior to submission. Coordinate installation requirements and any electrical requirements for equipment submitted. Contractor shall be responsible for correctness of all submittals. Each piece of equipment and its associated components (e.g., relays, fuses, disconnects, etc.) shall be clearly identified.
- E. Submittals will be reviewed for general compliance with design concept in accordance with contract documents, but dimensions, quantities, or other details will not be verified.
- F. Identify submittals, indicating intended application, location and service of submitted items. Refer to specification sections or paragraphs where applicable. Clearly indicate exact type, model number, style, size and special features of proposed item. Submittals of a general nature will not be acceptable. For items other than first-named, clearly list on the first page of the submittal all differences between the specified item and the proposed item. The Contractor shall be responsible for corrective action (or replacement with the specified item) while maintaining the specification requirements if differences have not been clearly indicated in the submittal.
- G. Submit actual operating conditions or characteristics, including NC Levels, for all equipment where required capacities are indicated. Factory order forms showing only required capacities will not be acceptable.
- H. Acceptance will not constitute waiver of contract requirements unless deviations are specifically indicated and clearly noted.

1.15 SHOP DRAWINGS:

- A. Prepare and submit shop drawings for all specially fabricated items, modifications to standard items, specially designed systems where detailed design is not shown on the contract drawings, or where the proposed installation differs from that shown on contract drawings.
- B. Submit data and shop drawings as listed below, in addition to provisions of Paragraph A above. Identify all shop drawings by the name of the item and system and the applicable specification paragraph number.

Items and Systems

Coordinated Drawings.
Fire Stopping - Methods and Materials.
Identification System.
Pipe Materials & Fittings.
Pressure Relief Valve.
Sleeves.
Strainers.
Thermal Insulation Materials.
Thermometers and Gauges.
Valves - Globe, Angle, Check, Plug, Butterfly, and Ball types.

- C. No item listed above shall be delivered to the site, or installed, until approved. After the proposed materials have been approved, no substitution will be permitted except where approved by the Architect.

1.16 SUPERVISION AND COORDINATION:

- A. Provide complete supervision, direction, scheduling, and coordination of all work under the Contract, including that of subcontractors.
- B. Coordinate rough-in of all work and installation of sleeves, anchors, and supports for piping, and other work performed under Division 22.
- C. Coordinate electrical work required under Division 22 with that under Division 26. Coordinate all work under Division 22 with work under all other Divisions.

1.17 CUTTING AND PATCHING:

- A. Accomplish all cutting and patching necessary for the installation of work under Division 22. Damage resulting from this work to other work already in place, shall be repaired at Contractor's expense. Where cutting is required, saw-cut or core drill only, and perform work in neat and workmanlike manner. Use mechanics skilled in the particular trades required.
- B. Do not cut structural members without approval.

1.18 PENETRATION OF WATERPROOF CONSTRUCTION:

- A. Coordinate the work to minimize penetration of waterproof construction, including roofs, exterior walls, and interior waterproof construction. Where such penetrations are necessary, furnish and install all necessary curbs, sleeves, flashings, fittings and caulking to make penetrations absolutely watertight.
- B. Where plumbing vents or other pipes penetrate roofs, flash pipe with All American, Inc., or approved equal, roof flashing assemblies, with 4-pound lead, 6-inch skirt, lead cap, and caulked counterflashing sleeve.
- C. Furnish and install pitch pockets where required.
- D. Furnish and install roof drains, curbs, vent assemblies, and duct sleeves specifically designed for application to the particular roof construction, and install in accordance with the manufacturer's instructions, The National Roofing Contractors Association, SMACNA and as required by other divisions of this specification. The Contractor shall be responsible for sleeve sizes and locations.

1.19 VIBRATION ISOLATION

- A. Furnish and install vibration isolators, flexible connections, supports, anchors, and/or foundations required to prevent transmission of vibration from equipment or piping to building structure.

1.20 ACCESSIBILITY

- A. All equipment shall be installed in such a way that all components requiring access are so located and installed that they may be serviced, reset, replaced, recalibrated, etc., by service technicians in accordance with the Manufacturer's recommendations. If any equipment or components are located in such a position that this Contractor cannot comply with the above, the Contractor shall notify the Engineer in writing before equipment is installed.

1.21 DEMOLITION

- A. Unless otherwise noted all existing equipment, piping, etc., shall remain.
- B. Where existing equipment is indicated to be removed, all associated piping, conduit, power, controls, insulation, hangers, ductwork, supports and housekeeping pads, etc., patch, paint and repair walls/roof/floor to match existing and/or new finishes.
- C. Provide necessary piping, valves, traps, temporary feeds, drips, etc., as required. Drain and re-fill piping systems as often as necessary to accommodate phasing and to minimize time lengths of outages.
- D. The Contractor shall be responsible for visiting the site and determining the existing conditions in which the work is to be performed.

- E. Where any abandoned pipes in existing floors, walls, pipe tunnels, ceilings, etc., conflict with new work, remove abandoned pipes as necessary to accommodate new work.
- F. The location of all existing equipment, piping, etc., indicated is approximate only and shall be checked and verified. Install all new mechanical/plumbing/fire protection work to connect to or clear existing work as applicable.
- G. Maintain egress at all times. Coordinate egress requirements with the State Fire Marshal, the Owner and the authorities having jurisdiction.
- H. Where required to maintain the existing systems in operation, temporarily backfeed existing systems from new equipment. Contractor shall temporarily extend existing piping systems to new piping systems with the appropriate shut-off valves.
- I. At completion of project all temporary piping, valves, controls, etc., shall be removed in their entirety.
- J. Existing piping, equipment, ductwork, materials, etc., not required for re-use or re-installation in this project, shall be removed from the project site.
- K. Deliver to the Owner, on the premises where directed, existing equipment and materials which are removed and which are desired by the Owner or are indicated to remain the property of the Owner.
- L. All other materials and equipment which are removed shall become property of the Contractor and shall be promptly removed, from the premises, and disposed of by the Contractor, in an approved manner. Contractor shall be responsible for proper disposal of all removed equipment containing refrigerants. Contractor shall include in his bid all cost associated with the evacuation, removal and disposal of all existing equipment containing refrigerants in accordance with EPA and Health Department requirements. Where existing split systems or ductless units are indicated to be relocated, extend refrigeration piping, power, and control wiring to the same.
- M. Where piping is removed, remove all pipe hangers which were supporting the removed piping or ductwork. Patch the remaining penetration voids with like materials and paint to match existing construction.
- N. Before demolition begins, and in the presence of the Owners representative, test and note all deficiencies in all existing systems affected by demolition but not completely removed by demolition. Provide a copy of the list of system deficiencies to the Owner and the Engineer. Videotape existing conditions in each space prior to beginning demolition work.
- O. The Owner shall have the first right of refusal for all fixtures, devices and equipment removed by the Contractor.
- P. All devices and equipment designated by the Owner to remain the property of the Owner shall be moved and stored by the Contractor at a location on site as designated by the Owner. It shall be the Contractor's responsibility to store all devices and equipment in a safe manner to prevent damage while stored.
- Q. All existing equipment refused by the Owner shall become the property of the Contractor and shall be removed from the site by the Contractor in a timely manner and disposed of in a legal

manner.

- R. Work Abandoned in Place: cut and remove underground pipe a minimum of 2 inches beyond face of adjacent construction. Cap and patch surface to match existing finish.
- S. Temporary Disconnection: Remove, store, clean, reinstall, reconnect, and make operational equipment indicated for relocation.
- T. Terminate services and utilities in accordance with local laws, ordinances, rules and regulations.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. In other Part 2 articles where subparagraph titles below introduce lists, the following requirements apply for product selection:
 - 1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the manufacturers specified.
 - 2. Manufacturers: Subject to compliance with requirements, provide products by the manufacturers specified.

2.2 PIPE, TUBE, AND FITTINGS

- A. Refer to individual Division 22 piping Sections for pipe, tube, and fitting materials and joining methods.
- B. Pipe Threads: ASME B1.20.1 for factory-threaded pipe and pipe fittings.

2.3 JOINING MATERIALS

- A. Refer to individual Division 22 piping Sections for special joining materials not listed below.
- B. Pipe-Flange Gasket Materials: Suitable for chemical and thermal conditions of piping system contents.
 - 1. ASME B16.21, nonmetallic, flat, asbestos-free, 1/8-inch (3.2-mm) maximum thickness unless thickness or specific material is indicated.
 - a. Full-Face Type: For flat-face, Class 125, cast-iron and cast-bronze flanges.
 - b. Narrow-Face Type: For raised-face, Class 250, cast-iron and steel flanges.
 - 2. AWWA C110, rubber, flat face, 1/8 inch (3.2 mm) thick, unless otherwise indicated; and full-face or ring type, unless otherwise indicated.

- C. Flange Bolts and Nuts: ASME B18.2.1, carbon steel, unless otherwise indicated.
- D. Solder Filler Metals: ASTM B 32, lead-free alloys. Include water-flushable flux according to ASTM B 813.
- E. Brazing Filler Metals: AWS A5.8, BCuP Series, copper-phosphorus alloys for general-duty brazing, unless otherwise indicated; and AWS A5.8, BAg1, silver alloy for refrigerant piping, unless otherwise indicated.
- F. Welding Filler Metals: Comply with AWS D10.12 for welding materials appropriate for wall thickness and chemical analysis of steel pipe being welded.
- G. Solvent Cements for Joining Plastic Piping:
 - 1. ABS Piping: ASTM D 2235.
 - 2. CPVC Piping: ASTM F 493.
 - 3. PVC Piping: ASTM D 2564. Include primer according to ASTM F 656.
 - 4. PVC to ABS Piping Transition: ASTM D 3138.

2.4 TRANSITION FITTINGS

- A. AWWA Transition Couplings: Same size as, and with pressure rating at least equal to and with ends compatible with, piping to be joined.
 - 1. Manufacturers:
 - a. Cascade Waterworks Mfg. Co.
 - b. Dresser Industries, Inc.; DMD Div.
 - c. Ford Meter Box Company, Incorporated (The); Pipe Products Div.
 - d. JCM Industries.
 - e. Smith-Blair, Inc.
 - f. Viking Johnson.
 - 2. Underground Piping NPS 1-1/2 (DN 40) and Smaller: Manufactured fitting or coupling.
 - 3. Underground Piping NPS 2 (DN 50) and Larger: AWWA C219, metal sleeve-type coupling.
 - 4. Aboveground Pressure Piping: Pipe fitting.
- B. Plastic-to-Metal Transition Fittings: PVC one-piece fitting with manufacturer's Schedule 80 equivalent dimensions; one end with threaded brass insert, and one solvent-cement-joint end.
 - 1. Manufacturers:
 - a. Eslon Thermoplastics.
 - b. Charlotte Pipe.
- C. Plastic-to-Metal Transition Adaptors: One-piece fitting with manufacturer's SDR 11 equivalent dimensions; one end with threaded brass insert, and one solvent-cement-joint end.
 - 1. Manufacturers:

- a. Thompson Plastics, Inc.
 - b. Charlotte Pipe.
- D. Plastic-to-Metal Transition Unions: MSS SP-107, PVC four-part union. Include brass end, solvent-cement-joint end, rubber O-ring, and union nut.
 - 1. Manufacturers:
 - a. NIBCO INC.
 - b. NIBCO, Inc.; Chemtrol Div.
 - c. Charlotte Pipe.
- E. Flexible Transition Couplings for Underground Nonpressure Drainage Piping: ASTM C 1173 with elastomeric sleeve, ends same size as piping to be joined, and corrosion-resistant metal band on each end.
 - 1. Manufacturers:
 - a. Cascade Waterworks Mfg. Co.
 - b. Fernco, Inc.
 - c. Mission Rubber Company.
 - d. Plastic Oddities, Inc.

2.5 DIELECTRIC FITTINGS

- A. Description: Combination fitting of copper alloy and ferrous materials with threaded, solder-joint, plain, or weld-neck end connections that match piping system materials.
- B. Insulating Material: Suitable for system fluid, pressure, and temperature.
- C. Dielectric Unions: Dielectric unions are prohibited. Provide dielectric couplings or nipples in lieu of dielectric unions. Provide standard unions where required.
- D. Dielectric Flanges: Factory-fabricated, companion-flange assembly, for 150- or 300-psig (1035- or 2070-kPa) minimum working pressure as required to suit system pressures.
 - 1. Manufacturers:
 - a. Epco Sales, Inc.
 - b. Watts Industries, Inc.; Water Products Div.
 - c. Flowset.
- E. Dielectric Couplings: Galvanized-steel coupling with inert and noncorrosive, thermoplastic lining; threaded ends; and 300-psig (2070-kPa) minimum working pressure at 225 deg F (107 deg C).
 - 1. Manufacturers:
 - a. Calpico, Inc.
 - b. Lochinvar Corp.

- F. Dielectric Nipples: Electroplated steel nipple with inert and noncorrosive, thermoplastic lining; plain, threaded, or grooved ends; and 300-psig (2070-kPa) minimum working pressure at 225 deg F (107 deg C).

1. Manufacturers:
 - a. Perfection Corp.
 - b. Precision Plumbing Products, Inc.
 - c. Sioux Chief Manufacturing Co., Inc.
 - d. Victaulic Co. of America.

2.6 MECHANICAL SLEEVE SEALS

- A. Description: Modular sealing element unit, designed for field assembly, to fill annular space between pipe and sleeve.

1. Manufacturers:
 - a. Advance Products & Systems, Inc.
 - b. Calpico, Inc.
 - c. Metraflex Co.
 - d. Pipeline Seal and Insulator, Inc.
2. Sealing Elements: EPDM or NBR interlocking links shaped to fit surface of pipe. Include type and number required for pipe material and size of pipe.
3. Pressure Plates: Reinforced nylon polymer. Include two for each sealing element.
4. Connecting Bolts and Nuts: Stainless steel of length required to secure pressure plates to sealing elements. Include one for each sealing element.
5. Wall Sleeve: Galvanized steel with 2-inch collar (water stop) continuously welded on both sides.

2.7 SLEEVES

- A. Galvanized Steel Pipe: ASTM A53, Type E, Grade B, Schedule 40, galvanized, plain ends.
- B. Stack Sleeve Fittings: Manufactured, cast-iron sleeve with integral clamping flange. Include clamping ring and bolts and nuts for membrane flashing.
1. Underdeck Clamp: Clamping ring with set screws.
- C. Galvanized-Steel Sheet: 0.0239-inch (0.6-mm) minimum thickness; round tube closed with welded longitudinal joint.
- D. Provide a mock-up of every sleeve type, including sealing systems.

2.8 ESCUTCHEONS

- A. Description: Manufactured wall and ceiling escutcheons and floor plates, with an ID to closely fit around pipe, tube, and insulation of insulated piping and an OD that completely covers opening.
- B. One-Piece, Cast-Brass Type: With set screw.
 - 1. Finish: Polished chrome-plated.
- C. One-Piece, Floor-Plate Type: Cast-iron floor plate.

2.9 GROUT

- A. Description: ASTM C 1107, Grade B, nonshrink and nonmetallic, dry hydraulic-cement grout.
 - 1. Characteristics: Post-hardening, volume-adjusting, nonstaining, noncorrosive, nongaseous, and recommended for interior and exterior applications.
 - 2. Design Mix: 5000-psi (34.5-MPa), 28-day compressive strength.
 - 3. Packaging: Premixed and factory packaged.

PART 3 - EXECUTION

3.1 PIPING SYSTEMS - COMMON REQUIREMENTS

- A. Install piping according to the following requirements and Division 22 Sections specifying piping systems.
- B. Drawing plans, schematics, and diagrams indicate general location and arrangement of piping systems. Indicated locations and arrangements were used to size pipe and calculate friction loss, expansion, pump sizing, and other design considerations. Install piping as indicated unless deviations to layout are approved on Coordination Drawings.
- C. Install piping in concealed locations, unless otherwise indicated and except in equipment rooms and service areas.
- D. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.
- E. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal.
- F. Install piping to permit valve servicing.
- G. Install piping at indicated slopes.
- H. Install piping free of sags and bends.

