
PROJECT MANUAL FOR
RENOVATE FIELD MAINTENANCE SHOP (FMS#3)
PHASE 1
at
RIVER ROAD TRAINING SITE
NEW CASTLE, DELAWARE 19720
FOR
Delaware Army National Guard

Biden Center
1 Vavala Way
New Castle, DE 19720

DEARNG#: 2021-03
FEDERAL#: 10106050030



Engineer:
Century Engineering, Inc.
550 Bay Road
Dover, DE 19901

April 2022

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Specifications for this project are arranged in accordance with the Construction Specification Institute numbering system and format. Section numbering is discontinuous and all numbers not appearing in the Table of Contents are not used for this Project.

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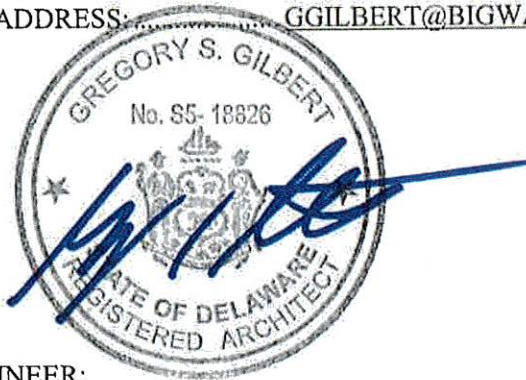
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SECTION 00 01 07 – SEALS PAGE

1) DESIGN PROFESSIONALS OF RECORD

a) ARCHITECT:

- (1) NAME: GREG GILBERT, AIA.
(2) DELAWARE LICENSE: **55-18826**
(3) TITLE: VICE PRESIDENT
(4) FIRM NAME: ..BIGNELL, WATKINS, HASSER ARCHITECTS.
(5) FIRM ADDRESS: ONE PARK PLACE, ANNAPOLIS MD 21401
(6) FIRM TELEPHONE: 410-224-2727
(7) EMAIL ADDRESS: GGILBERT@BIGWAHA.COM



b) CIVIL ENGINEER:

- (1) NAME: JOHN SCLESKY, P.E.
(2) DELAWARE PE LICENSE: 7534
(3) TITLE: SENIOR ENGINEER
(4) FIRM NAME: CENTURY ENGINEERING, INC.
(5) FIRM ADDRESS: 550 BAY ROAD, DOVER, DE 19901
(6) FIRM TELEPHONE: 302-734-9188
(7) EMAIL ADDRESS: JSCLESKY@CENTURYENG.COM



c) LANDSCAPE ARCHITECT:

- (1) NO LANDSCAPE ARCHITECT INVOLVEMENT.

d) STRUCTURAL ENGINEER:

- (1) NAME: WALT HOEY, P.E.
(2) DELAWARE PE LICENSE:
(3) TITLE:.....SENIOR ENGINEER
(4) FIRM NAME: CENTURY ENGINEERING, INC.
(5) FIRM ADDRESS:..... 550 BAY ROAD, DOVER, DE 19901
(6) FIRM TELEPHONE: 302-734-9188
(7) EMAIL ADDRESS:..... WHOEY@CENTURYENG.COM



Walter Hoey

b) FIRE PROTECTION ENGINEER:

- (1) NO FIRE PROTECTION ENGINEER INVOLVEMENT.

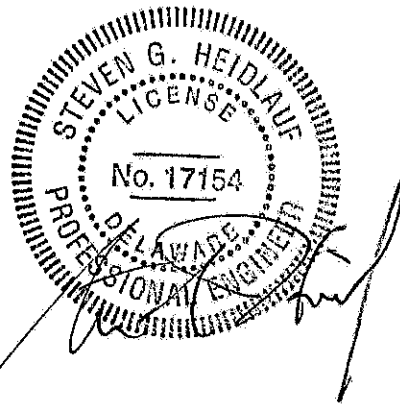
c) PLUMBING/HVAC ENGINEER:

- (1) NAME: JASON BOROWSKI, P.E.
(2) DELAWARE PE LICENSE:
(3) TITLE:.....SENIOR ENGINEER
(4) FIRM NAME: CENTURY ENGINEERING, INC.
(5) FIRM ADDRESS:..... 550 BAY ROAD, DOVER, DE 19901
(6) FIRM TELEPHONE: 302-734-9188
(7) EMAIL ADDRESS:..... JBOROWSKI@CENTURYENG.COM



d) ELECTRICAL ENGINEER:

- (1) NAME: STEVE G. HEIDLAUF, P.E.
- (2) DELAWARE PE LICENSE:
- (3) TITLE: CHIEF ELECTRICAL ENGINEER
- (4) FIRM NAME: CENTURY ENGINEERING, INC.
- (5) FIRM ADDRESS: 550 BAY ROAD, DOVER, DE 19901
- (6) FIRM TELEPHONE: 302-734-9188
- (7) EMAIL ADDRESS: SHEIDLAUF@CENTURYENG.COM



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SECTION 00 01 15 LIST OF DRAWING SHEETS

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AD1.1	DEMOLITION REFLECTED CEILING PLAN
AD1.2	DEMOLITION ROOF PLAN
A1.0	PROPOSED FLOOR PLAN
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A1.2	PROPOSED ROOF PLAN
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C1.0	SITE UTILITIES & DETAILS
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END OF SECTION

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Section 00 11 16 - ADVERTISEMENT FOR BIDS

Sealed bids for **DEARNG Contract 2021-03; ARNG 21-003 FMS3RENO – Field Maintenance Shop #3 Renovation Phase 1** will be received by the Delaware Army National Guard by mail or at the Security Officers Desk in the Main Lobby of the Biden National Guard/Reserve Center, 1 Vavala Way, New Castle, Delaware 19720 until **1:00 PM local time on Tuesday, June 7, 2022**, at which time they will be publicly read aloud in the Multi-Purpose Room.

Bidders are required to show identification at the Guard Booth when entering the site and must sign in at the Security Officers desk once inside. Please allow sufficient time to comply with these requirements. No exceptions. Bidder bears the risk of late delivery. Any bids received after the stated time will be returned unopened.

Project involves the renovation of the current Field Maintenance Shop #3 at River Road Training Site. Work to be accomplished in accordance with the contract includes the repair and replacement of interior administrative finishes, latrine repair/renovation, HVAC system replacement, new facility fire suppression, new domestic water service and new dedicated fire suppression system water service, CO/NX detection upgrades, electrical panel replacement and electrical lighting replacements.

Attention is called to the construction schedule as detailed in the Contract Documents.

A **MANDATORY** Pre-Bid Meeting will be held on **Tuesday, May 17, 2022 at 11:00AM local time** at River Road Training Site, 1197 River Road, New Castle, DE 19720 for the purpose of establishing the listing of subcontractors and to answer questions. Representatives of each party to any Joint Venture must attend the meeting. **ATTENDANCE OF THIS MEETING IS A PREREQUISITE FOR BIDDING ON THIS CONTRACT.**

Sealed bids shall be mailed and addressed to the Delaware Army National Guard, 1 Vavala Way, New Castle, Delaware 19720; **ATTN: Brittney M. Poore, Business Manager**. The outer envelope should clearly indicate: **“DEARNG Contract 2021-03; ARNG 21-003 FMS3RENO –Field Maintenance Shop #3 Renovation Phase 1 – SEALED BID – DO NOT OPEN.”**

Contract Documents can be obtained at the Pre-Bid Meeting or before, by calling (302) 734-9188 upon receipt of \$50.00 – Electronic or \$100.00 - Hardcopy per set/ non-refundable. Checks are to be made payable to “Century Engineering, LLC.”

Construction documents will be available for review at the office of Century Engineering, 550 Bay Road, Dover, DE 19901.

Minority Business Enterprises (MBE), Disadvantaged Business Enterprises (DBE), Women-Owned Business Enterprises (WBE) and Veteran-Owned Business Enterprises (VBE) will be afforded full opportunity to submit bids on this contract and will not be subject to discrimination on the basis of race, color, national origin or sex in consideration of this award.

Each bid must be accompanied by a bid security equivalent to ten percent of the bid amount and all additive alternates. The successful bidder must post a performance bond and payment bond in a sum equal to 100 percent of the contract price upon execution of the contract. The Owner reserves the right to reject any or all bids and to waive any informalities therein. The Owner may extend the time and place for the opening of the bids from that described in the advertisement, with not less than two calendar days' notice by certified delivery, facsimile machine or other electronic means to those bidders receiving plans.

END OF SECTION

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SECTION 00 21 13 - INSTRUCTIONS TO BIDDERS

TABLE OF ARTICLES

1. DEFINITIONS
2. BIDDER'S REPRESENTATION
3. BIDDING DOCUMENTS
4. BIDDING PROCEDURES
5. CONSIDERATION OF BIDS
6. POST-BID INFORMATION
7. PERFORMANCE BOND AND PAYMENT BOND
8. FORM OF AGREEMENT BETWEEN OWNER AND CONTRACTOR

ARTICLE 1: GENERAL

1.1 DEFINITIONS

1.1.1 Whenever the following terms are used, their intent and meaning shall be interpreted as follows:

1.2 STATE: The State of Delaware.

1.3 AGENCY: Contracting State Agency as noted on cover sheet.

1.4 DESIGNATED OFFICIAL: The agent authorized to act for the Agency.

1.5 BIDDING DOCUMENTS: Bidding Documents include the Bidding Requirements and the proposed Contract Documents. The Bidding Requirements consist of the Advertisement for Bid, Invitation to Bid, Instructions to Bidders, Supplementary Instructions to Bidders (if any), General Conditions, Supplementary General Conditions, General Requirements, Special Provisions (if any), the Bid Form (including the Non-collusion Statement), and other sample bidding and contract forms. The proposed Contract Documents consist of the form of Agreement between the Owner and Contractor, as well as the Drawings, Specifications (Project Manual) and all Addenda issued prior to execution of the Contract.

1.6 CONTRACT DOCUMENTS: The Contract Documents consist of the, Instructions to Bidders, Supplementary Instructions to Bidders (if any), General Conditions, Supplementary General Conditions, General Requirements, Special Provisions (if any), the form of agreement between the Owner and the Contractor, Drawings (if any), Specifications (Project Manual), and all addenda.

1.7 AGREEMENT: The form of the Agreement shall be AIA Document A101, Standard Form of Agreement between Owner and Contractor where the basis of payment is a STIPULATED SUM. In the case of conflict between the instructions contained therein and the General Requirements herein, these General Requirements shall prevail.

1.8 GENERAL REQUIREMENTS (or CONDITIONS): General Requirements (or conditions) are instructions pertaining to the Bidding Documents and to contracts in general. They contain, in summary, requirements of laws of the State; policies of the Agency and instructions to bidders.

1.9 SPECIAL PROVISIONS: Special Provisions are specific conditions or requirements peculiar to the bidding documents and to the contract under consideration and are supplemental to the General Requirements. Should the Special Provisions conflict with the General Requirements, the Special Provisions shall prevail.

1.10 ADDENDA: Written or graphic instruments issued by the Owner/Architect prior to the execution of the contract which modify or interpret the Bidding Documents by additions, deletions, clarifications or corrections.

1.11 BIDDER OR VENDOR: A person or entity who formally submits a Bid for the material or Work contemplated, acting directly or through a duly authorized representative who meets the requirements set forth in the Bidding Documents.

1.12 SUB-BIDDER: A person or entity who submits a Bid to a Bidder for materials or labor, or both for a portion of the Work.

- 1.13 BID: A complete and properly executed proposal to do the Work for the sums stipulated therein, submitted in accordance with the Bidding Documents.
- 1.14 BASE BID: The sum stated in the Bid for which the Bidder offers to perform the Work described in the Bidding Documents as the base, to which Work may be added or from which Work may be deleted for sums stated in Alternate Bids (if any are required to be stated in the bid).
- 1.15 ALTERNATE BID (or ALTERNATE): An amount stated in the Bid, where applicable, to be added to or deducted from the amount of the Base Bid if the corresponding change in the Work, as described in the Bidding Documents is accepted.
- 1.16 UNIT PRICE: An amount stated in the Bid, where applicable, as a price per unit of measurement for materials, equipment or services or a portion of the Work as described in the Bidding Documents.
- 1.17 SURETY: The corporate body which is bound with and for the Contract, or which is liable, and which engages to be responsible for the Contractor's payments of all debts pertaining to and for his acceptable performance of the Work for which he has contracted.
- 1.18 BIDDER'S DEPOSIT: The security designated in the Bid to be furnished by the Bidder as a guaranty of good faith to enter into a contract with the Agency if the Work to be performed or the material or equipment to be furnished is awarded to him.
- 1.19 CONTRACT: The written agreement covering the furnishing and delivery of material or work to be performed.
- 1.20 CONTRACTOR: Any individual, firm or corporation with whom a contract is made by the Agency.
- 1.21 SUBCONTRACTOR: An individual, partnership or corporation which has a direct contract with a contractor to furnish labor and materials at the job site, or to perform construction labor and furnish material in connection with such labor at the job site.
- 1.22 CONTRACT BOND: The approved form of security furnished by the contractor and his surety as a guaranty of good faith on the part of the contractor to execute the work in accordance with the terms of the contract.

ARTICLE 2: BIDDER'S REPRESENTATIONS

- 2.1 PRE-BID MEETING
- 2.1.1 A pre-bid meeting for this project will be held at the time and place designated. Attendance at this meeting is a pre-requisite for submitting a Bid, unless this requirement is specifically waived elsewhere in the Bid Documents.
- 2.2 By submitting a Bid, the Bidder represents that:
- 2.2.1 The Bidder has read and understands the Bidding Documents and that the Bid is made in accordance therewith.
- 2.2.2 The Bidder has visited the site, become familiar with existing conditions under which the Work is to be performed, and has correlated the Bidder's his personal observations with the requirements of the proposed Contract Documents.

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

2.3 JOINT VENTURE REQUIREMENTS

2.3.1 For Public Works Contracts, each Joint Venturer shall be qualified and capable to complete the Work with their own forces.

2.3.2 Included with the Bid submission, and as a requirement to bid, a copy of the executed Joint Venture Agreement shall be submitted and signed by all Joint Venturers involved.

2.3.3 All required Bid Bonds, Performance Bonds, Material and Labor Payment Bonds must be executed by both Joint Venturers and be placed in both of their names.

2.3.4 All required insurance certificates shall name both Joint Venturers.

2.3.5 Both Joint Venturers shall sign the Bid Form.

2.3.6 Both Joint Venturers shall include their Federal E.I. Number with the Bid.

2.3.7 In the event of a mandatory Pre-bid Meeting, each Joint Venturer shall have a representative in attendance.

2.3.8 Due to exceptional circumstances and for good cause shown, one or more of these provisions may be waived at the discretion of the State.

2.4 ASSIGNMENT OF ANTITRUST CLAIMS

2.4.1 As consideration for the award and execution by the Owner of this contract, the Contractor hereby grants, conveys, sells, assigns and transfers to the State of Delaware all of its right, title and interests in and to all known or unknown causes of action it presently has or may now or hereafter acquire under the antitrust laws of the United States and the State of Delaware, relating to the particular goods or services purchased or acquired by the Owner pursuant to this contract.

ARTICLE 3: BIDDING DOCUMENTS

3.1 COPIES OF BID DOCUMENTS

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

3.1.2 Bidders shall use complete sets of Bidding Documents for preparation of Bids. The issuing Agency nor the Architect assumes no responsibility for errors or misinterpretations resulting from the use of incomplete sets of Bidding Documents.

3.1.3 Any errors, inconsistencies or omissions discovered shall be reported to the Architect immediately.

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

3.2 INTERPRETATION OR CORRECTION OF BIDDING DOCUMENTS

- 3.2.1 The Bidder shall carefully study and compare the Bidding Documents with each other, and with other work being bid concurrently or presently under construction to the extent that it relates to the Work for which the Bid is submitted, shall examine the site and local conditions, and shall report any errors, inconsistencies, or ambiguities discovered to the Architect.
- 3.2.2 Bidders or Sub-bidders requiring clarification or interpretation of the Bidding Documents shall make a written request to the Architect at least seven days prior to the date for receipt of Bids. Interpretations, corrections and changes to the Bidding Documents will be made by written Addendum. Interpretations, corrections, or changes to the Bidding Documents made in any other manner shall not be binding.
- 3.2.3 The apparent silence of the specifications as to any detail, or the apparent omission from it of detailed description concerning any point, shall be regarded as meaning that only the best commercial practice is to prevail and only material and workmanship of the first quality are to be used. Proof of specification compliance will be the responsibility of the Bidder.
- 3.2.4 Unless otherwise provided in the Contract Documents, the Contractor shall provide and pay for all permits, labor, materials, equipment, tools, construction equipment and machinery, water, heat, utilities, transportation, and other facilities and services necessary for the proper execution and completion of the Work.
- 3.2.5 The Owner will bear the costs for all impact and user fees associated with the project.

3.3 SUBSTITUTIONS

- 3.3.1 The materials, products and equipment described in the Bidding Documents establish a standard of quality, required function, dimension, and appearance to be met by any proposed substitution. The specification of a particular manufacturer or model number is not intended to be proprietary in any way. Substitutions of products for those named will be considered, providing that the Vendor certifies that the function, quality, and performance characteristics of the material offered is equal or superior to that specified. It shall be the Bidder's responsibility to assure that the proposed substitution will not affect the intent of the design, and to make any installation modifications required to accommodate the substitution.
- 3.3.2 Requests for substitutions shall be made in writing to the Architect at least ten days prior to the date of the Bid Opening. Such requests shall include a complete description of the proposed substitution, drawings, performance and test data, explanation of required installation modifications due the substitution, and any other information necessary for an evaluation. The burden of proof of the merit of the proposed substitution is upon the proposer. The Architect's decision of approval or disapproval shall be final. The Architect is to notify Owner prior to any approvals.
- 3.3.3 If the Architect approves a substitution prior to the receipt of Bids, such approval shall be set forth in an Addendum. Approvals made in any other manner shall not be binding.
- 3.3.4 The Architect shall have no obligation to consider any substitutions after the Contract award.

3.4 ADDENDA

- 3.4.1 Addenda will be mailed or delivered to all who are known by the Architect to have received a complete set of the Bidding Documents.

INSTRUCTIONS TO BIDDERS

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- 3.4.2 Copies of Addenda will be made available for inspection wherever Bidding Documents are on file for that purpose.
- 3.4.3 No Addenda will be issued later than 2 calendar days prior to the date for receipt of Bids except an Addendum withdrawing the request for Bids or one which extends the time or changes the location for the opening of bids.
- 3.4.4 Each bidder shall ascertain prior to submitting his Bid that they have received all Addenda issued, and shall acknowledge their receipt in their Bid in the appropriate space. Not acknowledging an issued Addenda could be grounds for determining a bid to be non-responsive.

ARTICLE 4: BIDDING PROCEDURES

4.1 PREPARATION OF BIDS

- 4.1.1 Submit the bids on the Bid Forms included with the Bidding Documents.
- 4.1.2 Submit the original Bid Form for each bid. Bid Forms may be removed from the project manual for this purpose.
- 4.1.3 Execute all blanks on the Bid Form in a non-erasable medium (typewriter or manually in ink).
- 4.1.4 Where so indicated by the makeup on the Bid Form, express sums in both words and figures, in case of discrepancy between the two, the written amount shall govern.
- 4.1.5 Interlineations, alterations or erasures must be initialed by the signer of the Bid.
- 4.1.6 BID ALL REQUESTED ALTERNATES AND UNIT PRICES, IF ANY. If there is no change in the Base Bid for an Alternate, enter "No Change". The Contractor is responsible for verifying that they have received all addenda issued during the bidding period. Work required by Addenda shall automatically become part of the Contract.
- 4.1.7 Make no additional stipulations on the Bid Form and do not qualify the Bid in any other manner.
- 4.1.8 Each copy of the Bid shall include the legal name of the Bidder and a statement whether the Bidder is a sole proprietor, a partnership, a corporation, or any legal entity, and 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 agent's authority to bind the Bidder.
- 4.1.9 Bidder shall complete the Non-Collusion Statement form included with the Bid Forms and include it with their Bid.
- 4.1.10 In the construction of all Public Works projects for the State of Delaware or any agency thereof, preference in employment of laborers, workers or mechanics shall be given to bona fide legal citizens of the State who have established citizenship by residence of at least 90 days in the State.
- 4.1.11 Each bidder shall include a signed Affidavit for the Bidder certifying compliance with OMB Regulation 4104 - "Regulations for the Drug Testing of Contractor and Subcontractor

INSTRUCTIONS TO BIDDERS

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Employees Working on “Large Public Works Projects.” “Large Public Works” is based upon the current threshold required for bidding Public Works as set by the Purchasing and Contracting Advisory Council.

4.2 BID SECURITY

4.2.1 All bids shall be accompanied by a deposit of either a good and sufficient bond to the agency for the benefit of the agency, with corporate surety authorized to do business in this State, the form of the bond and the surety to be approved by the agency, or a security of the bidder assigned to the agency, for a sum equal to at least 10% of the bid plus all add alternates, or in lieu of the bid bond a security deposit in the form of a certified check, bank treasurer’s check, cashier’s check, money order, or other prior approved secured deposit assigned to the State. The bid bond need not be for a specific sum, but may be stated to be for a sum equal to 10% of the bid plus all add alternates to which it relates and not to exceed a certain stated sum, if said sum is equal to at least 10% of the bid. The Bid Bond form used shall be the standard OMB form (attached).

4.2.2 The Agency has the right to retain the bid security of Bidders to whom an award is being considered until either a formal contract has been executed and bonds have been furnished or the specified time has elapsed so the Bids may be withdrawn or all Bids have been rejected.

4.2.3 In the event of any successful Bidder refusing or neglecting to execute a formal contract and bond within 20 days of the awarding of the contract, the bid bond or security deposited by the successful bidder shall be forfeited.

4.3 SUBCONTRACTOR LIST

4.3.1 In accordance with Title 29, Chapter 69, Section 6962(d)(10)b of the Delaware Code, each Bidder shall submit with their Bid a completed List of Sub-Contractors included with the Bid Form. NAME ONLY ONE SUBCONTRACTOR FOR EACH TRADE. The bidder must list **in each category** the full name and address (City & State) of the sub-contractor that the Bidder will be using to perform the work and provide material for that subcontractor category. Should the Bidder’s listed subcontractor intend to provide any of their subcontractor category of work through a third-tier contractor, the Bidder shall list that third-tier contractor’s full name and address (City & State). **If the Bidder intends to perform any category of work itself, it must list its full name and address.** For clarification, if the Bidder intends to perform the work themselves, the Bidder **may not** insert “not applicable”, “N/A”, “self” or anything other than its own full name and address (City & State). To do so shall cause the bid to be rejected. In addition, the failure to produce a completed subcontractor list with the bid submittal shall cause the bid to be rejected. If you have more than three (3) third-tier contractors to report in any subcontractor category, print out additional page(s) containing the appropriate category, complete the rest of your list of third-tier contractors for that category, notate the addition in parentheses as (CONTINUATION) next to the subcontractor category and an asterisk (*) next to any additional third-tier contractors, and submit it with your bid.

4.3.2 It is the responsibility of the Contractor to ensure that their Subcontractors are in compliance with the provisions of this law. Also, if a Contractor elects to list themselves as a Subcontractor for any category, they must specifically name themselves on the Bid Form and be able to document their capability to act as Subcontractor in that category in accordance with this law.

4.4 AFFIDAVIT OF CONTRACTOR QUALIFICATIONS

- 4.4.1 In accordance with Title 29, Chapter 69, Section 6962(d)(10)b.3 of the Delaware Code, each Bidder shall submit with their Bid the Affidavit of Contractor Qualifications certifying that the Bidder will abide by the contractor's qualifications outlined in the construction bid specifications for the duration of the contract term. After a contract has been awarded the successful bidder shall not substitute another subcontractor whose name was submitted on the Subcontractor Form except for the reasons in the statute and not without written consent from the awarding agency. Failure to utilize the subcontractors on the list will subject the successful bidder to penalties as outlined in the General Requirements Section 5.2 of the contract.

4.5 AFFIDAVIT OF CRAFT TRAINING COMPLIANCE

- 4.5.1 In accordance with Title 29, Chapter 69, Section 6962(c)(13) of the Delaware Code, contractors and subcontractors must provide craft training for journeyman and apprentice levels if all of the following apply:

- A. A project meets the prevailing wage requirement under Title 29, Chapter 69, Section 6960 of the Delaware Code.
- B. The contractor employs 10 or more total employees.
- C. The project is not a federal highway project

Failure to provide required craft training on the project may subject the successful contractor and/or subcontractor(s) to penalties as outlined in Title 29, Chapter 69, Section 6962(c)(13) of the Delaware Code.

Bidders shall submit the Affidavit of Craft Training Compliance prior to contract execution.

4.6 EQUALITY OF EMPLOYMENT OPPORTUNITY ON PUBLIC WORKS

- 4.6.1 During the performance of this contract, the contractor agrees as follows:

- A. The Contractor will not discriminate against any employee or applicant for employment because of race, creed, sex, color, sexual orientation, gender identity or national origin. The Contractor will take affirmative action to ensure the applicants are employed, and that employees are treated during employment, without regard to their race, creed, sex, color, sexual orientation, gender identity or national origin. Such action shall include, but not be limited to, the following: Employment, upgrading, demotion or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. The Contractor agrees to post in conspicuous places available to employees and applicants for employment notices to be provided by the contracting agency setting forth this nondiscrimination clause.
- B. The Contractor will, in all solicitations or advertisements for employees placed by or on behalf of the Contractor, state that all qualified applicants will receive consideration for employment without regard to race, creed, sex, color, sexual orientation, gender identity or national origin."

4.7 PREVAILING WAGE REQUIREMENT

- 4.7.1 Wage Provisions: For renovation and new construction projects whose costs exceed the thresholds contained in Delaware Code, Title 29, Section 6960, the minimum wage rates for various classes of laborers and mechanics shall be as determined by the Department of Labor, Division of Industrial Affairs of the State of Delaware.
- 4.7.2 The employer shall pay all mechanics and labors employed directly upon the site of work, unconditionally and not less often than once a week and without subsequent deduction or rebate on any account, the full amounts accrued at time of payment, computed at wage rates not less than those stated in the specifications, regardless of any contractual relationship which may be alleged to exist between the employer and such laborers and mechanics.
- 4.7.3 The scale of the wages to be paid shall be posted by the employer in a prominent and easily accessible place at the site of the work.
- 4.7.4 Every contract based upon these specifications shall contain a stipulation that sworn payroll information, as required by the Department of Labor, be furnished weekly. The Department of Labor shall keep and maintain the sworn payroll information for a period of 6 months from the last day of the work week covered by the payroll.
- 4.8 SUBMISSION OF BIDS
- 4.8.1 Enclose the Bid, the Bid Security, and any other documents required to be submitted with the Bid in a sealed opaque envelope. Address the envelope to the party receiving the Bids. Identify with the project name, project number, and the Bidder's name and address. If the Bid is sent by mail, enclose the sealed envelope in a separate mailing envelope with the notation "BID ENCLOSED" on the face thereof. The State is not responsible for the opening of bids prior to bid opening date and time that are not properly marked.
- 4.8.2 Deposit Bids at the designated location prior to the time and date for receipt of bids indicated in the Advertisement for Bids. Bids received after the time and date for receipt of bids will be marked "LATE BID" and returned.
- 4.8.3 Bidder assumes full responsibility for timely delivery at location designated for receipt of bids.
- 4.8.4 Oral, telephonic or telegraphic bids are invalid and will not receive consideration.
- 4.8.5 Withdrawn Bids may be resubmitted up to the date and time designated for the receipt of Bids, provided that they are then fully in compliance with these Instructions to Bidders.
- 4.9 MODIFICATION OR WITHDRAW OF BIDS
- 4.9.1 Prior to the closing date for receipt of Bids, a Bidder may withdraw a Bid by personal request and by showing proper identification to the Architect. A request for withdraw by letter or fax, if the Architect is notified in writing prior to receipt of fax, is acceptable. A fax directing a modification in the bid price will render the Bid informal, causing it to be ineligible for consideration of award. Telephone directives for modification of the bid price shall not be permitted and will have no bearing on the submitted proposal in any manner.
- 4.9.2 Bidders submitting Bids that are late shall be notified as soon as practicable and the bid shall be returned.
- 4.9.3 A Bid may not be modified, withdrawn or canceled by the Bidder during a thirty (30) day period following the time and date designated for the receipt and opening of Bids, and

Bidder so agrees in submitting their Bid. Bids shall be binding for 30 days after the date of the Bid opening.

ARTICLE 5: CONSIDERATION OF BIDS

5.1 OPENING/REJECTION OF BIDS

5.1.1 Unless otherwise stated, Bids received on time will be publicly opened and will be read aloud. An abstract of the Bids will be made available to Bidders.

5.1.2 The Agency shall have the right to reject any and all Bids. A Bid not accompanied by a required Bid Security or by other data required by the Bidding Documents, or a Bid which is in any way incomplete or irregular is subject to rejection.

5.1.3 If the Bids are rejected, it will be done within thirty (30) calendar day of the Bid opening.

5.2 COMPARISON OF BIDS

5.2.1 After the Bids have been opened and read, the bid prices will be compared and the result of such comparisons will be made available to the public. Comparisons of the Bids may be based on the Base Bid plus desired Alternates. The Agency shall have the right to accept Alternates in any order or combination.

5.2.2 The Agency reserves the right to waive technicalities, to reject any or all Bids, or any portion thereof, to advertise for new Bids, to proceed to do the Work otherwise, or to abandon the Work, if in the judgment of the Agency or its agent(s), it is in the best interest of the State.

5.2.3 An increase or decrease in the quantity for any item is not sufficient grounds for an increase or decrease in the Unit Price.

5.2.4 The prices quoted are to be those for which the material will be furnished F.O.B. Job Site and include all charges that may be imposed during the period of the Contract.

5.2.5 No qualifying letter or statements in or attached to the Bid, or separate discounts will be considered in determining the low Bid except as may be otherwise herein noted. Cash or separate discounts should be computed and incorporated into Unit Bid Price(s).

5.3 DISQUALIFICATION OF BIDDERS

5.3.1 An agency shall determine that each Bidder on any Public Works Contract is responsible before awarding the Contract. Factors to be considered in determining the responsibility of a Bidder include:

- A. The Bidder's financial, physical, personnel or other resources including Subcontracts;
- B. The Bidder's record of performance on past public or private construction projects, including, but not limited to, defaults and/or final adjudication or admission of violations of the Prevailing Wage Laws in Delaware or any other state;
- C. The Bidder's written safety plan;
- D. Whether the Bidder is qualified legally to contract with the State;

- E. Whether the Bidder supplied all necessary information concerning its responsibility; and,
- F. Any other specific criteria for a particular procurement, which an agency may establish; provided however, that, the criteria be set forth in the Invitation to Bid and is otherwise in conformity with State and/or Federal law.

5.3.2 If an agency determines that a Bidder is nonresponsive and/or nonresponsible, the determination shall be in writing and set forth the basis for the determination. A copy of the determination shall be sent to the affected Bidder within five (5) working days of said determination.

5.3.3 In addition, any one or more of the following causes may be considered as sufficient for the disqualification of a Bidder and the rejection of their Bid or Bids.

5.3.3.1 More than one Bid for the same Contract from an individual, firm or corporation under the same or different names.

5.3.3.2 Evidence of collusion among Bidders.

5.3.3.3 Unsatisfactory performance record as evidenced by past experience.

5.3.3.4 If the Unit Prices are obviously unbalanced either in excess or below reasonable cost analysis values.

5.3.3.5 If there are any unauthorized additions, interlineation, conditional or alternate bids or irregularities of any kind which may tend to make the Bid incomplete, indefinite or ambiguous as to its meaning.

5.3.3.6 If the Bid is not accompanied by the required Bid Security and other data required by the Bidding Documents.

5.3.3.7 If any exceptions or qualifications of the Bid are noted on the Bid Form.

5.4 ACCEPTANCE OF BID AND AWARD OF CONTRACT

5.4.1 A formal Contract shall be executed with the successful Bidder within twenty (20) calendar days after the award of the Contract.

5.4.2 Per Section 6962(d)(13) a., Title 29, Delaware Code, "The contracting agency shall award any public works contract within thirty (30) days of the bid opening to the lowest responsive and responsible Bidder, unless the Agency elects to award on the basis of best value, in which case the election to award on the basis of best value shall be stated in the Invitation To Bid."

5.4.3 Each Bid on any Public Works Contract must be deemed responsive by the Agency to be considered for award. A responsive Bid shall conform in all material respects to the requirements and criteria set forth in the Contract Documents and specifications.

5.4.4 The Agency shall have the right to accept Alternates in any order or combination, and to determine the low Bidder on the basis of the sum of the Base Bid, plus accepted Alternates.

5.4.5 The successful Bidder shall execute a formal contract, submit the required Insurance Certificate, and furnish good and sufficient bonds, unless specifically waived in the General

Requirements, in accordance with the General Requirement, within twenty (20) days of official notice of contract award. The successful Bidder shall provide, at least two business days prior to contract execution, copies of the Employee Drug Testing Program for the Bidder and all listed Subcontractors. Bonds shall be for the benefit of the Agency with surety in the amount of 100% of the total contract award. Said Bonds shall be conditioned upon the faithful performance of the contract. Bonds shall remain in affect for period of one year after the date of substantial completion.

- 5.4.6 If the successful Bidder fails to execute the required Contract, Bond and all required information, as aforesaid, within twenty (20) calendar days after the date of official Notice of the Award of the Contract, their Bid guaranty shall immediately be taken and become the property of the State for the benefit of the Agency as liquidated damages, and not as a forfeiture or as a penalty. Award will then be made to the next lowest qualified Bidder of the Work or readvertised, as the Agency may decide.
- 5.4.7 Each bidder shall supply with its bid its taxpayer identification number (i.e., federal employer identification number or social security number) and should the vendor be awarded a contract, such vendor shall provide to the agency the taxpayer identification license numbers of such subcontractors. Such numbers shall be provided on the later of the date on which such subcontractor is required to be identified or the time the contract is executed. The successful Bidder shall provide to the agency to which it is contracting, within 30 days of entering into such public works contract, copies of all Delaware Business licenses of subcontractors and/or independent contractors that will perform work for such public works contract. However, if a subcontractor or independent contractor is hired or contracted more than 20 days after the Bidder entered the public works contract the Delaware Business license of such subcontractor or independent contractor shall be provided to the agency within 10 days of being contracted or hired.
- 5.4.8 The Bid Security shall be returned to the successful Bidder upon the execution of the formal contract. The Bid Securities of unsuccessful bidders shall be returned within thirty (30) calendar days after the opening of the Bids.

ARTICLE 6: POST-BID INFORMATION

- 6.1 CONTRACTOR'S QUALIFICATION STATEMENT
- 6.1.1 Bidders to whom an award of a Contract is under consideration shall, if requested by the Agency, submit a properly executed AIA Document A305, Contractor's Qualification Statement, unless such a statement has been previously required and submitted.
- 6.2 BUSINESS DESIGNATION FORM
- 6.2.1 Successful bidder shall be required to accurately complete an Office of Management and Budget Business Designation Form for Subcontractors.
- 6.3 Bidders to whom an award of a Contract has been made must produce their Delaware Business License before the Contract can be executed.

ARTICLE 7: PERFORMANCE BOND AND PAYMENT BOND

7.1 BOND REQUIREMENTS

7.1.1 The cost of furnishing the required Bonds, that are stipulated in the Bidding Documents, shall be included in the Bid.

7.1.2 If the Bidder is required by the Agency to secure a bond from other than the Bidder's usual sources, changes in cost will be adjusted as provide in the Contract Documents.

7.1.3 The Performance and Payment Bond forms used shall be the standard OMB forms (attached).

7.2 TIME OF DELIVERY AND FORM OF BONDS

7.2.1 The bonds shall be dated on or after the date of the Contract.

7.2.2 The Bidder shall require the attorney-in-fact who executes the required bonds on behalf of the surety to affix a certified and current copy of the power of attorney.

ARTICLE 8: FORM OF AGREEMENT BETWEEN AGENCY AND CONTRACTOR

8.1 Unless otherwise required in the Bidding Documents, the Agreement for the Work will be written on AIA Document A101, Standard Form of Agreement Between Owner and Contractor Where the Basis of Payment is a Stipulated Sum.

END OF INSTRUCTIONS TO BIDDERS

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SECTION 00 31 46 - PERMITS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes permits that have been issued for this Project as well as permits-in-progress initiated by the Owner and those required Contractor application.

1.3 DEFINITIONS

- A. Permits: A document issued by the Authorities having jurisdiction approving specific construction. Permits may approve the documents as submitted or contain caveats that are to be followed.
 - 1.Preconstruction Permits: Permits issued prior to the bidding and award and which are required prior to proceeding to this stage.
 - 2.Post Bid Permits: Permits required to be applied for by the successful contractor. These include demolition permits, building permits and sub-permits such as mechanical, electrical, fire suppression and plumbing.
 - 3.Post Construction Permits: Permits issued by the authorities having jurisdiction stating that a structure or portion of the structure has been approved as complying with applicable laws, regulations and codes and may be occupied and put to its intended use.

1.4 RESPONSIBILITIES

- A. The Contractor shall abide by the approved permits which are to include the notations provided by the entity/person approving the permit.
- B. The Contractor is responsible for obtaining and paying for all construction permits unless stated otherwise in the construction documents.
 - 1.The Contractor shall conform to all of the regulations and requirements, and shall be responsible for costs associated therewith, of all permits required of the Work.
 - 2.The Contractor shall be responsible for scheduling all inspections as required by the permits.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

PERMITS

3.1 SCHEDULE OF ISSUED PERMITS

- A. State of Delaware Architectural Accessibility Board – PENDING
- B. State of Delaware Department of Labor – PENDING

END OF SECTION

1197 RIVER ROAD
DEARNG#: 2021-03
FEDERAL#: 10106050030

BID FORM

I/We acknowledge Addendums numbered _____ and the price(s) submitted include any cost/schedule impact they may have.

This bid shall remain valid and cannot be withdrawn for thirty (30) days from the date of opening of bids (60 days for School Districts and Department of Education), and the undersigned shall abide by the Bid Security forfeiture provisions. Bid Security is attached to this Bid.

The Owner shall have the right to reject any or all bids, and to waive any informality or irregularity in any bid received.

This bid is based upon work being accomplished by the Sub-Contractors named on the list attached to this bid.

Should I/We be awarded this contract, I/We pledge to achieve substantial completion of all the work within _____ calendar days of the Notice to Proceed.

The undersigned represents and warrants that he has complied and shall comply with all requirements of local, state, and national laws; that no legal requirement has been or shall be violated in making or accepting this bid, in awarding the contract to him or in the prosecution of the work required; that the bid is legal and firm; that he has not, directly or indirectly, entered into any agreement, participated in any collusion, or otherwise taken action in restraint of free competitive bidding.

Upon receipt of written notice of the acceptance of this Bid, the Bidder shall, within twenty (20) calendar days, execute the agreement in the required form and deliver the Contract Bonds, and Insurance Certificates, required by the Contract Documents.

I am / We are an Individual / a Partnership / a Corporation

By _____ Trading as _____
(Individual's / General Partner's / Corporate Name)

(State of Corporation)

Business Address: _____

Witness: _____ By: _____
(SEAL) (Authorized Signature)

(Title)
Date: _____

ATTACHMENTS

Sub-Contractor List
Non-Collusion Statement
Affidavit of Employee Drug Testing Program
Affidavit of Contractor Qualifications
Bid Security
(Others as Required by Project Manuals)

RENOVATE FIELD MAINTENANCE SHOP (FMS#3) Phase 1
1197 RIVER ROAD
DEARNG#: 2021-03
FEDERAL#: 10106050030

BID FORM

SUBCONTRACTOR LIST

In accordance with Title 29, Chapter 69, Section 6962(d)(10)b of the Delaware Code, the following subcontractor listing must accompany any bid submittal. The bidder must list **in each category** the full name and address (City & State) of the sub-contractor that the bidder will be using to perform the work and provide material for that subcontractor category. Should the bidder's listed subcontractor intend to provide any of their subcontractor category of work through a third-tier contractor, the bidder shall list that third-tier contractor's full name and address (City & State). **If the bidder intends to perform any category of work itself, it must list its full name and address.** For clarification, if the bidder intends to perform the work themselves, the bidder **may not** insert "not applicable", "N/A", "self" or anything other than its own full name and address (City & State). To do so shall cause the bid to be rejected. In addition, the failure to produce a completed subcontractor list with the bid submittal shall cause the bid to be rejected. If you have more than three (3) third-tier contractors to report in any subcontractor category, print out additional page(s) containing the appropriate category, complete the rest of your list of third-tier contractors for that category, notate the addition in parentheses as (CONTINUATION) next to the subcontractor category and an asterisk (*) next to any additional third-tier contractors, and submit it with your bid.

<u>Subcontractor Category</u>	<u>Subcontractor</u>	<u>Address (City & State)</u>	<u>Subcontractors tax-payer ID # or Delaware Business license #</u>
1.			
A.			
B.			
C.			
2.			
A.			
B.			
C.			
3.			
A.			

C.

4.

A.

B.

C.

5.

A.

B.

C.

BID FORM

NON-COLLUSION STATEMENT

This is to certify that the undersigned bidder has neither directly nor indirectly, entered into any agreement, participated in any collusion or otherwise taken any action in restraint of free competitive bidding in connection with this proposal submitted this date (*to the Office of Management and Budget, Division of Facilities Management*).

All the terms and conditions of (*Project or Contract Number*) have been thoroughly examined and are understood.

NAME OF BIDDER: _____

**AUTHORIZED REPRESENTATIVE
(TYPED):** _____

**AUTHORIZED REPRESENTATIVE
(SIGNATURE):** _____

TITLE: _____

ADDRESS OF BIDDER: _____

E-MAIL: _____

PHONE NUMBER: _____

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

My Commission expires _____. NOTARY PUBLIC _____.

THIS PAGE MUST BE SIGNED AND NOTARIZED FOR YOUR BID TO BE CONSIDERED.

**AFFIDAVIT
OF
EMPLOYEE DRUG TESTING PROGRAM**

4104 Regulations for the Drug Testing of Contractor and Subcontractor Employees Working on Large Public Works Projects requires that Contractors and Subcontractors implement a program of mandatory drug testing for Employees who work on Large Public Works Contracts funded all or in part with public funds.

We hereby certify that we have in place or will implement during the entire term of the contract a Mandatory Drug Testing Program for our employees on the jobsite, including subcontractors, that complies with this regulation:

Contractor/Subcontractor Name: _____

Contractor/Subcontractor Address: _____

Authorized Representative (typed or printed): _____

Authorized Representative (signature): _____

Title: _____

Sworn to and Subscribed before me this _____ day of _____ 20____.

My Commission expires _____. NOTARY PUBLIC _____.

THIS PAGE MUST BE SIGNED AND NOTARIZED FOR YOUR BID TO BE CONSIDERED.

RENOVATE FIELD MAINTENANCE SHOP (FMS#3) Phase 1
1197 RIVER ROAD
DEARNG#: 2021-03
FEDERAL#: 10106050030

**AFFIDAVIT
OF
CONTRACTOR QUALIFICATIONS**

We hereby certify that we will abide by the contractor's qualifications outlined in the construction bid specifications for the duration of the contract term.

In accordance with Title 29, Chapter 69, Section 6962(d)(10)b.3 of the Delaware Code, after a contract has been awarded the successful bidder shall not substitute another subcontractor whose name was submitted on the Subcontractor Form except for the reasons in the statute and not without written consent from the awarding agency. Failure to utilize the subcontractors on the list will subject the successful bidder to penalties as outlined in the General Requirements Section 5.2 of the contract.

Contractor Name: _____

Contractor Address: _____

Authorized Representative (typed or printed): _____

Authorized Representative (signature): _____

Title: _____

Sworn to and Subscribed before me this _____ day of _____ 20____.

My Commission expires _____. NOTARY PUBLIC _____.

THIS PAGE MUST BE SIGNED AND NOTARIZED FOR YOUR BID TO BE CONSIDERED.

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RENOVATE FIELD MAINTENANCE SHOP (FMS#3) Phase 1
1197 RIVER ROAD
DEARNG#: 2021-03
FEDERAL#: 10106050030
BID BOND

TO ACCOMPANY PROPOSAL
(Not necessary if security is used)

KNOW ALL MEN BY THESE PRESENTS That: _____
_____ of _____ in the County of _____
and State of _____ as **Principal**, and _____
_____ of _____ in the County of _____ and State of _____
_____ as **Surety**, legally authorized to do business in the State of Delaware ("**State**"), are held and firmly
unto the **State** in the sum of _____ Dollars (\$
_____), or _____ percent not to exceed _____
Dollars (\$_____) of amount of bid on Contract No.
DEARNG# 2021-03/FEDERAL # 10106050030, to be paid to the **State** for the use and benefit of Delaware
Army National Guard for which payment well and truly to be made, we do bind ourselves, our and each of
our heirs, executors, administrators, and successors, jointly and severally for and in the whole firmly by these
presents.

NOW THE CONDITION OF THIS OBLIGATION IS SUCH That if the above bonded **Principal**
who has submitted to the Delaware Army National Guard, a certain proposal to enter into this contract for the
furnishing of certain material and/or services within the **State of Delaware**, shall be awarded this Contract,
and if said **Principal** shall well and truly enter into and execute this Contract as may be required by the terms
of this Contract and approved by the State of Delaware; this Contract to be entered into within twenty days
after the date of official notice of the award thereof in accordance with the terms of said proposal, then this
obligation shall be void or else to be and remain in full force and virtue.

Sealed with _____ seal and dated this _____ day of _____ in the year of our Lord two
thousand and _____ (20____).

SEALED, AND DELIVERED IN THE
Presence of

Name of Bidder (Organization)

Corporate
Seal

By:

Authorized Signature

Attest _____

Title

Name of Surety

Witness: _____

By:

Title

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STANDARD FORM OF AGREEMENT BETWEEN OWNER AND CONTRACTOR A101-2017

The contract to be utilized on this project shall be the “Standard Form of Agreement Between Owner and Contractor” AIA Document A101-2017, including AIA Document A101 – 2017 Exhibit A, as well as Supplements to A101-2017 and Exhibit A and the State of Delaware’s General Requirements.

AIA® Document A101® – 2017

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

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

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

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

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

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

The Owner and Contractor agree as follows.

ADDITIONS AND DELETIONS:

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

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

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

TABLE OF ARTICLES

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

EXHIBIT A INSURANCE AND BONDS

ARTICLE 1 THE CONTRACT DOCUMENTS

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

ARTICLE 2 THE WORK OF THIS CONTRACT

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

ARTICLE 3 DATE OF COMMENCEMENT AND SUBSTANTIAL COMPLETION

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

(Check one of the following boxes.)

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

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

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

§ 3.3 Substantial Completion

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

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

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

[] By the following date:

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

Portion of Work

Substantial Completion Date

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

ARTICLE 4 CONTRACT SUM

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

§ 4.2 Alternates

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

Item

Price

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

Item

Price

Conditions for Acceptance

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

Item

Price

§ 4.4 Unit prices, if any:

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

Item

Units and Limitations

Price per Unit (\$0.00)

§ 4.5 Liquidated damages, if any:

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

§ 4.6 Other:

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

ARTICLE 5 PAYMENTS

§ 5.1 Progress Payments

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

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

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

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

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

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

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

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

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

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

§ 5.1.7 Retainage

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

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

§ 5.1.7.1.1 The following items are not subject to retainage:

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

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

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

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

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

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

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

§ 5.2 Final Payment

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

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

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

§ 5.3 Interest

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

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

%

ARTICLE 6 DISPUTE RESOLUTION

§ 6.1 Initial Decision Maker

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

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

§ 6.2 Binding Dispute Resolution

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

- ☐ Arbitration pursuant to Section 15.4 of AIA Document A201–2017
- ☐ Litigation in a court of competent jurisdiction
- ☐ Other (Specify)

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

ARTICLE 7 TERMINATION OR SUSPENSION

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

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

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

ARTICLE 8 MISCELLANEOUS PROVISIONS

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

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

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

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

§ 8.5 Insurance and Bonds

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

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

§ 8.6 Notice in electronic format, pursuant to Article 1 of AIA Document A201–2017, may be given in accordance with AIA Document E203™–2013, Building Information Modeling and Digital Data Exhibit, if completed, or as otherwise set forth below:

(If other than in accordance with AIA Document E203–2013, insert requirements for delivering notice in electronic format such as name, title, and email address of the recipient and whether and how the system will be required to generate a read receipt for the transmission.)

§ 8.7 Other provisions:

ARTICLE 9 ENUMERATION OF CONTRACT DOCUMENTS

§ 9.1 This Agreement is comprised of the following documents:

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

(Insert the date of the E203-2013 incorporated into this Agreement.)

- .5 Drawings

Number

Title

Date

- .6 Specifications

Section

Title

Date

Pages

- .7 Addenda, if any:

Number

Date

Pages

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

- .8 Other Exhibits:

(Check all boxes that apply and include appropriate information identifying the exhibit where required.)

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

- [] The Sustainability Plan:

Title	Date	Pages

- [] Supplementary and other Conditions of the Contract:

Document	Title	Date	Pages

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

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

OWNER *(Signature)*

(Printed name and title)

CONTRACTOR *(Signature)*

(Printed name and title)

Additions and Deletions Report for AIA® Document A101® – 2017

This Additions and Deletions Report, as defined on page 1 of the associated document, reproduces below all text the author has added to the standard form AIA document in order to complete it, as well as any text the author may have added to or deleted from the original AIA text. Added text is shown underlined. Deleted text is indicated with a horizontal line through the original AIA text.

Note: This Additions and Deletions Report is provided for information purposes only and is not incorporated into or constitute any part of the associated AIA document. This Additions and Deletions Report and its associated document were generated simultaneously by AIA software at 10:44:38 ET on 10/01/2021.

There are no differences.

Certification of Document's Authenticity

AIA® Document D401™ – 2003

I, _____, hereby certify, to the best of my knowledge, information and belief, that I created the attached final document simultaneously with its associated Additions and Deletions Report and this certification at 10:44:38 ET on 10/01/2021 under Order No. 2114241921 from AIA Contract Documents software and that in preparing the attached final document I made no changes to the original text of AIA® Document A101™ – 2017, Standard Form of Agreement Between Owner and Contractor where the basis of payment is a Stipulated Sum, as published by the AIA in its software, other than those additions and deletions shown in the associated Additions and Deletions Report.

(Signed)

(Title)

(Dated)

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SUPPLEMENT TO A101-2017 – EXHIBIT A INSURANCE AND BONDS

The following supplements modify the “Standard Form of Agreement Between Owner and Contractor,” AIA Document A101-2017 Exhibit A Insurance and Bonds. Where a portion of the Standard Form of Agreement is modified or deleted by the following, the unaltered portions of the Standard Form of Agreement shall remain in effect.

ARTICLE A.2 OWNER’S INSURANCE

A.2.1 General

Delete paragraph A.2.1 in its entirety.

A.2.2 Liability Insurance

Delete paragraph A.2.2 in its entirety, except in the case of school projects this paragraph shall remain.

A.2.3 Required Property Insurance

Delete paragraph A.2.3 in its entirety.

A.2.4 Optional Extended Property Insurance

Delete paragraph A.2.4 in its entirety.

A.2.5 Other Optional Insurance

Delete paragraph A.2.5 in its entirety.

ARTICLE A.3 CONTRACTORS INSURANCE AND BONDS

A.3.1.3 Additional Insured Obligations

In the first sentence after “coverage to include (1)” delete “(1) the Owner,”.

Strike the remainder of the first sentence beginning at the semicolon “; and (2) the Owner” through the end of the sentence.

Delete the second sentence in its entirety.

A.3.3.2.1 Delete paragraph 3.3.2.1 in its entirety and replace with the following:

Property Insurance of the same type and scope satisfying the requirements identified in Section A.2.3, The Contractor shall comply with all obligations of the Owner under A.2.3 except to the extent provided below. Upon request, the Contractor shall provide the Owner with a copy of the property insurance policy or policies required.

(This page intentionally left blank)

SUPPLEMENT TO AGREEMENT BETWEEN OWNER AND CONTRACTOR A101-2017

The following supplements modify the "Standard Form of Agreement Between Owner and Contractor," AIA Document A101-2017. Where a portion of the Standard Form of Agreement is modified or deleted by the following, the unaltered portions of the Standard Form of Agreement shall remain in effect.

ARTICLE 3: DATE OF COMMENCEMENT AND SUBSTANTIAL COMPLETION

3.1 Delete paragraph 3.1 in its entirety and replace with the following:

"The date of Commencement of the Work shall be a date set forth in a notice to proceed issued by the Owner."

ARTICLE 5: PAYMENTS

5.1 PROGRESS PAYMENTS

5.1.3 Delete paragraph 5.1.3 in its entirety and replace with the following:

"Provided that a valid Application for Payment is received by the Architect that meets all requirements of the Contract, payment shall be made by the Owner not later than 30 days after the Owner receives the valid Application for Payment."

5.3 Insert the interest rate of "1% per month not to exceed 12% per annum."

ARTICLE 6: DISPUTE RESOLUTION

6.2 BINDING DISPUTE RESOLUTION

Check Other – and add the following sentence:

"Any remedies available in law or in equity."

ARTICLE 7: TERMINATION or SUSPENSION

7.1.1 Delete paragraph 7.1.1 in its entirety.

ARTICLE 8: MISCELLANEOUS PROVISIONS

8.4 Delete paragraph 8.4 in its entirety and replace with the following:

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

END OF SUPPLEMENT TO AGREEMENT BETWEEN OWNER AND CONTRACTOR

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STATE OF DELAWARE
RENOVATE FIELD MAINTENANCE SHOP (FMS#3) Phase 1
1197 RIVER ROAD
DEARNG#: 2021-03
FEDERAL#: 10106050030

PERFORMANCE BOND

Bond Number: _____

KNOW ALL PERSONS BY THESE PRESENTS, that we, _____, as principal (“**Principal**”), and _____, a _____ corporation, legally authorized to do business in the State of Delaware, as surety (“**Surety**”), are held and firmly bound unto the _____ (“**Owner**”) (*insert State agency name*), in the amount of _____ (\$ _____), to be paid to **Owner**, for which payment well and truly to be made, we do bind ourselves, our and each and every of our heirs, executors, administrations, successors and assigns, jointly and severally, for and in the whole, firmly by these presents.

Sealed with our seals and dated this _____ day of _____, 20__.

NOW THE CONDITION OF THIS OBLIGATION IS SUCH, that if **Principal**, who has been awarded by **Owner** that certain contract known as Contract No. _____ dated the _____ day of _____, 20__ (the “Contract”), which Contract is incorporated herein by reference, shall well and truly provide and furnish all materials, appliances and tools and perform all the work required under and pursuant to the terms and conditions of the Contract and the Contract Documents (as defined in the Contract) or any changes or modifications thereto made as therein provided, shall make good and reimburse **Owner** sufficient funds to pay the costs of completing the Contract that **Owner** may sustain by reason of any failure or default on the part of **Principal**, and shall also indemnify and save harmless **Owner** from all costs, damages and expenses arising out of or by reason of the performance of the Contract and for as long as provided by the Contract; then this obligation shall be void, otherwise to be and remain in full force and effect.

Surety, for value received, hereby stipulates and agrees, if requested to do so by **Owner**, to fully perform and complete the work to be performed under the Contract pursuant to the terms, conditions and covenants thereof, if for any cause **Principal** fails or neglects to so fully perform and complete such work.

Surety, for value received, for itself and its successors and assigns, hereby stipulates and agrees that the obligation of **Surety** and its bond shall be in no way impaired or affected by any extension of time, modification, omission, addition or change in or to the Contract or the work to be performed thereunder, or by any payment thereunder before the time required therein, or by any waiver of any provisions thereof, or by any assignment, subletting or other transfer thereof or of any work to be performed or any monies due or to become due thereunder; and **Surety** hereby waives notice of any and all such extensions, modifications, omissions, additions, changes, payments, waivers, assignments, subcontracts and transfers and hereby expressly stipulates and agrees that any and all

things done and omitted to be done by and in relation to assignees, subcontractors, and other transferees shall have the same effect as to **Surety** as though done or omitted to be done by or in relation to **Principal**.

Surety hereby stipulates and agrees that no modifications, omissions or additions in or to the terms of the Contract shall in any way whatsoever affect the obligation of **Surety** and its bond.

Any proceeding, legal or equitable, under this Bond may be brought in any court of competent jurisdiction in the State of Delaware. Notices to **Surety** or Contractor may be mailed or delivered to them at their respective addresses shown below.

IN WITNESS WHEREOF, **Principal** and **Surety** have hereunto set their hand and seals, and such of them as are corporations have caused their corporate seal to be hereto affixed and these presents to be signed by their duly authorized officers, the day and year first above written.

PRINCIPAL

Name: _____

Witness or Attest: Address: _____

Name:

(Corporate Seal)

By: _____ (SEAL)

Name:

Title:

SURETY

Name: _____

Witness or Attest: Address: _____

Name:

(Corporate Seal)

By: _____ (SEAL)

Name:

Title:

STATE OF DELAWARE
RENOVATE FIELD MAINTENANCE SHOP (FMS#3) Phase 1
1197 RIVER ROAD
DEARNG#: 2021-03
FEDERAL#: 10106050030

PAYMENT BOND

Bond Number: _____

KNOW ALL PERSONS BY THESE PRESENTS, that we, _____, as principal (“**Principal**”), and _____, a _____ corporation, legally authorized to do business in the State of Delaware, as surety (“**Surety**”), are held and firmly bound unto the _____ (“**Owner**”) (*insert State agency name*), in the amount of _____ (\$_____), to be paid to **Owner**, for which payment well and truly to be made, we do bind ourselves, our and each and every of our heirs, executors, administrations, successors and assigns, jointly and severally, for and in the whole firmly by these presents.

Sealed with our seals and dated this _____ day of _____, 20__.

NOW THE CONDITION OF THIS OBLIGATION IS SUCH, that if **Principal**, who has been awarded by **Owner** that certain contract known as Contract No. _____ dated the _____ day of _____, 20__ (the “Contract”), which Contract is incorporated herein by reference, shall well and truly pay all and every person furnishing materials or performing labor or service in and about the performance of the work under the Contract, all and every sums of money due him, her, them or any of them, for all such materials, labor and service for which **Principal** is liable, shall make good and reimburse **Owner** sufficient funds to pay such costs in the completion of the Contract as **Owner** may sustain by reason of any failure or default on the part of **Principal**, and shall also indemnify and save harmless **Owner** from all costs, damages and expenses arising out of or by reason of the performance of the Contract and for as long as provided by the Contract; then this obligation shall be void, otherwise to be and remain in full force and effect.

Surety, for value received, for itself and its successors and assigns, hereby stipulates and agrees that the obligation of **Surety** and its bond shall be in no way impaired or affected by any extension of time, modification, omission, addition or change in or to the Contract or the work to be performed thereunder, or by any payment thereunder before the time required therein, or by any waiver of any provisions thereof, or by any assignment, subletting or other transfer thereof or of any work to be performed or any monies due or to become due thereunder; and **Surety** hereby waives notice of any and all such extensions, modifications, omissions, additions, changes, payments, waivers, assignments, subcontracts and transfers and hereby expressly stipulates and agrees that any and all things done and omitted to be done by and in relation to assignees, subcontractors, and other transferees shall have the same effect as to **Surety** as though done or omitted to be done by or in relation to **Principal**.

Surety hereby stipulates and agrees that no modifications, omission or additions in or to the terms of the Contract shall in any way whatsoever affect the obligation of **Surety** and its bond.

Any proceeding, legal or equitable, under this Bond may be brought in any court of competent jurisdiction in the State of Delaware. Notices to **Surety** or Contractor may be mailed or delivered to them at their respective addresses shown below.

IN WITNESS WHEREOF, **Principal** and **Surety** have hereunto set their hand and seals, and such of them as are corporations have caused their corporate seal to be hereto affixed and these presents to be signed by their duly authorized officers, the day and year first above written.

PRINCIPAL

Name: _____

Witness or Attest: Address: _____

Name:

(Corporate Seal)

By: _____(SEAL)

Name:

Title:

SURETY

Name: _____

Witness or Attest: Address: _____

Name:

(Corporate Seal)

By: _____(SEAL)

Name:

Title:

SECTION 00 72 13 – GENERAL CONDITIONS

STATE OF DELAWARE

DIVISION OF FACILITIES MANAGEMENT

GENERAL CONDITIONS

TO THE

CONTRACT

The General Conditions of this Contract are as stated in the American Institute of Architects Document AIA A201 (2017 Edition) entitled General Conditions of the Contract for Construction as revised by the Supplementary General Conditions and is part of this project manual as if herein written in full.

END OF SECTION

AIA® Document A201® – 2017

General Conditions of the Contract for Construction

for the following PROJECT:
(Name and location or address)

THE OWNER:
(Name, legal status and address)

THE ARCHITECT:
(Name, legal status and address)

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ADDITIONS AND DELETIONS:

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

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

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

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ARTICLE 1 GENERAL PROVISIONS

§ 1.1 Basic Definitions

§ 1.1.1 The Contract Documents

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

§ 1.1.2 The Contract

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

§ 1.1.3 The Work

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

§ 1.1.4 The Project

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

§ 1.1.5 The Drawings

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

§ 1.1.6 The Specifications

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

§ 1.1.7 Instruments of Service

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

§ 1.1.8 Initial Decision Maker

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

§ 1.2 Correlation and Intent of the Contract Documents

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

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

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

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

§ 1.3 Capitalization

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

§ 1.4 Interpretation

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

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

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

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

§ 1.6 Notice

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

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

§ 1.7 Digital Data Use and Transmission

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

§ 1.8 Building Information Models Use and Reliance

Any use of, or reliance on, all or a portion of a building information model without agreement to protocols governing the use of, and reliance on, the information contained in the model and without having those protocols set forth in AIA Document E203™–2013, Building Information Modeling and Digital Data Exhibit, and the requisite AIA Document

G202™–2013, Project Building Information Modeling Protocol Form, shall be at the using or relying party's sole risk and without liability to the other party and its contractors or consultants, the authors of, or contributors to, the building information model, and each of their agents and employees.

ARTICLE 2 OWNER

§ 2.1 General

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

§ 2.1.2 The Owner shall furnish to the Contractor, within fifteen days after receipt of a written request, information necessary and relevant for the Contractor to evaluate, give notice of, or enforce mechanic's lien rights. Such information shall include a correct statement of the record legal title to the property on which the Project is located, usually referred to as the site, and the Owner's interest therein.

§ 2.2 Evidence of the Owner's Financial Arrangements

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

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

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

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

§ 2.3 Information and Services Required of the Owner

§ 2.3.1 Except for permits and fees that are the responsibility of the Contractor under the Contract Documents, including those required under Section 3.7.1, the Owner shall secure and pay for necessary approvals, easements, assessments and charges required for construction, use or occupancy of permanent structures or for permanent changes in existing facilities.

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

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

§ 2.3.4 The Owner shall furnish surveys describing physical characteristics, legal limitations and utility locations for the site of the Project, and a legal description of the site. The Contractor shall be entitled to rely on the accuracy of information furnished by the Owner but shall exercise proper precautions relating to the safe performance of the Work.

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

§ 2.3.6 Unless otherwise provided in the Contract Documents, the Owner shall furnish to the Contractor one copy of the Contract Documents for purposes of making reproductions pursuant to Section 1.5.2.

§ 2.4 Owner's Right to Stop the Work

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

§ 2.5 Owner's Right to Carry Out the Work

If the Contractor defaults or neglects to carry out the Work in accordance with the Contract Documents and fails within a ten-day period after receipt of notice from the Owner to commence and continue correction of such default or neglect with diligence and promptness, the Owner may, without prejudice to other remedies the Owner may have, correct such default or neglect. Such action by the Owner and amounts charged to the Contractor are both subject to prior approval of the Architect and the Architect may, pursuant to Section 9.5.1, withhold or nullify a Certificate for Payment in whole or in part, to the extent reasonably necessary to reimburse the Owner for the reasonable cost of correcting such deficiencies, including Owner's expenses and compensation for the Architect's additional services made necessary by such default, neglect, or failure. If current and future payments are not sufficient to cover such amounts, the Contractor shall pay the difference to the Owner. If the Contractor disagrees with the actions of the Owner or the Architect, or the amounts claimed as costs to the Owner, the Contractor may file a Claim pursuant to Article 15.

ARTICLE 3 CONTRACTOR

§ 3.1 General

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

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

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

§ 3.2 Review of Contract Documents and Field Conditions by Contractor

§ 3.2.1 Execution of the Contract by the Contractor is a representation that the Contractor has visited the site, become generally familiar with local conditions under which the Work is to be performed, and correlated personal observations with requirements of the Contract Documents.

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

§ 3.2.3 The Contractor is not required to ascertain that the Contract Documents are in accordance with applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of public authorities, but the Contractor shall promptly report to the Architect any nonconformity discovered by or made known to the Contractor as a request for information in such form as the Architect may require.

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

§ 3.3 Supervision and Construction Procedures

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

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

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

§ 3.4 Labor and Materials

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

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

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

§ 3.5 Warranty

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

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

§ 3.6 Taxes

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

§ 3.7 Permits, Fees, Notices and Compliance with Laws

§ 3.7.1 Unless otherwise provided in the Contract Documents, the Contractor shall secure and pay for the building permit as well as for other permits, fees, licenses, and inspections by government agencies necessary for proper execution and completion of the Work that are customarily secured after execution of the Contract and legally required at the time bids are received or negotiations concluded.

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

§ 3.7.3 If the Contractor performs Work knowing it to be contrary to applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of public authorities, the Contractor shall assume appropriate responsibility for such Work and shall bear the costs attributable to correction.

§ 3.7.4 Concealed or Unknown Conditions

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

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

§ 3.8 Allowances

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

§ 3.8.2 Unless otherwise provided in the Contract Documents,

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

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

§ 3.9 Superintendent

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

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

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

§ 3.10 Contractor's Construction and Submittal Schedules

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

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

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

§ 3.11 Documents and Samples at the Site

The Contractor shall make available, at the Project site, the Contract Documents, including Change Orders, Construction Change Directives, and other Modifications, in good order and marked currently to indicate field changes and selections made during construction, and the approved Shop Drawings, Product Data, Samples, and similar required submittals. These shall be in electronic form or paper copy, available to the Architect and Owner, and

delivered to the Architect for submittal to the Owner upon completion of the Work as a record of the Work as constructed.

§ 3.12 Shop Drawings, Product Data and Samples

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

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

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

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

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

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

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

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

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

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

§ 3.12.10.1 If professional design services or certifications by a design professional related to systems, materials, or equipment are specifically required of the Contractor by the Contract Documents, the Owner and the Architect will

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

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

§ 3.13 Use of Site

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

§ 3.14 Cutting and Patching

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

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

§ 3.15 Cleaning Up

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

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

§ 3.16 Access to Work

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

§ 3.17 Royalties, Patents and Copyrights

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

§ 3.18 Indemnification

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

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

ARTICLE 4 ARCHITECT

§ 4.1 General

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

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

§ 4.2 Administration of the Contract

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

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

§ 4.2.3 On the basis of the site visits, the Architect will keep the Owner reasonably informed about the progress and quality of the portion of the Work completed, and promptly report to the Owner (1) known deviations from the Contract Documents, (2) known deviations from the most recent construction schedule submitted by the Contractor, and (3) defects and deficiencies observed in the Work. The Architect will not be responsible for the Contractor's failure to perform the Work in accordance with the requirements of the Contract Documents. The Architect will not have control over or charge of, and will not be responsible for acts or omissions of, the Contractor, Subcontractors, or their agents or employees, or any other persons or entities performing portions of the Work.

§ 4.2.4 Communications

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

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

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

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

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

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

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

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

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

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

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

ARTICLE 5 SUBCONTRACTORS

§ 5.1 Definitions

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

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

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

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

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

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

§ 5.2.4 The Contractor shall not substitute a Subcontractor, person, or entity for one previously selected if the Owner or Architect makes reasonable objection to such substitution.

§ 5.3 Subcontractual Relations

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

§ 5.4 Contingent Assignment of Subcontracts

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

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

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

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

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

ARTICLE 6 CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS

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

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

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

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

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

§ 6.2 Mutual Responsibility

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

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

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

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

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

§ 6.3 Owner's Right to Clean Up

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

ARTICLE 7 CHANGES IN THE WORK

§ 7.1 General

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

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

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

§ 7.2 Change Orders

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

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

§ 7.3 Construction Change Directives

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

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

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

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

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

- .1 Costs of labor, including applicable payroll taxes, fringe benefits required by agreement or custom, workers' compensation insurance, and other employee costs approved by the Architect;
- .2 Costs of materials, supplies, and equipment, including cost of transportation, whether incorporated or consumed;
- .3 Rental costs of machinery and equipment, exclusive of hand tools, whether rented from the Contractor or others;
- .4 Costs of premiums for all bonds and insurance, permit fees, and sales, use, or similar taxes, directly related to the change; and
- .5 Costs of supervision and field office personnel directly attributable to the change.

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

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

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

§ 7.3.8 The amount of credit to be allowed by the Contractor to the Owner for a deletion or change that results in a net decrease in the Contract Sum shall be actual net cost as confirmed by the Architect. When both additions and credits covering related Work or substitutions are involved in a change, the allowance for overhead and profit shall be figured on the basis of net increase, if any, with respect to that change.

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

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

§ 7.4 Minor Changes in the Work

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

ARTICLE 8 TIME

§ 8.1 Definitions

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

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

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

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

§ 8.2 Progress and Completion

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

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

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

§ 8.3 Delays and Extensions of Time

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

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

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

ARTICLE 9 PAYMENTS AND COMPLETION

§ 9.1 Contract Sum

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

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

§ 9.2 Schedule of Values

Where the Contract is based on a stipulated sum or Guaranteed Maximum Price, the Contractor shall submit a schedule of values to the Architect before the first Application for Payment, allocating the entire Contract Sum to the various portions of the Work. The schedule of values shall be prepared in the form, and supported by the data to substantiate its accuracy, required by the Architect. This schedule, unless objected to by the Architect, shall be used as a basis for reviewing the Contractor's Applications for Payment. Any changes to the schedule of values shall be submitted to the Architect and supported by such data to substantiate its accuracy as the Architect may require, and unless objected to by the Architect, shall be used as a basis for reviewing the Contractor's subsequent Applications for Payment.

§ 9.3 Applications for Payment

§ 9.3.1 At least ten days before the date established for each progress payment, the Contractor shall submit to the Architect an itemized Application for Payment prepared in accordance with the schedule of values, if required under Section 9.2, for completed portions of the Work. The application shall be notarized, if required, and supported by all data substantiating the Contractor's right to payment that the Owner or Architect require, such as copies of requisitions, and releases and waivers of liens from Subcontractors and suppliers, and shall reflect retainage if provided for in the Contract Documents.

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

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

§ 9.3.2 Unless otherwise provided in the Contract Documents, payments shall be made on account of materials and equipment delivered and suitably stored at the site for subsequent incorporation in the Work. If approved in advance by the Owner, payment may similarly be made for materials and equipment suitably stored off the site at a location agreed upon in writing. Payment for materials and equipment stored on or off the site shall be conditioned upon compliance by the Contractor with procedures satisfactory to the Owner to establish the Owner's title to such materials and equipment or otherwise protect the Owner's interest, and shall include the costs of applicable insurance, storage, and transportation to the site, for such materials and equipment stored off the site.

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

§ 9.4 Certificates for Payment

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

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

§ 9.5 Decisions to Withhold Certification

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

- .1 defective Work not remedied;
- .2 third party claims filed or reasonable evidence indicating probable filing of such claims, unless security acceptable to the Owner is provided by the Contractor;
- .3 failure of the Contractor to make payments properly to Subcontractors or suppliers for labor, materials or equipment;

- .4 reasonable evidence that the Work cannot be completed for the unpaid balance of the Contract Sum;
- .5 damage to the Owner or a Separate Contractor;
- .6 reasonable evidence that the Work will not be completed within the Contract Time, and that the unpaid balance would not be adequate to cover actual or liquidated damages for the anticipated delay; or
- .7 repeated failure to carry out the Work in accordance with the Contract Documents.