- I. Install fittings for changes in direction and branch connections.
- J. Install piping to allow application of insulation.
- K. Select system components with pressure rating equal to or greater than system operating pressure.
- L. Install escutcheons for penetrations of walls, ceilings, and floors according to the following:
 - 1. New Piping:
 - a. Piping with Fitting or Sleeve Protruding from Wall: One-piece, deep-pattern type.
 - b. Chrome-Plated Piping: One-piece, cast-brass type with polished chrome-plated finish.
 - c. Insulated Piping: One-piece, stamped-steel type with spring clips.
 - d. Bare Piping at Wall and Floor Penetrations in Finished Spaces: One-piece, cast-brass type with polished chrome-plated finish.
 - e. Bare Piping at Ceiling Penetrations in Finished Spaces: One-piece, cast-brass type with polished chrome-plated finish.
- M. Permanent sleeves are not required for holes formed by removable PE sleeves.
- N. Install sleeves for pipes passing through concrete and masonry walls and concrete floor and roof slabs.
- O. Install sleeves for pipes passing through concrete and masonry walls, gypsum-board partitions, and concrete floor and roof slabs.
 - 1. Cut sleeves to length for mounting flush with both surfaces.
 - a. Exception: Extend sleeves installed in floors 2 inches above finished floor level. Extend cast-iron sleeve fittings below floor slab as required to secure clamping ring if ring is specified.
 - 2. Install sleeves in new walls and slabs as new walls and slabs are constructed.
 - 3. Install sleeves that are two pipe sizes larger than pipe or pipe insulation.
 - a. Galvanized Steel Pipe Sleeves: For pipes through walls and floors except where noted through membrane waterproofing.
 - b. Stack Sleeve Fittings: For pipes penetrating floors with membrane waterproofing. Secure flashing between clamping flanges. Install section of cast-iron soil pipe to extend sleeve to 2 inches (50 mm) above finished floor level. Refer to Division 07 Section "Sheet Metal Flashing and Trim" for flashing. Seal space outside of sleeve fittings with grout.
 - c. Provide galvanized steel sheet sleeves for interior stud partitions.
 - d. Provide galvanized steel wall sleeves with sleeve seal system for walls below grade and concrete slabs on grade. Select sleeve size to allow one-inch annular clear space between piping and sleeve for installing sleeve seal system. Select type, size and number of sealing elements required for piping material and size for sleeve ID or hole size. Position piping in center of sleeve. Center piping in penetration, assemble sleeve system components and install in annular space

between piping and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make a water-tight seal.

4. Except for underground wall penetrations, seal annular space between sleeve and pipe or pipe insulation, using joint sealants appropriate for size, depth, and location of joint. Refer to Division 07 Section "Joint Sealants" for materials and installation.
- P. Aboveground, Exterior-Wall Pipe Penetrations: Seal penetrations using sleeves and mechanical sleeve seals. Select sleeve size two pipe sizes larger than pipe and sleeve for installing mechanical sleeve seals.
- Q. Fire-Barrier Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at pipe penetrations. Seal pipe penetrations with firestop materials. Refer to Division 07 Section "Firestopping" for materials. Provide mock-up for all fire and/or smoke barrier penetrations.
- R. Verify final equipment locations for roughing-in.
- S. Refer to equipment specifications in other Sections of these Specifications for roughing-in requirements.
- T. The entire potable water system and all its components shall comply with NSF 61 – Annex G, NSF 372, and all Maryland State "Lead Free" plumbing laws and guidelines.

3.2 PIPING JOINT CONSTRUCTION

- A. Join pipe and fittings according to the following requirements and Division 22 Sections specifying piping systems.
- B. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.
- C. Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly.
- D. Soldered Joints: Apply ASTM B 813, water-flushable flux, unless otherwise indicated, to tube end. Construct joints according to ASTM B 828 or CDA's "Copper Tube Handbook," using lead-free solder alloy complying with ASTM B 32.
- E. Brazed Joints: Construct joints according to AWS's "Brazing Handbook," "Pipe and Tube" Chapter, using copper-phosphorus brazing filler metal complying with AWS A5.8.
- F. Threaded Joints: Thread pipe with tapered pipe threads according to ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and restore full ID. Join pipe fittings and valves as follows:
 1. Apply appropriate tape or thread compound to external pipe threads unless dry seal threading is specified.
 2. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged. Do not use pipe sections that have cracked or open welds.

- G. Welded Joints: Construct joints according to AWS D10.12, using qualified processes and welding operators according to Part 1 "Quality Assurance" Article.
- H. Flanged Joints: Select appropriate gasket material, size, type, and thickness for service application. Install gasket concentrically positioned. Use suitable lubricants on bolt threads.
- I. Plastic Piping Solvent-Cement Joints: Clean and dry joining surfaces. Join pipe and fittings according to the following:
 - 1. Comply with ASTM F 402 for safe-handling practice of cleaners, primers, and solvent cements.
 - 2. ABS Piping: Join according to ASTM D 2235 and ASTM D 2661 Appendixes.
 - 3. CPVC Piping: Join according to ASTM D 2846/D 2846M Appendix.
 - 4. PVC Nonpressure Piping: Join according to ASTM D 2855.
 - 5. PVC to ABS Nonpressure Transition Fittings: Join according to ASTM D 3138 Appendix.
- J. Plastic Nonpressure Piping Gasketed Joints: Join according to ASTM D 3212.

3.3 PIPING CONNECTIONS

- A. Make connections according to the following, unless otherwise indicated:
 - 1. Install unions, in piping NPS 2 (DN 50) and smaller, adjacent to each valve and at final connection to each piece of equipment.
 - 2. Install flanges, in piping NPS 2-1/2 (DN 65) and larger, adjacent to flanged valves and at final connection to each piece of equipment.
 - 3. Wet Piping Systems: Install dielectric coupling and nipple fittings to connect piping materials of dissimilar metals.

3.4 EQUIPMENT INSTALLATION - COMMON REQUIREMENTS

- A. Install equipment to allow maximum possible headroom unless specific mounting heights are not indicated.
- B. Install equipment level and plumb, parallel and perpendicular to other building systems and components in exposed interior spaces, unless otherwise indicated.
- C. Install plumbing equipment to facilitate service, maintenance, and repair or replacement of components. Connect equipment for ease of disconnecting, with minimum interference to other installations. Extend grease fittings to accessible locations.
- D. Install equipment to allow right of way for piping installed at required slope.

3.5 PAINTING

- A. Painting of plumbing systems, equipment, and components is specified in this Section.

- B. Damage and Touchup: Repair marred and damaged factory-painted finishes with materials and procedures to match original factory finish.
- C. Provide protective finishes on all materials and equipment. Use coated or corrosion-resistant materials, hardware and fittings throughout the work. Paint bare, untreated ferrous surfaces with rust-inhibiting paint. All exterior components including supports, hangers, nuts, bolts, washers, vibration isolators, etc., shall be stainless steel.
- D. Clean surfaces prior to application of insulation, adhesives, coatings, paint, or other finishes.
- E. Provide factory-applied finishes where specified. Unless otherwise indicated factory-applied paints shall be baked enamel with proper pretreatment.
- F. Protect all finishes and restore any finishes damaged as a result of work under Division 22 to their original condition.
- G. The preceding requirements apply to all work, whether exposed or concealed.
- H. Remove all construction marking and writing from exposed equipment, piping and building surfaces. Do not paint manufacturer's labels or tags.
- I. All exposed piping, equipment, etc. shall be painted. Colors shall be selected by the Engineer/Owner and conform to ANSI Standards.

3.6 ERECTION OF METAL SUPPORTS AND ANCHORAGES

- A. Refer to Division 05 Section "Metal Fabrications" for structural steel.
- B. Cut, fit, and place miscellaneous metal supports accurately in location, alignment, and elevation to support and anchor plumbing materials and equipment.
- C. Field Welding: Comply with AWS D1.1.

3.7 GROUTING

- A. Mix and install grout for plumbing equipment base bearing surfaces, pump and other equipment base plates, and anchors.
- B. Clean surfaces that will come into contact with grout.
- C. Provide forms as required for placement of grout.
- D. Avoid air entrapment during placement of grout.
- E. Place grout, completely filling equipment bases.
- F. Place grout on concrete bases and provide smooth bearing surface for equipment.
- G. Place grout around anchors.

- H. Cure placed grout.

3.8 SUPPORTS AND HANGERS

- A. Provide supports, hangers, braces, attachments and foundations required for the work. Support and set the work in a thoroughly substantial and workmanlike manner without placing strains on materials, equipment, or building structure, submit shop drawings for approval. Coordinate all work with the requirements of the structural division.
- B. Supports hangers, braces, and attachments shall be standard manufactured items or fabricated structural steel shapes. All interior hangers shall be galvanized or steel with rust inhibiting paint. For uninsulated copper piping/tubing provide copper hanger with wool or felt insert to prevent contact of dissimilar metals. All exterior hangers shall be constructed of stainless steel utilizing stainless steel rods, nuts, washers, bolts, etc.

3.9 PROVISIONS FOR ACCESS:

- A. The Contractor shall provide access panels and doors for all concealed equipment, valves, strainers, cleanouts, traps, and other devices requiring maintenance, service, adjustment, balancing or manual operation.
- B. Where access doors are necessary, furnish and install manufactured steel door assemblies consisting of hinged door, cam locks, and frame designed for the particular wall or ceiling construction. Properly locate each door. Door size shall be a minimum of 24" x 24" unless otherwise approved by the Architect/Engineer. Provide UL Approved and labeled access doors where installed in fire rated walls or ceilings. Doors shall be Milcor Metal Access Doors as manufactured by Inland-Ryerson, or approved equal.
 - 1. Acoustical or Cement Plaster: Style B
 - 2. Hard Finish Plaster: Style K or L
 - 3. Masonry or Dry Wall: Style M
- C. Where access is by means of lift-out ceiling tiles or panels, mark each panel using small color-coded or numbered tabs. Provide a chart or index for identification. Charts shall be similar to valve charts specified hereinafter. Provide chart in O & M Manual and in the Boiler Room. Screw markers shall be mounted on the ceiling grid.
- D. Access panels, doors, etc., described herein shall be furnished under the section of specifications providing the particular service to be turned over to the pertinent trade for installation. Coordinate installation with installing Contractor. Coordinate locations with the Architect prior to installation.

3.10 PROTECTION OF WORK:

- A. Protect work, material and equipment from weather and construction operations before and after installation. Properly store and handle all materials and equipment.

- B. Cover temporary openings in piping and equipment to prevent the entrance of water, dirt, debris, or other foreign matter.
- C. Cover or otherwise protect all finishes.
- D. Replace damaged materials, devices, finishes and equipment.

3.11 OPERATION OF EQUIPMENT:

- A. Clean all systems and equipment prior to initial operation for testing, or other purposes. Lubricate, adjust, and test all equipment in accordance with manufacturer's instructions. Do not operate equipment unless all proper safety devices or controls are operational. Provide all maintenance and service for equipment that is authorized for operation during construction.
- B. Provide the services of the manufacturer's factory-trained servicemen or technicians to start up the equipment.
- C. Do not use plumbing systems for temporary services during construction unless authorized in writing by the Owner. Where such authorization is granted, temporary use of equipment shall in no way limit or otherwise affect warranties or guaranty period of the work. All equipment safeties shall be functional and equipment operated within the recommended and designed parameters.
- D. Upon completion of work, clean and restore all equipment to new conditions; replace expendable items such as filters, blowdown all strainers, etc.

3.12 IDENTIFICATIONS, FLOW DIAGRAMS, ELECTRICAL DIAGRAMS AND OPERATING INSTRUCTIONS

- A. Contractor shall submit for approval schematic piping diagrams of each piping system installed in the building. Diagrams shall indicate valve location, service, type (i.e., butterfly, globe, ball, etc.) make, model number and the identification number of each valve in the particular system. Following approval by all authorities, the diagrams shall be framed, mounted under glass and hung in the Mechanical Room where directed. Contractor shall deliver the AutoCadd-developed color print from which the diagrams were reproduced to the Owner.
- B. All valves shall be plainly tagged.
- C. All items of equipment shall be furnished with white letters and numbers on black plastic identification plates or aluminum letters and numbers on black engraved aluminum identification plates. Lettering shall be a minimum of 1/4" high. Identification plates shall be securely affixed to each piece of equipment, starters, panels, etc., by screws or adhesive (Tuff-bond #TB2 or as approved equal). Pressure sensitive tape backing is prohibited for all concealed equipment and devices located above drop tile ceilings.
- D. Provide electronic copies of operating and maintenance instructions for all principal items of equipment furnished. This material shall be bound as a volume of the "Record and Information Booklet" as hereinafter specified.

- E. All lines (piping) installed under this contract shall be stenciled with "direction of flow" arrows and with stenciled letters naming each pipe and service.
- F. Provide at least one (1), eight (8) hour session of instruction to the operating personnel. Time of instruction shall be designated by the Owner. All instruction periods shall be video taped, DVD format and provided by an audio/visual specialist. Turn two (2) copies of disks over to the Owner after successful demonstration and training.

3.13 WALL AND FLOOR PENETRATION:

- A. All penetrations of partitions, ceilings, and floors by piping or conduit under Division 22 shall be sealed and caulked airtight for sound and air transfer control and/or fire stopped for fire walls and floors. Provide a mock-up for each type of penetration. Maintain mock-up at the job site trailer after review by Architect/Engineer and Authorities Having Jurisdiction.

3.14 RECORD DRAWINGS:

- A. Upon completion of the plumbing installations, the Contractor shall deliver to the Architect one complete set of the plumbing contract drawings which shall be legibly marked in red pencil to show all changes and departures of the installation as compared with the original design. They shall be suitable for use in preparation of Record Drawings.

3.15 GUARANTEE:

- A. Contractor's attention is directed to guarantee obligations contained in the GENERAL CONDITIONS.
- B. The above shall not in any way void or abrogate equipment manufacturer's guarantee or warranty. Certificates of guarantee shall be included in the operations and maintenance manuals.
- C. Contractor shall also provide, when due to malfunction, two (2) year's free service, from the time of final acceptance by the Owner, to keep the equipment in operating condition. This service shall be rendered upon request when notified of any equipment malfunctions.
- D. All refrigeration compressors shall be provided with a five (5) year parts and labor warranty, including replacement of refrigerant.

3.16 LUBRICATION

- A. All bearings, motors, and all equipment requiring lubrication shall be provided with accessible fittings for same. Before turning over the equipment to the Owner, the Contractor shall fully lubricate each item of equipment, shall provide one year's supply of lubricant for each, and shall provide Owner with complete written lubricating instructions, together with diagram locating the points requiring lubrication. Include this information in the Record and Information Booklet.

- B. In general, all motors and equipment shall be provided with grease lubricated roller or ball bearings with Alemite or equal accessible or extended grease fittings and drain plugs.
- C. Provide remote grease fittings with copper lube lines for air handling units, fans, cooling towers, and for bearings/motors where grease fittings are situated in locations inconvenient/inaccessible for lubrication.
- D. Provide pressure relief fittings at all grease lubrication locations designed to automatically vent within the range of 1/4 to 1 psi, automatically reset below this range, or another pressure relief range if the preceding differs from the manufacturer's recommended pressure range.

3.17 RECORD AND INFORMATION BOOKLET:

- A. The Contractor shall have prepared three (3) copies of the Record and Information Booklet and deliver these copies of the booklet to the Owner. The booklet shall be as specified herein. The booklet must be approved and will not be accepted as final until so stamped.
- B. The booklet shall be bound in a three-ring loose-leaf binder similar to "National" No. 3881 with the following title lettered on the front: "Record and Information Booklet Bohemia Manor M.S. – H.S.". No sheets larger than 8-1/2" x 11" shall be used, except sheets that may be neatly folded to 8-1/2" x 11" and used as a pull-out.
- C. Provide the following data in the booklet:
 1. Catalog data on each piece of plumbing equipment furnished.
 2. Maintenance operation and lubrication instructions on each piece of equipment furnished.
 3. Complete catalog data on each piece of plumbing equipment furnished, including approved shop drawings.
 4. Manufacturer's and Contractors' guarantees.
 5. Chart form indicating time and type of routine maintenance of plumbing equipment. The chart shall also indicate tag number, model number of equipment, location and service. For replacement items such as filters, indicate type, size and quantity of the replaceable items.
 6. Provide sale and service representatives' names and phone numbers of all equipment and subcontractors.
 7. Catalog data of all equipment valves, etc., which shall include wiring diagrams, parts list and assembly drawing.
 8. Provide valve chart including valve tag number, valve type, valve model number, valve manufacturer, style, service and location, etc., as specified hereinafter.
 9. Provide certification that lead-free and asbestos-free products were provided.
 10. Provide operating curves indicating design and balanced conditions for pumps.
 11. Provide copies of all flushing reports.
 12. Provide copies of all start-up reports.
 13. DVD's of all demonstration and instructional periods.
 14. CD's/DVD's of all Coordination Drawings.