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

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

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

§ 9.6 Progress Payments

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

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

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

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

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

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

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

§ 9.6.8 Provided the Owner has fulfilled its payment obligations under the Contract Documents, the Contractor shall defend and indemnify the Owner from all loss, liability, damage or expense, including reasonable attorney's fees and litigation expenses, arising out of any lien claim or other claim for payment by any Subcontractor or supplier of any tier. Upon receipt of notice of a lien claim or other claim for payment, the Owner shall notify the Contractor. If approved by the applicable court, when required, the Contractor may substitute a surety bond for the property against which the lien or other claim for payment has been asserted.

§ 9.7 Failure of Payment

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

§ 9.8 Substantial Completion

§ 9.8.1 Substantial Completion is the stage in the progress of the Work when the Work or designated portion thereof is sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize the Work for its intended use.

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

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

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

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

§ 9.9 Partial Occupancy or Use

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

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

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

§ 9.10 Final Completion and Final Payment

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

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

§ 9.10.3 If, after Substantial Completion of the Work, final completion thereof is materially delayed through no fault of the Contractor or by issuance of Change Orders affecting final completion, and the Architect so confirms, the Owner shall, upon application by the Contractor and certification by the Architect, and without terminating the Contract, make payment of the balance due for that portion of the Work fully completed, corrected, and accepted. If the remaining balance for Work not fully completed or corrected is less than retainage stipulated in the Contract Documents, and if bonds have been furnished, the written consent of the surety to payment of the balance due for that portion of the Work fully completed and accepted shall be submitted by the Contractor to the Architect prior to certification of such payment. Such payment shall be made under terms and conditions governing final payment, except that it shall not constitute a waiver of Claims.

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

- .1 liens, Claims, security interests, or encumbrances arising out of the Contract and unsettled;
- .2 failure of the Work to comply with the requirements of the Contract Documents;
- .3 terms of special warranties required by the Contract Documents; or
- .4 audits performed by the Owner, if permitted by the Contract Documents, after final payment.

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

ARTICLE 10 PROTECTION OF PERSONS AND PROPERTY

§ 10.1 Safety Precautions and Programs

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

§ 10.2 Safety of Persons and Property

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

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

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

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

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

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

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

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

§ 10.2.8 Injury or Damage to Person or Property

If either party suffers injury or damage to person or property because of an act or omission of the other party, or of others for whose acts such party is legally responsible, notice of the injury or damage, whether or not insured, shall be given to the other party within a reasonable time not exceeding 21 days after discovery. The notice shall provide sufficient detail to enable the other party to investigate the matter.

§ 10.3 Hazardous Materials and Substances

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

§ 10.3.2 Upon receipt of the Contractor's notice, the Owner shall obtain the services of a licensed laboratory to verify the presence or absence of the material or substance reported by the Contractor and, in the event such material or substance is found to be present, to cause it to be rendered harmless. Unless otherwise required by the Contract Documents, the Owner shall furnish in writing to the Contractor and Architect the names and qualifications of persons or entities who are to perform tests verifying the presence or absence of the material or substance or who are to perform the task of removal or safe containment of the material or substance. The Contractor and the Architect will

promptly reply to the Owner in writing stating whether or not either has reasonable objection to the persons or entities proposed by the Owner. If either the Contractor or Architect has an objection to a person or entity proposed by the Owner, the Owner shall propose another to whom the Contractor and the Architect have no reasonable objection. When the material or substance has been rendered harmless, Work in the affected area shall resume upon written agreement of the Owner and Contractor. By Change Order, the Contract Time shall be extended appropriately and the Contract Sum shall be increased by the amount of the Contractor's reasonable additional costs of shutdown, delay, and start-up.

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

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

§ 10.3.5 The Contractor shall reimburse the Owner for the cost and expense the Owner incurs (1) for remediation of hazardous materials or substances the Contractor brings to the site and negligently handles, or (2) where the Contractor fails to perform its obligations under Section 10.3.1, except to the extent that the cost and expense are due to the Owner's fault or negligence.

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

§ 10.4 Emergencies

In an emergency affecting safety of persons or property, the Contractor shall act, at the Contractor's discretion, to prevent threatened damage, injury, or loss. Additional compensation or extension of time claimed by the Contractor on account of an emergency shall be determined as provided in Article 15 and Article 7.

ARTICLE 11 INSURANCE AND BONDS

§ 11.1 Contractor's Insurance and Bonds

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

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

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

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

or omission of the Owner, have the right to stop the Work until the lapse in coverage has been cured by the procurement of replacement coverage by the Contractor. The furnishing of notice by the Contractor shall not relieve the Contractor of any contractual obligation to provide any required coverage.

§ 11.2 Owner's Insurance

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

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

§ 11.2.3 Notice of Cancellation or Expiration of Owner's Required Property Insurance. Within three (3) business days of the date the Owner becomes aware of an impending or actual cancellation or expiration of any property insurance required by the Contract Documents, the Owner shall provide notice to the Contractor of such impending or actual cancellation or expiration. Unless the lapse in coverage arises from an act or omission of the Contractor: (1) the Contractor, upon receipt of notice from the Owner, shall have the right to stop the Work until the lapse in coverage has been cured by the procurement of replacement coverage by either the Owner or the Contractor; (2) the Contract Time and Contract Sum shall be equitably adjusted; and (3) the Owner waives all rights against the Contractor, Subcontractors, and Sub-subcontractors to the extent any loss to the Owner would have been covered by the insurance had it not expired or been cancelled. If the Contractor purchases replacement coverage, the cost of the insurance shall be charged to the Owner by an appropriate Change Order. The furnishing of notice by the Owner shall not relieve the Owner of any contractual obligation to provide required insurance.

§ 11.3 Waivers of Subrogation

§ 11.3.1 The Owner and Contractor waive all rights against (1) each other and any of their subcontractors, sub-subcontractors, agents, and employees, each of the other; (2) the Architect and Architect's consultants; and (3) Separate Contractors, if any, and any of their subcontractors, sub-subcontractors, agents, and employees, for damages caused by fire, or other causes of loss, to the extent those losses are covered by property insurance required by the Agreement or other property insurance applicable to the Project, except such rights as they have to proceeds of such insurance. The Owner or Contractor, as appropriate, shall require similar written waivers in favor of the individuals and entities identified above from the Architect, Architect's consultants, Separate Contractors, subcontractors, and sub-subcontractors. The policies of insurance purchased and maintained by each person or entity agreeing to waive claims pursuant to this section 11.3.1 shall not prohibit this waiver of subrogation. This waiver of subrogation shall be effective as to a person or entity (1) even though that person or entity would otherwise have a duty of indemnification, contractual or otherwise, (2) even though that person or entity did not pay the insurance premium directly or indirectly, or (3) whether or not the person or entity had an insurable interest in the damaged property.

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

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

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

§11.5 Adjustment and Settlement of Insured Loss

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

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

ARTICLE 12 UNCOVERING AND CORRECTION OF WORK

§ 12.1 Uncovering of Work

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

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

§ 12.2 Correction of Work

§ 12.2.1 Before Substantial Completion

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

§ 12.2.2 After Substantial Completion

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

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

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

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

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

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

§ 12.3 Acceptance of Nonconforming Work

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

ARTICLE 13 MISCELLANEOUS PROVISIONS

§ 13.1 Governing Law

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

§ 13.2 Successors and Assigns

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

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

§ 13.3 Rights and Remedies

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

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

§ 13.4 Tests and Inspections

§ 13.4.1 Tests, inspections, and approvals of portions of the Work shall be made as required by the Contract Documents and by applicable laws, statutes, ordinances, codes, rules, and regulations or lawful orders of public authorities. Unless otherwise provided, the Contractor shall make arrangements for such tests, inspections, and

approvals with an independent testing laboratory or entity acceptable to the Owner, or with the appropriate public authority, and shall bear all related costs of tests, inspections, and approvals. The Contractor shall give the Architect timely notice of when and where tests and inspections are to be made so that the Architect may be present for such procedures. The Owner shall bear costs of tests, inspections, or approvals that do not become requirements until after bids are received or negotiations concluded. The Owner shall directly arrange and pay for tests, inspections, or approvals where building codes or applicable laws or regulations so require.

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

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

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

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

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

§ 13.5 Interest

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

ARTICLE 14 TERMINATION OR SUSPENSION OF THE CONTRACT

§ 14.1 Termination by the Contractor

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

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

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

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

§ 14.1.4 If the Work is stopped for a period of 60 consecutive days through no act or fault of the Contractor, a Subcontractor, a Sub-subcontractor, or their agents or employees or any other persons or entities performing portions of the Work because the Owner has repeatedly failed to fulfill the Owner's obligations under the Contract Documents with respect to matters important to the progress of the Work, the Contractor may, upon seven additional days' notice to the Owner and the Architect, terminate the Contract and recover from the Owner as provided in Section 14.1.3.

§ 14.2 Termination by the Owner for Cause

§ 14.2.1 The Owner may terminate the Contract if the Contractor

- .1 repeatedly refuses or fails to supply enough properly skilled workers or proper materials;
- .2 fails to make payment to Subcontractors or suppliers in accordance with the respective agreements between the Contractor and the Subcontractors or suppliers;
- .3 repeatedly disregards applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of a public authority; or
- .4 otherwise is guilty of substantial breach of a provision of the Contract Documents.

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

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

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

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

§ 14.3 Suspension by the Owner for Convenience

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

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

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

§ 14.4 Termination by the Owner for Convenience

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

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

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

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

ARTICLE 15 CLAIMS AND DISPUTES

§ 15.1 Claims

§ 15.1.1 Definition

A Claim is a demand or assertion by one of the parties seeking, as a matter of right, payment of money, a change in the Contract Time, or other relief with respect to the terms of the Contract. The term "Claim" also includes other disputes and matters in question between the Owner and Contractor arising out of or relating to the Contract. The responsibility to substantiate Claims shall rest with the party making the Claim. This Section 15.1.1 does not require the Owner to file a Claim in order to impose liquidated damages in accordance with the Contract Documents.

§ 15.1.2 Time Limits on Claims

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

§ 15.1.3 Notice of Claims

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

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

§ 15.1.4 Continuing Contract Performance

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

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

§ 15.1.5 Claims for Additional Cost

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

§ 15.1.6 Claims for Additional Time

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

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

§ 15.1.7 Waiver of Claims for Consequential Damages

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

- .1 damages incurred by the Owner for rental expenses, for losses of use, income, profit, financing, business and reputation, and for loss of management or employee productivity or of the services of such persons; and
- .2 damages incurred by the Contractor for principal office expenses including the compensation of personnel stationed there, for losses of financing, business and reputation, and for loss of profit, except anticipated profit arising directly from the Work.

This mutual waiver is applicable, without limitation, to all consequential damages due to either party's termination in accordance with Article 14. Nothing contained in this Section 15.1.7 shall be deemed to preclude assessment of liquidated damages, when applicable, in accordance with the requirements of the Contract Documents.

§ 15.2 Initial Decision

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

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

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

§ 15.2.4 If the Initial Decision Maker requests a party to provide a response to a Claim or to furnish additional supporting data, such party shall respond, within ten days after receipt of the request, and shall either (1) provide a response on the requested supporting data, (2) advise the Initial Decision Maker when the response or supporting data will be furnished, or (3) advise the Initial Decision Maker that no supporting data will be furnished. Upon receipt of the response or supporting data, if any, the Initial Decision Maker will either reject or approve the Claim in whole or in part.

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

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

§ 15.2.6.1 Either party may, within 30 days from the date of receipt of an initial decision, demand in writing that the other party file for mediation. If such a demand is made and the party receiving the demand fails to file for mediation within 30 days after receipt thereof, then both parties waive their rights to mediate or pursue binding dispute resolution proceedings with respect to the initial decision.

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

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

§ 15.3 Mediation

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

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

§ 15.3.3 Either party may, within 30 days from the date that mediation has been concluded without resolution of the dispute or 60 days after mediation has been demanded without resolution of the dispute, demand in writing that the other party file for binding dispute resolution. If such a demand is made and the party receiving the demand fails to file for binding dispute resolution within 60 days after receipt thereof, then both parties waive their rights to binding dispute resolution proceedings with respect to the initial decision.

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

§ 15.4 Arbitration

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

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

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

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

§ 15.4.4 Consolidation or Joinder

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

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

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

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I, _____, hereby certify, to the best of my knowledge, information and belief, that I created the attached final document simultaneously with its associated Additions and Deletions Report and this certification at 11:04:55 ET on 10/01/2021 under Order No. 2114241921 from AIA Contract Documents software and that in preparing the attached final document I made no changes to the original text of AIA® Document A201™ – 2017, General Conditions of the Contract for Construction, as published by the AIA in its software, other than those additions and deletions shown in the associated Additions and Deletions Report.

(Signed)

(Title)

(Dated)

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SECTION 00 73 13

SUPPLEMENTARY GENERAL CONDITIONS A201-2017

The following supplements modify the "General Conditions of the Contract for Construction," AIA Document A201-2017. Where a portion of the General Conditions is modified or deleted by the Supplementary Conditions, the unaltered portions of the General Conditions shall remain in effect.

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ARTICLE 1: GENERAL PROVISIONS

1.1 BASIC DEFINITIONS

1.1.1 THE CONTRACT DOCUMENTS

Strike the last sentence of Section 1.1.1 in its entirety and replace with the following:

“The Contract Documents also include Advertisement for Bid, Instructions to Bidder, sample forms, the Bid Form, the Contractor’s completed Bid and the Award Letter.”

Add the following Section:

“1.1.1.1 In the event of conflict or discrepancies among the Contract Documents, the Documents prepared by the State of Delaware, Division of Facilities Management shall take precedence over all other documents.”

1.1.8 INITIAL DECISION MAKER

Strike the last sentence of Section 1.1.8 in its entirety and add the following to the end of the remaining sentence:

“and certify termination of the Agreement under Section 14.2.2.”

1.2 CORRELATION AND INTENT OF THE CONTRACT DOCUMENTS

1.2.1.1 Insert “if possible” at the end of the second sentence.

Add the following Sections:

“1.2.4 In the case of an inconsistency between the Drawings and the Specifications, or within either document not clarified by addendum, the better quality or greater quantity of work shall be provided in accordance with the Architect’s interpretation.”

“1.2.5 The word “PROVIDE” as used in the Contract Documents shall mean “FURNISH AND INSTALL” and shall include, without limitation, all labor, materials, equipment, transportation, services and other items required to complete the Work.”

“1.2.6 The word “PRODUCT” as used in the Contract Documents means all materials, systems and equipment.”

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

Strike Section 1.5.1 in its entirety and replace with the following:

“All pre-design studies, drawings, specifications and other documents, including those in electronic form, prepared by the Architect under this Agreement are, and shall remain, the property of the Owner whether the Project for which they are made is executed or not. Such documents may be used by the Owner to construct one or more like Projects without the approval of, or additional compensation to, the Architect. The Contractor, Subcontractors, Sub-subcontractors, and Material or Equipment Suppliers are authorized to use and reproduce applicable portions of the Drawings, Specifications and other documents prepared by the Architect and the Architect’s consultants appropriate to and for use in the execution of their Work under the Contract Documents. They are not to be used by the Contractor or any Subcontractor, Sub-subcontractor or Material and Equipment Supplier on other Projects or for additions to this Project outside the scope

of the Work without the specific written consent of the Owner, Architect and Architect's consultants.

The Architect shall not be liable for injury or damage resulting from the re-use of drawings and specifications if the Architect is not involved in the re-use Project. Prior to re-use of construction documents for a Project in which the Architect is not also involved, the Owner will remove from such documents all identification of the original Architect, including name, address and professional seal or stamp."

Strike Section 1.5.2 in its entirety.

1.7 DIGITAL DATA USE AND TRANSMISSION

Strike Section 1.7 in its entirety and replace with the following:

"The parties shall agree upon protocols governing transmission and use of Instruments of Service or any other information or documentation in digital form."

1.8 BUILDING INFORMATION MODELS USE AND RELIANCE

Strike Section 1.8 in its entirety.

ARTICLE 2: OWNER

2.2 EVIDENCE OF THE OWNERS FINANCIAL ARRANGEMENTS

Strike Section 2.2 in its entirety.

2.3 INFORMATION AND SERVICES REQUIRED OF THE OWNER

2.3.3 Strike 2.3.3 in its entirety.

2.3.4 Add the following sentence at the end of the paragraph:

"The Contractor, at their expense shall bear the costs to accurately identify the location of all underground utilities in the area of their excavation and shall bear all cost for any repairs required, out of failure to accurately identify said utilities."

Strike Section 2.3.6 in its entirety and replace with the following:

"2.3.6 The Contractor shall be furnished free of charge (1) electronic set of the Drawings and Project Manuals. Additional sets will be furnished at the cost of reproduction, postage and handling."

2.5 OWNER'S RIGHT TO CARRY OUT THE WORK

Add ", except as outlined in Section 3.15" after the reference to "Article 15" at the end of the last sentence of the Section.

ARTICLE 3: CONTRACTOR

3.2 REVIEW OF CONTRACT DOCUMENTS AND FIELD CONDITIONS BY CONTRACTOR

3.2.2 Add "and Owner" after "report to the Architect" in the second sentence.

3.2.4 Strike “subject to Section 15.1.7” in the second sentence.

3.2.4 Strike the third sentence.

3.3 SUPERVISION AND CONSTRUCTION PROCEDURES

Add the following Sections:

“3.3.2.1 The Contractor shall immediately remove from the Work, whenever requested to do so by the Owner, any person who is considered by the Owner or Architect to be incompetent or disposed to be so disorderly, or who for any reason is not satisfactory to the Owner, and that person shall not again be employed on the Work without the consent of the Owner or the Architect.”

“3.3.4 The Contractor must provide suitable storage facilities at the Site for the proper protection and safe storage of their materials, or as otherwise identified by the specifications. Consult the Owner and the Architect before storing any materials.”

“3.3.5 When any room is used as a shop, storeroom, office, etc., by the Contractor or Subcontractor(s) during the construction of the Work, the Contractor making use of these areas will be held responsible for any repairs, patching or cleaning arising from such use.”

3.4 LABOR AND MATERIALS

Add the Following Sections:

“3.4.4 Before starting the Work, each Contractor shall carefully examine all preparatory Work that has been executed to receive their Work. Check carefully, by whatever means are required, to ensure that its Work and adjacent, related Work, will finish to proper contours, planes and levels. Promptly notify the Architect & Owner of any defects or imperfections in preparatory Work which will in any way affect satisfactory completion of its Work. Absence of such notification will be construed as an acceptance of preparatory Work and later claims of defects will not be recognized.”

“3.4.5 Under no circumstances shall the Contractor’s Work proceed prior to preparatory Work having been completely cured, dried and/or otherwise made satisfactory to receive this Work. Responsibility for timely installation of all materials rests solely with the Contractor responsible for that Work, who shall maintain coordination at all times.”

3.5 WARRANTY

Add the following Sections:

“3.5.3 The Contractor will guarantee all materials and workmanship against original defects, except injury from proper and usual wear when used for the purpose intended, for two years after Acceptance by the Owner, and will maintain all items in perfect condition during the period of warranty.”

“3.5.4 Defects appearing during the period of warranty will be made good by the Contractor at his expense upon demand of the Owner, it being required that all work will be in perfect condition when the period of warranty will have elapsed.”

“3.5.5 Upon notification by the Owner of a defect covered by the Contractor’s warranty, the Contractor shall respond within 4 hours of the notification.”

“3.5.6 In addition to the General Warranty there are other warranties required for certain items for different periods of time than the two years as above and are particularly so stated in that part of the specifications referring to same. The said warranties will commence at the same time as the General Warranty.”

“3.5.7 If the Contractor fails to remedy any failure, defect or damage within a reasonable time after receipt of notice, the Owner will have the right to replace, repair, or otherwise remedy the failure, defect or damage at the Contractor’s expense.”

3.8 ALLOWANCES

Add the following Section:

“3.8.1.1 For costs to be covered under a project allowance, (included in the schedule of values) the Contractor shall submit a summary of those costs anticipated and an Allowance Access Authorization Form to the Architect and Owner, reflecting the projected costs. The Allowance Access Authorization Form must be signed by the Owner prior to initiating any work associated with the allowance.”

3.10 CONTRACTOR’S CONSTRUCTION AND SUBMITTAL SCHEDULES

3.10.1 Add “estimated” after “and the” and before “date of” in the second sentence.

3.10.2 Strike “and thereafter as necessary to maintain a current submittal schedule” in the first sentence.

3.11 DOCUMENTS AND SAMPLES AT THE SITE

Add the following Sections:

“3.11.1 During the course of the Work, the Contractor shall maintain a record set of drawings on which the Contractor shall mark the actual physical location of all piping, valves, equipment, conduit, outlets, access panels, controls, actuators, including all appurtenances that will be concealed once construction is complete, etc., including all invert elevations.”

“3.11.2 At the completion of the project, the Contractor shall obtain a set of the conformed contract drawings from the Architect, and neatly transfer all information outlined in 3.11.1 to provide a complete record of the as-built conditions.”

“3.11.3 Upon completion of the work noted in 3.11.2 the contractor shall schedule a meeting with the Architect/Engineer and Owner to review the final record drawings and closeout documents prior to submission. After this meeting the Contractor shall make adjustments per the review and submit one (1) original markup and (2) copies of the red line drawings (as-built conditions, to the Owner and one (1) print to the Architect. In addition, attach one complete set of the as-built documents to each of the Operating and Maintenance Instructions/Manuals. The Contractor will include (2) USB drives, each containing all “red line drawings (as-built) and Closeout Documents properly tabbed in accordance with closeout requirements as defined elsewhere in the contract documents.”

3.12 SHOP DRAWINGS, PRODUCT DATA AND SAMPLES

3.12.10.2 Strike “If the Contract Documents require” from the beginning of the sentence.

3.12.10.2 Strike “to” between “professional” and certify” and replace with “shall”.

3.17 Insert “indemnify and” between “shall” and “hold” in the second sentence.

ARTICLE 4: ADMINISTRATION OF THE CONTRACT

4.2 ADMINISTRATION OF THE CONTRACT

4.2.7 Strike the first sentence and replace with the following:

“The Architect will review and approve or take other appropriate action upon the Contractor’s submittals such as Shop Drawings, Product Data and Samples for the purpose of checking for conformance with the Contract Documents.”

4.2.7 Strike the second sentence and replace with the following:

“The Architect’s action will be taken with such reasonable promptness as to cause no delay in the Work in the activities of the Owner, Contractor or separate Contractors, while allowing sufficient time in the Owner’s professional judgment to permit adequate review.”

Add the following Section:

“4.2.10.1 There will be no full-time Project Representative provided by the Owner or Architect on this project.”

“4.2.13 Add “and in compliance with all local requirements.” to the end of the sentence.”

ARTICLE 5: SUBCONTRACTORS

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

5.2.3 Strike Section 5.2.3 in its entirety and replace with the following:

“If the Owner or Architect has reasonable objection to a person or entity proposed by the Contractor, the Contractor shall propose another to whom the Owner or Architect has no reasonable objection, subject to the statutory requirements of 29 Delaware Code § 6962(d)(10)b.3 and 4.”

5.2.4 Strike Section 5.2.4 in its entirety and replace with the following:

”The Contractor may not substitute any Subcontractor listed in its Bid unless the Contractor complies with the requirements of 29 Delaware Code § 6962(d)(10)b.3 and 4. Failure to comply with this requirement shall subject the Contractor to a penalty as outlined in Section 5.2 of the Owner’s General Requirements.”

Add the following Section:

“5.2.5 The Contractor shall comply and shall ensure all Subcontractors comply with all requirements for drug testing as set forth in TITLE 19 LABOR
DELAWARE ADMINISTRATIVE CODE 4000 Office of Management and Budget 4100
Division of Facilities Management **4104 Regulations for the Drug Testing of Contractor and Subcontractor Employees Working on Large Public Works Projects.**”

ARTICLE 6: CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS

6.1 OWNER’S RIGHT TO PERFORM CONSTRUCTION AND TO AWARD SEPARATE CONTRACTS

6.1.1 Strike “and waiver of subrogation” from the end of the second sentence.

- 6.1.4 Strike Section 6.1.4 in its entirety.
- 6.2 MUTUAL RESPONSIBILITY
- 6.2.3 Strike “shall” and replace with “may” in the second sentence.

ARTICLE 7: CHANGES IN THE WORK

(SEE ARTICLE 7: CHANGES IN WORK IN THE STATE OF DELAWARE DIVISION OF FACILITIES MANAGEMENT GENERAL REQUIREMENTS)

- 7.3.4.1 Strike “and other employee costs approved by the Architect” after “worker’s compensation insurance,”
- 7.3.4.4 Add “work attributable to the” before “change” at the end of the sentence.
- 7.4 MINOR CHANGES IN WORK
Add “unless such changes are approved” at the end of the third sentence.

ARTICLE 8: TIME

- 8.2 PROGRESS AND COMPLETION
 - 8.2.1 Add the following Section:
 - “8.2.1.1 Refer to Project Specifications Section SUMMARY OF WORK for Contract time requirements.”
 - 8.2.2 After “by the Contractor” strike “and” and insert “to”.
 - 8.2.4 Add the following Section:
 - “8.2.4 If the Work falls behind the Progress Schedule as submitted by the Contractor, the Contractor shall employ additional labor and/or equipment necessary to bring the Work into compliance with the Progress Schedule at no additional cost to the Owner.”
 - 8.3 DELAYS AND EXTENSION OF TIME
 - 8.3.1 Strike “binding dispute resolution” and insert “any and all remedies at law or in equity”.

Add the following Section:
 - “8.3.2.1 The Contractor shall update the status of the suspension, delay, or interruption of the Work with each Application for Payment. (The Contractor shall report the termination of such cause immediately upon the termination thereof.) Failure to comply with this procedure shall constitute a waiver for any claim for adjustment of time or price based upon said cause.”
- Strike Section 8.3.3 in its entirety and replace with the following:
- 8.3.3 “Except in the case of a suspension of the Work directed by the Owner, an extension of time under the provisions of Section 8.3.1 shall be the Contractor’s sole remedy in the progress of the Work and there shall be no payment or compensation to the Contractor for any expense or damage resulting from the delay.”

Add the following Section:

“8.3.4 By permitting the Contractor to work after the expired time for completion of the project, the Owner does not waive their rights under the Contract.”

ARTICLE 9: PAYMENTS AND COMPLETION

9.2 SCHEDULE OF VALUES

Add the following Sections:

“9.2.1 The Schedule of Values shall be submitted using AIA Document G703, Continuation Sheet to G702.”

“9.2.2 The Schedule of Values is to include a line item for Project Closeout Document Submittal. The value of this item is to be no less than 1.5% of the initial contract amount.”

9.3 APPLICATIONS FOR PAYMENT

9.3.1 Strike Section 9.3.1 in its entirety and replace with the following:

“At least ten days before the date established for each progress payment, the Contractor shall submit to the Architect an itemized Application for Payment prepared in accordance with the schedule of values for completed portions of the Work. The application shall be notarized, and supported by all data substantiating the Contractor’s right to payment that the Owner or Architect require, such as copies of requisitions, and releases and waivers of liens from Subcontractors and suppliers, and shall reflect retainage.”

Add the following Sections:

“9.3.1.3 Application for Payment shall be submitted on AIA Document G702 “Application and Certificate for Payment”, supported by AIA Document G703 “Continuation Sheet”. Said Applications shall be fully executed and notarized.”

“9.3.4 Until Closeout Documents have been received and outstanding items completed the Owner will pay 95% (ninety-five percent) of the amount due the Contractor on account of progress payments.”

“9.3.5 The Contractor shall provide a current and updated Progress Schedule to the Architect with each Application for Payment. Failure to provide Schedule will be just cause for rejection of Application for Payment.”

9.5 DECISIONS TO WITHHOLD CERTIFICATION

Add the following Subsections to 9.5.1:

- .8 failure to provide a current Progress Schedule;
- .9 a lien or attachment is filed;
- .10 failure to comply with mandatory requirements for maintaining Record Documents.

9.6 PROGRESS PAYMENTS

9.6.1 Strike Section 9.6.1 in its entirety and replace with the following:

“9.6.1 After the Architect has approved and issued a Certificate for Payment, payment shall be made by the Owner within 30 days after Owner’s receipt of the Certificate for Payment.”

- 9.6.8 Strike “Provided the Owner has fulfilled its payment obligations under the Contract Documents,” in the first sentence.

9.7 FAILURE OF PAYMENT

Strike Section 9.7 in its entirety and replace with the following:

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

9.8 SUBSTANTIAL COMPLETION

- 9.8.3 At the end of Section 9.8.3, add the following sentence:

“If the Architect is required to make more than 2 inspections of the same portion of work, the Contractor shall be responsible for all costs associated with subsequent inspections including but not limited to any Architect’s fees.”

- 9.8.5 Strike “shall” and insert “may” in the second sentence.

- 9.8.5 Insert “1/2 of the” after “make payment of” in the second sentence.

9.9 PARTIAL OCCUPANCY OR USE

- 9.9.1 Strike the first sentence and replace with the following (the remainder of the Section remains as written):

“The Owner may occupy or use any completed or partially completed portion of the Work at any stage when such portion is designated by separate agreement with the Contractor, provided such occupancy or use authorized by public authorities having jurisdiction over the Project.”

- 9.10.2 Strike “to remain in force after final payment is currently in effect” after “required by the Contract Documents” and replace with “shall remain in force until final payment is completed” in the first sentence.

- 9.10.4.4 Strike “if permitted by the Contract Documents,”

ARTICLE 10: PROTECTION OF PERSONS AND PROPERTY

10.1 SAFETY PRECAUTIONS AND PROGRAMS

Add the following Sections:

- 10.1.1 Each Contractor shall develop a safety program in accordance with the Occupational Safety and Health Act of 1970. A copy of said plan shall be furnished to the Owner and Architect prior to the commencement of that Contractor’s Work.

- 10.1.2 Each Contractor shall appoint a Safety Representative. Safety Representatives shall be someone who is on site on a full time basis. If deemed necessary by the Owner or Architect, Contractor

Safety meetings will be scheduled. The attendance of all Safety Representatives will be required. Minutes will be recorded of said meetings by the Contractor and will be distributed to all parties as well as posted in all job offices/trailers etc.

10.2 SAFETY OF PERSONS AND PROPERTY

Add the following Section:

10.2.4.1 As required in the Hazardous Chemical Act of June 1984, all vendors supplying any material that may be defined as hazardous must provide Material Safety Data Sheets for those products. Any chemical product should be considered hazardous if it has a caution warning on the label relating to a potential physical or health hazard, if it is known to be present in the work place, and if employees may be exposed under normal conditions or in foreseeable emergency situations. Material Safety Data Sheets shall be provided directly to the Owner, along with the shipping slips that include those products.

10.2.5 Strike the second sentence in its entirety.

10.3 HAZARDOUS MATERIALS AND SUBSTANCES

10.3.3 Strike Section 10.3.3 in its entirety.

10.3.4 Insert "hazardous" in the last sentence after "handling of such".

10.3.6 Strike Section 10.3.6 in its entirety.

ARTICLE 11: INSURANCE AND BONDS

11.1 CONTRACTOR'S INSURANCE AND BONDS

11.1.1 Strike "Owner" from the the third sentence .

11.2 OWNER'S LIABILITY INSURANCE

Strike 11.2 in its entirety, except that in the case of school projects in which case Section 11.2 shall remain.

11.3 WAIVERS OF SUBROGATION

Delete Section 11.3 in its entirety

11.4 LOSS OF USE, BUSINESS INTERRUPTION, AND DELAY IN COMPLETION INSURANCE

Delete Section 11.4 in its entirety

ARTICLE 12: UNCOVERING AND CORRECTION OF WORK

12.2.2 AFTER SUBSTANTIAL COMPLETION

Add the following Section:

"12.2.2.1.1 At any time during the progress of the Work, or in any case where the nature of the defects will be such that it is not expedient to have corrected, the Owner, at its option, will have the right to deduct such sum, or sums, of money from the amount of the Contract as it considers

justified to adjust the difference in value between the non-conforming work and that required under contract including any damage to the structure.”

- 12.2.2.1 Strike all references to “one year” or “one-year” and replace with “two years”.
- 12.2.2.2 Strike “one-year” and replace with “two years”.
- 12.2.2.3 Strike “one-year” and replace with “two years”.
- 12.2.5 Strike “one-year” and replaced with “two years”.

ARTICLE 13: MISCELLANEOUS PROVISIONS

13.1 GOVERNING LAW

Strike the last sentence.

13.4 TESTS AND INSPECTIONS

13.4.1 Strike the last sentence and replace with the following:

“The Owner shall pay for tests, inspections, or approvals where building codes or applicable laws or regulations prohibit the Owner from delegating their cost to the Contractor.”

13.5 INTEREST

Strike “the date payment is due at such rate as the parties may agree upon in writing or, in the absence thereof, at the legal rate prevailing from time to time at the place where the Project is located” and replace with “30 days of presentment of the authorized Certificate of Payment at the annual rate of 12% or 1% per month.”

Insert the following Section:

“13.6 CONFLICTS WITH FEDERAL STATUTES OR REGULATIONS

13.6.1 If any provision, specifications or requirement of the Contract Documents conflict or is inconsistent with any statute, law or regulation of the government of the United State of America, the Contractor shall notify the Architect and Owner immediately upon discovery.”

ARTICLE 14: TERMINATION OR SUSPENSION OF THE CONTRACT

14.1 TERMINATION BY THE CONTRACTOR

14.1.1.4 Insert “, upon the Contractors’ request,” after “”furnish to the Contractor” .

14.1.3 Strike “and profit on Work not executed, and” after “as well as reasonable overhead” and replace with “, profit, and reasonable”

14.3 SUSPENSION BY OWNER FOR CONVENIENCE

14.3.2 Strike “Adjustment of the Contract Sum shall include profit”.

14.4 TERMINATION BY THE OWNER FOR CONVENIENCE

14.4.3 Strike Section 14.4.3 in its entirety and replace with the following:

“In case of such termination for the Owner’s convenience, the Contractor shall be entitled to receive payment for Work executed, and reasonable costs incurred by reason of such termination along with reasonable overhead.”

ARTICLE 15: CLAIMS AND DISPUTES

15.1 CLAIMS

15.1.2 TIME LIMITS ON CLAIMS

Strike the last sentence.

15.1.3 NOTICE OF CLAIM

Strike all references to “21” and replace with “45”.

15.1.5 CLAIMS FOR ADDITIONAL COSTS

Strike the first sentence and replace with the following:

“Contractor shall not proceed to execute any portion of the Work that is subject to the Claim without prior approval of the costs or method of payment for the costs associated with the Claim as determined by the Architect and approved by the Owner.”

15.1.7 WAIVER OF CLAIMS FOR CONSEQUENTIAL DAMAGES

Strike Section 15.1.7 in its entirety.

15.2 INITIAL DECISION

15.2.1 Strike “and binding dispute resolution” in the fourth sentence and replace with “or any and all remedies at law or in equity”.

15.2.5 Strike Section 15.2.5 in its entirety and replace with the following:

“The Architect will approve or reject Claims by written decision, which shall state the reasons therefore and shall notify the parties of any change in the Contract Sum or Contract Time or both. The approval or rejection of a Claim by the Architect shall be subject to mediation and any or all remedies at law or in equity.”

15.2.6 Strike Section 15.2.6 and its sub Sections in their entirety.

15.3 MEDIATION

15.3.1 Strike “binding dispute resolution” and replace with “any or all remedies at law or in equity”.

15.3.2 Strike “, shall be administered by the American Arbitration Association in accordance with its Construction Industry Mediation Procedure in effect on the date of the Agreement,” in the first sentence.

15.3.2 Strike all references to “binding dispute resolution” and replace with “any or all remedies at law and in equity”.

15.3.3 Strike Section 15.3.3 in its entirety.

15.4 ARBITRATION

Strike Section 15.4 and its Subsections in their entirety.

END OF SECTION

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GENERAL REQUIREMENTS

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ARTICLE 1: GENERAL

1.1 CONTRACT DOCUMENTS

1.1.1 The intent of the Contract Documents is to include all items necessary for the proper execution and completion of the Work by the Contractor. The Contract Documents are complementary and what is required by one shall be as binding as if required by all. Performance by the Contractor shall be required to an extent consistent with the Contract Documents and reasonably inferable from them as being necessary to produce the intended results.

1.1.2 Work including material purchases shall not begin until the Contractor is in receipt of a bonafide State of Delaware Purchase Order. Any work performed or material purchases prior to the issuance of the Purchase Order is done at the Contractor's own risk and cost.