3.18 TESTS, GENERAL:

- A. The entire new plumbing systems shall be tested hydrostatically for a duration of four (4) hours before insulation covering is applied and provided tight under the following gauge pressures:

1. Domestic Water & Coil Drain Piping: 100 psi

- B. Upon completion of roughing-in and before setting fixtures, the entire new water piping system shall be tested at a hydrostatic pressure of not less than one hundred (100) pounds per square inch gauge and proved tight at this pressure. Where a portion of the water piping system is to be concealed before completion, this portion shall be tested separately in a manner described for the entire system.
- C. All testing shall be witnessed by the Owner or Construction Manager. The Contractor shall provide a minimum of 48-hour notice before testing. The Contractor shall coordinate with and get approval from the Owner or Construction Manager.

3.19 LINTELS:

- A. Under this Section, provide lintels not provided elsewhere which are required for openings for the installation of plumbing work. Lintels shall meet the requirements of the Architectural and Structural Sections and The Architectural Drawings and Specifications.

3.20 EQUIPMENT BY OTHERS

- A. This Contractor shall make all system connections required to equipment furnished and installed under other divisions. Connections shall be complete in all respects to render this equipment functional to its fullest intent.
- B. It shall be the responsibility of the supplier of this equipment to furnish complete instructions for connections. Failure to do so will relieve this Contractor of any responsibility for improper equipment operation.
- C. Typical equipment refers to, but is not limited to: Fume hoods, storage cabinets, dishwashers, clothes washers, dryers and all other lab equipment.

3.21 FASTENERS:

- A. All fasteners located in public space, including classrooms, offices, etc., shall be provided with tamper-proof type fasteners.

3.22 INSTALLATION AND COORDINATION DRAWINGS;

- A. Prepare, submit, and use composite installation and coordination drawings to assure proper coordination and installation of work. Drawings shall include, but not be limited, to the following: Complete Ductwork, Plumbing, Sprinkler and HVAC Piping Drawings showing coordination with approved equipment, approved casework drawings, lights, electrical equipment and structural. The Mechanical Contractor is responsible for coordinating with all trades to insure systems will fit in the available space. If conflicts exist after fabrication and/or installation of systems prior to preparing a coordinated drawing of the area, the Contractor shall remove, re-fabricate, and re-install all such work at their own cost, except for the difference in cost, if any, from the originally

designed system to the revised design. If no design changes were made, and clarifications were required, it shall be at no expense to the Owner.

- B. Draw plans to a scale not less than 3/8-inch equals one foot. Include plans, sections, and elevations of proposed work, showing all equipment, piping and ductwork in areas involved. Fully dimension all work including fume hoods, casework and associated utilities, valve boxes, lighting fixtures, conduits, pullboxes, panelboards, and other electrical work, telecommunications equipment, walls, doors, ceilings, columns, beams, joists and other architectural and structural work.
- C. Identify all equipment and devices on wiring diagrams and schematics. Where field connections are shown to factory-wired terminals, include manufacturer's literature showing internal wiring.
- D. All coordination drawings shall be prepared in AutoCAD format and submitted in color. Different colors shall be used to determine different building components. In addition to the composite coordination drawings, simultaneously submit individual sheet-metal, piping, and sprinkler coordination drawings.
- E. Prepare separate coordinated reflected ceiling plans in 1/8", 1/4", or 3/8" scale showing grid systems, lighting fixtures, communication system components, TV brackets, sprinkler heads, air devices, and all other ceiling-mounted items.

3.23 PLUMBING INSTALLATIONS

- A. General: Sequence, coordinate, and integrate the various elements of plumbing systems, materials, and equipment including, but not limited to, the following:
 - 1. Coordinate plumbing systems, equipment and materials installation with other building components.
 - 2. Verify all dimensions by field measurements.
 - 3. Coordinate the installation of required supporting devices and sleeves to be set in poured-in-place concrete and other structural components, as they are constructed.
 - 4. Sequence, coordinate, and integrate installations of mechanical materials and equipment for efficient flow of the work. Give particular attention to large equipment requiring positioning prior to closing in the building.
 - 5. Where mounting heights are not detailed, noted, or dimensioned, install systems, materials, and equipment to provide the maximum headroom possible.
 - 6. Coordinate connection of mechanical systems with exterior underground and overhead utilities and services. Comply with requirements of governing regulations, franchised service companies, and controlling agencies. Provide required connection for each service.
 - 7. Install systems, materials, and equipment to conform with approved submittal data, including coordination drawings, to greatest extent possible. Conform to arrangements indicated by the Contract Documents, recognizing that portions of the work are shown only in diagrammatic form.
 - 8. Install systems, materials, and equipment level and plumb, parallel and perpendicular to other building systems and components.
 - 9. Install mechanical equipment to facilitate service, maintenance, and repair or replacement of equipment components in accordance with manufacturers' recommendations. Connect equipment for ease of disconnecting, with minimum of interference with other installations. Extend grease fittings to an accessible location.

10. Install access panels or doors where units are concealed behind finished surfaces.
11. Install systems, materials, and equipment giving right-of-way priority to systems required to be installed at a specified slope.

END OF SECTION

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SECTION 22 05 19 - METERS AND GAUGES FOR PLUMBING PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Dial-type pressure gauges.
 - 2. Gauge attachments.
 - 3. Test plugs.
 - 4. Test-plug kits.

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Product Certificates: For each type of meter and gauge, from manufacturer.
- C. Operation and Maintenance Data: For meters and gauges to include in operation and maintenance manuals.

PART 2 - PRODUCTS

2.1 THERMOWELLS

- A. Thermowells:
 - 1. Standard: ASME B40.200.
 - 2. Description: Pressure-tight, socket-type fitting made for insertion into piping tee fitting.
 - 3. Material for Use with Copper Tubing: Brass.
 - 4. Material for Use with Steel Piping: Brass.
 - 5. Type: Stepped shank unless straight or tapered shank is indicated.
 - 6. External Threads: NPS 1/2, NPS 3/4, or NPS 1, ASME B1.20.1 pipe threads.
 - 7. Internal Threads: 1/2, 3/4, and 1-inch, with ASME B1.1 screw threads.
 - 8. Bore: Diameter required to match thermometer bulb or stem.
 - 9. Insertion Length: Length required to match thermometer bulb or stem.
 - 10. Lagging Extension: Include on thermowells for insulated piping and tubing.
 - 11. Bushings: For converting size of thermowells internal screw thread to size of thermometer connection.
- B. Heat-Transfer Medium: Mixture of graphite and glycerine.

2.2 PRESSURE GAUGES

A. Direct-Mounted, Metal-Case, Dial-Type Pressure Gauges:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Ashcroft Inc.
 - b. Ernst Flow Industries.
 - c. Terice, H. O. Co.
 - d. Weiss Instruments, Inc.
2. Standard: ASME B40.100.
3. Case: Sealed type; cast aluminum or drawn steel, 6-inch (114-mm) nominal diameter.
4. Pressure-Element Assembly: Bourdon tube unless otherwise indicated.
5. Pressure Connection: Brass, with NPS 1/2, ASME B1.20.1 pipe threads and bottom-outlet type unless back-outlet type is indicated.
6. Movement: Mechanical, with link to pressure element and connection to pointer.
7. Dial: Nonreflective aluminum with permanently etched scale markings graduated in psi .
8. Pointer: Dark-colored metal.
9. Window: Glass.
10. Ring: Stainless steel.
11. Accuracy: Grade A, plus or minus 1 percent of middle half of scale range.

2.3 GAUGE ATTACHMENTS

- A. Snubbers: ASME B40.100, brass; with NPS 1/2, ASME B1.20.1 pipe threads and piston -type surge-dampening device. Include extension for use on insulated piping.
- B. Valves: Stainless steel ball, stem and trim, brass body, with NPS 1/2, ASME B1.20.1 pipe threads.

2.4 TEST PLUGS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 1. Terice, H. O. Co.
 2. Weiss Instruments, Inc.
 3. Peterson Equipment Company.
 4. Flow Design, Inc.
 5. Sisco Manufacturing Company, Inc.
 6. Nutech
 7. Griswold
- B. Description: Test-station fitting made for insertion into piping tee fitting.
- C. Body: Brass or stainless steel with core inserts and gasketed and threaded cap. Include extended stem on units to be installed in insulated piping.
- D. Thread Size: NPS 1/4 or NPS 1/2, ASME B1.20.1 pipe thread.

- E. Core Inserts: Chlorosulfonated polyethylene synthetic and EPDM self-sealing rubber.

2.5 TEST-PLUG KITS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Flow Design, Inc.
 - 2. Sisco Manufacturing Company, Inc.
 - 3. Peterson Equipment Company.
 - 4. Trerice, H.O. Company.
 - 5. Weiss Instruments, Inc.
 - 6. Nutech.
 - 7. Griswold.
- B. Furnish one test-plug kit(s) containing two thermometer(s), one pressure gauge and adapter, and carrying case. Thermometer sensing elements, pressure gauge, and adapter probes shall be of diameter to fit test plugs and of length to project into piping.
- C. High-Range Thermometer: Small, bimetallic insertion type with 1- to 2-inch diameter dial and tapered-end sensing element. Dial range shall be at least 0 to 220 deg F.
- D. Pressure Gauge: Small, Bourdon-tube insertion type with 2- to 3-inch diameter dial and probe. Dial range shall be at least 0 to 200 psig.
- E. Carrying Case: Metal or plastic, with formed instrument padding.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install thermowells with socket extending to center of pipe and in vertical position in piping tees.
- B. Install thermowells of sizes required to match thermometer connectors. Include bushings if required to match sizes.
- C. Install thermowells with extension on insulated piping.
- D. Fill thermowells with heat-transfer medium.
- E. Install direct-mounted thermometers in thermowells and adjust vertical and tilted positions.
- F. Install direct-mounted pressure gauges in piping tees with pressure gauge located on pipe at the most readable position.
- G. Install valve and snubber in piping for each pressure gauge for fluids.
- H. Install test plugs in piping tees.

- I. Install pressure gauges in the following locations:
 - 1. Building water service entrance into building.
 - 2. Inlet and outlet of each pressure-reducing valve.
 - 3. Suction and discharge of each domestic water pump.
 - 4. Where indicated on the Drawings.
- J. All pressure gauges mounted 96" or higher above finished floor are to be 6" nominal diameter and shall be adjusted so the gauge can be read from the floor.

3.2 CONNECTIONS

- A. Install meters and gauges adjacent to machines and equipment to allow service and maintenance of meters, gauges, machines, and equipment.

3.3 ADJUSTING

- A. Adjust faces of meters and gauges to proper angle for best visibility.

3.4 PRESSURE-GAUGE SCHEDULE

- A. Pressure gauges at discharge of each water service into building shall be selected so that the thermal readings are at the approximate mid-point and maximum pressures. Do not exceed full scale.

END OF SECTION

SECTION 22 05 23 - GENERAL-DUTY VALVES FOR PLUMBING PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Brass ball valves.
 - 2. Bronze ball valves.
 - 3. Bronze lift check valves.
 - 4. Bronze swing check valves.
- B. Related Sections:
 - 1. Division 22 plumbing piping Sections for specialty valves applicable to those Sections only.
 - 2. Division 22 Section "Identification for Plumbing Piping and Equipment" for valve tags and schedules.

1.3 DEFINITIONS

- A. CWP: Cold working pressure.
- B. EPDM: Ethylene propylene copolymer rubber.
- C. NBR: Acrylonitrile-butadiene, Buna-N, or nitrile rubber.
- D. NRS: Nonrising stem.
- E. OS&Y: Outside screw and yoke.
- F. RS: Rising stem.
- G. SWP: Steam working pressure.

1.4 SUBMITTALS

- A. Product Data: For each type of valve indicated.

1.5 QUALITY ASSURANCE

- A. Source Limitations for Valves: Obtain each type of valve from single source from single manufacturer.
- B. ASME Compliance:
 - 1. ASME B16.10 and ASME B16.34 for ferrous valve dimensions and design criteria.
 - 2. ASME B31.1 for power piping valves.
 - 3. ASME B31.9 for building services piping valves.
- C. NSF Compliance: NSF 61 Annex G and NSF 372 for valve materials for potable-water service.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Prepare valves for shipping as follows:
 - 1. Protect internal parts against rust and corrosion.
 - 2. Protect threads, flange faces, grooves, and weld ends.
 - 3. Set angle, gate, and globe valves closed to prevent rattling.
 - 4. Set ball and plug valves open to minimize exposure of functional surfaces.
 - 5. Block check valves in either closed or open position.
- B. Use the following precautions during storage:
 - 1. Maintain valve end protection.
 - 2. Store valves indoors and maintain at higher than ambient dew point temperature. If outdoor storage is necessary, store valves off the ground in watertight enclosures.
- C. Use sling to handle large valves; rig sling to avoid damage to exposed parts. Do not use handwheels or stems as lifting or rigging points.

PART 2 - PRODUCTS

2.1 GENERAL REQUIREMENTS FOR VALVES

- A. Refer to valve schedule articles for applications of valves.
- B. Valve Pressure and Temperature Ratings: Not less than indicated and as required for system pressures and temperatures.
- C. Valve Sizes: Same as upstream piping unless otherwise indicated.
- D. Valve Actuator Types:
 - 1. Gear Actuator: For quarter-turn valves NPS 4" and larger.
 - 2. Handwheel: For valves other than quarter-turn types.
 - 3. Handlever: For quarter-turn valves NPS 3 and smaller.

4. Wrench: For plug valves with square heads. Furnish Owner with 1 wrench for every 2 plug valves, for each size square plug-valve head.
- E. Valves in Insulated Piping: With 2-inch stem extensions and the following features:
 1. Ball Valves: With extended operating handle of non-thermal-conductive material, and protective sleeve that allows operation of valve without breaking the vapor seal or disturbing insulation.
- F. Valve-End Connections:
 1. Flanged: With flanges according to ASME B16.1 for iron valves.
 2. Solder Joint: With sockets according to ASME B16.18.
 3. Threaded: With threads according to ASME B1.20.1.
- G. Valve Bypass and Drain Connections: MSS SP-45.

2.2 BRASS BALL VALVES

- A. Two-Piece, Full-Port, Brass Ball Valves with Stainless-Steel Trim:
 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Crane Co.; Crane Valve Group; Crane Valves.
 - b. Crane Co.; Crane Valve Group; Jenkins Valves.
 - c. Flow-Tek, Inc.; a subsidiary of Bray International, Inc.
 - d. Hammond Valve.
 - e. Jamesbury; a subsidiary of Metso Automation.
 - f. Kitz Corporation.
 - g. Milwaukee Valve Company.
 - h. Watts Regulator Company.
 2. Description:
 - a. Standard: MSS SP-110.
 - b. SWP Rating: 150 psig.
 - c. CWP Rating: 600 psig.
 - d. Body Design: Two piece.
 - e. Body Material: Forged brass.
 - f. Ends: Threaded.
 - g. Seats: PTFE or TFE.
 - h. Stem: Stainless steel.
 - i. Ball: Stainless steel, vented.
 - j. Port: Full.

2.3 BRONZE BALL VALVES

- A. Two-Piece, Regular-Port, Bronze Ball Valves with Stainless-Steel Trim:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Conbraco Industries, Inc.; Apollo Valves.
 - b. Crane Co.; Crane Valve Group; Crane Valves.
 - c. Hammond Valve.
 - d. Milwaukee Valve Company.
 - e. Watts Regulator Co.; a division of Watts Water Technologies, Inc.
2. Description:
 - a. Standard: MSS SP-110.
 - b. SWP Rating: 150 psig.
 - c. CWP Rating: 600 psig.
 - d. Body Design: Two piece.
 - e. Body Material: Bronze.
 - f. Ends: Threaded.
 - g. Seats: PTFE or TFE.
 - h. Stem: Stainless steel.
 - i. Ball: Stainless steel, vented.
 - j. Port: Regular.

2.4 BRONZE LIFT CHECK VALVES

A. Class 125, Lift Check Valves with Bronze Disc:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Crane Co.; Crane Valve Group; Crane Valves.
 - b. Crane Co.; Crane Valve Group; Jenkins Valves.
 - c. Crane Co.; Crane Valve Group; Stockham Division.
2. Description:
 - a. Standard: MSS SP-80, Type 1.
 - b. CWP Rating: 200 psig.
 - c. Body Design: Vertical flow.
 - d. Body Material: ASTM B 61 or ASTM B 62, bronze.
 - e. Ends: Threaded.
 - f. Disc: Bronze.

2.5 BRONZE SWING CHECK VALVES

A. Class 125, Bronze Swing Check Valves with Bronze Disc:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Crane Co.; Crane Valve Group; Crane Valves.

- b. Crane Co.; Crane Valve Group; Jenkins Valves.
- c. Crane Co.; Crane Valve Group; Stockham Division.
- d. Hammond Valve.
- e. Milwaukee Valve Company.
- f. Watts Regulator Co.; a division of Watts Water Technologies, Inc.

2. Description:

- a. Standard: MSS SP-80, Type 3.
- b. CWP Rating: 200 psig.
- c. Body Design: Horizontal flow.
- d. Body Material: ASTM B 62, bronze.
- e. Ends: Threaded.
- f. Disc: Bronze.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine valve interior for cleanliness, freedom from foreign matter, and corrosion. Remove special packing materials, such as blocks, used to prevent disc movement during shipping and handling.
- B. Operate valves in positions from fully open to fully closed. Examine guides and seats made accessible by such operations.
- C. Examine threads on valve and mating pipe for form and cleanliness.
- D. Examine mating flange faces for conditions that might cause leakage. Check bolting for proper size, length, and material. Verify that gasket is of proper size, that its material composition is suitable for service, and that it is free from defects and damage.
- E. Do not attempt to repair defective valves; replace with new valves.

3.2 VALVE INSTALLATION

- A. Install valves with unions or flanges at each piece of equipment arranged to allow service, maintenance, and equipment removal without system shutdown.

- B. Locate valves for easy access and provide separate support where necessary. All valves and controls for plumbing/mechanical must be installed no higher than 36" above acoustical ceiling tiles and no higher than 24" above ceilings requiring access panels.
- C. Install valves in horizontal piping with stem at or above center of pipe.
- D. Install valves in position to allow full stem movement.
- E. Install check valves for proper direction of flow and as follows:
 - 1. Swing Check Valves: In horizontal position with hinge pin level.
 - 2. Lift Check Valves: With stem upright and plumb.

3.3 ADJUSTING

- A. Adjust or replace valve packing after piping systems have been tested and put into service but before final adjusting and balancing. Replace valves if persistent leaking occurs.

3.4 GENERAL REQUIREMENTS FOR VALVE APPLICATIONS

- A. If valve applications are not indicated, use the following:
 - 1. Shutoff Service: Ball.
 - 2. Throttling Service: Globe, ball.
 - 3. Pump-Discharge Check Valves:
 - a. NPS 2 and Smaller: Bronze swing check valves with bronze disc.
- B. If valves with specified SWP classes or CWP ratings are not available, the same types of valves with higher SWP classes or CWP ratings may be substituted.
- C. Select valves, except wafer types, with the following end connections:
 - 1. For Copper Tubing, NPS 2 and Smaller: Threaded ends except where solder-joint valve-end option is indicated in valve schedules below.
 - 2. For Copper Tubing, NPS 2-1/2 to NPS 4: Flanged ends except where threaded valve-end option is indicated in valve schedules below.
 - 3. For Copper Tubing, NPS 5 and Larger: Flanged ends.

3.5 DOMESTIC COLD-WATER VALVE SCHEDULE

A. Pipe NPS 4 and Smaller:

1. Bronze and Brass Valves: May be provided with solder-joint ends instead of threaded ends.
2. Ball Valves: Two piece, NPS 2 and less, full port, brass with stainless steel trim and NPS 2-1/2 and larger, standard port, bronze with stainless-steel trim.
3. Bronze Swing Check Valves: Class 125, bronze disc.
4. Bronze Globe Valves: Class 125, bronze disc.

END OF SECTION

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SECTION 22 05 29 - HANGERS AND SUPPORTS FOR PLUMBING PIPING AND EQUIPMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Metal pipe hangers and supports.
 - 2. Thermal-hanger shield inserts.
 - 3. Fastener systems.
- B. Related Sections:
 - 1. Division 22 Section "Vibration and Seismic Controls for Plumbing Piping and Equipment" for vibration isolation devices.

1.3 DEFINITIONS

- A. MSS: Manufacturers Standardization Society of The Valve and Fittings Industry Inc.

1.4 PERFORMANCE REQUIREMENTS

- A. Structural Performance: Hangers and supports for plumbing piping and equipment shall withstand the effects of gravity loads and stresses within limits and under conditions indicated according to ASCE/SEI 7.
 - 1. Design supports for multiple pipes, including pipe stands, capable of supporting combined weight of supported systems, system contents, and test water.
 - 2. Design equipment supports capable of supporting combined operating weight of supported equipment and connected systems and components.

1.5 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Welding certificates.

1.6 QUALITY ASSURANCE

- A. Structural Steel Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."
- B. Pipe Welding Qualifications: Qualify procedures and operators according to ASME Boiler and Pressure Vessel Code.

PART 2 - PRODUCTS

2.1 METAL PIPE HANGERS AND SUPPORTS

- A. Carbon-Steel Pipe Hangers and Supports:
 - 1. Description: MSS SP-58, Types 1 through 58, factory-fabricated components.
 - 2. Galvanized Metallic Coatings: Pregalvanized or hot dipped.
 - 3. Nonmetallic Coatings: Plastic coating, jacket, or liner.
 - 4. Padded Hangers: Hanger with fiberglass or other pipe insulation pad or cushion to support bearing surface of piping.
 - 5. Hanger Rods: Continuous-thread rod, nuts, and washer made of stainless steel, or be cadmium plated.
- B. Copper Pipe Hangers:
 - 1. Description: MSS SP-58, Types 1 through 58, copper-coated-steel, factory-fabricated components. Provide felt or wool inserts.
 - 2. Hanger Rods: Continuous-thread rod, nuts, and washer made of stainless steel, or be cadmium plated.

2.2 THERMAL-HANGER SHIELD INSERTS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Clement Support Services.
 - 2. ERICO International Corporation.
 - 3. National Pipe Hanger Corporation.
 - 4. PHS Industries, Inc.
- B. Insulation-Insert Material for Cold Piping: ASTM C 552, Type II cellular glass with 100-psig (688-kPa) or ASTM C 591, type VI, Grade 1 polyisocyanurate with 125 psig (862 kPa) minimum compressive strength and vapor barrier.
- C. Insulation-Insert Material for Hot Piping: Water-repellent treated, ASTM C 533, Type I calcium silicate with 100-psig (688-kPa) or ASTM C 591, type VI, Grade 1 polyisocyanurate with 125 psig (862 kPa) minimum compressive strength.
- D. For Trapeze or Clamped Systems: Insert and shield shall cover entire circumference of pipe.
- E. For Clevis or Band Hangers: Insert and shield shall cover lower 180 degrees of pipe.

- F. Insert Length: Extend 2 inches (50 mm) beyond sheet metal shield for piping operating below ambient air temperature.

2.3 FASTENER SYSTEMS

- A. Powder-Actuated Fasteners: Threaded-steel stud, for use in hardened portland cement concrete with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.
- B. Mechanical-Expansion Anchors: Insert-wedge-type, zinc-coated or stainless-steel anchors, for use in hardened portland cement concrete; with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.

2.4 MISCELLANEOUS MATERIALS

- A. Structural Steel: ASTM A 36/A 36M, carbon-steel plates, shapes, and bars; black (painted) and galvanized.
- B. Grout: ASTM C 1107, factory-mixed and -packaged, dry, hydraulic-cement, nonshrink and nonmetallic grout; suitable for interior and exterior applications.
 - 1. Properties: Nonstaining, noncorrosive, and nongaseous.
 - 2. Design Mix: 5000-psi (34.5-MPa), 28-day compressive strength.

PART 3 - EXECUTION

3.1 HANGER AND SUPPORT INSTALLATION

- A. Metal Pipe-Hanger Installation: Comply with MSS SP-58 and MSS SP-89. Install hangers, supports, clamps, and attachments as required to properly support piping from the building structure.
- B. Metal Framing System Installation: Arrange for grouping of parallel runs of piping, and support together on field-assembled metal framing systems.
- C. Thermal-Hanger Shield Installation: Install in pipe hanger or shield for insulated piping.
- D. Fastener System Installation:
 - 1. Install powder-actuated fasteners for use in lightweight concrete or concrete slabs less than 4 inches (100 mm) thick in concrete after concrete is placed and completely cured. Use operators that are licensed by powder-actuated tool manufacturer. Install fasteners according to powder-actuated tool manufacturer's operating manual.
 - 2. Install mechanical-expansion anchors in concrete after concrete is placed and completely cured. Install fasteners according to manufacturer's written instructions.
- E. Install hangers and supports complete with necessary attachments, inserts, bolts, rods, nuts, washers, and other accessories.

- F. Equipment Support Installation: Fabricate from welded-structural-steel shapes.
- G. Install hangers and supports to allow controlled thermal and seismic movement of piping systems, to permit freedom of movement between pipe anchors, and to facilitate action of expansion joints, expansion loops, expansion bends, and similar units.
- H. Install lateral bracing with pipe hangers and supports to prevent swaying.
- I. Load Distribution: Install hangers and supports so that piping live and dead loads and stresses from movement will not be transmitted to connected equipment.
- J. Pipe hangers and supports shall be attached to the panel point at the top chord of bar joist or at a location approved by the structural engineer. Do not support all parallel piping from the same bar joist (4" pipe and larger) or truss, unless approved by structural engineer. The maximum span between hangers shall be 10 feet for piping supported by the roof truss system. For geothermal piping to individual heat pump units in the attic, rack branch piping vertically to structural uprights.
- K. Insulated Piping:
 - 1. Attach clamps and spacers to piping.
 - a. Piping Operating above Ambient Air Temperature: Clamp may project through insulation.
 - b. Piping Operating below Ambient Air Temperature: Use thermal-hanger shield insert with clamp sized to match OD of insert.
 - c. Do not exceed pipe stress limits allowed by ASME B31.9 for building services piping.
 - 2. Install MSS SP-58, Type 39, protection saddles if insulation without vapor barrier is indicated. Fill interior voids with insulation that matches adjoining insulation.
 - a. Option: Thermal-hanger shield inserts may be used. Include steel weight-distribution plate for pipe NPS 4 (DN 100) and larger if pipe is installed on rollers.
 - 3. Install MSS SP-58, Type 40, protective shields on cold piping with vapor barrier. Shields shall span an arc of 180 degrees.
 - a. Option: Thermal-hanger shield inserts may be used. Include steel weight-distribution plate for pipe NPS 4 (DN 100) and larger if pipe is installed on rollers.
 - 4. Shield Dimensions for Pipe: Not less than the following:
 - a. NPS 1/4 to NPS 3-1/2 (DN 8 to DN 90): 12 inches (305 mm) long and 0.048 inch (1.22 mm) thick.
 - b. NPS 4 (DN 100): 12 inches (305 mm) long and 0.06 inch (1.52 mm) thick.
 - c. NPS 5 and NPS 6 (DN 125 and DN 150): 18 inches (457 mm) long and 0.06 inch (1.52 mm) thick.
 - d. NPS 8 to NPS 14 (DN 200 to DN 350): 24 inches (610 mm) long and 0.075 inch (1.91 mm) thick.

5. Pipes NPS 8 (DN 200) and Larger: Include wood or reinforced calcium-silicate-insulation inserts of length at least as long as protective shield.
6. Thermal-Hanger Shields: Install with insulation same thickness as piping insulation.

3.2 EQUIPMENT SUPPORTS

- A. Fabricate structural-steel stands to suspend equipment from structure overhead or to support equipment above floor.
- B. Grouting: Place grout under supports for equipment and make bearing surface smooth.
- C. Provide lateral bracing, to prevent swaying, for equipment supports.

3.3 METAL FABRICATIONS

- A. Cut, drill, and fit miscellaneous metal fabrications for trapeze pipe hangers and equipment supports.
- B. Fit exposed connections together to form hairline joints. Field weld connections that cannot be shop welded because of shipping size limitations.
- C. Field Welding: Comply with AWS D1.1/D1.1M procedures for shielded, metal arc welding; appearance and quality of welds; and methods used in correcting welding work; and with the following:
 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 2. Obtain fusion without undercut or overlap.
 3. Remove welding flux immediately.
 4. Finish welds at exposed connections so no roughness shows after finishing and so contours of welded surfaces match adjacent contours.

3.4 ADJUSTING

- A. Hanger Adjustments: Adjust hangers to distribute loads equally on attachments and to achieve indicated slope of pipe.
- B. Trim excess length of continuous-thread hanger and support rods to 1-1/2 inches (40 mm).

3.5 PAINTING

- A. Touchup: Clean field welds and abraded areas of shop paint. Paint exposed areas immediately after erecting hangers and supports. Use same materials as used for shop painting. Comply with SSPC-PA 1 requirements for touching up field-painted surfaces.
 1. Apply paint by brush or spray to provide a minimum dry film thickness of 2.0 mils (0.05 mm).

- B. Touchup: Cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint on miscellaneous metal are specified in Division 09 painting Sections.
- C. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas and apply galvanizing-repair paint to comply with ASTM A 780.

3.6 HANGER AND SUPPORT SCHEDULE

- A. Specific hanger and support requirements are in Sections specifying piping systems and equipment.
- B. Comply with MSS SP-58 for pipe-hanger selections and applications that are not specified in piping system Sections.
- C. Use hangers and supports with galvanized metallic coatings for piping and equipment that will not have field-applied finish.
- D. Use nonmetallic coatings on attachments for electrolytic protection where attachments are in direct contact with copper tubing.
- E. Use painted or galvanized carbon-steel pipe hangers and supports and metal framing systems and attachments for general service applications. Use stainless steel pipe hangers and attachments for exterior applications.
- F. Use thermal-hanger shield inserts for insulated piping and tubing.
- G. Horizontal-Piping Hangers and Supports: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
 - 1. Adjustable, Steel Clevis Hangers (MSS Type 1): For suspension of noninsulated or insulated, stationary pipes NPS 1/2 to NPS 30 (DN 15 to DN 750).
 - 2. Steel Pipe Clamps (MSS Type 4): For suspension of cold and hot pipes NPS 1/2 to NPS 24 (DN 15 to DN 600) if little or no insulation is required.
 - 3. Adjustable Roller Hangers and Supports: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
 - a. Spring-Cushion Roll Hangers (MSS Type 49): For equipping Type 41, roll hanger with springs.
 - b. Variable-Spring Base Supports (MSS Type 52): Preset to indicated load and limit variability factor to 25 percent to allow expansion and contraction of piping system from base support.
- H. Vertical-Piping Clamps: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
 - 1. Extension Pipe or Riser Clamps (MSS Type 8): For support of pipe risers NPS 3/4 to NPS 24 (DN 24 to DN 600).
 - 2. Carbon- or Alloy-Steel Riser Clamps (MSS Type 42): For support of pipe risers NPS 3/4 to NPS 24 (DN 20 to DN 600) if longer ends are required for riser clamps.
- I. Hanger-Rod Attachments: Unless otherwise indicated and except as specified in piping system Sections, install the following types:

1. Steel Clevises (MSS Type 14): For 120 to 450 deg F (49 to 232 deg C) piping installations.
 2. Malleable-Iron Sockets (MSS Type 16): For attaching hanger rods to various types of building attachments.
- J. Building Attachments: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
1. Top-Beam C-Clamps (MSS Type 19): For use under roof installations with bar-joist construction, to attach to top flange of structural shape at the panel point.
 2. Side-Beam Brackets (MSS Type 34): For sides of steel or wooden beams.
 3. Side Beam Clamps (MSS Type 27): For bottom of steel I-Beams.
- K. Saddles and Shields: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
1. Protection Shields (MSS Type 40): Of length recommended in writing by manufacturer to prevent crushing insulation.
 2. Thermal-Hanger Shield Inserts: For supporting insulated pipe.
- L. Comply with MSS SP-58 for trapeze pipe-hanger selections and applications that are not specified in piping system sections.
- M. Comply with MFMA-103 for metal framing system selections and applications that are not specified in piping system sections.
- N. Use powder-actuated fasteners or mechanical-expansion anchors instead of building attachments where required in concrete construction.