1.2 EQUALITY OF EMPLOYMENT OPPORTUNITY ON PUBLIC WORKS

1.2.1 For Public Works Projects financed in whole or in part by state appropriation the Contractor agrees that during the performance of this contract:

1. The Contractor will not discriminate against any employee or applicant for employment because of race, creed, sex, color, sexual orientation, gender identity or national origin. The Contractor will take positive steps to ensure that applicants are employed and that employees are treated during employment without regard to their race, creed, sex, color, sexual orientation, gender identity or national origin. Such action shall include, but not be limited to, the following: employment, upgrading, demotion or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. The Contractor agrees to post in conspicuous places available to employees and applicants for employment notices to be provided by the contracting agency setting forth this nondiscrimination clause.
2. The Contractor will, in all solicitations or advertisements for employees placed by or on behalf of the Contractor, state that all qualified applicants will receive consideration for employment without regard to race, creed, sex, color, sexual orientation, gender identity or national origin."

ARTICLE 2: OWNER

(NO ADDITIONAL GENERAL REQUIREMENTS – SEE SUPPLEMENTARY GENERAL CONDITIONS)

ARTICLE 3: CONTRACTOR

3.1 Schedule of Values: The successful Bidder shall within twenty (20) days after receiving notice to proceed with the work, furnish to the Owner a complete schedule of values on the various items comprising the work.

3.2 Subcontracts: Upon approval of Subcontractors, the Contractor shall award their Subcontracts as soon as possible after the signing of their own contract and see that all material, their own and those of their Subcontractors, are promptly ordered so that the work will not be delayed by failure of materials to arrive on time.

3.3 Before commencing any work or construction, the General Contractor is to consult with the Owner as to matters in connection with access to the site and the allocation of Ground Areas for the various features of hauling, storage, etc.

- 3.4 The Contractor shall supervise and direct the Work, using the Contractor's best skill and attention. The Contractor shall be solely responsible for and have control over construction means, methods, techniques, sequences and procedures and for coordinating all portions of the Work under the Contract, unless the Contract Documents give other specific instructions.
- 3.5 The Contractor shall enforce strict discipline and good order among the Contractor's employees and other persons carrying out the Contract. The Contractor shall not permit employment of unfit persons or persons not skilled in tasks assigned to them.
- 3.6 The Contractor warrants to the Owner that materials and equipment furnished will be new and of good quality, unless otherwise permitted, and that the work will be free from defects and in conformance with the Contract Documents. Work not conforming to these requirements, including substitutions not properly approved, may be considered defective. If required by the Owner, the Contractor shall furnish evidence as to the kind and quality of materials and equipment provided.
- 3.7 Unless otherwise provided, the Contractor shall pay all sales, consumer, use and other similar taxes, and shall secure and pay for required permits, fees, licenses, and inspections necessary for proper execution of the Work.
- 3.8 The Contractor shall comply with and give notices required by laws, ordinances, rules, regulations, and lawful orders of public authorities bearing on performance of the Work. The Contractor shall promptly notify the Owner if the Drawings and Specifications are observed to be at variance therewith.
- 3.9 The Contractor shall be responsible to the Owner for the acts and omissions of the Contractor's employees, Subcontractors and their agents and employees, and other persons performing portions of the Work under contract with the Contractor.
- 3.10 The Contractor shall keep the premises and surrounding area free from accumulation of waste materials or rubbish caused by operations under the Contract. At completion of the Work the Contractor shall remove from and about the Project all waste materials, rubbish, the Contractor's tools, construction equipment, machinery and surplus materials. The Contractor shall be responsible for returning all damaged areas to their original conditions.
- 3.11 STATE LICENSE AND TAX REQUIREMENTS
- 3.11.1 Each Contractor and Subcontractor shall be licensed to do business in the State of Delaware and shall pay all fees and taxes due under State laws. In conformance with Section 2503, Chapter 25, Title 30, Delaware Code, "the Contractor shall furnish the Delaware Department of Finance within ten (10) days after entering into any contract with a contractor or subcontractor not a resident of this State, a statement of total value of such contract or contracts together with the names and addresses of the contracting parties."
- 3.12 The Contractor shall comply with all requirements set forth in Section 6962, Chapter 69, Title 29 of the Delaware Code.

- 3.13 During the contract Work, the Contractor and each Subcontractor, shall implement an Employee Drug Testing Program in accordance with OMB Regulation 4104 - "Regulations for the Drug Testing of Contractor and Subcontractor Employees Working on "Large Public Works Projects". "Large Public Works" is based upon the current threshold required for bidding Public Works as set by the Purchasing and Contracting Advisory Council.

ARTICLE 4: ADMINISTRATION OF THE CONTRACT

4.1 CONTRACT SURETY

4.1.1 PERFORMANCE BOND AND LABOR AND MATERIAL PAYMENT BOND

- 4.1.2 All bonds will be required as follows unless specifically waived elsewhere in the Bidding Documents.

- 4.1.3 Contents of Performance Bonds – The bond shall be in the form approved by the Office of Management and Budget. The bond shall be conditioned upon the faithful compliance and performance by the successful bidder of each and every term and condition of the contract and the proposal, plans, specifications, and bid documents thereof. Each term and condition shall be met at the time and in the manner prescribed by the Contract, Bid documents and the specifications, including the payment in full to every person furnishing material or performing labor in the performance of the Contract, of all sums of money due the person for such labor and material. (The bond shall also contain the successful bidder's guarantee to indemnify and save harmless the State and the agency from all costs, damages and expenses growing out of or by reason of the Contract in accordance with the Contract.)

- 4.1.4 Invoking a Performance Bond – The agency may, when it considers that the interest of the State so requires, cause judgement to be confessed upon the bond.

- 4.1.5 Within twenty (20) days after the date of notice of award of contract, the Bidder to whom the award is made shall furnish a Performance Bond and Labor and Material Payment Bond, each equal to the full amount of the Contract price to guarantee the faithful performance of all terms, covenants and conditions of the same. The bonds are to be issued by an acceptable Bonding Company licensed to do business in the State of Delaware and shall be issued in duplicate.

- 4.1.6 Performance and Payment Bonds shall be maintained in full force (warranty bond) for a period of two (2) years after the date of the Certificate for Final Payment. The Performance Bond shall guarantee the satisfactory completion of the Project and that the Contractor will make good any faults or defects in his work which may develop during the period of said guarantees as a result of improper or defective workmanship, material or apparatus, whether furnished by themselves or their Sub-Contractors. The Payment Bond shall guarantee that the Contractor shall pay in full all persons, firms or corporations who furnish labor or material or both labor and material for, or on account of, the work included herein. The bonds shall be paid for by this Contractor. The Owner shall have the right to demand that the proof parties signing the bonds are duly authorized to do so.

4.2 FAILURE TO COMPLY WITH CONTRACT

- 4.2.1 If any firm entering into a contract with the State, or Agency that neglects or refuses to perform or fails to comply with the terms thereof, the Agency which signed the Contract may terminate the Contract and proceed to award a new contract in accordance with this Chapter 69, Title 29 of the Delaware Code or may require the Surety on the Performance Bond to complete the Contract in accordance with the terms of the Performance Bond. Nothing herein shall preclude the Agency from pursuing additional remedies as otherwise provided by law.

4.3 CONTRACT INSURANCE AND CONTRACT LIABILITY

- 4.3.1 In addition to the bond requirements stated in the Bid Documents, each successful Bidder shall purchase adequate insurance for the performance of the Contract and, by submission of a Bid, agrees to indemnify and save harmless and to defend all legal or equitable actions brought against the State, any Agency, officer and/or employee of the State, for and from all claims of liability which is or may be the result of the successful Bidder's actions during the performance of the Contract.

- 4.3.2 The purchase or nonpurchase of such insurance or the involvement of the successful Bidder in any legal or equitable defense of any action brought against the successful Bidder based upon work performed pursuant to the Contract will not waive any defense which the State, its agencies and their respective officers, employees and agents might otherwise have against such claims, specifically including the defense of sovereign immunity, where applicable, and by the terms of this section, the State and all agencies, officers and employees thereof shall not be financially responsible for the consequences of work performed, pursuant to said contract.

4.4 RIGHT TO AUDIT RECORDS

- 4.4.1 The Owner shall have the right to audit the books and records of a Contractor or any Subcontractor under any Contract or Subcontract to the extent that the books and records relate to the performance of the Contract or Subcontract.
- 4.4.2 Said books and records shall be maintained by the Contractor for a period of seven (7) years from the date of final payment under the Prime Contract and by the Subcontractor for a period of seven (7) years from the date of final payment under the Subcontract.

ARTICLE 5: SUBCONTRACTORS

5.1 SUBCONTRACTING REQUIREMENTS

- 5.1.1 All contracts for the construction, reconstruction, alteration or repair of any public building (not a road, street or highway) shall be subject to the following provisions:
1. A contract shall be awarded only to a Bidder whose Bid is accompanied by a statement containing, for each Subcontractor category, the name and address (city or town and State only – street number and P.O. Box addresses not required) of the subcontractor whose services the Bidder intends to use in performing the Work and providing the material for such Subcontractor category.

2. A Bid will not be accepted nor will an award of any Contract be made to any Bidder which, as the Prime Contractor, has listed itself as the Subcontractor for any Subcontractor unless:
 - A. It has been established to the satisfaction of the awarding Agency that the Bidder has customarily performed the specialty work of such Subcontractor category by artisans regularly employed by the Bidder's firm;
 - B. That the Bidder is duly licensed by the State to engage in such specialty work, if the State requires licenses; and
 - C. That the Bidder is recognized in the industry as a bona fide Subcontractor or Contractor in such specialty work and Subcontractor category.
- 5.1.2 The decision of the awarding Agency as to whether a Bidder who list itself as the Subcontractor for a Subcontractor category shall be final and binding upon all Bidders, and no action of any nature shall lie against any awarding agency or its employees or officers because of its decision in this regard.
- 5.1.3 After such a Contract has been awarded, the successful Bidder shall not substitute another Subcontractor for any Subcontractor whose name was set forth in the statement which accompanied the Bid without the written consent of the awarding Agency.
- 5.1.4 No Agency shall consent to any substitution of Subcontractors unless the Agency is satisfied that the Subcontractor whose name is on the Bidders accompanying statement:
 - A. Is unqualified to perform the work required;
 - B. Has failed to execute a timely reasonable Subcontract;
 - C. Has defaulted in the performance on the portion of the work covered by the Subcontract; or
 - D. Is no longer engaged in such business.
- 5.1.5 Should a Bidder be awarded a contract, such successful Bidder shall provide to the agency the taxpayer identification license numbers of such subcontractors. Such numbers shall be provided on the later of the date on which such subcontractor is required to be identified or the time the contract is executed. The successful Bidder shall provide to the agency to which it is contracting, within 30 days of entering into such public works contract, copies of all Delaware Business licenses of subcontractors and/or independent contractors that will perform work for such public works contract. However, if a subcontractor or independent contractor is hired or contracted more than 20 days after the Bidder entered the public works contract the Delaware Business license of such subcontractor or independent contractor shall be provided to the agency within 10 days of being contracted or hired.
- 5.1.6 The Contractor may employ additional Subcontractors on the jobsite only after submitting a copy of the Subcontractor's Employee Drug Testing Program to the Owner for approval. A Contractor or Subcontractor shall not commence work until the Owner has concluded its review and determined that the submitted Employee Drug Testing Program complies with OMB Regulation 4104.

5.2 PENALTY FOR SUBSTITUTION OF SUBCONTRACTORS

- 5.2.1 Should the Contractor fail to utilize any or all of the Subcontractors in the Contractor's Bid statement in the performance of the Work on the public bidding, the Contractor shall be penalized in the amount of (project specific amount*). The Agency may determine to deduct payments of the penalty from the Contractor or have the amount paid directly to the Agency. Any penalty amount assessed against the Contractor may be remitted or refunded, in whole or in part, by the Agency awarding the Contract, only if it is established to the satisfaction of the Agency that the Subcontractor in question has defaulted or is no longer engaged in such business. No claim for the remission or refund of any penalty shall be granted unless an application is filed within one year after the liability of the successful Bidder accrues. All penalty amounts assessed and not refunded or remitted to the contractor shall be reverted to the State.

*one (1) percent of contract amount not to exceed \$10,000

5.3 ASBESTOS ABATEMENT

- 5.3.1 The selection of any Contractor to perform asbestos abatement for State-funded projects shall be approved by the Office of Management and Budget, Division of Facilities Management pursuant to Chapter 78 of Title 16.

5.4 STANDARDS OF CONSTRUCTION FOR THE PROTECTION OF THE PHYSICALLY HANDICAPPED

- 5.4.1 All Contracts shall conform with the standard established by the Delaware Architectural Accessibility Board unless otherwise exempted by the Board.

5.5 CONTRACT PERFORMANCE

- 5.5.1 Any firm entering into a Public Works Contract that neglects or refuses to perform or fails to comply with its terms, the Agency may terminate the Contract and proceed to award a new Contract or may require the Surety on the Performance Bond to complete the Contract in accordance with the terms of the Performance Bond.

ARTICLE 6: CONSTRUCTION BY OWNER OR SEPARATE CONTRACTORS

- 6.1 The Owner reserves the right to simultaneously perform other construction or operations related to the Project with the Owner's own forces, and to award separate contracts in connection with other portions of the Project or other Projects at the same site.
- 6.2 The Contractor shall afford the Owner and other Contractors reasonable opportunity for access and storage of materials and equipment, and for the performance of their activities, and shall connect and coordinate their activities with other forces as required by the Contract Documents.

ARTICLE 7: CHANGES IN THE WORK

- 7.1 The Owner, without invalidating the Contract, may order changes in the Work consisting of Additions, Deletions, Modifications or Substitutions, with the Contract Sum and Contract completion date being adjusted accordingly. Such changes in the Work shall be authorized by written Change Order signed by the Professional, as the duly authorized agent, the Contractor and the Owner.

- 7.2 The Contract Sum and Contract Completion Date shall be adjusted only by a fully executed Change Order.
- 7.3 The additional cost, or credit to the Owner resulting from a change in the Work shall be by mutual agreement of the Owner, Contractor and the Architect. In all cases, this cost or credit shall be based on the 'DPE' wages required and the "invoice price" of the materials/equipment needed.
- 7.3.1 "DPE" shall be defined to mean "direct personnel expense". Direct payroll expense includes prevailing wage rates plus a maximum multiplier of 1.35 times DPE. For example, if the prevailing wage rate is \$50/hour, the DPE would be \$67.50/hour (50 x 1.35).
- 7.3.2 "Invoice price" of materials/equipment shall be defined to mean the actual cost of materials and/or equipment that is paid by the Contractor, (or subcontractor), to a material distributor, direct factory vendor, store, material provider, or equipment leasing entity. Rates for equipment that is leased and/or owned by the Contractor or subcontractor(s) shall not exceed those listed in the latest version of the "Means Building Construction Cost Data" publication.
- 7.3.3 In addition to the above, the General Contractor is allowed a fifteen percent (15%) markup for overhead and profit for additional work performed by the General Contractor's own forces. For additional subcontractor work, the Subcontractor is allowed a fifteen (15) percent overhead and profit on change order work above and beyond the direct costs stated previously. To this amount, the General Contractor will be allowed a mark-up not exceeding seven and one half percent (7.5%) on the subcontractors work. These mark-ups shall include all costs including, but not limited to: overhead, profit, bonds, insurance, supervision, etc. No markup is permitted on the work of the subcontractors subcontractor. No additional costs shall be allowed for changes related to the Contractor's onsite superintendent/staff, or project manager, unless a change in the work changes the project duration and is identified by the CPM schedule. There will be no other costs associated with the change order.

ARTICLE 8: TIME

- 8.1 Time limits, if any, are as stated in the Project Manual. By executing the Agreement, the Contractor confirms that the stipulated limits are reasonable, and that the Work will be completed within the anticipated time frame.
- 8.2 If progress of the Work is delayed at any time by changes ordered by the Owner, by labor disputes, fire, unusual delay in deliveries, abnormal adverse weather conditions, unavoidable casualties or other causes beyond the Contractor's control, the Contract Time shall be extended for such reasonable time as the Owner may determine.
- 8.3 Any extension of time beyond the date fixed for completion of the construction and acceptance of any part of the Work called for by the Contract, or the occupancy of the building by the Owner, in whole or in part, previous to the completion shall not be deemed a waiver by the Owner of his right to annul or terminate the Contract for abandonment or delay in the matter provided for, nor relieve the Contractor of full responsibility.

8.4 SUSPENSION AND DEBARMENT

8.4.1 Per Section 6962(d)(14), Title 29, Delaware Code, "Any Contractor who fails to perform a public works contract or complete a public works project within the time schedule established by the Agency in the Invitation To Bid, may be subject to Suspension or Debarment for one or more of the following reasons: a) failure to supply the adequate labor supply ratio for the project; b) inadequate financial resources; or, c) poor performance on the Project."

8.4.2 "Upon such failure for any of the above stated reasons, the Agency that contracted for the public works project may petition the Director of the Office of Management and Budget for Suspension or Debarment of the Contractor. The Agency shall send a copy of the petition to the Contractor within three (3) working days of filing with the Director. If the Director concludes that the petition has merit, the Director shall schedule and hold a hearing to determine whether to suspend the Contractor, debar the Contractor or deny the petition. The Agency shall have the burden of proving, by a preponderance of the evidence, that the Contractor failed to perform or complete the public works project within the time schedule established by the Agency and failed to do so for one or more of the following reasons: a) failure to supply the adequate labor supply ratio for the project; b) inadequate financial resources; or, c) poor performance on the project. Upon a finding in favor of the Agency, the Director may suspend a Contractor from Bidding on any project funded, in whole or in part, with public funds for up to 1 year for a first offense, up to 3 years for a second offense and permanently debar the Contractor for a third offense. The Director shall issue a written decision and shall send a copy to the Contractor and the Agency. Such decision may be appealed to the Superior Court within thirty (30) days for a review on the record."

8.5 RETAINAGE

8.5.1 Per Section 6962(d)(5) a.3, Title 29, Delaware Code: The Agency may at the beginning of each public works project establish a time schedule for the completion of the project. If the project is delayed beyond the completion date due to the Contractor's failure to meet their responsibilities, the Agency may forfeit, at its discretion, all or part of the Contractor's retainage.

8.5.2 This forfeiture of retainage also applies to the timely completion of the punchlist. A punchlist will only be prepared upon the mutual agreement of the Owner, Architect and Contractor. Once the punchlist is prepared, all three parties will by mutual agreement, establish a schedule for its completion. Should completion of the punchlist be delayed beyond the established date due to the Contractor's failure to meet their responsibilities, the Agency may hold permanently, at its discretion, all or part of the Contractor's retainage.

ARTICLE 9: PAYMENTS AND COMPLETION

9.1 APPLICATION FOR PAYMENT

9.1.1 Applications for payment shall be made upon AIA Document G702. There will be a five percent (5%) retainage on all Contractor's monthly invoices until completion of the project. This retainage may become payable upon receipt of all required closeout documentation, provided all other requirements of the Contract Documents have been met.

9.1.2 A date will be fixed for the taking of the monthly account of work done. Upon receipt of Contractor's itemized application for payment, such application will be audited, modified, if found necessary, and approved for the amount. Statement shall be submitted to the Owner.

9.1.3 Section 6516, Title 29 of the Delaware Code annualized interest is not to exceed 12% per annum beginning thirty (30) days after the “presentment” (as opposed to the date) of the invoice.

9.2 PARTIAL PAYMENTS

9.2.1 Any public works Contract executed by any Agency may provide for partial payments at the option of the Owner with respect to materials placed along or upon the sites or stored at secured locations, which are suitable for use in the performance of the contract.

9.2.2 When approved by the agency, partial payment may include the values of tested and acceptable materials of a nonperishable or noncontaminative nature which have been produced or furnished for incorporation as a permanent part of the work yet to be completed, provided acceptable provisions have been made for storage.

9.2.2.1 Any allowance made for materials on hand will not exceed the delivered cost of the materials as verified by invoices furnished by the Contractor, nor will it exceed the contract bid price for the material complete in place.

9.2.3 If requested by the Agency, receipted bills from all Contractors, Subcontractors, and material, men, etc., for the previous payment must accompany each application for payment. Following such a request, no payment will be made until these receipted bills have been received by the Owner.

9.3 SUBSTANTIAL COMPLETION

9.3.1 When the building has been made suitable for occupancy, but still requires small items of miscellaneous work, the Owner will determine the date when the project has been substantially completed.

9.3.2 If, after the Work has been substantially completed, full completion thereof is materially delayed through no fault of the Contractor, and without terminating the Contract, the Owner may make payment of the balance due for the portion of the Work fully completed and accepted. Such payment shall be made under the terms and conditions governing final payment that it shall not constitute a waiver of claims.

9.3.3 On projects where commissioning is included, the commissioning work as defined in the specifications must be complete prior to the issuance of substantial completion.

9.4 FINAL PAYMENT

9.4.1 Final payment, including the five percent (5%) retainage if determined appropriate, shall be made within thirty (30) days after the Work is fully completed and the Contract fully performed and provided that the Contractor has submitted the following closeout documentation (in addition to any other documentation required elsewhere in the Contract Documents):

9.4.1.1 Evidence satisfactory to the Owner that all payrolls, material bills, and other indebtedness connected with the work have been paid,

9.4.1.2 An acceptable RELEASE OF LIENS,

9.4.1.3 Copies of all applicable warranties,

9.4.1.4 As-built drawings,

- 9.4.1.5 Operations and Maintenance Manuals,
- 9.4.1.6 Instruction Manuals,
- 9.4.1.7 Consent of Surety to final payment.
- 9.4.1.8 The Owner reserves the right to retain payments, or parts thereof, for its protection until the foregoing conditions have been complied with, defective work corrected and all unsatisfactory conditions remedied.

ARTICLE 10: PROTECTION OF PERSONS AND PROPERTY

- 10.1 The Contractor shall be responsible for initiating, maintaining, and supervising all safety precautions and programs in connection with the performance of the Contract. The Contractor shall take all reasonable precautions to prevent damage, injury or loss to: workers, persons nearby who may be affected, the Work, materials and equipment to be incorporated, and existing property at the site or adjacent thereto. The Contractor shall give notices and comply with applicable laws ordinances, rules regulations, and lawful orders of public authorities bearing on the safety of persons and property and their protection from injury, damage, or loss. The Contractor shall promptly remedy damage and loss to property at the site caused in whole or in part by the Contractor, a Subcontractor, or anyone directly or indirectly employed by any of them, or by anyone for whose acts they may be liable.
- 10.2 The Contractor shall notify the Owner in the event any existing hazardous material such as lead, PCBs, asbestos, etc. is encountered on the project. The Owner will arrange with a qualified specialist for the identification, testing, removal, handling and protection against exposure or environmental pollution, to comply with applicable regulation laws and ordinances. The Contractor and Architect will not be required to participate in or to perform this operation. Upon completion of this work, the Owner will notify the Contractor and Architect in writing the area has been cleared and approved by the authorities in order for the work to proceed. The Contractor shall attach documentation from the authorities of said approval.
- 10.3 As required in the Hazardous Chemical Information Act of June 1984, all vendors supplying any materials that may be defined as hazardous, must provide Material Safety Data Sheets for those products. Any chemical product should be considered hazardous if it has a warning caution on the label relating to a potential physical or health hazard, if it is known to be present in the work place, and if employees may be exposed under normal conditions or in any foreseeable emergency situation. Material Safety Data Sheets must be provided directly to the Owner along with the shipping slips that include those products.
- 10.4 The Contractor shall certify to the Owner that materials incorporated into the Work are free of all asbestos. This certification may be in the form of Material Safety Data Sheet (MSDS) provided by the product manufacturer for the materials used in construction, as specified or as provided by the Contractor.

ARTICLE 11: INSURANCE AND BONDS

- 11.1 The Contractor shall carry all insurance required by law, such as Unemployment Insurance, etc. The Contractor shall carry such insurance coverage as they desire on their own property such as a field office, storage sheds or other structures erected upon the project site that belong to them and for their own use. The Subcontractors involved with this project shall carry whatever insurance protection they consider necessary to cover the loss of any of their personal property, etc.

- 11.2 Upon being awarded the Contract, the Contractor shall obtain a minimum of two (2) copies of all required insurance certificates called for herein, and submit one (1) copy of each certificate, to the Owner, within 20 days of contract award.
- 11.3 Bodily Injury Liability and Property Damage Liability Insurance shall, in addition to the coverage included herein, include coverage for injury to or destruction of any property arising out of the collapse of or structural injury to any building or structure due to demolition work and evidence of these coverages shall be filed with and approved by the Owner.
- 11.4 The Contractor's Property Damage Liability Insurance shall, in addition to the coverage noted herein, include coverage on all real and personal property in their care, custody and control damaged in any way by the Contractor or their Subcontractors during the entire construction period on this project.
- 11.5 Builders Risk (including Standard Extended Coverage Insurance) on the existing building during the entire construction period, may be provided by the Contractor under this contract. The Owner shall insure the existing building and all of its contents and all this new alteration work under this contract during entire construction period for the full insurable value of the entire work at the site. Note, however, that the Contractor and their Subcontractors shall be responsible for insuring building materials (installed and stored) and their tools and equipment whenever in use on the project, against fire damage, theft, vandalism, etc.
- 11.6 Certificates of the insurance company or companies stating the amount and type of coverage, terms of policies, etc., shall be furnished to the Owner, within 20 days of contract award.
- 11.7 The Contractor shall, at their own expense, (in addition to the above) carry the following forms of insurance:
- 11.7.1 Contractor's Contractual Liability Insurance
- Minimum coverage to be:
- | | | |
|-----------------|---|---|
| Bodily Injury | \$500,000
\$1,000,000
\$1,000,000 | for each person
for each occurrence
aggregate |
| Property Damage | \$500,000
\$1,000,000 | for each occurrence
aggregate |
- 11.7.2 Contractor's Protective Liability Insurance
- Minimum coverage to be:
- | | | |
|-----------------|---|---|
| Bodily Injury | \$500,000
\$1,000,000
\$1,000,000 | for each person
for each occurrence
aggregate |
| Property Damage | \$500,000
\$500,000 | for each occurrence
aggregate |

11.7.3 Automobile Liability Insurance

Minimum coverage to be:

Bodily Injury	\$1,000,000	for each person
	\$1,000,000	for each occurrence
Property Damage	\$500,000	per accident

11.7.4 Prime Contractor's and Subcontractors' policies shall include contingent and contractual liability coverage in the same minimum amounts as 11.7.1 above.

11.7.5 Workmen's Compensation (including Employer's Liability):

11.7.5.1 Minimum Limit on employer's liability to be as required by law.

11.7.5.2 Minimum Limit for all employees working at one site.

11.7.6 Certificates of Insurance must be filed with the Owner guaranteeing fifteen (15) days prior notice of cancellation, non-renewal, or any change in coverages and limits of liability shown as included on certificates.

11.7.7 Social Security Liability

11.7.7.1 With respect to all persons at any time employed by or on the payroll of the Contractor or performing any work for or on their behalf, or in connection with or arising out of the Contractor's business, the Contractor shall accept full and exclusive liability for the payment of any and all contributions or taxes or unemployment insurance, or old age retirement benefits, pensions or annuities now or hereafter imposed by the Government of the United States and the State or political subdivision thereof, whether the same be measured by wages, salaries or other remuneration paid to such persons or otherwise.

11.7.7.2 Upon request, the Contractor shall furnish Owner such information on payrolls or employment records as may be necessary to enable it to fully comply with the law imposing the aforesaid contributions or taxes.

11.7.7.3 If the Owner is required by law to and does pay any and/or all of the aforesaid contributions or taxes, the Contractor shall forthwith reimburse the Owner for the entire amount so paid by the Owner.

ARTICLE 12: UNCOVERING AND CORRECTION OF WORK

12.1 The Contractor shall promptly correct Work rejected by the Owner or failing to conform to the requirements of the Contract Documents, whether observed before or after Substantial Completion and whether or not fabricated, installed or completed, and shall correct any Work found to be not in accordance with the requirements of the Contract Documents within a period of two years from the date of Substantial Completion, or by terms of an applicable special warranty required by the Contract Documents. The provisions of this Article apply to work done by Subcontractors as well as to Work done by direct employees of the Contractor.

12.2 At any time during the progress of the work, or in any case where the nature of the defects shall be such that it is not expedient to have them corrected, the Owner, at their option, shall have the right to deduct such sum, or sums, of money from the amount of the contract as they consider justified to adjust the difference in value between the defective work and that required under contract including any damage to the structure.

ARTICLE 13: MISCELLANEOUS PROVISIONS

13.1 CUTTING AND PATCHING

- 13.1.1 The Contractor shall be responsible for all cutting and patching. The Contractor shall coordinate the work of the various trades involved.

13.2 DIMENSIONS

- 13.2.1 All dimensions shown shall be verified by the Contractor by actual measurements at the project site. Any discrepancies between the drawings and specifications and the existing conditions shall be referred to the Owner for adjustment before any work affected thereby has been performed.

13.3 LABORATORY TESTS

- 13.3.1 Any specified laboratory tests of material and finished articles to be incorporated in the work shall be made by bureaus, laboratories or agencies approved by the Owner and reports of such tests shall be submitted to the Owner. The cost of the testing shall be paid for by the Contractor.

- 13.3.2 The Contractor shall furnish all sample materials required for these tests and shall deliver same without charge to the testing laboratory or other designated agency when and where directed by the Owner.

13.4 ARCHAEOLOGICAL EVIDENCE

- 13.4.1 Whenever, in the course of construction, any archaeological evidence is encountered on the surface or below the surface of the ground, the Contractor shall notify the authorities of the State Historic Preservation Office and suspend work in the immediate area for a reasonable time to permit those authorities, or persons designated by them, to examine the area and ensure the proper removal of the archaeological evidence for suitable preservation by the Division of Historical and Cultural Affairs.

13.5 GLASS REPLACEMENT AND CLEANING

- 13.5.1 The General Contractor shall replace without expense to the Owner all glass broken during the construction of the project. If job conditions warrant, at completion of the job the General Contractor shall have all glass cleaned and polished.

13.6 WARRANTY

- 13.6.1 For a period of two (2) years from the date of substantial completion, as evidenced by the date of final acceptance of the work, the contractor warrants that work performed under this contract conforms to the contract requirements and is free of any defect of equipment, material or workmanship performed by the contractor or any of his subcontractors or suppliers. However, manufacturer's warranties and guarantees, if for a period longer than two (2) years, shall take precedence over the above warranties. The contractor shall remedy, at his own expense, any such failure to conform or any such defect. The protection of this warranty shall be included in the Contractor's Performance Bond.

ARTICLE 14: TERMINATION OF CONTRACT

- 14.1 If the Contractor defaults or persistently fails or neglects to carry out the Work in accordance with the Contract Documents or fails to perform a provision of the Contract, the Owner, after seven days written notice to the Contractor, may make good such deficiencies and may deduct the cost thereof from the payment then or thereafter due the Contractor. Alternatively, at the Owner's option, and the Owner may terminate the Contract and take possession of the site and of all materials, equipment, tools, and machinery thereon owned by the Contractor and may finish the Work by whatever method the Owner may deem expedient. If the costs of finishing the Work exceed any unpaid compensation due the Contractor, the Contractor shall pay the difference to the Owner.
- 14.2 "If the continuation of this Agreement is contingent upon the appropriation of adequate state, or federal funds, this Agreement may be terminated on the date beginning on the first fiscal year for which funds are not appropriated or at the exhaustion of the appropriation. The Owner may terminate this Agreement by providing written notice to the parties of such non-appropriation. All payment obligations of the Owner will cease upon the date of termination. Notwithstanding the foregoing, the Owner agrees that it will use its best efforts to obtain approval of necessary funds to continue the Agreement by taking appropriate action to request adequate funds to continue the Agreement."

END OF GENERAL REQUIREMENTS

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EMPLOYEE DRUG TESTING REPORT FORM

Period Ending: _____

4104 Regulations for the Drug Testing of Contractor and Subcontractor Employees Working on Large Public Works Projects requires that Contractors and Subcontractors who work on Large Public Works Contracts funded all or in part with public funds maintain testing data that includes but is not limited to the data elements below.

Project Number: _____

Project Name: _____

Contractor/Subcontractor Name: _____

Contractor/Subcontractor Address: _____

Number of employees who worked on the jobsite during the report period: _____

Number of employees subject to random testing during the report period: _____

Number of Negative Results _____ Number of Positive Results _____

Action taken on employee(s) in response to a failed or positive random test:

Date: _____

This form is not required to be submitted to the Owner. Included as a reference to show information required to be maintained by the Contractor. The Owner shall have the right to periodically audit all Contractor and Subcontractor test results at the Contractor's or Subcontractor's offices (or by other means to make the data available for inspection by the Owner).

EMPLOYEE DRUG TESTING

REPORT OF POSITIVE RESULTS

4104 Regulations for the Drug Testing of Contractor and Subcontractor Employees Working on Large Public Works Projects requires that Contractors and Subcontractors who work on Large Public Works Contracts funded all or in part with public funds to notify the Owner in writing of a positive random drug test.

Project Number: _____

Project Name: _____

Contractor/Subcontractor Name: _____

Contractor/Subcontractor Address: _____

Name of employee with positive test result: _____

Last 4 digits of employee SSN: _____

Date test results received: _____

Action taken on employee in response to a positive test result:

Authorized Representative of Contractor/Subcontractor: _____
(typed or printed)

Authorized Representative of Contractor/Subcontractor: _____
(signature)

Date: _____

This form shall be sent by mail to the Owner within 24 hours of receipt of test results.

Enclose this test results form in a sealed envelope with the notation "Drug Testing Form – DO NOT OPEN" on the face thereof and place in a separate mailing envelope.

STATE OF DELAWARE
DELAWARE ARMY NATIONAL GUARD
Contract No. 2021-03
**AFFIDAVIT OF
CRAFT TRAINING COMPLIANCE**

We, the contractor, hereby certify that we and all applicable subcontractors will abide by the contractor and subcontractor craft training requirements outlined below for the duration of the contract. Craft training must be provided by a contractor and/or subcontractor for each craft on a project for which there are Delaware Department of Labor approved and registered training programs. A list of crafts for which there are approved and registered training programs is maintained by the Delaware Department of Labor and can be found at https://det.delawareworks.com/apprenticeship/documents/Apprenticeship_Occupation_List_for_29Del6962_Compliance.pdf. If you have questions regarding craft training programs, please submit them in writing to the Delaware Department of Labor at: apprenticeship@delaware.gov. The Craft Training Compliance Affidavit must be submitted prior to contract execution.

In accordance with Title 29, Chapter 69, Section 6962(c)(13) of the Delaware Code, contractors and subcontractors must provide craft training for journeyman and apprentice levels if all of the following apply:

- A. A project meets the prevailing wage requirement under Title 29, Chapter 69, Section 6960 of the Delaware Code.
- B. The contractor employs 10 or more total employees.
- C. The project is not a federal highway project

Failure to provide required craft training on the project may subject the successful contractor and/or subcontractor(s) to penalties as outlined in Title 29, Chapter 69, Section 6962(c)(13) of the Delaware Code.

Craft(s)

Contractor Name:

Contractor Address:

Contractor Program

Registration Number(s)

On this line also indicate whether DE, Other State (identify) or US Registration Number

Or

☐ **Craft Training requirements are not applicable because:** _____

Authorized Representative (typed or printed):

Authorized Representative (signature):

Title:

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

My Commission expires _____. NOTARY PUBLIC _____.

THIS PAGE MUST BE SIGNED AND NOTARIZED TO BE CONSIDERED.

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SECTION 01 11 00 – SUMMARY OF WORK

PART 1 - GENERAL

1.1 SUMMARY OF WORK

- A. Work involves the repair and maintenance of latrine repair/renovation, interior finishes, HVAC systems, fire Suppression, new water and fire service line installation, CO/NX detection upgrades, electrical panel replacement, and electrical lighting replacement.