END OF SECTION

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SECTION 22 05 53 - IDENTIFICATION FOR PLUMBING PIPING AND EQUIPMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Pipe labels.
 - 2. Stencils.
 - 3. Valve tags.

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Samples: For color, letter style, and graphic representation required for each identification material and device.
- C. Equipment Label Schedule: Include a listing of all equipment to be labeled with the proposed content for each label.
- D. Valve numbering scheme.
- E. Valve Schedules: For each piping system to include in maintenance manuals.

1.4 COORDINATION

- A. Coordinate installation of identifying devices with completion of covering and painting of surfaces where devices are to be applied.
- B. Coordinate installation of identifying devices with locations of access panels and doors.
- C. Install identifying devices before installing acoustical ceilings and similar concealment.

PART 2 - PRODUCTS

2.1 PIPE LABELS

- A. General Requirements for Manufactured Pipe Labels: Preprinted, color-coded, with lettering indicating service, and showing flow direction.
- B. Pretensioned Pipe Labels: Pre-coiled, semirigid plastic formed to cover full circumference of pipe and to attach to pipe without fasteners or adhesive for pipe sizes four-inches and less. For larger pipe sizes (six-inches and greater), markers shall be strapped around using nylon ties.
- C. Pipe Label Contents: Include identification of piping service using same designations or abbreviations as used on Drawings, pipe size, and an arrow indicating flow direction.
 - 1. Flow-Direction Arrows: Integral with piping system service lettering to accommodate both directions, or as separate unit on each pipe label to indicate flow direction.
 - 2. Lettering Size: At least 1-1/2 inches high.

2.2 STENCILS

- A. Stencils: Prepared with letter sizes according to ASME (ANSI) A13.1 for piping; and minimum letter height of 3/4 inch for access panel and door labels, equipment labels, and similar operational instructions.
 - 1. Stencil Material: Fiberboard or metal.
 - 2. Stencil Paint: Exterior, gloss, alkyd enamel black unless otherwise indicated. Paint may be in pressurized spray-can form.
 - 3. Identification Paint: Exterior, alkyd enamel in colors according to ASME (ANSI) A13.1 unless otherwise indicated.

2.3 VALVE TAGS

- A. Valve Tags: Stamped or engraved with 1/4-inch black-filled letters for piping system abbreviation and 1/2-inch black-filled numbers, 2-inch diameter.
 - 1. Tag Material: Brass, 19 gauge minimum thickness, and having predrilled or stamped holes for attachment hardware.
 - 2. Fasteners: Brass jack chain.
- B. Valve Schedules: For each piping system, on 8-1/2-by-11-inch (A4) bond paper. Tabulate valve number, piping system, system abbreviation (as shown on valve tag), location of valve (room or space), normal-operating position (open, closed, or modulating), and variations for identification. Mark valves for emergency shutoff and similar special uses.
 - 1. Valve-tag schedule shall be included in operation and maintenance data.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Clean piping and equipment surfaces of substances that could impair bond of identification devices, including dirt, oil, grease, release agents, and incompatible primers, paints, and encapsulants.

3.2 EQUIPMENT LABEL INSTALLATION

- A. Install or permanently fasten labels on each major item of mechanical equipment.
- B. Locate equipment labels where accessible and visible.

3.3 PIPE LABEL INSTALLATION

- A. Piping Color-Coding: Pipe labels, green background, white letters.
- B. Stenciled Pipe Label Option: Stenciled labels may be provided instead of manufactured pipe labels, at Installer's option. Install stenciled pipe labels with painted, color-coded bands or rectangles, complying with ASME (ANSI) A13.1, on each piping system.
 - 1. Identification Paint: Use for contrasting background.
 - 2. Stencil Paint: Use for pipe marking.
- C. Locate pipe labels where piping is exposed or above accessible ceilings in finished spaces; machine rooms; accessible maintenance spaces such as shafts, tunnels, and plenums; and exterior exposed locations as follows:
 - 1. Near each valve and control device.
 - 2. Near each branch connection, excluding short takeoffs for fixtures and terminal units. Where flow pattern is not obvious, mark each pipe at branch.
 - 3. Near penetrations through walls, floors, ceilings, and inaccessible enclosures.
 - 4. At access doors, manholes, and similar access points that permit view of concealed piping.
 - 5. Near major equipment items and other points of origination and termination.
 - 6. Spaced at maximum intervals of 15 feet along each run. Reduce intervals to 15 feet in areas of congested piping and equipment.
 - 7. On piping above removable acoustical ceilings. Omit intermediately spaced labels.
 - 8. Where pipes are adjacent to each other, markings shall be neatly lined up. All markings shall be located in such a manner to be easily legible from the floor.
 - 9. For piping less than 3/4 inch, provide permanently legible tag as specified hereinbefore for valve identification.
 - 10. For buried piping, provide 2-inch minimum width with plastic identification/detection tape with metallic core. Install 4 to 6-inches below-grade.

D. Pipe Label Color Schedule:

1. Domestic Water Piping:
 - a. Background Color: Green.
 - b. Letter Color: White.

3.4 VALVE-TAG INSTALLATION

- A. Install tags on valves and control devices in piping systems, except check valves; valves within factory-fabricated equipment units; shutoff valves; faucets; convenience and lawn-watering hose connections; and similar roughing-in connections of end-use fixtures and units. List tagged valves in a valve schedule.
- B. Valve-Tag Application Schedule: Tag valves according to size, shape, and color scheme and with captions similar to those indicated in the following subparagraphs:
 1. Valve-Tag Size and Shape:
 - a. Cold Water: 2 inches, round.
 - b. Hot Water: 2 inches, round.
 2. Valve-Tag Color:
 - a. Cold Water: Natural.
 - b. Hot Water: Natural.
 3. Letter Color:
 - a. Cold Water: Black.
 - b. Hot Water: Black.

END OF SECTION

SECTION 22 07 00 - PLUMBING INSULATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Insulation Materials:
 - a. Mineral fiber.
 - 2. Insulating cements.
 - 3. Adhesives.
 - 4. Mastics.
 - 5. Lagging adhesives.
 - 6. Sealants.
 - 7. Factory-applied jackets.
 - 8. Field-applied jackets.
 - 9. Tapes.
 - 10. Securements.
 - 11. Corner angles.
- B. Related Sections include the following:
 - 1. Division 23 Section "HVAC Insulation."

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated. Include thermal conductivity, thickness, and jackets (both factory and field applied, if any).
- B. Shop Drawings:
 - 1. Detail application of protective shields, saddles, and inserts at hangers for each type of insulation and hanger.
 - 2. Detail attachment and covering of heat tracing inside insulation.
 - 3. Detail insulation application at pipe expansion joints for each type of insulation.
 - 4. Detail insulation application at elbows, fittings, flanges, valves, and specialties for each type of insulation.
 - 5. Detail field application for each equipment type.
- C. Qualification Data: For qualified Installer.

- D. Material Test Reports: From a qualified testing agency acceptable to authorities having jurisdiction indicating, interpreting, and certifying test results for compliance of insulation materials, sealers, attachments, cements, and jackets, with requirements indicated. Include dates of tests and test methods employed.
- E. Field quality-control reports.

1.4 QUALITY ASSURANCE

- A. Installer Qualifications: Skilled mechanics who have successfully completed an apprenticeship program or another craft training program certified by the Department of Labor, Bureau of Apprenticeship and Training.
- B. Fire-Test-Response Characteristics: Insulation and related materials shall have fire-test-response characteristics indicated, as determined by testing identical products per ASTM E 84, by a testing and inspecting agency acceptable to authorities having jurisdiction. Factory label insulation and jacket materials and adhesive, mastic, tapes, and cement material containers, with appropriate markings of applicable testing and inspecting agency.
 - 1. Insulation Installed Indoors: Flame-spread index of 25 or less, and smoke-developed index of 50 or less.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Packaging: Insulation material containers shall be marked by manufacturer with appropriate ASTM standard designation, type and grade, and maximum use temperature.

1.6 COORDINATION

- A. Coordinate size and location of supports, hangers, and insulation shields specified in Division 22 Section "Hangers and Supports for Plumbing Piping and Equipment."
- B. Coordinate clearance requirements with piping Installer for piping insulation application and equipment Installer for equipment insulation application. Before preparing piping Shop Drawings, establish and maintain clearance requirements for installation of insulation and field-applied jackets and finishes and for space required for maintenance.
- C. Coordinate installation and testing of heat tracing.

1.7 SCHEDULING

- A. Schedule insulation application after pressure testing systems and, where required, after installing and testing heat tracing. Insulation application may begin on segments that have satisfactory test results.
- B. Complete installation and concealment of plastic materials as rapidly as possible in each area of construction.

PART 2 - PRODUCTS

2.1 INSULATION MATERIALS

- A. Comply with requirements in Part 3 schedule articles for where insulating materials shall be applied.
- B. Products shall not contain asbestos, lead, mercury, or mercury compounds.
- C. Products that come in contact with stainless steel shall have a leachable chloride content of less than 50 ppm when tested according to ASTM C 871.
- D. Insulation materials for use on austenitic stainless steel shall be qualified as acceptable according to ASTM C 795.
- E. Foam insulation materials shall not use CFC or HCFC blowing agents in the manufacturing process.
- F. Mineral-Fiber, Preformed Pipe Insulation:
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Johns Manville; Micro-Lok.
 - b. Knauf Insulation; 1000(Pipe Insulation.
 - c. Owens Corning; Fiberglas Pipe Insulation.
 - d. Mason Industries, Inc.; Alley-K.
 - 2. Type I, 850 deg F Materials: Mineral or glass fibers bonded with a thermosetting resin. Comply with ASTM C 547, Type I, Grade A, with factory-applied ASJ. Factory-applied jacket requirements are specified in "Factory-Applied Jackets" Article.
- G. Mineral-Fiber, Pipe and Tank Insulation: Mineral or glass fibers bonded with a thermosetting resin. Semirigid board material with factory-applied ASJ complying with ASTM C 1393, Type II or Type IIIA Category 2, or with properties similar to ASTM C 612, Type IB. Nominal density is 2.5 lb/cu. ft. or more. Thermal conductivity (k-value) at 100 deg F is 0.29 Btu x in./h x sq. ft. x deg F or less. Factory-applied jacket requirements are specified in "Factory-Applied Jackets" Article.
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. CertainTeed Corp.; CrimpWrap.
 - b. Johns Manville; MicroFlex.
 - c. Knauf Insulation; Pipe and Tank Insulation.
 - d. Owens Corning; Fiberglas Pipe and Tank Insulation.

2.2 INSULATING CEMENTS

- A. Mineral-Fiber Insulating Cement: Comply with ASTM C 195.
 - 1. Products: Subject to compliance with requirements, provide one of the following:

- a. Insulco, Division of MFS, Inc.; Triple I.
- b. P. K. Insulation Mfg. Co., Inc.; Super-Stik.

2.3 ADHESIVES

- A. Materials shall be compatible with insulation materials, jackets, and substrates and for bonding insulation to itself and to surfaces to be insulated, unless otherwise indicated.
- B. Calcium Silicate Adhesive: Fibrous, sodium-silicate-based adhesive with a service temperature range of 50 to 800 deg F.
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Childers Products, Division of ITW; CP-97.
 - b. Foster Products Corporation, H. B. Fuller Company; 81-27/81-93.
 - c. Marathon Industries, Inc.; 290.
 - 2. For indoor applications, use adhesive that has a VOC content of 80 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
- C. Mineral-Fiber Adhesive: Comply with MIL-A-3316C, Class 2, Grade A.
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Childers Products, Division of ITW; CP-82.
 - b. Foster Products Corporation, H. B. Fuller Company; 85-20.
 - c. ITW TACC, Division of Illinois Tool Works; S-90/80.
 - d. Marathon Industries, Inc.; 225.
 - e. Mon-Eco Industries, Inc.; 22-25.
 - 2. For indoor applications, use adhesive that has a VOC content of 80 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
- D. ASJ Adhesive, and FSK and PVDC Jacket Adhesive: Comply with MIL-A-3316C, Class 2, Grade A for bonding insulation jacket lap seams and joints.
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Childers Products, Division of ITW; CP-82.
 - b. Foster Products Corporation, H. B. Fuller Company; 85-20.
 - c. ITW TACC, Division of Illinois Tool Works; S-90/80.
 - d. Marathon Industries, Inc.; 225.
 - e. Mon-Eco Industries, Inc.; 22-25.
 - 2. For indoor applications, use adhesive that has a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
- E. PVC Jacket Adhesive: Compatible with PVC jacket.
 - 1. Products: Subject to compliance with requirements, provide one of the following:

- a. Dow Chemical Company (The); 739, Dow Silicone.
 - b. Johns-Manville; Zeston Perma-Weld, CEEL-TITE Solvent Welding Adhesive.
 - c. P.I.C. Plastics, Inc.; Welding Adhesive.
 - d. Speedline Corporation; Speedline Vinyl Adhesive.
2. For indoor applications, use adhesive that has a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

2.4 MASTICS

- A. Materials shall be compatible with insulation materials, jackets, and substrates; comply with MIL-C-19565C, Type II.
 1. For indoor applications, use mastics that have a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
- B. Vapor-Barrier Mastic: Water based; suitable for indoor and outdoor use on below ambient services.
 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Childers Products, Division of ITW; CP-35.
 - b. Foster Products Corporation, H. B. Fuller Company; 30-90.
 - c. ITW TACC, Division of Illinois Tool Works; CB-50.
 - d. Marathon Industries, Inc.; 590.
 - e. Mon-Eco Industries, Inc.; 55-40.
 - f. Vimasco Corporation; 749.
 2. Water-Vapor Permeance: ASTM E 96, Procedure B, 0.013 perm at 43-mil dry film thickness.
 3. Service Temperature Range: Minus 20 to plus 180 deg F.
 4. Solids Content: ASTM D 1644, 59 percent by volume and 71 percent by weight.
 5. Color: White.
- C. Vapor-Barrier Mastic: Solvent based; suitable for indoor use on below ambient services.
 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Childers Products, Division of ITW; CP-30.
 - b. Foster Products Corporation, H. B. Fuller Company; 30-35.
 - c. ITW TACC, Division of Illinois Tool Works; CB-25.
 - d. Marathon Industries, Inc.; 501.
 - e. Mon-Eco Industries, Inc.; 55-10.
 2. Water-Vapor Permeance: ASTM F 1249, 0.05 perm at 35-mil dry film thickness.
 3. Service Temperature Range: 0 to 180 deg F.
 4. Solids Content: ASTM D 1644, 44 percent by volume and 62 percent by weight.
 5. Color: White.
- D. Vapor-Barrier Mastic: Solvent based; suitable for outdoor use on below ambient services.

1. Products: Subject to compliance with requirements, provide one of the following:

- a. Childers Products, Division of ITW; Encacel.
- b. Foster Products Corporation, H. B. Fuller Company; 60-95/60-96.
- c. Marathon Industries, Inc.; 570.
- d. Mon-Eco Industries, Inc.; 55-70.