1.2 WORK RESTRICTIONS

- A. Work Restrictions, General: Comply with restrictions on construction operations.
 - 1. Comply with limitations on use of public streets and with other requirements of authorities having jurisdiction.
- B. On-Site Work Hours: Limit work to the site and/or existing building to normal business working hours of 7:00 a.m. to 6:00 p.m., Monday through Friday, unless otherwise indicated.
 - 1. Weekend Hours: Weekend work shall not be allowed unless preapproved by the Owner.
 - 2. Early Morning Hours: Early morning hours are not allowed unless required for utility shut downs.
 - 3. Holidays: No work shall occur on State or Federally recognized holidays.
- C. Noise, Vibration, and Odors: Coordinate operations that may result in any level of noise and vibration, odors, or other disruption to the occupancy or use of adjacent occupied areas, the buildings and adjacent properties with the Owner.
 - 1. Notify Architect and Owner not less than seven (7) days in advance of proposed disruptive operations.
 - 2. Obtain Architect's and/or Owner's written permission before proceeding with disruptive operations.
- D. Nonsmoking Campus and Building: Smoking is prohibited within the boundaries of all state workplaces including all buildings, facilities, indoor and outdoor spaces and all the surrounding grounds owned by the State. This policy also includes but is not limited to parking lots, walkways, State vehicles and private vehicles parked or operated on State workplace property.

1.3 FIELD ENGINEERING

- A. Provide field engineering services; establish grades, lines, and levels, by use of recognized engineering survey practices.
- B. Control datum for survey is that shown on drawings. Locate and protect control and reference points.

1.4 SCHEDULE

- A. The following is the required schedule for this work:
1. Bids Due: 2:30 p.m. sharp, local time on **TBD, 2021** the Security Officers desk in the main lobby of the Biden National Guard/Reserve Center, 1 Vavala Way, New Castle, Delaware, 19720.
 2. Notice of Building Contract Award: Within thirty (30) days of receipt and acceptance of qualified low bid.
 3. Purchase Order Issuance: The issuance of a State of Delaware purchase order is contingent upon the successful Contractor submitting bonds on State-approved forms, signed contracts and insurance certificates to the State of Delaware within twenty (20) days of Notice of Award. A purchase order will be issued in approximately thirty (30) days after these items have been submitted to the State of Delaware.
 4. On-Site Mobilization: Upon receipt of State of Delaware purchase order and issuance of the Notice to Proceed. Anticipated **TBD, 2021**.
 - a. Mobilization payment shall not exceed 10% of the total contract value. 60% of the mobilization payments shall be payable for initial mobilization, and the remaining 40% shall be payable upon final demobilization.
 5. Substantial Completion: The work shall be completed by **TBD 2021**.
 6. Completion of Punch List: 21 calendar days from date of substantial completion.

1.5 CONSTRUCTION PROGRESS DOCUMENTATION

- A. Contractor's Construction Schedule: Submit two opaque copies of initial schedule, large enough to show entire schedule for entire construction period.
1. Bar-Chart Schedule: Submit horizontal bar-chart-type construction schedule within five days of date established for commencement of the Work.
 2. Preparation: Indicate each significant construction activity separately. Identify first workday of each week with a continuous vertical line. Outline significant construction activities.
 3. Time Frame: Extend schedule from date established for commencement of the Work to date of substantial completion.
 - a. Contract completion date shall not be changed unless specifically authorized by Change Order.
 4. Contractor's Construction Schedule Updating: At bi-weekly intervals, update schedule to reflect actual construction progress and activities. Issue schedule at each regularly scheduled progress meeting.
 - a. Revise schedule immediately after each meeting or other activity where revisions have been recognized or made.
- B. Field Condition Reports: Submit two copies at time of discovery of differing conditions.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 01 14 00 – WORK RESTRICTIONS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 USE OF PREMISES

- A. Use of Site: Limit use of premises to work in areas indicated. Do not disturb portions of site beyond areas in which the Work is indicated.
 - 1. Limits: Confine construction operations to the limits indicated on the drawings.
 - 2. Parking: Parking shall be restricted to the paved staging area as shown on the Erosion and Sediment Control Plan. Parking along roadways shall not be permitted at any time.
 - 3. Dumpster: Dumpster shall be located in the staging and stockpiling area identified on the Sediment & Stormwater Management Plans. The dumpster shall be covered and secured to avoid windblown debris. Dumpster shall be managed on a regular basis in order to avoid an overflowing dumpster. Restoration of grounds disturbed by the dumpster will be required upon completion of the Project. “No Trespassing” signs shall be placed on the dumpster.
 - 4. Access: Access to the construction site shall be from River Road.
 - 5. Storage: Material storage and stockpiles shall be coordinated with the Owners.
 - 6. Public Roadways, Driveways, Entrances and Public Sidewalks: Keep public roadways, driveways, entrances and public sidewalks serving premises clear and available to the Public, Owner, Owner's employees and emergency vehicles at all times. Do not use these areas for parking or storage of materials.
 - a. Schedule deliveries to minimize use of roadways, driveways, sidewalks and entrances.
 - b. The Owner will not sign for any deliveries at any time.
 - c. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on-site.
 - 7. Access to potable water will not be provided.
 - 8. Access to restrooms facilities will not be provided.
- B. Use of Existing Building: No building located on site.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

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SECTION 01 26 00 – CONTRACT MODIFICATION PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section specifies administrative and procedural requirements for handling and processing Contract modifications.
- B. Related Sections include the following:
 - 1. Division 1 Section “Submittal Procedures for” administrative procedures for handling requests for substitutions made after Contract award.

1.3 MINOR CHANGES IN THE WORK

- A. Architect will issue supplemental instructions authorizing Minor Changes in the Work, not involving adjustment to the Contract Sum or the Contract Time, on AIA Document G710, "Architect's Supplemental Instructions.

1.4 PROPOSAL REQUESTS

- A. Owner-Initiated Proposal Requests: Architect will issue a detailed description of proposed changes in the Work that may require adjustment to the Contract Sum or the Contract Time. If necessary, the description will include supplemental or revised Drawings and Specifications.
 - 1. Proposal Requests issued by Architect are for information only. Do not consider them instructions either to stop work in progress or to execute the proposed change.
 - 2. Within time specified in Proposal Request after receipt of Proposal Request, submit a quotation estimating cost adjustments to the Contract Sum and the Contract Time necessary to execute the change.
 - a. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
 - b. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
 - c. Include an updated Contractor's Construction Schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
- B. Contractor-Initiated Proposals: If latent or unforeseen conditions require modifications to the Contract, Contractor may propose changes by submitting a request for a change.

1. Include a statement outlining reasons for the change and the effect of the change on the Work. Provide a complete description of the proposed change. Indicate the effect of the proposed change on the Contract Sum and the Contract Time.
2. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
3. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
4. Include an updated Contractor's Construction Schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
5. Comply with requirements in Division 1 Section "Product Requirements" if the proposed change requires substitution of one product or system for product or system specified.

1.5 CHANGE ORDER PROCEDURES

- A. On Owner's approval of a Proposal Request, Architect will issue a Change Order for signatures of Owner and Contractor on AIA Document G701.

1.6 CONSTRUCTION CHANGE DIRECTIVE

- A. Construction Change Directive: Architect may issue a Construction Change Directive on AIA Document G714. Construction Change Directive instructs Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order.
 1. Construction Change Directive contains a complete description of change in the Work. It also designates method to be followed to determine change in the Contract Sum or the Contract Time.
- B. Documentation: Maintain detailed records on a time and material basis of work required by the Construction Change Directive.
 1. After completion of change, submit an itemized account and supporting data necessary to substantiate cost and time adjustments to the Contract.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 01 29 00 – PAYMENT PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section specifies administrative and procedural requirements necessary to prepare and process Applications for Payment.
- B. Related Sections include the following:
 - 1. Division 1 Section "Contract Modification Procedures" for administrative procedures for handling changes to the Contract.
 - 2. Division 1 Section "Construction Progress Documentation" for administrative requirements governing preparation and submittal of Contractor's Construction Schedule.

1.3 DEFINITIONS

- A. Schedule of Values: A statement furnished by Contractor allocating portions of the Contract Sum to various portions of the Work and used as the basis for reviewing Contractor's Applications for Payment.

1.4 SCHEDULE OF VALUES

- A. Coordination: Coordinate preparation of the Schedule of Values with preparation of Contractor's Construction Schedule.
 - 1. Correlate line items in the Schedule of Values with other required administrative forms and schedules, including the following:
 - a. Application for Payment forms with Continuation Sheets.
 - 2. Submit the Schedule of Values to Architect at earliest possible date but no later than seven days before the date scheduled for submittal of initial Applications for Payment.
- B. Format and Content: Use the Project Manual table of contents as a guide to establish line items for the Schedule of Values. Provide at least one line item for each Specification Section.
 - 1. Identification: Include the following Project identification on the Schedule of Values:
 - a. Project name and location.
 - b. Name of Architect.
 - c. Architect's project number.
 - d. Contractor's name and address.
 - e. Date of submittal.

2. Arrange the Schedule of Values in tabular form with separate columns to indicate the following for each item listed:
 - a. Related Specification Section or Division.
 - b. Description of the Work.
 - c. Change Orders (numbers) that affect value.
 - d. Dollar value.
 - 1) Percentage of the Contract Sum to nearest one-hundredth percent, adjusted to total 100 percent.
3. Provide a breakdown of the Contract Sum in enough detail to facilitate continued evaluation of Applications for Payment and progress reports. Coordinate with the Project Manual table of contents. Provide several line items for principal subcontract amounts, where appropriate.
4. Round amounts to nearest whole dollar; total shall equal the Contract Sum.
5. Provide a separate line item in the Schedule of Values for each part of the Work where Applications for Payment may include materials or equipment purchased or fabricated and stored, but not yet installed.
 - a. Differentiate between items stored on-site and items stored off-site. Include evidence of insurance or bonded warehousing if required.
6. Provide separate line items in the Schedule of Values for initial cost of materials, for each subsequent stage of completion, and for total installed value of that part of the Work.
7. Each item in the Schedule of Values and Applications for Payment shall be complete. Include total cost and proportionate share of general overhead and profit for each item.
 - a. Temporary facilities and other major cost items that are not direct cost of actual work-in-place may be shown either as separate line items in the Schedule of Values or distributed as general overhead expense, at Contractor's option.
8. Schedule Updating: Update and resubmit the Schedule of Values before the next Applications for Payment when Change Orders or Construction Change Directives result in a change in the Contract Sum.

1.5 APPLICATIONS FOR PAYMENT

- A. Each Application for Payment shall be consistent with previous applications and payments as certified by Architect and paid for by Owner.
 1. Initial Application for Payment, Application for Payment at time of Substantial Completion, and final Application for Payment involve additional requirements.
- B. Payment Application Times: The date for each progress payment is indicated in the Agreement between Owner and Contractor. The period of construction Work covered by each Application for Payment is the period indicated in the Agreement.
- C. Payment Application Forms: Use AIA Document G702 and AIA Document G703 Continuation Sheets as form for Applications for Payment.

- D. Application Preparation: Complete every entry on form. Notarize and execute by a person authorized to sign legal documents on behalf of Contractor. Architect will return incomplete applications without action.
1. Entries shall match data on the Schedule of Values and Contractor's Construction Schedule. Use updated schedules if revisions were made.
 2. Include amounts of Change Orders and Construction Change Directives issued before last day of construction period covered by application.
- E. Transmittal: Submit 3 signed and notarized original copies of each Application for Payment to Architect by a method ensuring receipt within 24 hours. One copy shall include waivers of lien and similar attachments if required.
1. Transmit each copy with a transmittal form listing attachments and recording appropriate information about application.
- F. Initial Application for Payment: Administrative actions and submittals that must precede or coincide with submittal of first Application for Payment include the following:
1. List of subcontractors.
 2. Schedule of Values.
 3. Contractor's Construction Schedule (preliminary if not final).
 4. List of Contractor's staff assignments (Project Superintendent specifically).
 5. Copies of building permits.
 6. Certificates of insurance and insurance policies.
 7. Performance and payment bonds.
- G. Application for Payment at Substantial Completion: After issuing the Certificate of Substantial Completion, submit an Application for Payment showing 100 percent completion for portion of the Work claimed as substantially complete.
1. Include documentation supporting claim that the Work is substantially complete and a statement showing an accounting of changes to the Contract Sum.
- H. Final Payment Application: Submit final Application for Payment with releases and supporting documentation not previously submitted and accepted, including, but not limited, to the following:
1. Updated final statement, accounting for final changes to the Contract Sum.
 2. AIA Document G706, "Contractor's Affidavit of Payment of Debts and Claims."
 3. AIA Document G706A, "Contractor's Affidavit of Release of Liens."
 4. AIA Document G707, "Consent of Surety to Final Payment."

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

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SECTION 01 31 00 – PROJECT MANAGEMENT AND COORDINATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes administrative provisions for coordinating construction operations on Project including, but not limited to, the following:
 - 1. General project coordination procedures.
 - 2. Administrative and supervisory personnel.
 - 3. Project meetings.
- B. Related Sections: The following Sections contain requirements that relate to this Section:
 - 1. Division 1 Section "Construction Progress Documentation" for preparing and submitting the Contractor's Construction Schedule.
 - 2. Division 1 Section "Closeout Procedures" for coordinating Contract closeout.

1.3 COORDINATION

- A. Coordination: Coordinate construction operations included in various Sections of the Specifications to ensure efficient and orderly installation of each part of the Work. Coordinate construction operations, included in different Sections that depend on each other for proper installation, connection, and operation.
 - 1. Schedule construction operations in sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
 - 2. Coordinate installation of different components with subcontractors to ensure maximum accessibility for required maintenance, service, and repair.
 - 3. Make adequate provisions to accommodate items scheduled for later installation.
- B. If necessary, prepare memoranda for distribution to each party involved, outlining special procedures required for coordination. Include such items as required notices, reports, and list of attendees at meetings.
 - 1. Prepare similar memoranda for Owner if coordination of their Work is required.
- C. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities and activities of other contractors to avoid conflicts and to ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:
 - 1. Preparation of Contractor's Construction Schedule.
 - 2. Preparation of the Schedule of Values.

3. Installation and removal of temporary facilities and controls.
4. Delivery and processing of submittals.
5. Progress meetings.
6. Preinstallation conferences.
7. Project closeout activities.

1.4 SUBMITTALS

- A. Staff Names: Within 15 days of notice to proceed, submit a list of principal staff assignments, including superintendent and other personnel in attendance at Project site. Identify individuals and their duties and responsibilities; list addresses and telephone numbers, including home and office telephone numbers. Provide names, addresses, and telephone numbers of individuals assigned as standbys in the absence of individuals assigned to Project.

1.5 PROJECT MEETINGS

- A. General: The Architect will schedule and conduct meetings and conferences at Project site, unless otherwise indicated.
 1. Attendees: Inform participants and others involved, and individuals whose presence is required, of date and time of each meeting.
 2. Minutes: The Architect will record significant discussions and agreements achieved. The minutes will be distributed to everyone concerned, including Owner, within 7 days of the meeting.
- B. Preconstruction Conference: A preconstruction conference will be scheduled before the start of construction, at a time convenient to the Owner and Contractor, but no later than 15 days after execution of the Agreement. The conference will be held at the Project. The meeting will be conducted to review responsibilities and personnel assignments.
 1. Attendees: Authorized representatives of Owner, Architect, and their consultants; Contractor and its superintendent; major subcontractors; and other concerned parties shall attend the conference. All participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
 2. Agenda: Items of significance that could affect progress will be discussed, including the following:
 - a. Tentative construction schedule.
 - b. Designation of responsible personnel.
 - c. Procedures for processing field decisions and Change Orders.
 - d. Procedures for processing Applications for Payment.
 - e. Submittal procedures.
 - f. Preparation of Record Documents.
 - g. Use of the premises.
 - h. Responsibility for temporary facilities and controls.
 - i. Parking availability.
 - j. Storage areas.
 - k. Equipment deliveries and priorities.
 - l. Progress cleaning.
 - m. Working hours.

- C. **Progress Meetings:** Progress meetings will be conducted monthly. Coordinate dates of meetings with preparation of payment requests.
1. **Attendees:** In addition to representatives of Owner and Architect, each contractor, subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
 2. **Agenda:** Review and correct or approve minutes of previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.
 - a. **Contractor's Construction Schedule:** Review progress since the last meeting. Determine whether each activity is on time, ahead of schedule, or behind schedule, in relation to Contractor's Construction Schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.
 - b. Review present and future needs of each entity present, including the following:
 - 1) Deliveries.
 - 2) Off-site fabrication.
 - 3) Access.
 - 4) Site utilization.
 - 5) Temporary facilities and controls.
 - 6) Work hours.
 - 7) Progress cleaning.
 - 8) Quality and work standards.
 3. **Reporting:** The Architect will distribute minutes of the meeting to each party present and to parties who should have been present. A brief summary, in narrative form, of progress since the previous meeting and report will be included.
 - a. **Schedule Updating:** Revise Contractor's Construction Schedule after each progress meeting where revisions to the schedule have been made or recognized. The revised schedule will be issued concurrently with the report of each meeting.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 01 31 50 – FIELD ENGINEERING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes administrative provisions and procedural requirements for Field Engineering services, including, but not necessarily limited to the following:
 - 1. Land Survey Work.
 - 2. Engineering services.

1.3 SUBMITTALS

- A. Certificates: Submit a certificate signed by the Land Surveyor certifying that the location and elevation of improvements comply with the Contract Documents.
- B. Project Record Documents: Submit a record of Work performed and record survey data as required under provisions of Sections "Submittals" and "Project Closeout".

1.4 QUALITY ASSURANCE

- A. Surveyor: Engage a Professional Land Surveyor, licensed in the State of Delaware, to perform required surveying services to ensure that grades, lines, levels, and locations of the Work are in compliance with the Contract Documents.
- B. Engineer: Engage a Professional Engineer of the discipline required, registered in the State of Delaware, to perform required engineering services.

1.5 EXAMINATION

- A. The Owner will identify existing control points and property line corner stakes.
- B. Verify layout information shown on the Drawings, in relation to the property survey and existing benchmarks before proceeding to layout the Work. Locate and protect existing benchmarks and control points. Preserve permanent reference points during construction.
 - 1. Do not change or relocate benchmarks or control points without prior written approval. Promptly report lost or destroyed reference points, or requirements to relocate reference points because of necessary changes in grades or locations.
 - 2. Promptly replace lost or destroyed Project control points. Base replacements on the original survey control points.
- C. Establish and maintain a minimum of two permanent benchmarks on the site, referenced to data established by survey control points.

1. Record benchmark locations, with horizontal and vertical data, on Project Record Documents.
- D. Existing utilities and equipment: The existence and location of underground and other utilities and construction indicated as existing are not guaranteed. Before beginning sitework, investigate and verify the existence and location of underground utilities and other construction.

1.6 PERFORMANCE

- A. Working from lines and levels established by the property survey, establish benchmarks and markers to set lines and levels at each story of construction and elsewhere as needed to properly locate each element of the Project. Calculate and measure required dimensions within indicated or recognized tolerances. Do not scale Drawings to determine dimensions.
 1. Advise entities engaged in construction activities, of marked lines and levels provided for their use.
 2. As construction proceeds, check every major element for line, level and plumb.
- B. Surveyor's Log: Maintain a surveyor's log of control and other survey Work. Make this log available for reference.
 1. Record deviations from required lines and levels and advise the Architect when deviations that exceed indicated or recognized tolerances are detected. On Project Record Drawings, record deviations that are accepted and not corrected.
 2. On completion of foundation walls, major site improvements, and other Work requiring field engineering services, prepare a certified survey showing dimensions, locations, angles and elevations of construction and sitework.
- C. Site Improvements: Locate and lay out site improvements, including pavements, stakes for grading, fill and topsoil placement, utility slopes and invert elevations by instrumentation and similar appropriate means.
- D. Building Lines and Levels: Locate and lay out batter boards for structures, building foundations, column grids and locations, floor levels and control lines and levels required for mechanical and electrical work.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 01 32 00 – CONSTRUCTION PROGRESS DOCUMENTATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for documenting the progress of construction during performance of the Work, including the following:
 - 1. Contractor's Construction Schedule.
 - 2. Field condition reports.
 - 3. Special reports.
- B. Related Sections include the following:
 - 1. Division 1 Section "Payment Procedures" for submitting the Schedule of Values.
 - 2. Division 1 Section "Project Management and Coordination" for submitting and distributing meeting and conference minutes.

1.3 DEFINITIONS

- A. Activity: A discrete part of a project that can be identified for planning, scheduling, monitoring, and controlling the construction project. Activities included in a construction schedule consume time and resources.
 - 1. Critical activities are activities on the critical path. They must start and finish on the planned early start and finish times.
- B. CPM: Critical path method, which is a method of planning and scheduling a construction project where activities are arranged based on activity relationships. Network calculations determine when activities can be performed and the critical path of Project.
- C. Critical Path: The longest connected chain of interdependent activities through the network schedule that establishes the minimum overall Project duration and contains no float.
- D. Event: The starting or ending point of an activity.
- E. Major Area: A story of construction, a separate building, or a similar significant construction element.
- F. Milestone: A key or critical point in time for reference or measurement.

1.4 SUBMITTALS

- A. Preliminary Construction Schedule: Submit two opaque copies.
- B. Contractor's Construction Schedule: Submit two opaque copies of initial schedule, large enough to show entire schedule for entire construction period.
- C. Field Condition Reports: Submit two copies at time of discovery of differing conditions.
- D. Special Reports: Submit two copies at time of unusual event.

1.5 COORDINATION

- A. Coordinate preparation and processing of schedules and reports with performance of construction activities and with scheduling and reporting of separate contractors.
- B. Coordinate Contractor's Construction Schedule with the Schedule of Values, list of subcontracts, Submittals Schedule, progress reports, payment requests, and other required schedules and reports.
 - 1. Secure time commitments for performing critical elements of the Work from parties involved.
 - 2. Coordinate each construction activity in the network with other activities and schedule them in proper sequence.

PART 2 - PRODUCTS

2.1 CONTRACTOR'S CONSTRUCTION SCHEDULE, GENERAL

- A. Procedures: Comply with procedures contained in AGC's "Construction Planning & Scheduling."
- B. Time Frame: Extend schedule from date established for commencement of the Work to date of Substantial Completion.
 - 1. Contract completion date shall not be changed by submission of a schedule that shows an early completion date, unless specifically authorized by Change Order.
- C. Activities: Treat each separate area as a separate numbered activity for each principal element of the Work. Comply with the following:
 - 1. Activity Duration: Define activities so no activity is longer than 20 days, unless specifically allowed by Architect.
 - 2. Submittal Review Time: Include review and resubmittal times indicated in Division 1 Section "Submittal Procedures" in schedule. Coordinate submittal review times in Contractor's Construction Schedule with Submittals Schedule.
 - 3. Substantial Completion: Indicate completion in advance of date established for Substantial Completion, and allow time for Architect's administrative procedures necessary for certification of Substantial Completion.

- D. Constraints: Include constraints and work restrictions indicated in the Contract Documents and as follows in schedule, and show how the sequence of the Work is affected.
 - 1. Work Restrictions: Show the effect of the following items on the schedule:
 - a. Coordination with existing construction.
 - b. Use of premises restrictions.
 - c. Provisions for future construction.
 - d. Seasonal variations.
 - e. Environmental control.
 - 2. Work Stages: Indicate important stages of construction for each major portion of the Work, including, but not limited to, the following:
 - a. Mockups.
 - b. Fabrication.
 - c. Deliveries.
 - d. Installation.
- E. Milestones: Include milestones indicated in the Contract Documents in schedule, including, but not limited to, the Notice to Proceed, Substantial Completion, and Final Completion.
- F. Contract Modifications: For each proposed contract modification and concurrent with its submission, prepare a time-impact analysis using fragnets to demonstrate the effect of the proposed change on the overall project schedule.

2.2 CONSTRUCTION SCHEDULE

- A. Bar-Chart Schedule: Submit horizontal bar-chart-type construction schedule within five days of date established for commencement of the Work.
- B. Preparation: Indicate each significant construction activity separately. Identify first workday of each week with a continuous vertical line. Outline significant construction activities.

2.3 REPORTS

- A. Daily Construction Reports: Prepare a daily construction report recording the following information concerning events at Project site:
 - 1. List of subcontractors at Project site.
 - 2. List of separate contractors at Project site.
 - 3. Approximate count of personnel at Project site.
 - 4. Equipment at Project site.
 - 5. Material deliveries.
 - 6. High and low temperatures and general weather conditions.
 - 7. Accidents.
 - 8. Meetings and significant decisions.
 - 9. Unusual events (refer to special reports).
 - 10. Stoppages, delays, shortages, and losses.

11. Emergency procedures.
12. Orders and requests of authorities having jurisdiction.
13. Change Orders received and implemented.
14. Construction Change Directives received and implemented.
15. Substantial Completions authorized.

- B. Field Condition Reports: Immediately on discovery of a difference between field conditions and the Contract Documents, prepare and submit a detailed report. Submit with a request for interpretation. Include a detailed description of the differing conditions, together with recommendations for changing the Contract Documents.

2.4 SPECIAL REPORTS

- A. General: Submit special reports directly to Owner within one day of an occurrence. Distribute copies of report to parties affected by the occurrence.
- B. Reporting Unusual Events: When an event of an unusual and significant nature occurs at Project site, whether or not related directly to the Work, prepare and submit a special report. List chain of events, persons participating, response by Contractor's personnel, evaluation of results or effects, and similar pertinent information. Advise Owner in advance when these events are known or predictable.

PART 3 - EXECUTION

3.1 CONTRACTOR'S CONSTRUCTION SCHEDULE

- A. Contractor's Construction Schedule Updating: At bi-weekly intervals, update schedule to reflect actual construction progress and activities. Issue schedule at each regularly scheduled progress meeting.
1. Revise schedule immediately after each meeting or other activity where revisions have been recognized or made. Issue updated schedule concurrently with the report of each such meeting.
 2. As the Work progresses, indicate Actual Completion percentage for each activity.
- B. Distribution: Distribute copies of approved schedule to Architect, Owner, separate contractors, and other parties identified by Contractor with a need-to-know schedule responsibility.

END OF SECTION

SECTION 01 33 00 – SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for submitting Shop Drawings, Product Data, Samples, and other submittals.
- B. Related Sections include the following:
 - 1. Division 1 Section "Payment Procedures" for submitting Applications for Payment and the Schedule of Values.
 - 2. Division 1 Section "Project Management and Coordination" for submitting and distributing meeting and conference minutes and for submitting Coordination Drawings.
 - 3. Division 1 Section "Construction Progress Documentation" for submitting schedules and reports, including Contractor's Construction Schedule and the Submittals Schedule.
 - 4. Division 1 Section "Quality Requirements" for submitting test and inspection reports and for mockup requirements.
 - 5. Division 1 Section "Closeout Procedures" for submitting warranties.
 - 6. Division 1 Section "Project Record Documents" for submitting Record Drawings, Record Specifications, and Record Product Data.
 - 7. Division 1 Section "Operation and Maintenance Data" for submitting operation and maintenance manuals.

1.3 DEFINITIONS

- A. Action Submittals: Written and graphic information that requires Architect's responsive action.
- B. Informational Submittals: Written information that does not require Architect's responsive action. Submittals may be rejected for not complying with requirements.

1.4 SUBMITTAL PROCEDURES

- A. General: Electronic copies of CAD Drawings of the Contract Drawings will be provided by Architect for Contractor's use in preparing submittals. The Contractor will be responsible for field verifying existing conditions.
- 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 reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.
- C. Processing Time: Allow enough time for submittal review, including time for resubmittals, as follows. Time for review shall commence on Architect's receipt of submittal. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing, including resubmittals.
1. Initial Review: Allow 15 days for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required. Architect will advise Contractor when a submittal being processed must be delayed for coordination.
 2. Intermediate Review: If intermediate submittal is necessary, process it in same manner as initial submittal.
 3. Resubmittal Review: Allow 15 days for review of each resubmittal.
 4. Sequential Review: Where sequential review of submittals by Architect's consultants, Owner, or other parties is indicated, allow 21 days for initial review of each submittal.
- D. Identification: 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 6 by 8 inches (150 by 200 mm) on label or beside title block to record Contractor's review and approval markings and action taken by Architect.
 3. Include the following information on label for processing and recording action taken:
 - a. Project name.
 - b. Date.
 - c. Name and address of Architect.
 - d. Name and address of Contractor.
 - e. Name and address of subcontractor.
 - f. Name and address of supplier.
 - g. Name of manufacturer.
 - h. Submittal number or other unique identifier, including revision identifier.
 - 1) Submittal number shall use Specification Section number followed by a decimal point and then a sequential number (e.g., 06100.01). Resubmittals shall include an alphabetic suffix after another decimal point (e.g., 06100.01.A).
 - i. Number and title of appropriate Specification Section.
 - j. Drawing number and detail references, as appropriate.
 - k. Location(s) where product is to be installed, as appropriate.
 - l. Other necessary identification.
- E. Deviations: Highlight or otherwise specifically identify deviations from the Contract Documents on submittals.

- F. **Additional Copies:** Unless additional copies are required for final submittal, and unless Architect observes noncompliance with provisions in the Contract Documents, initial submittal may serve as final submittal.
1. Submit one copy of submittal to concurrent reviewer in addition to specified number of copies to Architect.
 2. Additional copies submitted for maintenance manuals will be marked with action taken and will be returned.
- G. **Transmittal:** Package each submittal individually and appropriately for transmittal and handling. Transmit each submittal using a transmittal form. Architect will return submittals, without review, received from sources other than Contractor.
1. **Transmittal Form:** Provide locations on 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. Specification Section number and title.
 - i. Drawing number and detail references, as appropriate.
 - j. Submittal and transmittal distribution record.
 - k. Remarks.
 - l. Signature of transmitter.
 2. On an attached separate sheet, prepared on Contractor's letterhead, record relevant information, requests for data, revisions other than those requested by Architect on previous submittals, and deviations from requirements in the Contract Documents, including minor variations and limitations. Include same label information as related submittal.
- H. **Resubmittals:** Make resubmittals in same form and number of copies as initial submittal.
1. Note date and content of previous submittal.
 2. Note date and content of revision in label or title block and clearly indicate extent of revision.
 3. Resubmit submittals until they are marked "Furnish as Submitted".
- 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 "Approved as Submitted", or "Approved as Noted" taken by Architect.

1.5 CONTRACTOR'S USE OF ARCHITECT'S CAD FILES

- A. General: At Contractor's written request, copies of Architect's CAD files will be provided to Contractor for Contractor's use in connection with Project, subject to the following conditions:
 - 1. CADD files are limited to those that have been generated for this Project.
 - 2. Contractor will be asked to sign Architects waiver of release form before files will be delivered to the contractor.

PART 2 - PRODUCTS

2.1 ACTION SUBMITTALS

- A. General: Prepare and submit Action Submittals required by individual Specification Sections.
- B. Product Data: Collect information into a single submittal for each element of construction 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 operation and maintenance manuals.
 - k. Compliance with specified referenced standards.
 - l. Testing by recognized testing agency.
 - m. Application of testing agency labels and seals.
 - n. Notation of coordination requirements.
 - 4. Submit Product Data before or concurrent with Samples.
 - 5. Number of Copies: Submit six (6) copies of Product Data, unless otherwise indicated. Architect will return three copies. Mark up and retain one returned copy as a Project Record Document.
- 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: Fully illustrate requirements in the Contract Documents. 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. Shopwork manufacturing instructions.
 - g. Templates and patterns.
 - h. Schedules.
 - i. Design calculations.
 - j. Compliance with specified standards.
 - k. Notation of coordination requirements.
 - l. Notation of dimensions established by field measurement.
 - m. Relationship to adjoining construction clearly indicated.
 - n. Seal and signature of professional engineer if specified.
 - o. Wiring Diagrams: Differentiate between manufacturer-installed and field-installed wiring.
 2. Sheet Size: Except for templates, patterns, and similar full-size drawings, submit Shop Drawings on sheets at least 8-1/2 by 11 inches (215 by 280 mm) but no larger than 30 by 40 inches (750 by 1000 mm).
 3. Number of Copies: Submit PDF or six (6) opaque copies of each submittal, unless copies are required for operation and maintenance manuals. Submit five copies where copies are required for operation and maintenance manuals. Architect will retain three copies; remainder will be returned.
- D. Samples: Submit Samples for review of kind, color, pattern, and texture for a check of these characteristics with other elements and for a comparison of these characteristics between submittal and actual component as delivered and installed.
1. Transmit Samples that contain multiple, related components such as accessories together in one submittal package.
 2. Identification: Attach label on unexposed side of Samples that includes the following:
 - a. Generic description of Sample.
 - b. Product name and name of manufacturer.
 - c. Sample source.
 - d. Number and title of appropriate Specification Section.
 3. 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.
 4. 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.

- a. Number of Samples: Submit one full set(s) of available choices where color, pattern, texture, or similar characteristics are required to be selected from manufacturer's product line. Architect will return submittal with options selected.
5. Samples for Verification: Submit full-size units or Samples of size indicated, prepared from same material to be used for the Work, cured and finished in manner specified, and physically identical with material or 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.
 - a. Number of Samples: Submit four sets of Samples. Architect will retain three Sample sets; remainder will be returned.
 - 1) Submit a single Sample where assembly details, workmanship, fabrication techniques, connections, operation, and other similar characteristics are to be demonstrated.
 - 2) If variation in color, pattern, texture, or other characteristic is inherent in material or product represented by a Sample, submit at least four sets of paired units that show approximate limits of variations.
- E. Product Schedule or List: As required in individual Specification Sections, prepare a written summary indicating types of products required for the Work and their intended location. Include the following information in tabular form:
 1. Type of product. Include unique identifier for each product.
 2. Number and name of room or space.
 3. Location within room or space.
 4. Number of Copies: Submit three copies of product schedule or list, unless otherwise indicated. Architect will return two copies.
 - a. Mark up and retain one returned copy as a Project Record Document.
- F. Contractor's Construction Schedule: Comply with requirements specified in Division 1 Section "Construction Progress Documentation" for Construction Manager's action.
- G. Submittals Schedule: Comply with requirements specified in Division 1 Section "Construction Progress Documentation."
- H. Application for Payment: Comply with requirements specified in Division 1 Section "Payment Procedures."
- I. Schedule of Values: Comply with requirements specified in Division 1 Section "Payment Procedures."
- 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.
4. Number of Copies: Submit three copies of subcontractor list, unless otherwise indicated. Architect will return two copies.
 - a. Mark up and retain one returned copy as a Project Record Document.

2.2 INFORMATIONAL SUBMITTALS

- A. General: Prepare and submit Informational Submittals required by other Specification Sections.
 1. Number of Copies: Submit three copies of each submittal, unless otherwise indicated. Architect 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 specified in Division 1 Section "Quality Requirements."
- B. Coordination Drawings: Comply with requirements specified in Division 1 Section "Project Management and Coordination."
- C. Contractor's Construction Schedule: Comply with requirements specified in Division 1 Section "Construction Progress Documentation."
- D. Qualification Data: Prepare written information that demonstrates capabilities and experience of firm or person. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.
- E. Welding Certificates: Prepare written certification that welding procedures and personnel comply with requirements in the Contract Documents. 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 in the Contract Documents and, where required, is authorized by manufacturer for this specific Project.
- G. Manufacturer Certificates: Prepare written statements on manufacturer's letterhead certifying that manufacturer complies with requirements in the Contract Documents. Include evidence of manufacturing experience where required.
- H. Product Certificates: Prepare written statements on manufacturer's letterhead certifying that product complies with requirements in the Contract Documents.
- I. Material Certificates: Prepare written statements on manufacturer's letterhead certifying that material complies with requirements in the Contract Documents.

- J. **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 in the Contract Documents.
- K. **Product Test Reports:** Prepare written reports indicating current product produced by manufacturer complies with requirements in the Contract Documents. Base reports on evaluation of tests performed by manufacturer and witnessed by a qualified testing agency, or on comprehensive tests performed by a qualified testing agency.
- L. **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.
- M. **Schedule of Tests and Inspections:** Comply with requirements specified in Division 1 Section "Quality Requirements."
- N. **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 in the Contract Documents.
- O. **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.
- P. **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 in the Contract Documents.
- Q. **Maintenance Data:** Prepare written and graphic instructions and procedures for operation and normal maintenance of products and equipment. Comply with requirements specified in Division 1 Section "Operation and Maintenance Data."
- R. **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.
- S. **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.
- T. 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 whether conditions, products, and installation will affect warranty.
 7. Other required items indicated in individual Specification Sections.
- U. 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.
- V. Material Safety Data Sheets (MSDSs): Submit information directly to Owner; do not submit to Architect.
1. Architect will not review submittals that include MSDSs and will return the entire submittal for resubmittal.