2. Water-Vapor Permeance: ASTM F 1249, 0.05 perm at 30-mil dry film thickness.

3. Service Temperature Range: Minus 50 to plus 220 deg F.

4. Solids Content: ASTM D 1644, 33 percent by volume and 46 percent by weight.

5. Color: White.

E. Breather Mastic: Water based; suitable for indoor and outdoor use on above ambient services.

1. Products: Subject to compliance with requirements, provide one of the following:

- a. Childers Products, Division of ITW; CP-10.
- b. Foster Products Corporation, H. B. Fuller Company; 35-00.
- c. ITW TACC, Division of Illinois Tool Works; CB-05/15.
- d. Marathon Industries, Inc.; 550.
- e. Mon-Eco Industries, Inc.; 55-50.
- f. Vimasco Corporation; WC-1/WC-5.

2. Water-Vapor Permeance: ASTM F 1249, 3 perms at 0.0625-inch dry film thickness.

3. Service Temperature Range: Minus 20 to plus 200 deg F.

4. Solids Content: 63 percent by volume and 73 percent by weight.

5. Color: White.

2.5 LAGGING ADHESIVES

A. Description: Comply with MIL-A-3316C, Class I, Grade A, and shall be compatible with insulation materials, jackets, and substrates.

1. For indoor applications, use lagging adhesives that have a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

2. Products: Subject to compliance with requirements, provide one of the following:

- a. Childers Products, Division of ITW; CP-52.
- b. Foster Products Corporation, H. B. Fuller Company; 81-42.
- c. Marathon Industries, Inc.; 130.
- d. Mon-Eco Industries, Inc.; 11-30.
- e. Vimasco Corporation; 136.

3. Fire-resistant, water-based lagging adhesive and coating for use indoors to adhere fire-resistant lagging cloths over equipment and pipe insulation.

4. Service Temperature Range: Minus 50 to plus 180 deg F.

5. Color: White.

2.6 SEALANTS

A. FSK and Metal Jacket Flashing Sealants:

1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Childers Products, Division of ITW; CP-76-8.
 - b. Foster Products Corporation, H. B. Fuller Company; 95-44.
 - c. Marathon Industries, Inc.; 405.
 - d. Mon-Eco Industries, Inc.; 44-05.
 - e. Vimasco Corporation; 750.
2. Materials shall be compatible with insulation materials, jackets, and substrates.
3. Fire- and water-resistant, flexible, elastomeric sealant.
4. Service Temperature Range: Minus 40 to plus 250 deg F.
5. Color: Aluminum.
6. For indoor applications, use sealants that have a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

B. ASJ Flashing Sealants, and Vinyl, PVDC, and PVC Jacket Flashing Sealants:

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include but are not limited to the following:
 - a. Childers Products, Division of ITW; CP-76.
2. Materials shall be compatible with insulation materials, jackets, and substrates.
3. Fire- and water-resistant, flexible, elastomeric sealant.
4. Service Temperature Range: Minus 40 to plus 250 deg F.
5. Color: White.
6. For indoor applications, use sealants that have a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

2.7 FACTORY-APPLIED JACKETS

A. Insulation system schedules indicate factory-applied jackets on various applications. When factory-applied jackets are indicated, comply with the following:

1. ASJ: White, kraft-paper, fiberglass-reinforced scrim with aluminum-foil backing; complying with ASTM C 1136, Type I.
2. ASJ-SSL: ASJ with self-sealing, pressure-sensitive, acrylic-based adhesive covered by a removable protective strip; complying with ASTM C 1136, Type I.
3. FSK Jacket: Aluminum-foil, fiberglass-reinforced scrim with kraft-paper backing; complying with ASTM C 1136, Type II.
4. PVDC Jacket for Indoor Applications: 4-mil thick, white PVDC biaxially oriented barrier film with a permeance at 0.02 perms when tested according to ASTM E 96 and with a flame-spread index of 5 and a smoke-developed index of 20 when tested according to ASTM E 84.
 - a. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to the following:

- 1) Dow Chemical Company (The); Saran 540 Vapor Retarder Film and Saran 560 Vapor Retarder Film.
5. PVDC Jacket for Outdoor Applications: 6-mil-thick, white PVDC biaxially oriented barrier film with a permeance at 0.01 perms when tested according to ASTM E 96 and with a flame-spread index of 5 and a smoke-developed index of 25 when tested according to ASTM E 84.
 - a. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to the following:
 - 1) Dow Chemical Company (The); Saran 540 Vapor Retarder Film and Saran 560 Vapor Retarder Film.
6. PVDC-SSL Jacket: PVDC jacket with a self-sealing, pressure-sensitive, acrylic-based adhesive covered by a removable protective strip.
 - a. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to the following:
 - 1) Dow Chemical Company (The); Saran 540 Vapor Retarder Film and Saran 560 Vapor Retarder Film.

2.8 FIELD-APPLIED JACKETS

- A. Field-applied jackets shall comply with ASTM C 921, Type I, unless otherwise indicated.
- B. PVC Jacket: High-impact-resistant, UV-resistant PVC complying with ASTM D 1784, Class 16354-C; thickness as scheduled; roll stock ready for shop or field cutting and forming. Thickness is indicated in field-applied jacket schedules.
 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Johns Manville; Zeston.
 - b. P.I.C. Plastics, Inc.; FG Series.
 - c. Proto PVC Corporation; LoSmoke.
 - d. Speedline Corporation; SmokeSafe.
 2. Adhesive: As recommended by jacket material manufacturer.
 3. Color: White.
 4. Factory-fabricated fitting covers to match jacket if available; otherwise, field fabricate.
 - a. Shapes: 45- and 90-degree, short- and long-radius elbows, tees, valves, flanges, unions, reducers, end caps, soil-pipe hubs, traps, mechanical joints, and P-trap and supply covers for lavatories.
 5. Factory-fabricated tank heads and tank side panels.
- C. Metal Jacket:
 1. Products: Subject to compliance with requirements, provide one of the following:

- a. Childers Products, Division of ITW; Metal Jacketing Systems.
 - b. PABCO Metals Corporation; Surefit.
- 2. Aluminum Jacket: Comply with ASTM B 209 (ASTM B 209M), Alloy 3003, 3005, 3105 or 5005, Temper H-14.
 - a. Sheet and roll stock ready for shop or field sizing.
 - b. Finish and thickness are indicated in field-applied jacket schedules.
 - c. Moisture Barrier for Indoor Applications: 3-mil-thick, heat-bonded polyethylene and kraft paper.
 - d. Moisture Barrier for Outdoor Applications: 3-mil-thick, heat-bonded polyethylene and kraft paper.
 - e. Factory-Fabricated Fitting Covers:
 - 1) Same material, finish, and thickness as jacket.
 - 2) Preformed 2-piece or gore, 45- and 90-degree, short- and long-radius elbows.
 - 3) Tee covers.
 - 4) Flange and union covers.
 - 5) End caps.
 - 6) Beveled collars.
 - 7) Valve covers.
 - 8) Field fabricate fitting covers only if factory-fabricated fitting covers are not available.
- D. Underground Direct-Buried Jacket: 125-mil-thick vapor barrier and waterproofing membrane consisting of a rubberized bituminous resin reinforced with a woven-glass fiber or polyester scrim and laminated aluminum foil.
 - 1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Pittsburgh Corning Corporation; Pittwrap.
 - b. Polyguard; Insulrap No Torch 125.

2.9 TAPES

- A. ASJ Tape: White vapor-retarder tape matching factory-applied jacket with acrylic adhesive, complying with ASTM C 1136.
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Avery Dennison Corporation, Specialty Tapes Division; Fasson 0835.
 - b. Compac Corp.; 104 and 105.
 - c. Ideal Tape Co., Inc., an American Biltrite Company; 428 AWF ASJ.
 - d. Venture Tape; 1540 CW Plus, 1542 CW Plus, and 1542 CW Plus/SQ.
 - 2. Width: 3 inches.
 - 3. Thickness: 11.5 mils.
 - 4. Adhesion: 90 ounces force/inch in width.
 - 5. Elongation: 2 percent.

6. Tensile Strength: 40 lbf/inch in width.
 7. ASJ Tape Disks and Squares: Precut disks or squares of ASJ tape.
- B. FSK Tape: Foil-face, vapor-retarder tape matching factory-applied jacket with acrylic adhesive; complying with ASTM C 1136.
1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Avery Dennison Corporation, Specialty Tapes Division; Fasson 0827.
 - b. Compac Corp.; 110 and 111.
 - c. Ideal Tape Co., Inc., an American Biltrite Company; 491 AWF FSK.
 - d. Venture Tape; 1525 CW, 1528 CW, and 1528 CW/SQ.
 2. Width: 3 inches.
 3. Thickness: 6.5 mils.
 4. Adhesion: 90 ounces force/inch in width.
 5. Elongation: 2 percent.
 6. Tensile Strength: 40 lbf/inch in width.
 7. FSK Tape Disks and Squares: Precut disks or squares of FSK tape.
- C. PVC Tape: White vapor-retarder tape matching field-applied PVC jacket with acrylic adhesive. Suitable for indoor and outdoor applications.
1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Avery Dennison Corporation, Specialty Tapes Division; Fasson 0555.
 - b. Compac Corp.; 130.
 - c. Ideal Tape Co., Inc., an American Biltrite Company; 370 White PVC tape.
 - d. Venture Tape; 1506 CW NS.
 2. Width: 2 inches.
 3. Thickness: 6 mils.
 4. Adhesion: 64 ounces force/inch in width.
 5. Elongation: 500 percent.
 6. Tensile Strength: 18 lbf/inch in width.
- D. Aluminum-Foil Tape: Vapor-retarder tape with acrylic adhesive.
1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Avery Dennison Corporation, Specialty Tapes Division; Fasson 0800.
 - b. Compac Corp.; 120.
 - c. Ideal Tape Co., Inc., an American Biltrite Company; 488 AWF.
 - d. Venture Tape; 3520 CW.
 2. Width: 2 inches.
 3. Thickness: 3.7 mils.
 4. Adhesion: 100 ounces force/inch in width.
 5. Elongation: 5 percent.
 6. Tensile Strength: 34 lbf/inch in width.
- E. PVDC Tape: White vapor-retarder PVDC tape with acrylic adhesive.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Dow Chemical Company (The); Saran 540 Vapor Retarder Tape.
2. Width: 3 inches.
3. Film Thickness: 6 mils.
4. Adhesive Thickness: 1.5 mils.
5. Elongation at Break: 145 percent.
6. Tensile Strength: 55 lbf/inch in width.

2.10 SECUREMENTS

A. Bands:

1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Childers Products; Bands.
 - b. PABCO Metals Corporation; Bands.
 - c. RPR Products, Inc.; Bands.
2. Stainless Steel: ASTM A 167 or ASTM A 240/A 240M, Type 304 or Type 316; 0.015 inch thick, $\frac{3}{4}$ -inch wide with wing or closed seal.
3. Aluminum: ASTM B 209 (ASTM B 209M), Alloy 3003, 3005, 3105, or 5005; Temper H-14, 0.020-inch thick, $\frac{3}{4}$ -inch wide with wing or closed seal.
4. Springs: Twin spring set constructed of stainless steel with ends flat and slotted to accept metal bands. Spring size determined by manufacturer for application.

B. Insulation Pins and Hangers:

1. Capacitor-Discharge-Weld Pins: Copper- or zinc-coated steel pin, fully annealed for capacitor-discharge welding, 0.135-inch diameter shank, length to suit depth of insulation indicated.
 - a. Products: Subject to compliance with requirements, provide one of the following:
 - 1) AGM Industries, Inc.; CWP-1.
 - 2) GEMCO; CD.
 - 3) Midwest Fasteners, Inc.; CD.
 - 4) Nelson Stud Welding; TPA, TPC, and TPS.
2. Cupped-Head, Capacitor-Discharge-Weld Pins: Copper- or zinc-coated steel pin, fully annealed for capacitor-discharge welding, 0.135-inch diameter shank, length to suit depth of insulation indicated with integral 1-1/2-inch galvanized carbon-steel washer.
 - a. Products: Subject to compliance with requirements, provide one of the following:
 - 1) AGM Industries, Inc.; CWP-1.
 - 2) GEMCO; Cupped Head Weld Pin.
 - 3) Midwest Fasteners, Inc.; Cupped Head.
 - 4) Nelson Stud Welding; CHP.

3. Metal, Adhesively Attached, Perforated-Base Insulation Hangers: Baseplate welded to projecting spindle that is capable of holding insulation, of thickness indicated, securely in position indicated when self-locking washer is in place. Comply with the following requirements:
 - a. Products: Subject to compliance with requirements, provide one of the following:
 - 1) AGM Industries, Inc.; Tactoo Insul-Hangers, Series T.
 - 2) GEMCO; Perforated Base.
 - 3) Midwest Fasteners, Inc.; Spindle.
 - b. Baseplate: Perforated, galvanized carbon-steel sheet, 0.030-inch thick by 2 inches square.
 - c. Spindle: Stainless steel, fully annealed, 0.106-inch diameter shank, length to suit depth of insulation indicated.
 - d. Adhesive: Recommended by hanger manufacturer. Product with demonstrated capability to bond insulation hanger securely to substrates indicated without damaging insulation, hangers, and substrates.
4. Nonmetal, Adhesively Attached, Perforated-Base Insulation Hangers: Baseplate fastened to projecting spindle that is capable of holding insulation, of thickness indicated, securely in position indicated when self-locking washer is in place. Comply with the following requirements:
 - a. Products: Subject to compliance with requirements, provide one of the following:
 - 1) GEMCO; Nylon Hangers.
 - 2) Midwest Fasteners, Inc.; Nylon Insulation Hangers.
 - b. Baseplate: Perforated, nylon sheet, 0.030-inch thick by 1-1/2 inches in diameter.
 - c. Spindle: Nylon, 0.106-inch diameter shank, length to suit depth of insulation indicated, up to 2-1/2 inches.
 - d. Adhesive: Recommended by hanger manufacturer. Product with demonstrated capability to bond insulation hanger securely to substrates indicated without damaging insulation, hangers, and substrates.
5. Self-Sticking-Base Insulation Hangers: Baseplate welded to projecting spindle that is capable of holding insulation, of thickness indicated, securely in position indicated when self-locking washer is in place. Comply with the following requirements:
 - a. Products: Subject to compliance with requirements, provide one of the following:
 - 1) AGM Industries, Inc.; Tactoo Insul-Hangers, Series TSA.
 - 2) GEMCO; Press and Peel.
 - 3) Midwest Fasteners, Inc.; Self Stick.
 - b. Baseplate: Galvanized carbon-steel sheet, 0.030-inch thick by 2 inches square.
 - c. Spindle: Stainless steel, fully annealed, 0.106-inch diameter shank, length to suit depth of insulation indicated.
 - d. Adhesive-backed base with a peel-off protective cover.

6. Insulation-Retaining Washers: Self-locking washers formed from 0.016-inch thick, stainless-steel sheet, with beveled edge sized as required to hold insulation securely in place but not less than 1-1/2 inches in diameter.
 - a. Products: Subject to compliance with requirements, provide one of the following:
 - 1) AGM Industries, Inc.; RC-150.
 - 2) GEMCO; R-150.
 - 3) Midwest Fasteners, Inc.; WA-150.
 - 4) Nelson Stud Welding; Speed Clips.
 - b. Protect ends with capped self-locking washers incorporating a spring steel insert to ensure permanent retention of cap in exposed locations.
 7. Nonmetal Insulation-Retaining Washers: Self-locking washers formed from 0.016-inch-thick nylon sheet, with beveled edge sized as required to hold insulation securely in place but not less than 1-1/2 inches in diameter.
 - a. Products: Subject to compliance with requirements, provide one of the following:
 - 1) GEMCO.
 - 2) Midwest Fasteners, Inc.
- C. Staples: Outward-clinching insulation staples, nominal 3/4-inch wide, stainless steel or Monel.
- D. Wire: 0.062-inch soft-annealed, stainless steel.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. C & F Wire.
 - b. Childers Products.
 - c. PABCO Metals Corporation.
 - d. RPR Products, Inc.

2.11 CORNER ANGLES

- A. Aluminum Corner Angles: 0.040-inch thick, minimum 1 by 1 inch, aluminum according to ASTM B 209 (ASTM B 209M), Alloy 3003, 3005, 3105 or 5005; Temper H-14.
- B. Stainless-Steel Corner Angles: 0.024-inch thick, minimum 1 by 1 inch, stainless steel accord.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions for compliance with requirements for installation and other conditions affecting performance of insulation application.

1. Verify that systems and equipment to be insulated have been tested and are free of defects.
2. Verify that surfaces to be insulated are clean and dry.
3. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Surface Preparation: Clean and dry surfaces to receive insulation. Remove materials that will adversely affect insulation application.
- B. Surface Preparation: Clean and prepare surfaces to be insulated. Before insulating, apply a corrosion coating to insulated surfaces as follows:
 1. Stainless Steel: Coat 300 series stainless steel with an epoxy primer 5 mils thick and an epoxy finish 5 mils thick if operating in a temperature range between 140 and 300 deg F. Consult coating manufacturer for appropriate coating materials and application methods for operating temperature range.
 2. Carbon Steel: Coat carbon steel operating at a service temperature between 32 and 300 deg F with an epoxy coating. Consult coating manufacturer for appropriate coating materials and application methods for operating temperature range.
- C. Coordinate insulation installation with the trade installing heat tracing. Comply with requirements for heat tracing that apply to insulation.
- D. Mix insulating cements with clean potable water; if insulating cements are to be in contact with stainless-steel surfaces, use demineralized water.

3.3 GENERAL INSTALLATION REQUIREMENTS

- A. Install insulation materials, accessories, and finishes with smooth, straight, and even surfaces; free of voids throughout the length of equipment and piping including fittings, valves, and specialties.
- B. Install insulation materials, forms, vapor barriers or retarders, jackets, and thicknesses required for each item of equipment and pipe system as specified in insulation system schedules.
- C. Install accessories compatible with insulation materials and suitable for the service. Install accessories that do not corrode, soften, or otherwise attack insulation or jacket in either wet or dry state.
- D. Install insulation with longitudinal seams at top and bottom of horizontal runs.
- E. Install multiple layers of insulation with longitudinal and end seams staggered.
- F. Do not weld brackets, clips, or other attachment devices to piping, fittings, and specialties.
- G. Keep insulation materials dry during application and finishing.
- H. Install insulation with tight longitudinal seams and end joints. Bond seams and joints with adhesive recommended by insulation material manufacturer.

- I. Install insulation with least number of joints practical.
- J. Where vapor barrier is indicated, seal joints, seams, and penetrations in insulation at hangers, supports, anchors, and other projections with vapor-barrier mastic.
 - 1. Install insulation continuously through hangers and around anchor attachments.
 - 2. For insulation application where vapor barriers are indicated, extend insulation on anchor legs from point of attachment to supported item to point of attachment to structure. Taper and seal ends at attachment to structure with vapor-barrier mastic.
 - 3. Install insert materials and install insulation to tightly join the insert. Seal insulation to insulation inserts with adhesive or sealing compound recommended by insulation material manufacturer.
 - 4. Cover inserts with jacket material matching adjacent pipe insulation. Install shields over jacket, arranged to protect jacket from tear or puncture by hanger, support, and shield.
- K. Apply adhesives, mastics, and sealants at manufacturer's recommended coverage rate and wet and dry film thicknesses.
- L. Install insulation with factory-applied jackets as follows:
 - 1. Draw jacket tight and smooth.
 - 2. Cover circumferential joints with 3-inch wide strips, of same material as insulation jacket. Secure strips with adhesive and outward clinching staples along both edges of strip, spaced 4 inches o.c.
 - 3. Overlap jacket longitudinal seams at least 1-1/2 inches. Install insulation with longitudinal seams at bottom of pipe. Clean and dry surface to receive self-sealing lap. Staple laps with outward clinching staples along edge at 2 inches o.c.
 - a. For below ambient services, apply vapor-barrier mastic over staples.
 - 4. Cover joints and seams with tape as recommended by insulation material manufacturer to maintain vapor seal.
 - 5. Where vapor barriers are indicated, apply vapor-barrier mastic on seams and joints and at ends adjacent to pipe flanges and fittings.
- M. Cut insulation in a manner to avoid compressing insulation more than 75 percent of its nominal thickness.
- N. Finish installation with systems at operating conditions. Repair joint separations and cracking due to thermal movement.
- O. Repair damaged insulation facings by applying same facing material over damaged areas. Extend patches at least 4 inches beyond damaged areas. Adhere, staple, and seal patches similar to butt joints.
- P. For above ambient services, do not install insulation to the following:
 - 1. Vibration-control devices.
 - 2. Testing agency labels and stamps.
 - 3. Nameplates and data plates.
 - 4. Manholes.
 - 5. Handholes.

6. Cleanouts.

3.4 PENETRATIONS

- A. Insulation Installation at Roof Penetrations: Install insulation continuously through roof penetrations.
 1. Seal penetrations with flashing sealant.
 2. For applications requiring only indoor insulation, terminate insulation above roof surface and seal with joint sealant. For applications requiring indoor and outdoor insulation, install insulation for outdoor applications tightly joined to indoor insulation ends. Seal joint with joint sealant.
 3. Extend jacket of outdoor insulation outside roof flashing at least 2 inches below top of roof flashing.
 4. Seal jacket to roof flashing with flashing sealant.
- B. Insulation Installation at Aboveground Exterior Wall Penetrations: Install insulation continuously through wall penetrations.
 1. Seal penetrations with flashing sealant.
 2. For applications requiring only indoor insulation, terminate insulation inside wall surface and seal with joint sealant. For applications requiring indoor and outdoor insulation, install insulation for outdoor applications tightly joined to indoor insulation ends. Seal joint with joint sealant.
 3. Extend jacket of outdoor insulation outside wall flashing and overlap wall flashing at least 2 inches.
 4. Seal jacket to wall flashing with flashing sealant.
- C. Insulation Installation at Interior Wall and Partition Penetrations (That Are Not Fire Rated): Install insulation continuously through walls and partitions.
- D. Insulation Installation at Fire-Rated Wall and Partition Penetrations: Install insulation continuously through penetrations of fire-rated walls and partitions.
 1. Comply with requirements of the authorities having jurisdiction for firestopping and fire-resistive joint sealers."

3.5 GENERAL PIPE INSULATION INSTALLATION

- A. Requirements in this article generally apply to all insulation materials except where more specific requirements are specified in various pipe insulation material installation articles.
- B. Insulation Installation on Fittings, Valves, Strainers, Flanges, and Unions:
 1. Install insulation over fittings, valves, strainers, flanges, unions, and other specialties with continuous thermal and vapor-retarder integrity, unless otherwise indicated.
 2. Insulate pipe elbows using preformed fitting insulation or mitered fittings made from same material and density as adjacent pipe insulation. Each piece shall be butted tightly against adjoining piece and bonded with adhesive. Fill joints, seams, voids, and irregular

- surfaces with insulating cement finished to a smooth, hard, and uniform contour that is uniform with adjoining pipe insulation.
3. Insulate tee fittings with preformed fitting insulation or sectional pipe insulation of same material and thickness as used for adjacent pipe. Cut sectional pipe insulation to fit. Butt each section closely to the next and hold in place with tie wire. Bond pieces with adhesive.
 4. Insulate valves using preformed fitting insulation or sectional pipe insulation of same material, density, and thickness as used for adjacent pipe. Overlap adjoining pipe insulation by not less than two times the thickness of pipe insulation, or one pipe diameter, whichever is thicker. For valves, insulate up to and including the bonnets, valve stuffing-box studs, bolts, and nuts. Fill joints, seams, and irregular surfaces with insulating cement.
 5. Insulate strainers using preformed fitting insulation or sectional pipe insulation of same material, density, and thickness as used for adjacent pipe. Overlap adjoining pipe insulation by not less than two times the thickness of pipe insulation, or one pipe diameter, whichever is thicker. Fill joints, seams, and irregular surfaces with insulating cement. Insulate strainers so strainer basket flange or plug can be easily removed and replaced without damaging the insulation and jacket. Provide a removable reusable insulation cover. For below ambient services, provide a design that maintains vapor barrier.
 6. Insulate flanges and unions using a section of oversized preformed pipe insulation. Overlap adjoining pipe insulation by not less than two times the thickness of pipe insulation, or one pipe diameter, whichever is thicker.
 7. Cover segmented insulated surfaces with a layer of finishing cement and coat with a mastic. Install vapor-barrier mastic for below ambient services and a breather mastic for above ambient services. Reinforce the mastic with fabric-reinforcing mesh. Trowel the mastic to a smooth and well-shaped contour.
 8. For services not specified to receive a field-applied jacket except for flexible elastomeric and polyolefin, install fitted PVC cover over elbows, tees, strainers, valves, flanges, and unions. Terminate ends with PVC end caps. Tape PVC covers to adjoining insulation facing using PVC tape.
 9. Stencil or label the outside insulation jacket of each union with the word "UNION." Match size and color of pipe labels.
- C. Insulate instrument connections for thermometers, pressure gages, pressure temperature taps, test connections, flow meters, sensors, switches, and transmitters on insulated pipes, vessels, and equipment. Shape insulation at these connections by tapering it to and around the connection with insulating cement and finish with finishing cement, mastic, and flashing sealant.
- D. Install removable insulation covers at locations indicated. Installation shall conform to the following:
1. Make removable flange and union insulation from sectional pipe insulation of same thickness as that on adjoining pipe. Install same insulation jacket as adjoining pipe insulation.
 2. When flange and union covers are made from sectional pipe insulation, extend insulation from flanges or union long at least two times the insulation thickness over adjacent pipe insulation on each side of flange or union. Secure flange cover in place with stainless-steel or aluminum bands. Select band material compatible with insulation and jacket.
 3. Construct removable valve insulation covers in same manner as for flanges except divide the two-part section on the vertical center line of valve body.
 4. When covers are made from block insulation, make two halves, each consisting of mitered blocks wired to stainless-steel fabric. Secure this wire frame, with its attached

- insulation, to flanges with tie wire. Extend insulation at least 2 inches over adjacent pipe insulation on each side of valve. Fill space between flange or union cover and pipe insulation with insulating cement. Finish cover assembly with insulating cement applied in two coats. After first coat is dry, apply and trowel second coat to a smooth finish.
5. Unless a PVC jacket is indicated in field-applied jacket schedules, finish exposed surfaces with a metal jacket.

3.6 MINERAL-FIBER INSULATION INSTALLATION

A. Insulation Installation on Straight Pipes and Tubes:

1. Secure each layer of preformed pipe insulation to pipe with wire or bands and tighten bands without deforming insulation materials.
2. Where vapor barriers are indicated, seal longitudinal seams, end joints, and protrusions with vapor-barrier mastic and joint sealant.
3. For insulation with factory-applied jackets on above ambient surfaces, secure laps with outward clinched staples at 6 inches o.c.
4. For insulation with factory-applied jackets on below ambient surfaces, do not staple longitudinal tabs but secure tabs with additional adhesive as recommended by insulation material manufacturer and seal with vapor-barrier mastic and flashing sealant.

B. Insulation Installation on Pipe Flanges:

1. Install preformed pipe insulation to outer diameter of pipe flange.
2. Make width of insulation section same as overall width of flange and bolts, plus twice the thickness of pipe insulation.
3. Fill voids between inner circumference of flange insulation and outer circumference of adjacent straight pipe segments with mineral-fiber blanket insulation.
4. Install jacket material with manufacturer's recommended adhesive, overlap seams at least 1 inch (25 mm), and seal joints with flashing sealant.

C. Insulation Installation on Pipe Fittings and Elbows:

1. Install preformed sections of same material as straight segments of pipe insulation when available.
2. When preformed insulation elbows and fittings are not available, install mitered sections of pipe insulation, to a thickness equal to adjoining pipe insulation. Secure insulation materials with wire or bands.

D. Insulation Installation on Valves and Pipe Specialties:

1. Install preformed sections of same material as straight segments of pipe insulation when available.
2. When preformed sections are not available, install mitered sections of pipe insulation to valve body.
3. Arrange insulation to permit access to packing and to allow valve operation without disturbing insulation.
4. Install insulation to flanges as specified for flange insulation application.

3.7 FIELD-APPLIED JACKET INSTALLATION

- A. Where glass-cloth jackets are indicated, install directly over bare insulation or insulation with factory-applied jackets.
1. Draw jacket smooth and tight to surface with 2-inch overlap at seams and joints.
 2. Embed glass cloth between two 0.062-inch thick coats of lagging adhesive.
 3. Completely encapsulate insulation with coating, leaving no exposed insulation.
- B. Where FSK jackets are indicated, install as follows:
1. Draw jacket material smooth and tight.
 2. Install lap or joint strips with same material as jacket.
 3. Secure jacket to insulation with manufacturer's recommended adhesive.
 4. Install jacket with 1-1/2-inch laps at longitudinal seams and 3-inch wide joint strips at end joints.
 5. Seal openings, punctures, and breaks in vapor-retarder jackets and exposed insulation with vapor-barrier mastic.
- C. Where PVC jackets are indicated, install with 1-inch overlap at longitudinal seams and end joints; for horizontal applications, install with longitudinal seams along top and bottom of tanks and vessels. Seal with manufacturer's recommended adhesive.
1. Apply two continuous beads of adhesive to seams and joints, one bead under lap and the finish bead along seam and joint edge.
- D. Where metal jackets are indicated, install with 2-inch overlap at longitudinal seams and end joints. Overlap longitudinal seams arranged to shed water. Seal end joints with weatherproof sealant recommended by insulation manufacturer. Secure jacket with stainless-steel bands 12 inches o.c. and at end joints.
- E. Where PVDC jackets are indicated, install as follows:
1. Apply three separate wraps of filament tape per insulation section to secure pipe insulation to pipe prior to installation of PVDC jacket.
 2. Wrap factory-pre-sized jackets around individual pipe insulation sections with one end overlapping the previously installed sheet. Install pre-sized jacket with an approximate overlap at butt joint of 2 inches over the previous section. Adhere lap seal using adhesive or SSL, and then apply 1-1/4 circumferences of appropriate PVDC tape around overlapped butt joint.
 3. Continuous jacket can be spiral wrapped around a length of pipe insulation. Apply adhesive or PVDC tape at overlapped spiral edge. When electing to use adhesives, refer to manufacturer's written instructions for application of adhesives along this spiral edge to maintain a permanent bond.
 4. Jacket can be wrapped in cigarette fashion along length of roll for insulation systems with an outer circumference of 33-1/2 inches or less. The 33-1/2-inch circumference limit allows for 2-inch overlap seal. Using the length of roll allows for longer sections of jacket to be installed at one time. Use adhesive on the lap seal. Visually inspect lap seal for "fishmouthing," and use PVDC tape along lap seal to secure joint.
 5. Repair holes or tears in PVDC jacket by placing PVDC tape over the hole or tear and wrapping a minimum of 1-1/4 circumferences to avoid damage to tape edges.

3.8 FINISHES

- A. Equipment and Pipe Insulation with ASJ, Glass-Cloth, or Other Paintable Jacket Material: Paint jacket with paint system identified below and as specified in Division 09 painting Sections.
 - 1. Flat Acrylic Finish: Two finish coats over a primer that is compatible with jacket material and finish coat paint. Add fungicidal agent to render fabric mildew proof.
 - a. Finish Coat Material: Interior, flat, latex-emulsion size.
- B. Flexible Elastomeric Thermal Insulation: After adhesive has fully cured, apply two coats of insulation manufacturer's recommended protective coating.
- C. Color: Final color as selected by Architect. Vary first and second coats to allow visual inspection of the completed Work.
- D. Do not field paint aluminum or stainless-steel jackets.