PART 3 - EXECUTION

3.1 CONTRACTOR'S REVIEW

- A. Review each submittal and check for coordination with other Work of the Contract and for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to Architect.
- 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.

3.2 ARCHITECT'S ACTION

- A. General: Architect will not review submittals that do not bear Contractor's approval stamp and will return them without action.
- B. Action Submittals: Architect will review each submittal, make marks to indicate corrections or modifications required, and return it. Architect will stamp each submittal with an action stamp and will mark stamp appropriately to indicate action taken, as follows:
 - 1. Approved as Submitted.
 - 2. Approved as Noted.
 - 3. Revise & Resubmit
 - 4. Rejected.
- C. Informational Submittals: Architect will review each submittal and will not return it, or will return it if it does not comply with requirements. Architect will forward each submittal to appropriate party.
- D. Partial submittals are not acceptable, will be considered nonresponsive, and will be returned without review.
- E. Submittals not required by the Contract Documents may not be reviewed and may be discarded.

END OF SECTION

SECTION 01 35 43 – ENVIRONMENTAL PROCEDURES

PART 1 - GENERAL

1.1 ENVIRONMENTAL PROCEDURES

- A. Environmental procedure considerations consist of, but are not limited to, the following factors:
 - 1. Natural resources including air, water, and land.
 - 2. Solid waste disposal.
 - 3. Noise.
 - 4. Control of toxic substances and hazardous materials.
 - 5. The presence of chemical, physical, and biological elements and agents that adversely effect and alter ecological balances.

1.2 GENERAL REQUIREMENTS

- A. Provide and maintain environmental protection defined herein, other Sections and as indicated in the Drawings.
- B. Comply with all Federal, State, and local laws, ordinances and regulations pertaining to environmental protection.
- C. Compliance by subcontractors with the provisions of this and various other sections of these specifications is the responsibility of the Contractor.
- D. Use of equipment from which factory-installed, anti-pollution and noise control devices are removed or rendered ineffective, either intentionally or through lack of proper maintenance is prohibited.
- E. Furnish a certificate that all materials and operating equipment installed as a part of this project, the installation thereof and all equipment used in the construction, are in compliance with all applicable local laws, ordinances, regulations and permits concerning environmental pollution control and abatement.

1.3 PROTECTION OF NATURAL RESOURCES

- A. General: It is intended that the natural resources within the project boundaries and outside the limits of permanent work performed be preserved in their existing condition, be restored to an equivalent of the existing condition or improved as indicated, as approved by the Architect/Engineer, upon completion of the work. Confine on-site construction activities to areas defined by the drawings and specifications.

1.4 TOXIC SUBSTANCES

- B. Asbestos and Hazardous Materials Procedure: In the event the Contractor, during the course of the work on the project, encounters the presence of asbestos or any materials containing asbestos, or polychlorinated biphenyl (PCB's) or any other hazardous materials as recognized by local Authorities having jurisdiction, promptly notify the Owner through the Architect/Engineer. Do not perform any work pertinent to the asbestos or hazardous material prior to receipt of special instructions from the Owner through the Architect/Engineer. Any delay in the progress of the work as a result of encountering either asbestos or hazardous materials on the project will be mitigated by the Architect/Engineer. Within 24 hours of this notification to the Owner through the Architect/Engineer of the encountering of the presence of asbestos or hazardous materials, the Contractor will meet with the Architect/Engineer to replan and work around the affected area. The Architect/Engineer will provide the special instructions without delay and upon confirmation by the local Authorities of the actions taken and authorize work to progress.
- C. Comply with all applicable provisions of the National Emission Standards for Asbestos (40 CFR 61 Subpart B).
- D. Comply with the local regulations of polychlorinated biphenyl (PCB). Since these chemicals are used in some existing insulation, existing fixed and vehicular transformers, assure proper marking, handling, and disposal of any PCB's in accordance with the regulations of 40 CFR 761.
 - 1. Do not use PCB chemical substance, mixture, equipment, container, sealant, coating, or dust-control agent except in accordance with regulations of 40 CFR 761.
 - 2. Immediately report any PCB chemical substance, mixture, equipment, container, sealant, coating or dust control agent found stored within the project area to the Architect in writing and stop work in the area.
- E. Lead paint is not known to be present.
- F. Asbestos is not known to be present.

1.5 CONTROL AND DISPOSAL OF EXCESS MATERIAL, TRASH AND DEBRIS

- A. Dispose of excess excavated material that is approved by the Architect/Engineer as clean fill onsite if an onsite soil disposal area is approved by the Architect/Engineer. If no such site is approved, dispose of the material in accordance with the provision of paragraph 1.5 (C).
- B. Pick-up trash and place in containers. Empty containers on a regular schedule. Conduct handling and disposal to prevent contamination of the site and other areas. Do not dispose of in areas of natural vegetation. On completion, leave the area clean and natural looking.
- C. Dispose of rubbish and debris as follows:
 - 1. Transport all waste off the site and dispose of it in a manner that complies with State, and local requirements. Secure a permit or license prior to transporting any material off the site. Do not burn or bury waste materials on the site.

1.6 CONTROL AND DISPOSAL OF CHEMICAL AND SANITARY WASTES

- A. Store chemical waste in corrosion-resistant containers, remove from the project site, and dispose of as necessary, but not less frequently than monthly. Provide for disposal of chemical waste in accordance with standard established practices as approved by the Architect. Dispose of lubricants to be discarded in accordance with approved procedures meeting state, and local regulations.

1.7 DUST CONTROL

- A. Keep dust down at all times including nonworking hours, weekends, and holidays.
- B. Secure and cover transport equipment and loose materials in transit to ensure that materials do not become airborne during transit.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

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SECTION 01 40 00 – QUALITY REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for quality assurance and quality control.
- B. Testing and inspecting services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with the Contract Document requirements.
 - 1. Specific quality-assurance and -control requirements for individual construction activities are specified in the Sections that specify those activities. Requirements in those Sections may also cover production of standard products.
 - 2. Specified tests, inspections, and related actions do not limit Contractor's other quality-assurance and -control procedures that facilitate compliance with the Contract Document requirements.
 - 3. Requirements for Contractor to provide quality-assurance and -control services required by Architect, Owner or authorities having jurisdiction are not limited by provisions of this Section.
- C. Related Sections include but are not limited to the following:
 - 1. Division 1 Section "Construction Progress Documentation" for developing a schedule of required tests and inspections.

1.3 DEFINITIONS

- A. Quality-Assurance Services: Activities, actions, and procedures performed before and during execution of the Work to guard against defects and deficiencies and substantiate that proposed construction will comply with requirements.
- B. Quality-Control Services: Tests, inspections, procedures, and related actions during and after execution of the Work to evaluate that actual products incorporated into the Work and completed construction comply with requirements. Services do not include contract enforcement activities performed by Architect.
- C. Mockups: Full-size, physical assemblies that are constructed on-site. Mockups are used to verify selections made under sample submittals, to demonstrate aesthetic effects and, where indicated, qualities of materials and execution, and to review construction, coordination, testing,

or operation; they are not Samples. Approved mockups establish the standard by which the Work will be judged.

- D. Laboratory Mockups: Full-size, physical assemblies that are constructed at testing facility to verify performance characteristics.
- E. Preconstruction Testing: Tests and inspections that are performed specifically for the Project before products and materials are incorporated into the Work to verify performance or compliance with specified criteria.
- F. Product Testing: Tests and inspections that are performed by an NRTL, an NVLAP, or a testing agency qualified to conduct product testing and acceptable to authorities having jurisdiction, to establish product performance and compliance with industry standards.
- G. Source Quality-Control Testing: Tests and inspections that are performed at the source, i.e., plant, mill, factory, or shop.
- H. Field Quality-Control Testing: Tests and inspections that are performed on-site for installation of the Work and for completed Work.
- I. Testing Agency: An entity engaged to perform specific tests, inspections, or both. Testing laboratory shall mean the same as testing agency.
- J. Installer/Applicator/Erector: Contractor or another entity engaged by Contractor as an employee, Subcontractor, or Sub-subcontractor, to perform a particular construction operation, including installation, erection, application, and similar operations.
 - 1. Using a term such as "carpentry" does not 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 trades people of the corresponding generic name.
- K. Experienced: When used with an entity, "experienced" means having successfully completed a minimum of five previous projects similar in size and scope to this Project; being familiar with special requirements indicated; and having complied with requirements of authorities having jurisdiction.

1.4 CONFLICTING REQUIREMENTS

- A. General: If compliance with two or more standards is specified and the standards establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement. Refer uncertainties and requirements that are different, but apparently equal, to Architect for a decision before proceeding.
- B. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of requirements. Refer uncertainties to Architect for a decision before proceeding.

1.5 SUBMITTALS

- A. Qualification Data: For testing agencies specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include proof of qualifications in the form of a recent report on the inspection of the testing agency by a recognized authority.
- B. Schedule of Tests and Inspections: Prepare in tabular form and include the following:
 - 1. Specification Section number and title.
 - 2. Description of test and inspection.
 - 3. Identification of applicable standards.
 - 4. Identification of test and inspection methods.
 - 5. Number of tests and inspections required.
 - 6. Time schedule or time span for tests and inspections.
 - 7. Entity responsible for performing tests and inspections.
 - 8. Requirements for obtaining samples.
 - 9. Unique characteristics of each quality-control service.
- C. Reports: Prepare and submit certified written reports that include the following:
 - 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 tests and inspections.
 - 6. Description of the Work and test and inspection method.
 - 7. Identification of product and Specification Section.
 - 8. Complete test or inspection data.
 - 9. Test and inspection results and an interpretation of test results.
 - 10. Record of temperature and weather conditions at time of sample taking and testing and inspecting.
 - 11. Comments or professional opinion on whether tested or inspected Work complies with the Contract Document requirements.
 - 12. Name and signature of laboratory inspector.
 - 13. Recommendations on retesting and reinspecting.
- D. Permits, Licenses, and Certificates: For Owner's records, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, correspondence, records, and similar documents, established for compliance with standards and regulations bearing on performance of the Work.

1.6 QUALITY ASSURANCE

- A. General: Qualifications paragraphs in this Article establish the minimum qualification levels required; individual Specification Sections specify additional requirements.
- B. Installer Qualifications: A firm or individual experienced in installing, erecting, or assembling work similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful in-service performance.

- C. **Manufacturer Qualifications:** A firm experienced in manufacturing products or systems similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.
- D. **Fabricator Qualifications:** A firm experienced in producing products similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.
- E. **Testing Agency Qualifications:** An NRTL, an NVLAP, or an independent agency with the experience and capability to conduct testing and inspecting indicated, as documented according to ASTM E 548; and with additional qualifications specified in individual Sections; and where required by authorities having jurisdiction, that is acceptable to authorities.
 - 1. NRTL: A nationally recognized testing laboratory according to 29 CFR 1910.7.
 - 2. NVLAP: A testing agency accredited according to NIST's National Voluntary Laboratory Accreditation Program.
- F. **Factory-Authorized Service Representative Qualifications:** An authorized representative of manufacturer who is trained and approved by manufacturer to inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.
 - 1. **Testing Agency Responsibilities:** Submit a certified written report of each test, inspection, and similar quality-assurance service to Architect with copy to Contractor. Interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from the Contract Documents.
- G. **Mockups:** Before installing portions of the Work requiring mockups, build mockups for each form of construction and finish required to comply with the following requirements, using materials indicated for the completed Work:
 - 1. Build mockups in location and of size indicated or, if not indicated, as directed by Architect.
 - 2. Notify Architect seven days in advance of dates and times when mockups will be constructed.
 - 3. Demonstrate the proposed range of aesthetic effects and workmanship.
 - 4. Obtain Architect's approval of mockups before starting work, fabrication, or construction.
 - a. Allow seven days for initial review and each re-review of each mockup.
 - 5. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
 - 6. Demolish and remove mockups when directed, unless otherwise indicated.

1.7 QUALITY CONTROL

- A. **Owner Responsibilities:** Where quality-control services are indicated as Owner's responsibility, Owner will engage a qualified testing agency to perform these services.

1. Owner will furnish Contractor with names, addresses, and telephone numbers of testing agencies engaged and a description of types of testing and inspecting they are engaged to perform.
 2. Costs for retesting and reinspecting construction that replaces or is necessitated by work that failed to comply with the Contract Documents will be charged to Contractor and the Contract Sum will be adjusted by Change Order.
- B. Tests and inspections not explicitly assigned to Owner are Contractor's responsibility. Unless otherwise indicated, provide quality-control services specified and those required by authorities having jurisdiction. Perform quality-control services required of Contractor by authorities having jurisdiction, whether specified or not.
1. Where services are indicated as Contractor's responsibility, engage a qualified testing agency to perform these quality-control services.
 - a. Contractor shall not employ same entity engaged by Owner, unless agreed to in writing by Owner.
 2. Notify testing agencies at least 24 hours in advance of time when Work that requires testing or inspecting will be performed.
 3. Where quality-control services are indicated as Contractor's responsibility, submit a certified written report, in duplicate, of each quality-control service.
 4. Testing and inspecting requested by Contractor and not required by the Contract Documents are Contractor's responsibility.
 5. Submit additional copies of each written report directly to authorities having jurisdiction, when they so direct.
- C. Manufacturer's Field Services: Where indicated, engage a factory-authorized service representative to inspect field-assembled components and equipment installation, including service connections. Report results in writing as specified in Division 1 Section "Submittal Procedures."
- D. Retesting/Reinspecting: Regardless of whether original tests or inspections were Contractor's responsibility, provide quality-control services, including retesting and reinspecting, for construction that replaced Work that failed to comply with the Contract Documents.
- E. Testing Agency Responsibilities: Cooperate with Architect and Contractor in performance of duties. Provide qualified personnel to perform required tests and inspections.
1. Notify Architect and Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.
 2. Determine the location from which test samples will be taken and in which in-situ tests are conducted.
 3. Conduct and interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from requirements.
 4. Submit a certified written report, in duplicate, of each test, inspection, and similar quality-control service through Contractor.
 5. Do not release, revoke, alter, or increase the Contract Document requirements or approve or accept any portion of the Work.
 6. Do not perform any duties of Contractor.

- F. Associated Services: Cooperate with agencies performing required tests, inspections, and similar quality-control services, and provide reasonable auxiliary services as requested. Notify agency sufficiently in advance of operations to permit assignment of personnel. Provide the following:
1. Access to the Work.
 2. Incidental labor and facilities necessary to facilitate tests and inspections.
 3. Adequate quantities of representative samples of materials that require testing and inspecting. Assist agency in obtaining samples.
 4. Facilities for storage and field curing of test samples.
 5. Delivery of samples to testing agencies.
 6. Preliminary design mix proposed for use for material mixes that require control by testing agency.
 7. Security and protection for samples and for testing and inspecting equipment at Project site.
- G. Coordination: Coordinate sequence of activities to accommodate required quality-assurance and -control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspecting.
1. Schedule times for tests, inspections, obtaining samples, and similar activities.
- H. Schedule of Tests and Inspections: Prepare a schedule of tests, inspections, and similar quality-control services required by the Contract Documents. Submit schedule within 30 days of date established for commencement of the Work.
1. Distribution: Distribute schedule to Owner, Architect testing agencies, and each party involved in performance of portions of the Work where tests and inspections are required.

1.8 SPECIAL TESTS AND INSPECTIONS

- A. Special Tests and Inspections: Owner will engage a qualified testing agency to conduct special tests and inspections required by authorities having jurisdiction as the responsibility of Owner, and as follows:
1. Verifying that manufacturer maintains detailed fabrication and quality-control procedures and reviewing the completeness and adequacy of those procedures to perform the Work.
 2. Notifying Architect and Contractor promptly of irregularities and deficiencies observed in the Work during performance of its services.
 3. Submitting a certified written report of each test, inspection, and similar quality-control service to Architect with copy to Contractor and to authorities having jurisdiction.
 4. Submitting a final report of special tests and inspections at Substantial Completion, which includes a list of unresolved deficiencies.
 5. Interpreting tests and inspections and stating in each report whether tested and inspected work complies with or deviates from the Contract Documents.
 6. Retesting and reinspecting corrected work.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 TEST AND INSPECTION LOG

- A. Prepare a record of tests and inspections. Include the following:
 - 1. Date test or inspection was conducted.
 - 2. Description of the Work tested or inspected.
 - 3. Date test or inspection results were transmitted to Architect.
 - 4. Identification of testing agency or special inspector conducting test or inspection.
- B. Maintain log at Project site. Post changes and modifications as they occur. Provide access to test and inspection log for Architect's reference during normal working hours.

3.2 REPAIR AND PROTECTION

- A. General: On completion of testing, inspecting, sample taking, and similar services, repair damaged construction and restore substrates and finishes.
 - 1. Provide materials and comply with installation requirements specified in other Specification Sections. Restore patched areas and extend restoration into adjoining areas with durable seams that are as invisible as possible.
- B. Protect construction exposed by or for quality-control service activities.
- C. Repair and protection are Contractor's responsibility, regardless of the assignment of responsibility for quality-control services.

END OF SECTION

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SECTION 01 42 00 – REFERENCES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 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 to other paragraphs or schedules in the Specifications and similar requirements in the Contract Documents. Terms such as "shown," "noted," "scheduled," and "specified" are used to help the user locate the reference. Location is not limited.
- 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. "Approved": The term "approved," when 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. "Regulations": 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" means to supply and deliver to the Project site, ready for unloading, unpacking, assembly, installation, and similar operations.
- G. "Install": The term "install" describes operations at the Project site including the actual unloading, temporary storage, unpacking, assembling, erecting, 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 another entity engaged by the Contractor, either as an employee, subcontractor, or contractor of lower tier, to perform a particular construction activity, including installation, erection, application, or similar operations. Installers are required to be experienced in the operations they are engaged to perform.
 - 1. The term "experienced," when used with the term "installer," means having successfully completed 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 authorities having jurisdiction.

2. Trades: Using a term such as "carpentry" does not 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.
3. Assigning Specialists: Certain Sections of the Specifications require that specific construction activities shall be performed by specialists who are recognized experts in those operations. The specialists must be engaged for those activities, and their assignments are requirements over which the Contractor has no option. However, the ultimate responsibility for fulfilling contract requirements remains with the Contractor.

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

J. "Project site" is the space available to the Contractor for performing 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.

K. "Testing Agencies": A testing agency 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.

1.3 SPECIFICATION FORMAT AND CONTENT EXPLANATION

A. Specification Format: These Specifications are organized into Divisions and Sections based on the CSI/CSC's "MasterFormat" numbering system.

B. Specification Content: These Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:

1. Abbreviated Language: Language used in the Specifications and other Contract Documents is abbreviated. Words and meanings shall be interpreted as appropriate. Words implied, but not stated, shall be interpolated as the sense requires. Singular words shall be interpreted as plural and plural words interpreted as singular where applicable as the context of the Contract Documents indicates.
2. Imperative mood and streamlined language are generally used in the Specifications. Requirements expressed in the imperative mood are to be performed by the Contractor. At certain locations in the Section Text, subjective language is used for clarity to describe responsibilities that must be fulfilled indirectly by the Contractor or by others when so noted.
 - a. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.

1.4 INDUSTRY STANDARDS

- C. **Applicability of Standards:** Unless the Contract Documents include more stringent requirements, applicable construction industry standards have the same force and effect as if bound or copied directly into the Contract Documents to the extent referenced. Such standards are made a part of the Contract Documents by reference.
- D. **Publication Dates:** Comply with standards in effect as of the date of the Contract Documents.
- E. **Conflicting Requirements:** Where compliance with two or more standards is specified and the standards establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement. Refer uncertainties and requirements that are different, but apparently equal, to the Architect for a decision before proceeding.
 - 1. **Minimum Quantity or Quality Levels:** The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of the requirements. Refer uncertainties to the Architect for a decision before proceeding.
- F. **Copies of Standards:** Each entity engaged in construction on the Project must be familiar with industry standards applicable to its construction activity. Copies of applicable standards are not bound with the Contract Documents.
 - 1. Where copies of standards are needed to perform a required construction activity, the Contractor shall obtain copies directly from the publication source and make them available on request.
- G. **Abbreviations and Names:** Trade association names and titles of general standards are frequently abbreviated. Where abbreviations and acronyms are used in the Specifications or other Contract Documents, they mean the recognized name of the trade association, standards-producing organization, authorities having jurisdiction, or other entity applicable to the context of the text provision. Refer to Gale Research's "Encyclopedia of Associations" or Columbia Books' "National Trade & Professional Associations of the U.S.," which are available in most libraries.

1.5 SUBMITTALS

Permits, Licenses, and Certificates: For the Owner's records, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, correspondence, records, and similar documents, established for compliance with standards and regulations bearing on performance of the Work.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION

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SECTION 01 50 00 – TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes requirements for temporary utilities, support facilities, and security and protection facilities.

1.3 USE CHARGES

- A. General: Cost or use charges for temporary facilities shall be included in the Contract Sum. Allow other entities to use temporary services and facilities without cost, including, but not limited to testing agencies and authorities having jurisdiction.
- B. Water Service: Water is available at the site at no cost to the contractor.
- C. Electric Power Service: No service use charges for electricity.
- D. Telephone Service: Provide temporary phone service to the site as required to contact Contractor site representatives.
- E. Contractor shall provide portable latrines for use during construction.

1.4 INFORMATIONAL SUBMITTALS

- A. Site Plan: Show temporary facilities, utility hookups, staging areas, and parking areas for construction personnel.
- B. Fire-Safety Program: Show compliance with requirements of NFPA 241 and authorities having jurisdiction. Indicate Contractor personnel responsible for management of fire-prevention program.
- C. Moisture-Protection Plan: Describe procedures and controls for protecting materials and construction from water absorption and damage.
 - 1. Describe delivery, handling, and storage provisions for materials subject to water absorption or water damage.
 - 2. Indicate procedures for discarding water-damaged materials, protocols for mitigating water intrusion into completed Work, and replacing water-damaged Work.
 - 3. Indicate sequencing of work that requires water, such as sprayed fire-resistive materials, plastering, and terrazzo grinding, and describe plans for dealing with water from these operations. Show procedures for verifying that wet construction has dried sufficiently to permit installation of finish materials.

1.5 QUALITY ASSURANCE

- A. Electric Service: Comply with NECA, NEMA, and UL standards and regulations for temporary electric service. Install service to comply with NFPA 70.
- B. Comply with Federal, State and local codes and regulations as well as utility company requirements.
- C. Coordinate work with Owner's requirements.
- D. Materials: Materials must be new and adequate in capacity for the required usage. Materials must not create unsafe conditions nor violate requirements of applicable codes and standards.
- E. Tests and Inspections: Arrange for authorities having jurisdiction to test and inspect each temporary utility before use. Obtain required certifications and permits.

1.6 PROJECT CONDITIONS

- A. Temporary Use of Permanent Facilities: Installer of each permanent service shall assume responsibility for operation, maintenance, and protection of each permanent service during its use as a construction facility before Owner's acceptance, regardless of previously assigned responsibilities.
- B. Maintain excavations free of water. Provide and operate pumping equipment. Grade site to drain water away from buildings and excavations.
- C. Provide temporary protection for installed products. Control traffic in immediate area to minimize damage.
- D. Prohibit traffic and storage on waterproofed and roofed surfaces, on lawns and landscaped areas.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Chain-Link Fencing: Minimum 2-inch (50-mm), 0.148-inch- (3.8-mm-) thick, galvanized-steel, chain-link fabric fencing; minimum 6 feet (1.8 m) high with galvanized-steel pipe posts; minimum 2-3/8-inch- (60-mm-) OD line posts and 2-7/8-inch- (73-mm-) OD corner and pull posts, with 1-5/8-inch- (42-mm-) OD top rails.
- B. Portable Chain-Link Fencing: Minimum 2-inch (50-mm), 0.148-inch- (3.8-mm-) thick, galvanized-steel, chain-link fabric fencing; minimum 6 feet (1.8 m) high with galvanized-steel pipe posts; minimum 2-3/8-inch- (60-mm-) OD line posts and 2-7/8-inch- (73-mm-) OD corner and pull posts, with 1-5/8-inch- (42-mm-) OD top and bottom rails. Provide concrete bases for supporting posts.
- C. Polyethylene Sheet: Reinforced, fire-resistive sheet, 10-mil (0.25-mm) minimum thickness, with flame-spread rating of 15 or less per ASTM E 84 and passing NFPA 701 Test Method 2.
- D. Dust-Control Adhesive-Surface Walk-off Mats: Provide mats minimum 36 by 60 inches (914 by 1624 mm).
- E. Insulation: Unfaced mineral-fiber blanket, manufactured from glass, slag wool, or rock wool; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively.
- F. Lumber and Plywood: Pressure-treated dimension lumber and plywood suitable for exterior exposure.
- G. Paint: Exterior latex primer and matching topcoat.

2.2 TEMPORARY FACILITIES

- A. Field Offices, General: Not Required.

2.3 EQUIPMENT

- A. Fire Extinguishers: Portable, UL rated; with class and extinguishing agent as required by locations and classes of fire exposures.
- B. Heating Equipment: Use of gasoline-burning space heaters, open-flame heaters, or salamander-type heating units is prohibited.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Locate facilities where they will serve Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required by progress of the Work.
- B. Provide each facility ready for use when needed to avoid delay. Do not remove until facilities are no longer needed or are replaced by authorized use of completed permanent facilities.

3.2 TEMPORARY UTILITY INSTALLATION

- A. General: Install temporary service or connect to existing service.
 - 1. Arrange with utility company, Owner, and existing users for time when service can be interrupted, if necessary, to make connections for temporary services.
- B. Sewers and Drainage: Provide temporary utilities to remove effluent lawfully.
 - 1. Connect temporary sewers to municipal system as directed by authorities having jurisdiction.
- C. Sanitary Facilities: Provide temporary toilets, wash facilities, and drinking water for use of construction personnel. Comply with requirements of authorities having jurisdiction for type, number, location, operation, and maintenance of fixtures and facilities.
- D. Construction Aids: The General Contractor and each Subcontractor shall provide construction aids and equipment required by their personnel and to facilitate execution of their Work. Examples are scaffolds, staging, ladders, stairs, ramps, runways, platforms, railings, hoists, cranes, chutes and other such facilities and equipment. Mutual use may be arranged by the Contractor where applicable.
- E. Heating and Cooling: Provide temporary heating and cooling required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of low temperatures or high humidity. Select equipment that will not have a harmful effect on completed installations or elements being installed.
- F. Isolation of Work Areas in Occupied Facilities: Prevent dust, fumes, and odors from entering occupied areas.
 - 1. Prior to commencing work, isolate the HVAC system in area where work is to be performed according to coordination drawings.
 - a. Disconnect supply and return ductwork in work area from HVAC systems servicing occupied areas.

- b. Maintain negative air pressure within work area using HEPA-equipped air-filtration units, starting with commencement of temporary partition construction, and continuing until removal of temporary partitions is complete.
 2. Maintain dust partitions during the Work. Use vacuum collection attachments on dust-producing equipment. Isolate limited work within occupied areas using portable dust-containment devices.
 3. Perform daily construction cleanup and final cleanup using approved, HEPA-filter-equipped vacuum equipment.
 - G. Ventilation and Humidity Control: Provide temporary ventilation required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of high humidity. Select equipment that will not have a harmful effect on completed installations or elements being installed. Coordinate ventilation requirements to produce ambient condition required and minimize energy consumption.
 1. Provide dehumidification systems when required to reduce substrate moisture levels to level required to allow installation or application of finishes.
 - H. Electric Power Service: Provide electric power service and distribution system of sufficient size, capacity, and power characteristics required for construction operations.
 - I. Lighting: Provide temporary lighting with local switching that provides adequate illumination for construction operations, observations, inspections, and traffic conditions.
 1. Install and operate temporary lighting that fulfills security and protection requirements without operating entire system.
 2. Install lighting for Project identification sign.
 - J. Telephone Service: Provide temporary telephone service in common-use facilities for use by all construction personnel. Install one telephone line(s) for each field office.
 1. Provide additional telephone lines for the following:
 - a. Provide a dedicated telephone line for each facsimile machine in each field office.
 2. At each telephone, post a list of important telephone numbers.
 - a. Police and fire departments.
 - b. Ambulance service.
 - c. Contractor's home office.
 - d. Contractor's emergency after-hours telephone number.
 - e. Architect's office.
 - f. Engineers' offices.
 - g. Owner's office.
 - h. Principal subcontractors' field and home offices.
 3. Provide superintendent with cellular telephone or portable two-way radio for use when away from field office.

3.3 SUPPORT FACILITIES INSTALLATION

- A. Security: Security of persons and property in the areas under control of the Contractor shall be the Contractor's exclusive responsibility.
 1. The Contractor, at his own expense, shall initiate whatever programs that are necessary to execute his responsibility.
 2. Control of access to the area under the Contractor's control shall be maintained. Visitors shall be required to report immediately to the Contractor's Superintendent and to produce full identification which will be recorded in the Contractor's Daily Log along with the purpose of the visit.
- B. Traffic Regulation: Obtain all necessary permits for access to and use of public roads and streets for construction and hauling purposes. Comply with traffic control regulations applying to permit issuance.
 1. Provide markers, signs, lights and barriers on and near the site to safely control construction traffic and public access.

- C. Parking: Use designated areas of Owner's existing parking areas for construction personnel's private vehicles and of Contractor's light-weight vehicles.
- D. Project Signs: Not required.
- E. Waste Disposal Facilities: Comply with requirements specified in Section 01 74 19 "Construction Waste Management and Disposal."
- F. Cleaning During Construction: Control accumulation of waste materials and rubbish. Periodically dispose of legally off site.
- G. Lifts and Hoists: Provide facilities necessary for hoisting materials and personnel.
 - 1. Trucks, cranes, and other devices for lifting material and personnel are considered tools and equipment and not temporary facilities.
- H. Environmental Protection: Provide protection, operate temporary facilities, and conduct construction as required to comply with environmental regulations and that minimize possible air, waterway, and subsoil contamination or pollution or other undesirable effects.
- I. Temporary Erosion and Sedimentation Control: Provide measures to prevent soil erosion and discharge of soil-bearing water runoff and airborne dust to undisturbed areas and to adjacent properties and walkways, according to erosion- and sedimentation-control Drawings.
 - 1. Verify that flows of water redirected from construction areas or generated by construction activity do not enter or cross tree- or plant- protection zones.
 - 2. Inspect, repair, and maintain erosion- and sedimentation-control measures during construction until permanent vegetation has been established.
 - 3. Clean, repair, and restore adjoining properties and roads affected by erosion and sedimentation from Project site during the course of Project.
 - 4. Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.
- J. Stormwater Control: Comply with requirements of authorities having jurisdiction. Provide barriers in and around excavations and subgrade construction to prevent flooding by runoff of stormwater from heavy rains.

3.4 OPERATION, TERMINATION, AND REMOVAL

- A. Supervision: Enforce strict discipline in use of temporary facilities. To minimize waste and abuse, limit availability of temporary facilities to essential and intended uses.
- B. Maintenance: Maintain facilities in good operating condition until removal.
 - 1. Maintain operation of temporary enclosures, heating, cooling, humidity control, ventilation, and similar facilities on a 24-hour basis where required to achieve indicated results and to avoid possibility of damage.
- C. Temporary Facility Changeover: Do not change over from using temporary security and protection facilities to permanent facilities until Substantial Completion.
- D. Termination and Removal: Remove each temporary facility when need for its service has ended, when it has been replaced by authorized use of a permanent facility, or no later than Substantial Completion. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with temporary facility. Repair damaged Work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.
 - 1. Materials and facilities that constitute temporary facilities are property of Contractor. Owner reserves right to take possession of Project identification signs.

2. Remove temporary roads and paved areas not intended for or acceptable for integration into permanent construction. Where area is intended for landscape development, remove soil and aggregate fill that do not comply with requirements for fill or subsoil. Remove materials contaminated with road oil, asphalt and other petrochemical compounds, and other substances that might impair growth of plant materials or lawns. Repair or replace street paving, curbs, and sidewalks at temporary entrances, as required by authorities having jurisdiction.
3. At Substantial Completion, repair, renovate, and clean permanent facilities used during construction period. Comply with final cleaning requirements specified in Section 01 77 00 "Closeout Procedures."

END OF SECTION

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SECTION 01 60 00 – PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for selection of products for use in Project; product delivery, storage, and handling; manufacturers' standard warranties on products; special warranties; product substitutions; and comparable products.
- B. Related Sections include but are not limited to the following:
 - 1. Division 1 Section "References" for applicable industry standards for products specified.
 - 2. Division 1 Section "Closeout Procedures" for submitting warranties for Contract closeout.
 - 3. Other included Sections for specific requirements for warranties on products and installations specified to be warranted.

1.3 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.

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.

1.4 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. Form: Tabulate information for each product under the following column headings:
 - a. Specification Section number and title.
 - b. Generic name used in the Contract Documents.
 - c. Proprietary name, model number, and similar designations.
 - d. Manufacturer's name and address.
 - e. Supplier's name and address.
 - f. Installer's name and address.
 - g. Projected delivery date or time span of delivery period.
 - h. Identification of items that require early submittal approval for scheduled delivery date.
 3. **Initial Submittal:** Within 30 days after date of commencement of the Work, submit 3 copies of initial product list. Include a written explanation for omissions of data and for variations from Contract requirements.
 - a. At Contractor's option, initial submittal may be limited to product selections and designations that must be established early in Contract period.
 4. **Completed List:** Within 60 days after date of commencement of the Work, submit 3 copies of completed product list. Include a written explanation for omissions of data and for variations from Contract requirements.
 5. **Architect's Action:** Architect will respond in writing to Contractor within 15 days of receipt of completed product list. Architect's response will include a list of unacceptable product selections and a brief explanation of reasons for this action. Architect's response, or lack of response, does not constitute a waiver of requirement to comply with the Contract Documents.
- B. **Substitution Requests:** Submit three copies of each request for consideration. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.
1. **Substitution Request Form:** Use CSI Form 13.1A at the end of this section.

2. Documentation: Show compliance with requirements for substitutions and the following, as applicable:
 - a. Statement indicating why specified material or product cannot be provided.
 - b. Coordination information, including a list of changes or modifications needed to other parts of 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.
 - 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 architects 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.
 3. Architect's/Engineer's Action: If necessary, Architect/Engineer will request additional information or documentation for evaluation within 7 days of receipt of a request for substitution. Architect/Engineer will notify Contractor of acceptance or rejection of proposed substitution within 15 days of receipt of request, or 7 days of receipt of additional information or documentation, whichever is later.
 - a. Form of Acceptance: Change Order.
 - b. Use product specified if Architect/Engineer cannot make a decision on use of a proposed substitution within time allocated.
- C. Comparable Product Requests: Submit three copies of each request for consideration. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.
1. Architect's Action: If necessary, Architect/Engineer will request additional information or documentation for evaluation within one week of receipt of a comparable product request. Architect/Engineer will notify Contractor of approval or rejection of proposed

comparable product request within 15 days of receipt of request, or 7 days of receipt of additional information or documentation, whichever is later.

- a. Form of Approval: As specified in Division 1 Section "Submittal Procedures."
- b. Use product specified if Architect cannot make a decision on use of a comparable product request within time allocated.

- D. Basis-of-Design Product Specification Submittal: Comply with requirements in Division 1 Section "Submittal Procedures." Show compliance with requirements.

1.5 QUALITY ASSURANCE

- A. Compatibility of Options: If Contractor is given option of selecting between two or more products for use on Project, product selected shall be compatible with products previously selected, even if previously selected products were also options.

1. Each contractor is responsible for providing products and construction methods compatible with products and construction methods of other contractors.
2. If a dispute arises between contractors over concurrently selectable but incompatible products, Architect/Engineer will determine which products shall be used.

1.6 PRODUCT DELIVERY, STORAGE, AND HANDLING

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

- B. Delivery and Handling:

1. Schedule delivery to minimize long-term storage at Project site and to prevent overcrowding of construction spaces.
2. Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.
3. Deliver products to Project site in an undamaged condition in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
4. Inspect products on delivery to ensure compliance with the Contract Documents and to ensure that products are undamaged and properly protected.