3.9 FIELD QUALITY CONTROL

- A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.
- B. Perform tests and inspections.
- C. Tests and Inspections:
 - 1. Inspect field-insulated equipment, randomly selected by Architect, by removing field-applied jacket and insulation in layers in reverse order of their installation. Extent of inspection shall be limited to one location(s) for each type of equipment defined in the "Equipment Insulation Schedule" Article. For large equipment, remove only a portion adequate to determine compliance.
- D. All insulation applications will be considered defective Work if sample inspection reveals noncompliance with requirements.

3.10 PIPING INSULATION SCHEDULE, GENERAL

- A. Acceptable preformed pipe and tubular insulation materials and thicknesses are identified for each piping system and pipe size range. If more than one material is listed for a piping system, selection from materials listed is Contractor's option.
- B. Items Not Insulated: Unless otherwise indicated, do not install insulation on the following:
 - 1. Drainage piping located in crawl spaces.
 - 2. Underground piping.
 - 3. Chrome-plated pipes and fittings unless there is a potential for personnel injury.

3.11 INDOOR PIPING INSULATION SCHEDULE

A. Domestic Cold Water:

1. Two-inch (2") pipe size and Smaller: Insulation shall be the following:
 - a. Molded fiberglass 1/2 inch thick.
2. Two-and-one-half-inch (2-1/2") pipe size and Larger: Insulation shall be the following:
 - a. Molded fiberglass 1-inch thick.
3. Half-inch (1/2") run-out piping: Insulation shall be one of the following:
 - a. Molded fiberglass 1/2-inch thick.
 - b. Flexible Elastomeric: 1/2 inch thick.

3.12 INDOOR, FIELD-APPLIED JACKET SCHEDULE

- A. Install jacket over insulation material. For insulation with factory-applied jacket, install the field-applied jacket over the factory-applied jacket.
- B. If more than one material is listed, selection from materials listed is Contractor's option.
- C. Piping, Concealed:
 1. None.
- D. Piping, Exposed:
 1. PVC: 20 mils thick.
 2. In lieu of providing the PVC jacket for all exposed piping, at the Contractor's option, provide Owens Corning paper-free ASJ: Evolution for all piping insulation (concealed and exposed).

3.13 OUTDOOR, ABOVE GROUND PIPING

- A. All outdoor piping shall receive aluminum jacketing 0.016-inch thick in addition to insulation as scheduled above.

END OF SECTION

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SECTION 22 11 16 - DOMESTIC WATER PIPING

PART 1 GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Aboveground domestic water pipes, tubes, and fittings inside buildings.
 - 2. Encasement for piping.

1.3 ACTION SUBMITTALS

- A. Product Data: For transition fittings and dielectric fittings.

1.4 INFORMATIONAL SUBMITTALS

- A. System purging and disinfecting activities report.
- B. Field quality-control reports.

PART 2 PRODUCTS

2.1 PIPING MATERIALS

- A. Comply with requirements in "Piping Schedule" Article for applications of pipe, tube, fitting materials, and joining methods for specific services, service locations, and pipe sizes.
- B. Potable-water piping and components shall comply with NSF 14 and NSF 61. Plastic piping components shall be marked with "NSF-pw."
- C. Piping material and jointing compounds shall be lead-free per "Maryland State Plumbing Code" COMAR 09.20.01.03 and NSF 372.

2.2 COPPER TUBE AND FITTINGS

- A. Hard Copper Tube: ASTM B 88, Type L (ASTM B 88M, Type B) water tube, drawn temper.

- B. Soft Copper Tube: ASTM B 88, Type L (ASTM B 88M, Type B) water tube, annealed temper.
- C. Cast-Copper, Solder-Joint Fittings: ASME B16.18, pressure fittings.
- D. Wrought-Copper, Solder-Joint Fittings: ASME B16.22, wrought-copper pressure fittings.
- E. Bronze Flanges: ASME B16.24, Class 150, with solder-joint ends.
- F. Copper Unions:
 - 1. MSS SP-123.
 - 2. Cast-copper-alloy, hexagonal-stock body.
 - 3. Ball-and-socket, metal-to-metal seating surfaces.
 - 4. Solder-joint or threaded ends.

2.3 DUCTILE-IRON PIPE AND FITTINGS

- A. Mechanical-Joint, Ductile-Iron Pipe:
 - 1. AWWA C151/A21.51, with mechanical-joint bell and plain spigot end unless grooved or flanged ends are indicated.
 - 2. Glands, Gaskets, and Bolts: AWWA C111/A21.11, ductile- or gray-iron glands, rubber gaskets, and steel bolts.
- B. Standard-Pattern, Mechanical-Joint Fittings:
 - 1. AWWA C110/A21.10, ductile or gray iron.
 - 2. Glands, Gaskets, and Bolts: AWWA C111/A21.11, ductile- or gray-iron glands, rubber gaskets, and steel bolts.
- C. Compact-Pattern, Mechanical-Joint Fittings:
 - 1. AWWA C153/A21.53, ductile iron.
 - 2. Glands, Gaskets, and Bolts: AWWA C111/A21.11, ductile- or gray-iron glands, rubber gaskets, and steel bolts.

2.4 PIPING JOINING MATERIALS

- A. Pipe-Flange Gasket Materials:
 - 1. AWWA C110/A21.10, rubber, flat face, 1/8-inch thick or ASME B16.21, nonmetallic and asbestos free unless otherwise indicated.
 - 2. Full-face or ring type unless otherwise indicated.
- B. Metal, Pipe-Flange Bolts and Nuts: ASME B18.2.1, carbon steel unless otherwise indicated.
- C. Solder Filler Metals: ASTM B 32, lead-free alloys.
- D. Flux: ASTM B 813, water flushable.

- E. Brazing Filler Metals: AWS A5.8/A5.8M, BCuP Series, copper-phosphorus alloys for general-duty brazing unless otherwise indicated.

2.5 ENCASEMENT FOR PIPING

- A. Standard: ASTM A 674 or AWWA C105/A21.5.
- B. Form: Sheet or tube.
- C. Color: Black or natural.

2.6 TRANSITION FITTINGS

- A. General Requirements:
 - 1. Same size as pipes to be joined.
 - 2. Pressure rating at least equal to pipes to be joined.
 - 3. End connections compatible with pipes to be joined.
- B. Fitting-Type Transition Couplings: Manufactured piping coupling or specified piping system fitting.

PART 3 EXECUTION

3.1 PIPING INSTALLATION

- A. Drawing plans, schematics, and diagrams indicate general location and arrangement of domestic water piping. Indicated locations and arrangements are used to size pipe and calculate friction loss, expansion, and other design considerations. Install piping as indicated unless deviations to layout are approved on coordination drawings.
- B. Install copper tubing under building slab in a PVC conduit and according to CDA's "Copper Tube Handbook."
- C. Install shutoff valve immediately upstream of each dielectric fitting.
- D. Install water-pressure-reducing valves downstream from shutoff valves. Comply with requirements for pressure-reducing valves in Section 221119 "Domestic Water Piping Specialties."
- E. Install domestic water piping level without pitch and plumb.
- F. Install piping concealed from view and protected from physical contact by building occupants unless otherwise indicated and except in equipment rooms and service areas.

- G. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.
- H. Install piping to permit valve servicing.
- I. Install nipples, unions, special fittings, and valves with pressure ratings the same as or higher than the system pressure rating used in applications below unless otherwise indicated.
- J. Install piping free of sags and bends.
- K. Install fittings for changes in direction and branch connections.
- L. Install unions in copper tubing at final connection to each piece of equipment, machine, and specialty.
- M. Install pressure gages on suction and discharge piping for each plumbing pump. Comply with requirements for pressure gages in Division 22 Section "Meters and Gages for Plumbing Piping."
- N. Install thermostats in hot-water circulation piping. Comply with requirements for thermostats in Section 221123 "Domestic Water Pumps."
- O. Install thermometers on inlet and outlet piping from each water heater. Comply with requirements for thermometers in Division 22 Section "Meters and Gages for Plumbing Piping."
- P. Install sleeves for piping penetrations of walls, ceilings, and floors. Comply with requirements for sleeves specified in Division 22 Section "Common Work Results for Plumbing."
- Q. Install sleeve seals for piping penetrations of concrete walls and slabs.
- R. Install escutcheons for piping penetrations of walls, ceilings, and floors.

3.2 JOINT CONSTRUCTION

- A. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.
- B. Remove scale, slag, dirt, and debris from inside and outside of pipes, tubes, and fittings before assembly.
- C. Threaded Joints: Thread pipe with tapered pipe threads according to ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and restore full ID. Join pipe fittings and valves as follows:
 - 1. Apply appropriate tape or thread compound to external pipe threads.
 - 2. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged.
- D. Brazed Joints for Copper Tubing: Comply with CDA's "Copper Tube Handbook," "Brazed Joints" chapter.

- E. Soldered Joints for Copper Tubing: Apply ASTM B 813, water-flushable flux to end of tube. Join copper tube and fittings according to ASTM B 828 or CDA's "Copper Tube Handbook."
- F. Flanged Joints: Select appropriate asbestos-free, nonmetallic gasket material in size, type, and thickness suitable for domestic water service. Join flanges with gasket and bolts according to ASME B31.9.
- G. Joints for Dissimilar-Material Piping: Make joints using adapters compatible with materials of both piping systems.
- H. The use of dielectric unions is prohibited.

3.3 TRANSITION FITTING INSTALLATION

- A. Install transition couplings at joints of dissimilar piping.
- B. Transition Fittings in Underground Domestic Water Piping:
 - 1. Fittings for NPS 1-1/2 and Smaller: Fitting-type coupling.
 - 2. Fittings for NPS 2 and Larger: Sleeve-type coupling.
- C. Transition Fittings in Aboveground Domestic Water Piping NPS 2 and Smaller: Plastic-to-metal transition fittings or unions.

3.4 HANGER AND SUPPORT INSTALLATION

- A. Comply with requirements for pipe hanger, support products, and installation in Division 22 Section "Hangers and Supports for Plumbing Piping Equipment".
 - 1. Vertical Piping: MSS Type 8 or 42, clamps.
 - 2. Individual, Straight, Horizontal Piping Runs:
 - a. 100 Feet and Less: MSS Type 1, adjustable, steel clevis hangers.
 - b. Longer Than 100 Feet: MSS Type 43, adjustable roller hangers.
 - c. Longer Than 100 Feet if Indicated: MSS Type 49, spring cushion rolls.
 - 3. Multiple, Straight, Horizontal Piping Runs 100 Feet or Longer: MSS Type 44, pipe rolls. Support pipe rolls on trapeze.
 - 4. Base of Vertical Piping: MSS Type 52, spring hangers.
- B. Support vertical piping and tubing at base and at each floor.
- C. Rod diameter may be reduced one size for double-rod hangers, to a minimum of 3/8 inch (10 mm).
- D. Install hangers for copper tubing with the following maximum horizontal spacing and minimum rod diameters:
 - 1. NPS 3/4 and Smaller: 60 inches with 3/8-inch rod.

2. NPS 1 and NPS 1-1/4: 72 inches with 3/8-inch rod.
3. NPS 1-1/2 and NPS 2: 96 inches with 3/8-inch rod.
4. NPS 2-1/2: 108 inches with 1/2-inch rod.
5. NPS 3 to NPS 5: 10 feet with 1/2-inch rod.

- E. Install supports for vertical copper tubing every 10 feet .
- F. Support piping and tubing not listed in this article according to MSS SP-69 and manufacturer's written instructions.

3.5 CONNECTIONS

- A. Drawings indicate general arrangement of piping, fittings, and specialties.
- B. When installing piping adjacent to equipment and machines, allow space for service and maintenance.

3.6 IDENTIFICATION

- A. Identify system components. Comply with requirements for identification materials and installation in Division 22 Section "Identification for Plumbing Piping and Equipment."
- B. Label pressure piping with system operating pressure.

3.7 FIELD QUALITY CONTROL

- A. Perform the following tests and inspections:
 1. Piping Tests:
 - a. Fill domestic water piping. Check components to determine that they are not air bound and that piping is full of water.
 - b. Test for leaks and defects in new piping and parts of existing piping that have been altered, extended, or repaired. If testing is performed in segments, submit a separate report for each test, complete with diagram of portion of piping tested.
 - c. Leave new, altered, extended, or replaced domestic water piping uncovered and unconcealed until it has been tested and approved. Expose work that was covered or concealed before it was tested.
 - d. Cap and subject piping to static water pressure of 50 psig above operating pressure, without exceeding pressure rating of piping system materials. Isolate test source and allow it to stand for four hours. Leaks and loss in test pressure constitute defects that must be repaired.
 - e. Repair leaks and defects with new materials, and retest piping or portion thereof until satisfactory results are obtained.
 - f. Prepare reports for tests and for corrective action required.
- B. Domestic water piping will be considered defective if it does not pass tests and inspections.

- C. Prepare test and inspection reports.

3.8 ADJUSTING

- A. Perform the following adjustments before operation:

1. Close drain valves, hydrants, and hose bibbs.
2. Open shutoff valves to fully open position.
3. Open throttling valves to proper setting.
4. Adjust balancing valves in hot-water-circulation return piping to provide adequate flow.
 - a. Manually adjust ball-type balancing valves in hot-water-circulation return piping to provide hot-water flow in each branch.
 - b. Adjust calibrated balancing valves to flows indicated.
5. Remove plugs used during testing of piping and for temporary sealing of piping during installation.
6. Remove and clean strainer screens. Close drain valves and replace drain plugs.
7. Remove filter cartridges from housings and verify that cartridges are as specified for application where used and are clean and ready for use.
8. Check plumbing specialties and verify proper settings, adjustments, and operation.

3.9 CLEANING

- A. Clean and disinfect potable domestic water piping as follows:

1. Purge all new piping.
2. Use purging and disinfecting procedures prescribed by authorities having jurisdiction; if methods are not prescribed, use procedures described in either AWWA C651 or AWWA C652 or follow procedures described below:
 - a. Flush piping system with clean, potable water until dirty water does not appear at outlets.
 - b. Fill and isolate system according to either of the following:
 - 1) Fill system or part thereof with water/chlorine solution with at least 50 ppm of chlorine. Isolate with valves and allow to stand for 24 hours.
 - 2) Fill system or part thereof with water/chlorine solution with at least 200 ppm of chlorine. Isolate and allow to stand for three hours.
 - c. Flush system with clean, potable water until no chlorine is in water coming from system after the standing time.
 - d. Repeat procedures if biological examination shows contamination.
 - e. Submit water samples in sterile bottles to authorities having jurisdiction.

- B. Clean interior of domestic water piping system. Remove dirt and debris as work progresses.

3.10 PIPING SCHEDULE

- A. Transition and special fittings with pressure ratings at least equal to piping rating may be used in applications below unless otherwise indicated.
- B. Flanges and unions may be used for aboveground piping joints unless otherwise indicated.
- C. Aboveground domestic water piping, NPS 2 and smaller shall be one of the following:
 - 1. Hard copper tube, ASTM B 88, Type L (ASTM B 88M, Type B); cast- or wrought-copper, solder-joint fittings; and brazed/soldered joints.
- D. Aboveground domestic water piping, NPS 2-1/2 to NPS 4, shall be the following:
 - 1. Hard copper tube, ASTM B 88, Type L (ASTM B 88M, Type B); cast or wrought-copper, solder-joint fittings; and brazed joints.
- E. Below Ground Domestic Cold Water Outside of Building or Under Building:
 - 1. Ductile iron pipe for water, ANSI 21.50 & 21.51 with double thickness cement mortar lining, ANSI 21.4. Cast iron pressure fittings, ANSI 21.10, Class 250. Mechanical specification for mechanical joint for cast iron pressure pipe & fittings ANSI A21.11. Joints for ductile iron pipe shall be AWWA C111, rubber gasket with 3/4-inch diameter rods.

3.11 VALVE SCHEDULE

- A. Drawings indicate valve types to be used. Where specific valve types are not indicated, the following requirements apply:
 - 1. Shutoff Duty: Use ball valves for all piping.
 - 2. Throttling Duty: Use ball or globe valves for piping NPS 2 and smaller. Use ball valves with flanged ends for piping NPS 2-1/2 and larger.
 - 3. Drain Duty: Hose-end drain valves.
- B. Use check valves to maintain correct direction of domestic water flow to and from equipment.

END OF SECTION