- C. Storage:

1. Store products to allow for inspection and measurement of quantity or counting of units.
2. Store materials in a manner that will not endanger Project structure.
3. Store products that are subject to damage by the elements, under cover in a weathertight enclosure above ground, with ventilation adequate to prevent condensation.
4. Store cementitious products and materials on elevated platforms.
5. Store foam plastic from exposure to sunlight, except to extent necessary for period of installation and concealment.

6. Comply with product manufacturer's written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage.
7. Protect stored products from damage and liquids from freezing.
8. Provide a secure location and enclosure at Project site for storage of materials and equipment by Owner's construction forces. Coordinate location with Owner.

1.7 PRODUCT WARRANTIES

- A. Warranties specified in other Sections shall be in addition to, and run concurrent with, other warranties required by the Contract Documents. Manufacturer's disclaimers and limitations on product warranties do not relieve Contractor of obligations under requirements of the Contract Documents.
 1. Manufacturer's Warranty: Preprinted written warranty published by individual manufacturer for a particular product and specifically endorsed by manufacturer to Owner.
 2. Special Warranty: Written warranty required by or incorporated into the Contract Documents, either to extend time limit provided by manufacturer's warranty or to provide more rights for Owner.
- 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 and properly executed.
 2. Specified Form: When specified forms are included with the Specifications, prepare a written document using appropriate form properly executed.
 3. Refer to Divisions 2 through 33 Sections for specific content requirements and particular requirements for submitting special warranties.
- C. Submittal Time: Comply with requirements in Division 1 Section "Closeout Procedures."

PART 2 - PRODUCTS

2.1 PRODUCT SELECTION PROCEDURES

- 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," Architect will make selection.

5. Where products are accompanied by the term "match sample," sample to be matched is Architect'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 Part 2 "Comparable Products" Article to obtain approval for use of an unnamed product.

B. Product Selection Procedures:

1. Product: Where Specifications name a single product and manufacturer, provide the named product that complies with requirements.
2. Manufacturer/Source: Where Specifications name a single manufacturer or source, provide a product by the named manufacturer or source that complies with requirements.
3. Products: Where Specifications include a list of names of both products and manufacturers, provide one of the products listed that complies with requirements.
4. Manufacturers: Where Specifications include a list of manufacturers' names, provide a product by one of the manufacturers listed that complies with requirements.
5. Available Products: Where Specifications include a list of names of both products and manufacturers, provide one of the products listed, or an unnamed product, that complies with requirements. Comply with provisions in Part 2 "Comparable Products" Article for consideration of an unnamed product.
6. Available Manufacturers: Where Specifications include a list of manufacturers, provide a product by one of the manufacturers listed, or an unnamed manufacturer, that complies with requirements. Comply with provisions in Part 2 "Comparable Products" Article for consideration of an unnamed product.
7. Product Options: Where Specifications indicate that sizes, profiles, and dimensional requirements on Drawings are based on a specific product or system, provide the specified product or system. Comply with provisions in Part 2 "Product Substitutions" Article for consideration of an unnamed product or system.
8. Basis-of-Design Product: Where Specifications name a product and include a list of manufacturers, provide 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. Comply with provisions in Part 2 "Comparable Products" Article for consideration of an unnamed product by the other named manufacturers.
9. Visual Matching Specification: Where Specifications require matching an established Sample, select a product that complies with requirements and matches Architect's/Engineer's sample. Architect's decision will be final on whether a proposed product matches.
 - a. If no product available within specified category matches and complies with other specified requirements, comply with provisions in Part 2 "Product Substitutions" Article for proposal of product.
10. Visual Selection Specification: Where Specifications include the phrase "as selected from manufacturer's colors, patterns, textures" or a similar phrase, select a product that complies with other specified requirements.
 - a. Standard Range: Where Specifications include the phrase "standard range of colors, patterns, textures" or similar phrase, Architect will select color, pattern,

density, 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, Architect will select color, pattern, density, or texture from manufacturer's product line that includes both standard and premium items.

2.2 PRODUCT SUBSTITUTIONS

- A. Timing: Architect will consider requests for substitution if received within 10 days prior to bid date (reference section 002113 Instructions to Bidders, para. 3.3.2)
- B. Conditions: Architect/Engineer will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Architect 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 Architect for redesign and evaluation services, increased cost of other construction by Owner, and similar considerations.
 2. Requested substitution does not require extensive 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 adversely affect Contractor's Construction Schedule.
 6. Requested substitution has received necessary approvals of authorities having jurisdiction.
 7. Requested substitution is compatible with other portions of 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, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.

2.3 COMPARABLE PRODUCTS

- A. Conditions: Architect/Engineer will consider Contractor's request for comparable product when the following conditions are satisfied. If the following conditions are not satisfied, Architect will return requests without action, except to record noncompliance with these requirements:
 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 architects and owners, if requested.
5. Samples, if requested.

PART 3 - EXECUTION (Not Used)



SUBSTITUTION REQUEST

(After the Bidding/Negotiating Phase)

Project: _____ Substitution Request Number: _____
From: _____
To: _____ Date: _____
A/E Project Number: _____
Re: _____ Contract For: _____

Specification Title: _____ Description: _____
Section: _____ Page: _____ Article/Paragraph: _____

Proposed Substitution: _____
Manufacturer: _____ Phone: _____
Address: _____
Trade Name: _____ Model No.: _____
Installer: _____ Phone: _____
Address: _____

History: ☐ New product ☐ 1-4 years old ☐ 5-10 years old ☐ More than 10 years old

Differences between proposed substitution and specified product:

☐ Point-by-point comparative data attached — REQUIRED BY A/E

Reason for not providing specified item:

Similar Installation:

Project: _____ Architect: _____
Address: _____ Owner: _____
Date Installed: _____

Proposed substitution affects other parts of Work: ☐ No ☐ Yes; explain _____

Savings to Owner for accepting substitution: _____ (\$ _____).

Proposed substitution changes Contract Time: ☐ No ☐ Yes [Add] [Deduct] _____ days.

Supporting Data Attached: ☐ Drawings ☐ Product Data ☐ Samples ☐ Tests ☐ Reports ☐ _____

SUBSTITUTION REQUEST

(After the Bidding/Negotiating Phase — Continued)

The Undersigned certifies:

- Proposed substitution has been fully investigated and determined to be equal or superior in all respects to specified product.
- Same warranty will be furnished for proposed substitution as for specified product.
- Same maintenance service and source of replacement parts, as applicable, is available.
- Proposed substitution will have no adverse effect on other trades and will not affect or delay progress schedule.
- Cost data as stated above is complete. Claims for additional costs related to accepted substitution which may subsequently become apparent are to be waived.
- Proposed substitution does not affect dimensions and functional clearances.
- Payment will be made for changes to building design, including A/E design, detailing, and construction costs caused by the substitution.
- Coordination, installation, and changes in the Work as necessary for accepted substitution will be complete in all respects.

Submitted by: _____

Signed by: _____

Firm: _____

Address: _____

Telephone: _____

Attachments: ☐

A/E's REVIEW AND ACTION

- ☐ Substitution approved - Make submittals in accordance with Specification Section 01 25 00 Substitution Procedures.
- ☐ Substitution approved as noted - Make submittals in accordance with Specification Section 01 25 00 Substitution Procedures.
- ☐ Substitution rejected - Use specified materials.
- ☐ Substitution Request received too late - Use specified materials.

Signed by: _____ Date: _____

Additional Comments: ☐ Contractor ☐ Subcontractor ☐ Supplier ☐ Manufacturer ☐ A/E
☐ Other: _____

END OF SECTION

SECTION 01 73 00 - EXECUTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes general procedural requirements governing execution of the Work including, but not limited to, the following:
 - 1. Construction layout.
 - 2. General installation of products.
 - 3. Coordination of Owner-installed products.
 - 4. Progress cleaning.
 - 5. Starting and adjusting.
 - 6. Protection of installed construction.
 - 7. Correction of the Work.
- B. Related Sections include the following:
 - 1. Division 1 Section "Project Management and Coordination" for procedures for coordinating field engineering with other construction activities.
 - 2. Division 1 Section "Closeout Procedures" for submitting final property survey with Project Record Documents, recording of Owner-accepted deviations from indicated lines and levels, and final cleaning.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Existing Conditions: The existence and location of site improvements, utilities, and other construction indicated as existing are not guaranteed. Before beginning work, investigate and verify the existence and location of mechanical and electrical systems and other construction affecting the Work.
 - 1. Before construction, verify the location and points of connection of utility services.
- B. Existing Utilities: The existence and location of underground and other utilities and construction indicated as existing are not guaranteed. Before beginning sitework, investigate

and verify the existence and location of underground utilities and other construction affecting the Work.

1. Before construction, verify the location and invert elevation at points of connection of sanitary sewer, storm sewer, and water-service piping; and underground electrical services.
 2. Furnish location data for work related to Project that must be performed by public utilities serving Project site.
- C. Acceptance of Conditions: Examine substrates, areas, and conditions, with Installer or Applicator present where indicated, for compliance with requirements for installation tolerances and other conditions affecting performance. Record observations.
1. Written Report: Where a written report listing conditions detrimental to performance of the Work is required by other Sections, include the following:
 - a. Description of the Work.
 - b. List of detrimental conditions, including substrates.
 - c. List of unacceptable installation tolerances.
 - d. Recommended corrections.
 2. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
 3. Examine roughing-in for mechanical and electrical systems to verify actual locations of connections before equipment and fixture installation.
 4. Examine walls, floors, and roofs for suitable conditions where products and systems are to be installed.
 5. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

3.2 PREPARATION

- A. Existing Utility Information: Furnish information to local utility that is necessary to adjust, move, or relocate existing utility structures, utility poles, lines, services, or other utility appurtenances located in or affected by construction. Coordinate with authorities having jurisdiction.
- B. Field Measurements: Take field measurements as required to fit the Work properly. Recheck measurements before installing each product. Where portions of the Work are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
- C. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.
- D. Review of Contract Documents and Field Conditions: Immediately on discovery of the need for clarification of the Contract Documents, submit a request for information to Architect. Include a detailed description of problem encountered, together with recommendations for changing the Contract Documents. Submit requests on CSI Form 13.2A, "Request for Interpretation."

3.3 CONSTRUCTION LAYOUT

- A. Verification: Before proceeding to lay out the Work, verify layout information shown on Drawings, in relation to the property survey and existing benchmarks. If discrepancies are discovered, notify Architect promptly.
- B. Site Improvements: Locate and lay out site improvements, including pavements, grading, fill and topsoil placement, utility slopes, and invert elevations.
- C. Building Lines and Levels: Locate and lay out control lines and levels for foundations including those required for mechanical and electrical work. Transfer survey markings and elevations for use with control lines and levels. Level foundations from two or more locations.
- D. Record Log: Maintain a log of layout control work. Record deviations from required lines and levels. Include beginning and ending dates and times of surveys, weather conditions, name and duty of each survey party member, and types of instruments and tapes used. Make the log available for reference by Architect.

3.4 INSTALLATION

- A. General: Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.
 - 1. Make vertical work plumb and make horizontal work level.
 - 2. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.
 - 3. Conceal pipes, ducts, and wiring in finished areas, unless otherwise indicated.
 - 4. Maintain minimum headroom clearance of 8 feet (2.4 m) in spaces without a suspended ceiling.
- B. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.
- C. Install products at the time and under conditions that will ensure the best possible results. Maintain conditions required for product performance until Substantial Completion.
- D. Conduct construction operations so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy.
- E. Tools and Equipment: Do not use tools or equipment that produces harmful noise levels.
- F. Templates: Obtain and distribute to the parties involved templates for work specified to be factory prepared and field installed. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing products to comply with indicated requirements.
- G. Anchors and Fasteners: Provide anchors and fasteners as required to anchor each component securely in place, accurately located and aligned with other portions of the Work.

1. Mounting Heights: Where mounting heights are not indicated, mount components at heights directed by Architect/engineer.
 2. Allow for building movement, including thermal expansion and contraction.
 3. Coordinate installation of anchorages. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.
- H. Joints: Make joints of uniform width. Where joint locations in exposed work are not indicated, arrange joints for the best visual effect. Fit exposed connections together to form hairline joints.
- I. Hazardous Materials: Use products, cleaners, and installation materials that are not considered hazardous.

3.5 OWNER-INSTALLED PRODUCTS

- A. Site Access: Provide access to Project site for Owner's construction forces.
- B. Coordination: Coordinate construction and operations of the Work with work performed by Owner's construction forces.
1. Construction Schedule: Inform Owner of Contractor's preferred construction schedule for Owner's portion of the Work. Adjust construction schedule based on a mutually agreeable timetable. Notify Owner if changes to schedule are required due to differences in actual construction progress.
 2. Preinstallation Conferences: Include Owner's construction forces at preinstallation conferences covering portions of the Work that are to receive Owner's work. Attend preinstallation conferences conducted by Owner's construction forces if portions of the Work depend on Owner's construction.

3.6 PROGRESS CLEANING

- A. General: Clean Project site and work areas daily, including common areas. Coordinate progress cleaning for joint-use areas where more than one installer has worked. Enforce requirements strictly. Dispose of materials lawfully.
1. Comply with requirements in NFPA 241 for removal of combustible waste materials and debris.
 2. Do not hold materials more than 7 days during normal weather or 3 days if the temperature is expected to rise above 80 deg F (27 deg C).
 3. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.
- B. Site: Maintain Project site free of waste materials and debris.
- C. Work Areas: Clean areas where work is in progress to the level of cleanliness necessary for proper execution of the Work.
1. Remove liquid spills promptly.

2. Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.
- D. Installed Work: Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.
- E. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.
- F. Exposed Surfaces in Finished Areas: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.
- G. Waste Disposal: Burying or burning waste materials on-site will not be permitted. Washing waste materials down sewers or into waterways will not be permitted.
- H. During handling and installation, clean and protect construction in progress and adjoining materials already in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.
- I. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.
- J. Limiting Exposures: Supervise construction operations to assure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.

3.7 STARTING AND ADJUSTING

- A. Start equipment and operating components to confirm proper operation. Remove malfunctioning units, replace with new units, and retest.
- B. Adjust operating components for proper operation without binding. Adjust equipment for proper operation.
- C. Test each piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
- D. Manufacturer's Field Service: If a factory-authorized service representative is required to inspect field-assembled components and equipment installation, comply with qualification requirements in Division 1 Section "Quality Requirements."

3.8 PROTECTION OF INSTALLED CONSTRUCTION

- A. Provide final protection and maintain conditions that ensure installed Work is without damage or deterioration at time of Substantial Completion.
- B. Comply with manufacturer's written instructions for temperature and relative humidity.

3.9 CORRECTION OF THE WORK

- A. Repair or remove and replace defective construction. Restore damaged substrates and finishes. Comply with requirements in DelDOT Standard Specifications, Latest Edition.
 - 1. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment.
- B. Restore permanent facilities used during construction to their specified condition.
- C. Remove and replace damaged surfaces that are exposed to view if surfaces cannot be repaired without visible evidence of repair.
- D. Repair components that do not operate properly. Remove and replace operating components that cannot be repaired.
- E. Remove and replace chipped, scratched, and broken glass or reflective surfaces.

END OF SECTION

SECTION 01 74 19 – CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for the following:
 - 1. Salvaging nonhazardous demolition and construction waste.
 - 2. Recycling nonhazardous demolition and construction waste.
 - 3. Disposing of nonhazardous demolition and construction waste.
- B. Related Requirements:
 - 1. Section 02 41 19 "Selective Demolition" for disposition of waste resulting from partial demolition of buildings, structures, and site improvements.

1.3 DEFINITIONS

- A. Construction, Demolition and Land Clearing (CDL) Waste: Includes all non-hazardous solid wastes resulting from construction, remodeling, alterations, repair, demolition and land clearing. Includes material that is recycled, reused, salvaged or disposed as garbage. Construction waste includes packaging.
- B. Disposal: Removal off-site of demolition and construction waste and subsequent sale, recycling, reuse, or deposit in landfill or incinerator acceptable to authorities having jurisdiction.
- C. Recycle: The process of sorting, treating and reconstituting materials for the purpose of using the material in the manufacture of a new product.
- D. Reuse: Making use of a material without altering its form. Materials can be reused on-site or reused on other projects off-site. Examples include, but are not limited to the following: Crushing or grinding of concrete for use as sub-base material. Chipping of land clearing debris for use of mulch.
- E. Salvage: Recovery of demolition or construction waste and subsequent sale, reuse in another facility or sale to a third party.
- F. Salvage and Reuse: Recovery of demolition or construction waste and subsequent incorporation into the Work.

- G. Source-Separated CDL Recycling: The process of separating recyclable materials in separate containers as they are generated on the job-site. The separated materials are hauled directly to a recycling facility or transfer station.
- H. Co-mingled CDL Recycling: The process of collecting mixed recyclable materials in one container on-site. The container is taken to a material recovery facility where materials are separated for recycling.
- I. Approved Recycling Facility: Any of the following:
 - 1. A facility that can legally accept CDL waste materials for the purpose of processing the materials into an altered form for the manufacture of a new product.
 - 2. Material Recovery Facility: A general term used to describe a waste-sorting facility. Mechanical, hand-separation, or a combination of both procedures, are used to recover recyclable materials.

1.4 PERFORMANCE REQUIREMENTS

- A. General: Achieve end-of-Project rates for salvage/recycling of 75 percent CDL waste by weight from the landfill by one or a combination of the following activities:
 - 1. Salvage.
 - 2. Reuse.
 - 3. Source-Separated CDL Recycling.
 - 4. Co-mingled CDL Recycling.
- B. CDL waste materials that can be salvaged, reused or recycled include, but are not limited to, the following:
 - 1. Demolition Waste:
 - a. Acoustical ceiling tiles.
 - b. Asphalt paving.
 - c. Asphalt shingles.
 - d. Carpet and carpet pad.
 - e. Concrete.
 - f. Concrete reinforcing steel.
 - g. Concrete masonry units.
 - h. Doors and frames.
 - i. Door hardware.
 - j. Field office waste including office paper, cans, plastic and office cardboard.
 - k. Fluorescent lamps and ballasts.
 - l. Glazing.
 - m. Gypsum board.
 - n. Insulation.
 - o. Land clearing debris (vegetation, stumpage, dirt, etc.).
 - p. Membrane and built-up Roofing.
 - q. Metals.

- r. Metal studs.
- s. Paint (through hazardous waste outlets).
- t. Plastic film (sheeting, shrink wrap and packaging),
- u. Plywood and oriented strand board.
- v. Rough hardware.
- w. Structural and miscellaneous steel.
- x. Windows.
- y. Wood.
- z. Equipment.
- aa. Piping.
- bb. Supports and hangers.
- cc. Valves.
- dd. Sprinklers.
- ee. Mechanical equipment.
- ff. Refrigerants.
- gg. Electrical conduit.
- hh. Copper wiring.
- ii. Lighting fixtures.
- jj. Electrical devices.
- kk. Switchgear and panelboards.
- ll. Transformers.

2. Construction Waste:

- a. Acoustical ceiling tiles.
- b. Asphalt paving.
- c. Asphalt shingles.
- d. Carpet and carpet pad.
- e. Concrete.
- f. Concrete reinforcing steel.
- g. Concrete masonry units.
- h. Doors and frames.
- i. Door hardware.
- j. Field office waste including office paper, cans, plastic and office cardboard.
- k. Fluorescent lamps and ballasts.
- l. Glazing.
- m. Gypsum board.
- n. Insulation.
- o. Land clearing debris (vegetation, stumpage, dirt, etc.).
- p. Membrane and built-up Roofing.
- q. Metals.
- r. Metal studs.
- s. Paint (through hazardous waste outlets).
- t. Plastic film (sheeting, shrink wrap and packaging),
- u. Plywood and oriented strand board.
- v. Rough hardware.
- w. Structural and miscellaneous steel.
- x. Windows.
- y. Wood.
- z. Piping.

- aa. Electrical conduit.
- bb. Packaging: Regardless of salvage/recycle goal indicated in "General" Paragraph above, salvage or recycle 100 percent of the following uncontaminated packaging materials:
 - 1) Paper.
 - 2) Cardboard.
 - 3) Boxes.
 - 4) Plastic sheet and film.
 - 5) Polystyrene packaging.
 - 6) Wood crates.
 - 7) Plastic pails.

1.5 ACTION SUBMITTALS

- A. Waste Management Plan: Submit plan within 30 days of date established for the Notice of Award.
- B. Waste Management Report: Submit report with each application for payment.

1.6 INFORMATIONAL SUBMITTALS

- A. Waste Reduction Progress Reports: Concurrent with each Application for Payment, submit report:
 - 1. Material category.
 - 2. Generation point of waste.
 - 3. Total quantity of waste in tons (tonnes).
 - 4. Quantity of waste salvaged, both estimated and actual in tons (tonnes).
 - 5. Quantity of waste recycled, both estimated and actual in tons (tonnes).
 - 6. Total quantity of waste recovered (salvaged plus recycled) in tons (tonnes).
 - 7. Total quantity of waste recovered (salvaged plus recycled) as a percentage of total waste.
- B. Records of Donations: Indicate receipt and acceptance of salvageable waste donated to individuals and organizations. Indicate whether organization is tax exempt.
- C. Records of Sales: Indicate receipt and acceptance of salvageable waste sold to individuals and organizations. Indicate whether organization is tax exempt.
- D. Recycling and Processing Facility Records: Indicate receipt and acceptance of recyclable waste by recycling and processing facilities licensed to accept them. Include manifests, weight tickets, receipts, and invoices.
- E. Landfill and Incinerator Disposal Records: Indicate receipt and acceptance of waste by landfills and incinerator facilities licensed to accept them. Include manifests, weight tickets, receipts, and invoices.
- F. Qualification Data: For refrigerant recovery technician.

- G. Statement of Refrigerant Recovery: Signed by refrigerant recovery technician responsible for recovering refrigerant, stating that all refrigerant that was present was recovered and that recovery was performed according to EPA regulations. Include name and address of technician and date refrigerant was recovered.

1.7 QUALITY ASSURANCE

- A. Waste Management Coordinator Qualifications: Experienced firm, with a record of successful waste management coordination of projects with similar requirements, that employs a LEED Accredited Professional, certified by the USGBC as waste management coordinator.
- B. Refrigerant Recovery Technician Qualifications: Certified by EPA-approved certification program.
- C. Regulatory Requirements: Conduct construction waste management activities in accordance with hauling and disposal regulations of all authorities having jurisdiction and all other applicable laws and ordinances.
- D. Waste Management Conference: Conduct conference at Project site to comply with requirements in Section 01 31 00 "Project Management and Coordination." Review methods and procedures related to waste management including, but not limited to, the following:
1. Review and discuss waste management plan including responsibilities of waste management coordinator.
 2. Review requirements for documenting quantities of each type of waste and its disposition.
 3. Review and finalize procedures for materials separation and verify availability of containers and bins needed to avoid delays.
 4. Review procedures for periodic waste collection and transportation to recycling and disposal facilities.
 5. Review waste management requirements for each trade.
 6. Attendees: Inform the following individuals, whose presence is required, of date and time of meeting.
 - a. Owner.
 - b. Architect/Engineer.
 - c. Contractor's superintendent.
 - d. Major subcontractors.
 - e. Waste Management Coordinator.
 - f. Other concerned parties.
 7. Minutes: Record discussion. Distribute meeting minutes to all participants. Note: If there is an Architectural/Engineering consultant contracted by the State of Delaware, they will perform this role.

1.8 WASTE MANAGEMENT PLAN

- A. General: Develop a waste management plan according to ASTM E 1609 and requirements in this Section. Plan shall consist of waste identification, waste reduction work plan, and

cost/revenue analysis. Distinguish between demolition and construction waste. Indicate quantities by weight or volume, but use same units of measure throughout waste management plan.

- B. Waste Identification: Indicate anticipated types and quantities of demolition, site-clearing and construction waste generated by the Work. List all assumptions made for the quantities estimates.
- C. Waste Reduction Work Plan: List each type of waste and whether it will be salvaged, recycled, or disposed of in landfill or incinerator. The plan shall include the following information:
 - 1. Types and estimated quantities, by weight, of CDL waste expected to be generated during demolition and construction.
 - 2. Proposed methods for CDL waste salvage, reuse, recycling and disposal during demolition including, but not limited to, one or more of the following:
 - a. Contracting with a deconstruction specialist to salvage materials generated,
 - b. Selective salvage as part of demolition contractor's work,
 - c. Reuse of materials on-site or sale or donation to a third party.
 - 3. Proposed methods for salvage, reuse, recycling and disposal during construction including, but not limited to, one or more of the following:
 - a. Requiring subcontractors to take their CDL waste to a recycling facility;
 - b. Contracting with a recycling hauler to haul recyclable CDL waste to an approved recycling or material recovery facility;
 - c. Processing and reusing materials on-site;
 - d. Self-hauling to a recycling or material recovery facility.
 - 4. Name of recycling or material recovery facility receiving the CDL wastes.
 - 5. Handling and Transportation Procedures: Include method that will be used for separating recyclable waste including sizes of containers, container labeling, and designated location on project site where materials separation will be located.
- D. Cost/Revenue Analysis: Indicate total cost of waste disposal as if there was no waste management plan and net additional cost or net savings resulting from implementing waste management plan. Include the following:
 - 1. Total quantity of waste.
 - 2. Estimated cost of disposal (cost per unit). Include hauling and tipping fees and cost of collection containers for each type of waste.
 - 3. Total cost of disposal (with no waste management).
 - 4. Revenue from salvaged materials.
 - 5. Revenue from recycled materials.
 - 6. Savings in hauling and tipping fees by donating materials.
 - 7. Savings in hauling and tipping fees that are avoided.
 - 8. Handling and transportation costs. Including cost of collection containers for each type of waste.
 - 9. Net additional cost or net savings from waste management plan.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 CONSTRUCTION WASTE MANAGEMENT, GENERAL

- A. Provide containers for CDL waste that is to be recycled clearly labeled as such with a list of acceptable and unacceptable materials. The list of acceptable materials must be the same as the materials recycled at the receiving material recovery facility or recycling processor.
- B. The collection containers for recyclable CDL waste must contain no more than 10% non-recyclable materials, by volume.
- C. Provide containers for CDL waste that is disposed in a landfill clearly labeled as such.
- D. Use detailed material estimates to reduce risk of unplanned and potentially wasteful cuts.
- E. To the greatest extent possible, include in material purchasing agreements a waste reduction provision requesting that materials and equipment be delivered in packaging made of recyclable material, that they reduce the amount of packaging, that packaging be taken back for reuse or recycling, and to take back all unused product. Insure that subcontractors require the same provisions in their purchase agreements.
- F. Conduct regular visual inspections of dumpsters and recycling bins to remove contaminants.

3.2 SOURCE SEPARATION

- A. General: Contractor shall separate recyclable materials from CDL waste to the maximum extent possible. Separate recyclable materials by type.
 - 1. Provide containers, clearly labeled, by type of separated materials or provide other storage method for managing recyclable materials until they are removed from Project site.
 - 2. Stockpile processed materials on-site without intermixing with other materials. Place, grade, and shape stockpiles to drain surface water and to minimize pest attraction. Cover to prevent windblown dust.
 - 3. Stockpile materials away from demolition area. Do not store within drip line of remaining trees.
 - 4. Store components off the ground and protect from weather.

3.3 CO-MINGLED RECYCLING

- A. General: Do not put CDL waste that will be disposed in a landfill into a co-mingled CDL waste recycling container.

3.4 REMOVAL OF CONSTRUCTION WASTE MATERIALS

- A. Remove CDL waste materials from project site on a regular basis. Do not allow CDL waste to accumulate on-site.
- B. Transport CDL waste materials off Owner's property and legally dispose of them.
- C. Burning of CDL waste is not permitted.

WASTE MANAGEMENT PROGRESS REPORT					
		Disposed in Municipal Solid Waste landfill	Diverted from Landfill by Recycling, Salvage or Reuse		
Material Category			Recycled	Salvaged	Reused
1.	Asphalt				
2.	Gravel				
3.	Land Clearing Debris				

	(Vegetation, Stumpage & Excess Soil)				
4.	Field Office waste (Office Paper, Aluminum Cans, Glass, Plastic and Cardboard)				
5.					
6.					
7.					
8.					
9.					
	Total (In Weight)		(TOTAL OF ALL ABOVE VALUES – IN WEIGHT)		
Percentage of Waste Diverted			(TOTAL WASTE DIVIDED BY TOTAL DIVERTED)		

END OF SECTION

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SECTION 01 77 00 – CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for contract closeout, including, but not limited to, the following:
 - 1. Inspection procedures.
 - 2. Project Record Documents.
 - 3. Operation and maintenance manuals.
 - 4. Warranties.
 - 5. Instruction of Owner's personnel.
 - 6. Final cleaning.
- B. Related Sections include the following:
 - 1. Division 1 Section "Payment Procedures" for requirements for Applications for Payment for Substantial and Final Completion.
 - 2. Division 1 Section "Project Record Documents" for submitting Record Drawings, Record Specifications, and Record Product Data.
 - 3. Division 1 Section "Operation and Maintenance Data" for operation and maintenance manual requirements.
 - 4. Divisions 02 through 33 Sections for specific closeout and special cleaning requirements for the Work in those Sections.

1.3 SUBSTANTIAL COMPLETION

- A. Preliminary Procedures: Before requesting inspection for determining date of Substantial Completion, complete the following. List items below that are incomplete in request.
 - 1. Prepare a list of items to be completed and corrected (punch list), the value of items on the list, and reasons why the Work is not complete.
 - 2. Advise Owner of pending insurance changeover requirements.
 - 3. Submit specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
 - 4. Obtain and submit releases permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
 - 5. Prepare and submit Project Record Documents, operation and maintenance manuals, damage or settlement surveys, and similar final record information.
 - 6. Deliver tools, spare parts, extra materials, and similar items to location designated by Owner. Label with manufacturer's name and model number where applicable.

7. Complete startup testing of systems.
8. Submit test/adjust/balance records.
9. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
10. Advise Owner of changeover in heat and other utilities.
11. Submit changeover information related to Owner's occupancy, use, operation, and maintenance.
12. Complete final cleaning requirements, including touchup painting.
13. Touch up and otherwise repair and restore marred exposed finishes to eliminate visual defects.

B. Inspection: Submit a written request for inspection for Substantial Completion. On receipt of request, Architect/Engineer will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect/Engineer will prepare the Certificate of Substantial Completion after inspection or will notify Contractor of items, either on Contractor's list or additional items identified by Architect/Engineer, that must be completed or corrected before certificate will be issued.

1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.
2. Results of completed inspection will form the basis of requirements for Final Completion.

1.4 FINAL COMPLETION

A. Preliminary Procedures: Before requesting final inspection for determining date of Final Completion, complete the following:

1. Submit a final Application for Payment according to Division 1 Section "Payment Procedures."
2. Submit certified copy of Architect's/Engineer's Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by Architect/Engineer. The certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.
3. Submit evidence of final, continuing insurance coverage complying with insurance requirements.
4. Submit pest-control final inspection report and warranty.
5. Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems. Submit demonstration and training videotapes.

B. Inspection: Submit a written request for final inspection for acceptance. On receipt of request, Architect/Engineer will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare a final Certificate for Payment after inspection or will notify Contractor of construction that must be completed or corrected before certificate will be issued.

1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.

1.5 LIST OF INCOMPLETE ITEMS (PUNCH LIST)

- A. Preparation: Submit three copies of list. Include name and identification of each space and area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by Contractor that are outside the limits of construction.
 - 1. Organize list of spaces in sequential order, starting with exterior areas first and proceeding from lowest floor to highest floor.
 - 2. Organize items applying to each space by major element, including categories for ceiling, individual walls, floors, equipment, and building systems.
 - 3. Include the following information at the top of each page:
 - a. Project name.
 - b. Date.
 - c. Name of Architect.
 - d. Name of Contractor.
 - e. Page number.

1.6 PROJECT RECORD DOCUMENTS

- A. General: Do not use Project Record Documents for construction purposes. Protect Project Record Documents from deterioration and loss. Provide access to Project Record Documents for Architect's reference during normal working hours.
- B. Record Drawings: Maintain and submit one original set of blue- or black-line white prints with two copies of Contract Drawings and Shop Drawings.
 - 1. 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 cannot be readily identified and recorded 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.
 - d. Mark Contract Drawings or Shop Drawings, whichever is most capable of showing actual physical conditions, completely and accurately. Where Shop Drawings are marked, show cross-reference on Contract Drawings.
 - 2. 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.
 - 3. Mark important additional information that was either shown schematically or omitted from original Drawings.
 - 4. Note Construction Change Directive numbers, Change Order numbers, alternate numbers, and similar identification where applicable.
 - 5. Identify and date each Record Drawing; include the designation "PROJECT RECORD DRAWING" in a prominent location. Organize into manageable sets; bind each set with durable paper cover sheets. Include identification on cover sheets.

- C. Record Specifications: Submit one copy of Project's Specifications, including addenda and contract modifications. Mark copy 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. Note related Change Orders, Record Drawings, and Product Data, where applicable.
- D. Record Product Data: Submit three copies of each Product Data submittal. Mark one set to indicate the actual product installation where installation varies substantially from that indicated in Product Data.
 - 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, and Record Specifications, where applicable.
- E. Miscellaneous Record Submittals: 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.

1.7 OPERATION AND MAINTENANCE MANUALS

- A. Assemble three complete sets of operation and maintenance data indicating the operation and maintenance of each system, subsystem, and piece of equipment not part of a system. Include operation and maintenance data required in individual Specification Sections and as follows:
 - 1. Maintenance Data:
 - a. Manufacturer's information, including list of spare parts.
 - b. Name, address, and telephone number of Installer or supplier.
 - c. Maintenance procedures.
 - d. Maintenance and service schedules for preventive and routine maintenance.
 - e. Maintenance record forms.
 - f. Sources of spare parts and maintenance materials.
 - g. Copies of maintenance service agreements.
 - h. Copies of warranties and bonds.
- B. Organize operation and maintenance manuals into suitable sets of manageable size. Bind and index data in heavy-duty, 3-ring, vinyl-covered, loose-leaf binders, in thickness necessary to accommodate contents, with pocket inside the covers to receive folded oversized sheets. Identify each binder on front and spine with the printed title "OPERATION AND MAINTENANCE MANUAL," Project name, and subject matter of contents.

1.8 WARRANTIES

- A. Submittal Time: Submit written warranties on request of Architect for designated portions of the Work where commencement of warranties other than date of Substantial Completion is indicated.
- B. Organize warranty documents into an orderly sequence based on the table of contents of the Project Manual.
 - 1. Bind warranties and bonds in heavy-duty, 3-ring, vinyl-covered, loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2-by-11-inch paper.
 - 2. Provide heavy paper dividers with plastic-covered tabs for each separate warranty. Mark tab to identify the product or installation. Provide a typed description of the product or installation, including the name of the product and the name, address, and telephone number of Installer.
 - 3. Identify each binder on the front and spine with the typed or printed title "WARRANTIES," Project name, and name of Contractor.
- C. Provide additional copies of each warranty to include in each operation and maintenance manual.

PART 2 - PRODUCTS

2.1 MATERIALS

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

PART 3 - EXECUTION

3.1 FINAL CLEANING

- A. General: Provide final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.
- B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to condition expected in an average commercial building cleaning and maintenance program. Comply with manufacturer's written instructions.
 - 1. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for entire Project or for a portion of Project:
 - a. Clean Project site, yard, and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances. Provide a magnetic sweep of all areas around the building to retrieve stray nails, screws and other fasteners or metal shards.
 - b. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.

- c. Rake grounds that are neither planted nor paved to a smooth, even-textured surface.
 - d. Remove tools, construction equipment, machinery, and surplus material from Project site.
 - e. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.
 - f. Remove debris and surface dust from limited access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.
 - g. Sweep concrete floors broom clean in unoccupied spaces.
 - h. Clean transparent materials, including glass in doors and windows. Remove glazing compounds and other noticeable, vision-obscuring materials. Replace chipped or broken glass and other damaged transparent materials.
 - i. Remove labels that are not permanent.
 - j. Touch up and otherwise repair and restore marred, exposed finishes and surfaces. Replace finishes and surfaces that cannot be satisfactorily repaired or restored or that already show evidence of repair or restoration.
 - 1) Do not paint over "UL" and similar labels, including mechanical and electrical nameplates.
 - k. Wipe surfaces of mechanical and electrical equipment, and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.
- C. Comply with safety standards for cleaning. Do not burn waste materials. Do not bury debris or excess materials on Owner's property. Do not discharge volatile, harmful, or dangerous materials into drainage systems. Remove waste materials from Project site and dispose of lawfully.

END OF SECTION

SECTION 01 78 23 – OPERATIONS AND MAINTENANCE DATA

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for preparing maintenance manuals, including the following:
 - 1. Maintenance documentation directory.
 - 2. Maintenance manuals for the care and maintenance of products, and materials.
- B. Related Sections include but are not limited to the following:
 - 1. Division 1 Section "Submittal Procedures" for submitting copies of submittals for maintenance manuals.
 - 2. Division 1 Section "Closeout Procedures" for submitting maintenance manuals.
 - 3. Division 1 Section "Project Record Documents" for preparing Record Drawings for maintenance manuals.
 - 4. Divisions 02 through 33 Sections for specific maintenance manual requirements for the Work in those Sections.

1.3 SUBMITTALS

- A. Final Submittal: Submit 1 copy of each manual in final form at least 15 days before final inspection. Architect will return copy with comments within 15 days after final inspection.
 - 1. Correct or modify each manual to comply with Architect's/Engineer's comments. Submit 3 copies of each corrected manual within 15 days of receipt of Architect's/Engineer's comments.

1.4 COORDINATION

- A. Where 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

2.1 MAINTENANCE DOCUMENTATION DIRECTORY

- A. Organization: Include a section in the directory for each of the following:
 - 1. List of documents.
 - 2. Table of contents.
- B. Tables of Contents: Include a table of contents for each emergency, operation, and maintenance manual.

2.2 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 Architect/Engineer.
- 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 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 "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, 20-lb/sq. ft. 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.

2.3 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.

PART 3 - EXECUTION

3.1 MANUAL PREPARATION

- A. Maintenance Documentation Directory: Prepare a separate manual that provides an organized reference to operation and maintenance manuals.
- B. Product Maintenance Manual: Assemble a complete set of maintenance data indicating care and maintenance of each product, material, and finish incorporated into the Work.
- C. 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.
- D. 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.
- E. Drawings: Prepare drawings supplementing manufacturers' printed data to illustrate the relationship of component parts of equipment and systems and to illustrate control sequence and flow diagrams. Coordinate these drawings with information contained in Record Drawings to ensure correct illustration of completed installation.
 - 1. Do not use original Project Record Documents as part of maintenance manuals.
 - 2. Comply with requirements of newly prepared Record Drawings in Division 1 Section "Project Record Documents."
- F. Comply with Division 1 Section "Closeout Procedures" for the schedule for submitting maintenance documentation.

END OF SECTION

SECTION 01 78 39 – PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 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.
- B. Related Sections include but are not limited to the following:
 - 1. Division 1 Section "Closeout Procedures" for general closeout procedures and maintenance manual requirements.
 - 2. Division 1 Section "Operation and Maintenance Data" for operation and maintenance manual requirements.
 - 3. Divisions 02 through 33 Sections for specific requirements for project record documents of the Work in those Sections.

1.3 SUBMITTALS

- A. Record Drawings: Comply with the following:
 - 1. Number of Copies: Submit copies of Record Drawings as follows:
 - a. Final Submittal: Submit three sets of marked-up Record Prints and one set of record transparencies. Print each Drawing, whether or not changes and additional information were recorded.
- B. Record Specifications: Submit three copies of Project's Specifications, including addenda and contract modifications.
- C. Record Product Data: Submit three copies 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

2.1 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 boat ramps, building pads
 - 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. Changes made by Change Order or Construction Change Directive.
 - i. Changes made following Architect's written orders.
 - j. Details not on the original Contract Drawings.
 - k. Field records for variable and concealed conditions.
 - l. Record information on the Work that is shown only schematically.
 3. Mark the Contract Drawings 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 Architect. When authorized, prepare a full set of corrected transparencies of the Contract Drawings and Shop Drawings.

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 Architect for resolution.
 3. Owner will furnish Contractor one set of transparencies of the Contract Drawings for use in recording information.
 4. Print the Contract Drawings and Shop Drawings for use as Record Transparencies. Architect will make the Contract Drawings available to Contractor's print shop.
- C. 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. Record CAD Drawings: Organize CAD information into separate electronic files that correspond to each sheet of the Contract Drawings. Name each file with the sheet identification. Include identification in each CAD file.
 4. Identification: As follows:
 - a. Project name.
 - b. Date.
 - c. Designation "PROJECT RECORD DRAWINGS."
 - d. Name of Architect/Engineer.
 - e. Name of Contractor.

2.2 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, and Product Data where applicable.

2.3 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, and Product Data where applicable.

2.4 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

3.1 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 Architect's/Engineer's reference during normal working hours.

END OF SECTION

SECTION 02 41 19 - SELECTIVE BUILDING DEMOLITION

PART 1 - GENERAL

1.1 RELATED WORK SPECIFIED IN DIVISION 1 SECTIONS

- A. Coordination and Meetings – Section 01 31 00
- B. Construction Schedule – Section 01 32 00
- C. Submittal Procedures – Section 01 33 00
- D. Construction Facilities – Section 01 52 00

1.2 REFERENCE DOCUMENTS

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

1.3 SUMMARY

- A. Work of this Section includes the following:
 - 1. Demolition work of existing construction and building elements indicated on Drawings or by provisions of this Section.
 - 2. Salvage of existing items to be reused or recycled.

1.4 DEFINITIONS

These terms apply to the selective demolition scope and are outlined in the project construction documents.

- A. Remove: Detach items from existing construction and dispose of them off-site unless indicated to be salvaged or reinstalled.
- B. Remove and Salvage: Detach items from existing construction, in a manner to prevent damage, and deliver to owner ready for reuse or store as noted on drawings.
- C. Remove and Reinstall: detach items from existing construction, in a manner to prevent damage, prepare for reuse, and reinstall where indicated.
- D. Existing to Remain: Leave existing items that are not to be removed and that are not otherwise indicated to be salvaged or reinstalled.

1.5 MATERIALS OWNERSHIP

- A. Except for items or materials indicated to be reused, salvaged, reinstalled, or otherwise indicated to remain the Owner's property, demolished materials shall become the contractor's property and shall be removed from the project site.

1.6 EXISTING CONDITIONS AND EXAMINATION

- A. Visit and examine the site and note all characteristics and irregularities affecting the work of this Section.

1.7 SUBMITTALS

- A. Submit for approval, drawings, diagrams, details and supporting data clearly showing sequence of demolition.
- B. Drawings for structural elements shall be designed by and bear signature and stamp of qualified professional engineer registered in the local jurisdiction.
- C. Existing Conditions Photographs: Photographs of existing conditions of surfaces, materials, equipment, and adjacent improvements that might be misconstrued as damage relating to selective demolition operation. File with the Architect prior to start of work. Insufficient documentation of damaged items prior to the start of work may result in the Contractor's responsibility to restore these items.

1.8 HAZARDOUS MATERIALS

- A. Prior to any demolition, any type of known quantities of hazardous materials must be removed by a Third Party and is the responsibility of the Owner's requirements to remove the hazardous materials from infrastructure.

1.9 PROTECTION

- A. Prevent movement or settlement of adjacent work. Provide and place bracing or shoring and be responsible for safety and support of such work. Be liable for any such movement or settlement, and any damage or injury caused.
- B. Cease operations and notify the Owner and local jurisdiction if safety of any adjacent work or structure appears to be endangered. Take all precautions to support the structure. Do not resume operations until reviewed with the Owner and the local jurisdiction.
- C. Cease operations and notify the Owner and jurisdiction immediately for special protective and disposal instructions when asbestos materials or other hazardous materials are uncovered during the work of this project.
- D. Prevailing weather conditions and weather forecasts shall be considered. Demolition work shall not proceed when weather conditions constitute a hazard to the workers and site.
- E. Prevent debris from blocking surface drainage inlets and mechanical and electrical systems which remain in operation.
- F. Temporarily suspended work that is without continuous supervision, shall be closed to prevent entrance of unauthorized persons.

1.10 TEMPORARY PARTITIONS

- A. Erect and maintain dustproof partitions, seal off ducts as required to prevent spread of dust and fumes to other parts of the building. On completion, remove partitions and make good surfaces to match adjacent surfaces.

1.11 SALVAGEABLE AND RECYCLABLE MATERIALS

- A. Except where otherwise specified, all materials indicated or specified to be permanently removed from the Place of the Work shall become Contractor's property. Maximize to the fullest extent possible, salvage and recycling of such materials, consistent with proper economy and expeditious performance of the Work.
- B. To reduce the quantity of material otherwise destined for disposal at a landfill, the Contractor is encouraged to consider utilizing the services of businesses and non-profit organizations that specialize in salvage and recycling of used building materials, but does so at his own option and risk.

1.12 WASTE /DISPOSAL OF DEMOLISHED MATERIALS

- A. Promptly dispose of all demolished materials.
- B. Do not allow demolished materials to accumulate on-site.
- C. Transport demolished materials off Owner's property and legally dispose of them.

PART 2 – MATERIALS

Not used.

PART 3 – EXECUTION

3.1 EXISTING SERVICES

- A. Disconnect all electrical and telephone service lines as required in the areas to be demolished. Post warning signs on all electrical lines and equipment that must remain energized to serve other areas during period of demolition.
- B. Disconnect and cap all mechanical services in accordance with Mechanical, Electrical and Plumbing documents. .

3.2 APPLICATION

- A. Carry out demolition work in accordance with the industry standards of practice for safety in demolition of structures.
- B. Remove from the site all materials indicated to be removed.
- C. Carry out demolition in a manner to minimize inconvenience to any adjacent buildings or spaces.
- D. Carry out demolition in an orderly and careful manner.

- E. Before commencing general demolition, separate by hand demolition, attached structures to remain from structure to be demolished.
- F. Lower waste materials in a controlled manner; do not drop or throw materials from heights.
- G. Burning of materials on site is not permitted.

3.3 SELECTIVE DEMOLITION

- A. Protect existing facilities from damage, including all building elements to remain. Items damaged as a result of demolition operations shall be repaired or replaced at no cost to the Owner.
- B. Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete work within limitations of governing regulations and as follows:
 - 1. Proceed with selective demolition systematically.
 - 2. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. To minimize disturbance of adjacent surfaces, use hand or small power tools designed for sawing or grinding, not hammering and chopping. Provide barriers in accordance with OSHA Standards.
 - 3. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
 - 4. Do not use cutting torches until work area is cleared of flammable materials. At concealed spaces, such as duct and pipe interiors, verify condition and contents of hidden space before starting flame-cutting operations. Maintain portable fire-suppression devices during flame-cutting operations.
 - 5. Maintain adequate ventilation when using cutting torches.
 - 6. Do not use impact tools in areas adjacent to any materials that are to remain.
 - 7. Locate selective demolition equipment throughout the structure and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
 - 8. Return elements of construction and surfaces to remain to condition existing before start of selective demolition operations.

3.4 CLEAN-UP

- A. For clean-up during demolition and for final cleaning, comply with requirements of Division 01. Clean surfaces on which new materials will be applied, removing grease, adhesives, bitumen, and other adhering materials, as necessary to furnish acceptable substrates for new materials. Required substrate conditions shall be as approved by the manufacturer of the new material.
- B. Sweep and thoroughly clean all areas on completion of all selective demolition operations.

END OF SECTION

SECTION 04 20 00 - UNIT MASONRY SYSTEM

PART 1 GENERAL

1.1 RELATED SECTIONS

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

1.2 DESCRIPTION OF WORK

- A. Provide all labor, materials, equipment and service necessary for the complete installation of unit masonry systems. Work includes that shown on the drawings and specified herein, including but not limited to the following:
 - 1. Concrete Masonry units
 - 2. Mortar
 - 3. Reinforcement
 - 4. Masonry Veneer Anchors
 - 5. Flashing
 - 6. Mortar Net
 - 7. Weep Holes
 - 8. Air and Vapor Barrier
 - 9. Masonry and Cavity Insulation
 - 10. Accessories
 - 11. Masonry Cleaners

1.3 QUALITY ASSURANCE

- A. Submittals
 - 1. **Product Data:** Provide data for masonry units, flashing, mortar, and fabricated wire reinforcement.
 - 2. **Samples:** Submit samples of the following for verification:
 - a. Full-size units for each different exposed masonry unit required, showing the full range of exposed colors, textures and dimensions to be expected in the completed construction
- B. Environmental Requirements
 - 1. Cold Weather Requirements: IMIAC - Recommended Practices and Guide Specifications for Cold Weather Masonry Construction.
 - 2. Hot Weather Requirements: IMIAC - Recommended Practices and Guide Specifications for Hot Weather Masonry Construction.
- C. Testing Agency Qualifications: An independent testing agency, acceptable to authorities having jurisdiction, qualified according to ASTM C 1093 to conduct the testing indicated, as documented according to ASTM E

- D. Store masonry units on elevated platforms in a dry location. If units are not stored in an enclosed location, cover tops and sides of stacks with waterproof sheeting, securely tied. If units become wet, do not install until they are dry.
 - 1. Protect concrete masonry units from moisture absorption so that, at the time of installation, the moisture content is not more than the maximum allowed at the time of delivery.
- E. Store cementitious materials on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.
- F. Deliver preblended, dry mortar mix in moisture-resistant containers designed for lifting and emptying into dispensing silo. Store preblended, dry mortar mix in delivery containers on elevated platforms, under cover, and in a dry location or in a metal dispensing silo with weatherproof cover.
- G. Store masonry accessories, including metal items, to prevent corrosion and accumulation of dirt and oil.

1.4 PROJECT CONDITIONS

- A. **Stain Prevention:** Prevent grout, mortar and soil from staining the face of masonry to be left exposed or painted. Immediately remove grout, mortar and soil that come in contact with such masonry.
 - 1. Protect base of walls from rain-splashed mud and from mortar splatter by coverings spread on ground and over wall surface.
 - 2. Protect surfaces of window and door frames, as well as similar products with painted and integral finishes, from mortar droppings.
- B. **Cold-Weather Requirements:** Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen substrates. Remove and replace unit masonry damaged by frost or by freezing conditions. Comply with cold-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602.
 - 1. **Cold-Weather Cleaning:** Use liquid cleaning methods only when air temperature is 40 deg. F and above and will remain so until masonry has dried, but not less than 7 days after completing cleaning.
- C. **Hot-Weather Requirements:** Protect unit masonry work when temperature and humidity conditions produce excessive evaporation of water from mortar and grout. Provide artificial shade and wind breaks and use cooled materials as required.
 - 1. When ambient temperature exceeds 100 deg. F, or 90 deg. F with a wind velocity greater than 8 mph, do not spread mortar beds more than 48 inches ahead of masonry. Set masonry units within one minute of spreading mortar.

1.5 PERFORMANCE REQUIREMENTS

- A. Provide unit masonry that develops the following net area compressive strengths ($f'm$) at 28 days. Determine compressive strength for masonry from net area compressive strengths of masonry units and mortar types according to Tables 1 and 2 in ACI 530.1/ASCE6/TMS 602.
- B. Provide unit masonry that develops the following net area compressive strengths ($f'm$) at 28 days. Determine compressive strength of masonry by testing masonry prisms according to ASTM C 1314.
 - 1. For Concrete Unit Masonry: As indicated in ACI 530.1

PART 2 PRODUCTS

2.1 CONCRETE MASONRY UNITS

- A. **Hollow Load Bearing Block Units:** ASTM C90, Type I - Moisture Controlled, Grade N.
- B. **Size and Shape:** Size of 8" H x 16" L

2.2 MORTAR AND GROUT

- A. **General:** Provide pre-blended Silo Systems Type N, pigmented mortar and grout with water repellent admixture conforming to the following:
- B. **Portland Cement:** ASTM C 150, Type I or II, except Type III may be used for cold weather construction. Provide natural color or white cement as required to produce mortar color indicated.
- C. **Hydrated Lime:** ASTM C 207, Type S or SA.
- D. **Portland Cement-Lime Mix:** Pre-blended Silo Systems packaged blend of portland cement complying with ASTM C 150, Type I or Type III, and hydrated lime complying with ASTM C 207.
- E. **Mortar Cement:** ASTM C 1329.
- F. **Masonry Cement:** ASTM C 91.
 - 1. For pigmented mortar, use a colored cement formulation as required to produce the color indicated or, if not indicated, as selected from manufacturer's standard formulations.
 - a. Pigments shall not exceed 10% of portland cement by weight for mineral oxides. Carbon black is not allowed.
 - b. Pigments shall not exceed 5% of mortar cement by weight for mineral oxides. Carbon black is not allowed.
- G. **Aggregate for Mortar:** ASTM C 144; except for joints less than 1/4" thick, use aggregate graded with 100% passing the No. 16 sieve.

1. White Mortar Aggregates: Natural white sand or ground white stone.
 2. Colored Mortar Aggregates: Natural colored sand or ground marble, granite or other sound stone; of color necessary to produce required mortar color.
- H. **Aggregate for Grout:** ASTM C 404.
- I. **Mortar Pigments:** Natural and synthetic iron oxides and chromium oxides, compounded for use in mortar mixes. Use only pigments with a record of satisfactory performance with masonry mortar.
- J. **Cold Weather Admixture:** Nonchloride, noncorrosive, accelerating admixture complying with ASTM C 494, Type C, and recommended by the manufacturer for use in masonry mortar of composition indicated.
- K. **Water:** Potable.
- L. **Products:** Subject to compliance with requirements, provide one of the following:
1. Cold Weather Admixture:
 - a. Accelguard 80; Euclid Chemical Co.
 - b. Morseled; W.R. Grace & Co., Construction Products Division
 - c. Trimix-NCA; Sonneborn, Div. of ChemRex, Inc.
 - d. or Approved Equal

2.3 REINFORCEMENT

- A. **Single Wythe Joint Reinforcement:** Ladder type; steel wire, hot dip galvanized to ASTM A153, Class B-2 after fabrication, 3/16 inch side rods with cross ties.
1. Manufacturers:
 - a. Hohmann & Barnard #220 Ladder Reinforcement
 - b. Heckman Building Products
 - c. or Approved equal.
- B. **Multiple Wythe Joint Reinforcement:** Ladder type; with moisture drip; steel wire, hot dip galvanized to ASTM A153, Class B-2 after fabrication, 3/16 inch side rods with cross ties.
1. Manufacturers:
 - a. National Wire Products
 - b. Dur O Wal
 - c. #280 SIS Dub'L Loop-Lok ladder type when cavity insulation is required.
 - d. or Approved Equal

2.4 MASONRY VENEER ANCHORS

A. Manufacturer

1. Hohmann & Barnard Veneer Anchor

- a. DW-10 Veneer Anchor.
- b. HB_213-2X Veneer Anchor (used with cavity insulation)
- c. Use with SX fastener manufactured by Stadler Companies.
- d. Stainless steel.
- e. Size leg length and tie length according to project requirements.
- f. Provide X seal tape.

2. Masonry veneer shall be attached to the structural elements or to the backup construction by means of the POS-I-TIE Masonry Veneer Anchor System as supplied and in accordance with the recommendations of Heckman Building Products. This system shall include the following elements:

- a. NWSD - A self-drilling steel fastener used for making connections through sheathing directly to metal studs, with a 3/8" x 3/4" stainless steel washer with a Permaseal backing.
- b. A steel barrel with an eye at the outer end that fits over the ends of the first three items and is used for turning them as well as for connection to item 3.
- c. Triangular shaped, five gauge stainless steel wire ties used to connect the masonry veneer to the steel barrels.

3. or Approved Equal

All of the above elements shall be stainless steel for corrosion protection according to ASTM A580/A580M.

B. Reinforcing Steel: ASTM A615, 60 KSI yield grade, deformed billet bars, uncoated finish.

C. Strap Anchors: Bent steel shape, 3/16 inch thick, hot dip galvanized to ASTM A123.

2.4 FLEXIBLE METAL FLASHING

A. Stainless Steel Core Flexible Flashing with Drainage Fabric

1. Product standard of quality: York Manufacturing, Inc.; York Flash-Vent SS

2. Accepted products:

- a. York Manufacturing, Inc.; York Flash-Vent SS, (www.yorkmfg.com)
- b. STS Coatings, Inc.; Wall Guardian TWF Stainless Steel (www.stscoatings.com)
- c. Building Materials West Company, Inc.; Evacu-Flash SS (www.evacu-flash.com)
- d. Or Approved Equal

3. Characteristics:

- a. Type: Engineered system, with high resistant to damage, composite with a stainless steel with non-asphalt adhesive polymer fabric laminated to one stainless steel and non-woven drainage fabric laminated to opposing face with non-asphalt adhesive.
- b. Stainless steel: ASTM A167
- c. Fabrics:
 - 1) Polymer fabric; laminated back face to stainless steel core
 - 2) Non-woven drainage fabric: Fabric laminated to front face stainless steel core.
- d. Recycled content: stainless steel is 60% recycled
- e. Size: Manufacturer's standard width rolls.

2.5 MORTAR NET

- A. Provide according to manufacturer's recommendations at all cavity walls. Provide Hohmann & Barnard Mortar Net sized per conditions of the project, or approved equal.

2.6 WEEPS

- A. Weeps: Honeycomb head joints.
 - 1. Manufacturers:
 - a. Hohmann & Barnard "QV" Quadro Vent
 - b. Heckman Building Products - #85 Cell Vent
 - c. or Approved Equal

2.7 CAVITY INSULATION

- A. Above Grade Cavity Wall Insulation
 - 1. Styrofoam Cavity Mate Insulation by Dow Chemical Co.
 - 2. Approved equal.

2.8 MASONRY CLEANERS

- A. Job-Mixed Detergent Solution: Solution of 1/2 cup dry measure tetrasodium polyphosphate and 1/2 cup dry measure laundry detergent dissolved in 1 gallon of water.
- B. Proprietary Acidic Cleaner: Manufacturer's standard strength cleaner designed for removing mortar/grout stains, efflorescence, and other new construction stains from new masonry without discoloring or damaging masonry surfaces. Use product expressly approved for intended use by cleaner manufacturer and manufacturer of masonry units being cleaned.

PART 3 EXECUTION

3.1 EXAMINATION AND PREPARATION

- A. Verify that field conditions are acceptable and are ready to receive Work.
- B. Coordinate placement of anchors supplied in other Sections.

3.2 COURSING

- A. Maintain masonry courses to uniform dimension. Form vertical and horizontal joints of uniform thickness. Courses shall match and align with existing conditions.
- B. **Concrete Masonry Units:**
 - 1. Bond: Running, and as indicated on drawings.
 - 2. Coursing: One unit and one mortar joint to equal 16 inches wide and 8 inches high.
 - 3. Mortar Joints: Standard concave strike joint.

3.3 WEEPS

- A. Install weeps in brick at 16 inches oc horizontally above through-wall flashing, at bottom of walls.

3.4 CAVITY WALL

- A. Do not permit mortar to drop or accumulate into cavity air space or to plug weep holes. **Strike joints facing cavities flush.**
- B. Build inner wythe ahead of outer wythe to receive cavity insulation air/vapor barrier adhesive.

3.5 REINFORCEMENT AND ANCHORAGES - CAVITY WALL MASONRY

- A. Install horizontal joint reinforcement 16 inches o.c
- B. Place masonry joint reinforcement in first and second horizontal joints above and below openings. Extend minimum 16 inches each side of opening.
- C. Reinforce corners and intersections with strap anchors 16 inches oc.

3.6 MASONRY FLASHINGS

- A. General
 - 1. Install where indicated, specified, or required in accord with flashing manufacturer's written instructions and as follows.
 - a. Prohibited practice: Tucking the flashing into the backer wall.
 - b. Prohibited practice: Bonding or splicing to non-woven drainage fabric.
 - 2. Extend flashing 6" minimum, beyond opening, each side without stretching flashing material.
 - 3. Flashing width: Width required starting 1.5" to the exterior of the outside face of exterior wythe, extending through cavity, rising height required to extend above lintel steel at least 2". After inspection by the agreed upon parties the flashing should be cut flush with the leading edge of the brick.

4. Splice end joints by butting ends together over 4" wide piece of self-adhering stainless steel flashing. The self-adhering stainless steel flashing should be sealed metal face down on to the substrate with the mastic. Remove the release linear and butt the two piece of flashing together and embed them into the splice sealant. Then seal the butt seam with sealant.
5. Masonry back up:
 - a. Surface mount flashing after damp proofing installation specified in Damp Proofing Section in accord with manufacturer's installation instructions.
 - b. Apply flashing with drainage surface to outside.
 - c. Fasten to masonry back-up surface at top by embedding in layer of sealant and use a termination bar to fasten to the backer wall and seal the top of the termination bar with sealant.
6. Confirm compatibility with manufacturer's mutual letters for all lapping components, Air barrier installation lapping over flashing top in the Air Barrier Section.
7. Lay flashing in continuous bead of sealant on masonry supporting steel.
8. At ends of openings, use preformed end dams from manufacturer.
9. Do not coat the entire drainage fabric with air barrier. Leave the drainage fabric exposed at least an inch over the top of the mortar droppings.
10. Weep vent protection use the geotextile drainage and install it on the third row height of standard bricks to have the fabric reach the base of the flashing and covering the weep vents.
11. Cover flashing within a few days of installation to protect it from damage from the different trades, the environment and falling debris. If flashing is left unprotected and it is punctured, torn, or has loose scrim you should contact the manufacturer for repair instructions.

3.7 TOLERANCES

- A. Comply with tolerances in ACI 530.1/ASCE 6/TMS 602 and the following:
- B. For conspicuous vertical lines, such as external corners, door jambs, reveals, and expansion and control joints, do not vary from plumb by more than 1/4" in 20 feet, nor 1/2" maximum.
- C. For vertical alignment of exposed head joints, do not vary from plumb by more than 1/4" in 10 feet, nor 1/2" maximum.
- D. For conspicuous horizontal lines, such as exposed lintels, sills, parapets, and reveals, do not vary from level by more than 1/4" in 20 feet, nor 1/2" maximum.
- E. For exposed bed joints, do not vary from thickness indicated by more than plus or minus 1/8" with a maximum thickness limited to 1/2". Do not vary from bed-joint thickness of adjacent courses by more than 1/8".
- F. For exposed head joints, do not vary from thickness indicated by more than plus or minus 1/8". Do not vary from adjacent bed-joint and head-joint thicknesses by more than 1/8".

3.8 CUTTING AND FITTING

- A. Cut and fit for chases, pipes, conduit, sleeves, grounds, and duct work. Coordinate with other sections of work to provide correct size, shape, and location.

3.9 CLEANING

- A. Remove excess mortar and mortar smears as work progresses.
- B. Clean soiled adjacent surfaces disturbed by masonry work with appropriate cleaning solution by brush and hand.
- C. Clean brick walls with specified cleaning solution in accordance with manufacturer's recommendations.
- D. Power cleaning is not allowed.

END OF SECTION

SECTION 05 50 00

METAL FABRICATIONS

PART 1 GENERAL

1.1 RELATED SECTIONS

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

1.2 DESCRIPTION OF WORK

- A. Provide all labor, materials, equipment and services necessary to furnish and install miscellaneous metal fabrications as shown on the drawings and specified herein, including but not limited to:

1. **Steel ladders**
2. **Loose lintels and bolts**
3. **Steel component materials**
4. **Finishes**

1.3 QUALITY ASSURANCE

- A. Provide miscellaneous closure plates, angles or other shapes as necessary to provide complete system. All exposed ends of pipe or tube shall be closed with plates welded to the exposed end. Provide continuous welds ground clean, smooth and neat.
- B. Application Publications:
 1. American Institute of Steel Construction (AISC): Manual of Steel Construction - 8th Edition.
 2. American Society for Testing and Materials (ASTM):
 - A27 Mild-to-Medium Strength Carbon-Steel Castings for General Application
 - A36 Structural Steel
 - A32 High-Strength Bolts for Structural Steel Joints including Suitable Nuts and Plain Hardened Washers
 3. American Welding Society (AWS): D1.1 Structural Welding Code.
 4. All of the applicable publications listed shall be in reference to the latest edition and/or amendment.

1.4 SUBMITTALS

- A. Shop Drawings: Indicate profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners, and accessories. Include erection drawings, elevations, and details where applicable.
- B. Indicate welded connections using standard AWS A2.0 welding symbols. Indicate net weld lengths.

- C. Prepare Shop Drawings under direct supervision of a Professional Structural Engineer experienced in design of this work and licensed in the State of the project.

PART 2 PRODUCTS

2.1 STEEL LADDERS

- A. Provide steel ladders as indicated on the drawings, and provide as indicated below
- B. Stringers: 3/8" x 4" solid steel plates. Bend 90 deg. at floor and anchor to floor with appropriate bolt. Provide two stringers per ladder spaced at 24" c.c. and brace to wall at 4'-0" o.c.
- C. Rungs: Provide 3/4 round solid steel rungs at 12" c.c.
- D. Braces: Brace ladder to wall at 4'-0" c.c. with 3/8" x 4" bent plates of length required to keep ladder rungs 7" off wall.

2.2 LOOSE LINTELS OR BOLTS

- A. Provide loose lintels where indicated on drawings and where required for the proper completion of the work.

2.3 STEEL COMPONENT MATERIALS

- A. Steel Sections: ASTM A36.
- B. Steel Plate: ASTM A283.
- C. Steel Tubing: ASTM A500, Grade B. ASTM A501.
- D. Pipe: ASTM A53, Grade B, Extra Strong. AISC.
- E. Sheet Steel: ASTM A446, Grade B Structural Quality with galvanized coating.
- F. Bolts, Nuts, and Washers: ASTM A325 galvanized to ASTM A153 for galvanized members.
- G. Handrail Fittings: Elbows, T-shapes, escutcheons; cast or machined steel.
- H. Welding Materials: AWS D1.1.
- I. Shop and Touch-Up Primer: SSPC 15, Type 1, red oxide.
- J. Touch-Up Primer for Galvanized Surfaces: Zinc rich type.

2.4 SCHEDULE OF FINISHES

- A. The Schedule is a list of principal items only. Refer to Drawing details for items not specifically scheduled.
- B. Ledge and Shelf Angles, Channels and Plates Not Attached to Structural Framing and Not Exposed to Exterior: For support of metal decking; prime paint finish.

- C. Lintels and all Items Exposed to Exterior: Galvanized and shop primed.
- D. Interior Steel Ladders: Primed finish.
- E. All other Interior Components: Primed finish.
- F. All other exterior steel items are to be galvanized or primed with zinc rich primer.

PART 3 EXECUTION

3.0 EXAMINATION AND PREPARATION

- A. Verify that field conditions are acceptable and are ready to receive Work.
- B. Make provisions for erection loads with temporary bracing. Keep Work in alignment.
- C. Supply items required to be cast into concrete or embedded in masonry with setting templates, to appropriate Sections.

3.2 FABRICATION - GENERAL

- A. Fit and shop assemble in largest practical sections, for delivery to site.
- B. Continuously seal joined members by continuous welds.
- C. Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush, and hairline. Ease exposed edges to small uniform radius.
- D. Exposed Mechanical Fastenings: Flush countersunk screws or bolts, consistent with design of component.
- E. Supply components required for anchorage of fabrications. Fabricate anchors and related components of same material and finish as fabrication.
- F. Provide miscellaneous closure plates, angles or other shapes as necessary to provide complete system. All exposed ends of pipe or tube shall be closed with plates welded to the exposed end. Provide continuous welds ground clean, smooth and neat.

3.3 INSTALLATION

- A. Install items plumb and level, accurately fitted, free from distortion or defects.
- B. Allow for erection loads and provide temporary bracing to maintain true alignment until completion of erection and installation of permanent attachments.
- C. Field weld components as indicated. Perform field welding in accordance with AWS D1.1.
- D. After erection, prime welds, abrasions, and surfaces not shop primed or galvanized, except surfaces to be in contact with concrete.

3.4 FINISHES

- A. Clean surfaces of rust, scale, grease, and foreign matter prior to finishing.
- D. Shop prime items with one coat. Do not prime surfaces in direct contact with concrete or where field welding is required.

END OF SECTION

SECTION 06 10 00 - ROUGH CARPENTRY

PART 1 GENERAL

1.1 RELATED SECTIONS

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

1.2 DESCRIPTION OF WORK

- A. Provide all labor, materials and equipment necessary for the proper installation of rough carpentry work. Provide all work shown on the drawings and all work specified herein, including but not limited to:
 - 1. Roof blocking
 - 2. Blocking required in walls
 - 3. Plywood backing panels
 - 4. Installation of work furnished under other sections, such as:
 - a. Hollow metal work
 - b. Metal and wood doors
 - c. Finished hardware
 - d. Other miscellaneous items not specifically mentioned
 - 5. Accessories
 - 6. Wood preservative treatment
 - 7. Fire retardant treatment

1.3 QUALITY ASSURANCE

- A. Perform work in accordance with the following agencies:
 - 1. Lumber Grading Agency: Certified by ALSC.
 - 2. Lumber Grading Rules: WWPA
 - 3. Plywood Grading Agency: Certified by American Plywood Association (APA).
 - 4. Wood Treatments: Certified by American Wood Preservers Association (AWPA).
 - 5. All stress grade lumber members shall be clearly stamped with the Lumber Inspection Association seal showing the stress grade. All fabrication, erection and other procedures shall conform to the current "National Design Specification for Stress Grade Lumber and Its Fastenings".
 - 6. All wood shall be certified and stamped by FSC.
 - 7. All connections shall be in accordance with the AFPA's "National Design Specification". Shop drawings shall be submitted for approval showing all critical connections. All critical connections shall be designed and installed with steel plates and through bolts or ICBO/UBC approved pre-fabricated timber connectors.

1.4 SUBMITTALS

- A. Product Data: Submit applicable reference standards, current performance data, and application recommendations and product limitations.

PART 2 PRODUCTS

2.1 ROOF BLOCKING

- A. Hem Fir, Spruce or Yellow Pine, or approved equal; No. 2 grade, 19% maximum moisture content (preservative treated and fire retardant treated - Hoover Exterior Fire X or equal).

2.2 BLOCKING REQUIRED IN WALLS

- A. Hem Fir, Spruce or Yellow Pine, or approved equal; No. 2 grade, 19% maximum moisture content (preservative treated); as manufactured by Preserve and Nature Wood (ACQ).
.15 PCF for ACQ.

2.3 PLYWOOD BACKING PANELS - For mounting electric and phone equipment

- A. Grade: APA C-D Plugged.
- B. Exposure:
 - 1. Exterior Use: Exterior.
 - 2. All others: Exposure 1.
- C. Treatment:
 - 1. Exterior uses: Exterior fire retardant treated.
 - 2. All other uses: Interior fire retardant treated.

2.4 INSTALLATION OF WORK SPECIFIED UNDER OTHER SECTIONS

- A. See other sections for product listings.

2.5 ACCESSORIES

- A. Fasteners: Stainless steel for exterior, high humidity and treated wood locations (both fire and preservative treated); plain finish elsewhere.
- B. Die Stamped Connectors: Galvanized steel.
- C. Anchors: Expansion shield and lag bolt type for anchorage to solid masonry or concrete. Bolt or ballistic fastener for anchorages to steel.
- D. Building Paper: No. 15 asphalt felt.

2.6 WOOD PRESERVATIVE TREATMENT

- A. All preservative-treated lumber shall be as manufactured by Preserve and Nature Wood (ACQ). .4 PCF for ACQ when wood is in contact with ground; .15 PCF for ACQ when wood is in contact with fasteners.
- B. Shop preservative treat wood materials indicated in schedule at end of Section, or as specified within this section, in accordance with manufacturer's instructions. (Mark each item with the AWP Quality Mark requirements.)

2.7 WOOD FIRE RETARDANT TREATMENT

- A. AWP Treatment U1, Exterior Type, chemically treated and pressure impregnated; capable of providing a maximum flame spread/smoke development rating of 25 or less; Exterior Firex manufactured by Hoover, or approved equal. Provide in all Type 2 construction projects and where required by code.

PART 3 EXECUTION

3.1 WOOD GROUNDS, NAILERS AND BLOCKING

- A. Provide wherever shown and where required for screeding or attachment of other work. Form shapes as shown and cut as required for true line and level of work to be attached. Coordinate location with other work involved.
- B. Attach to substrates as required to support applied loading. Countersink bolts and nuts flush with surfaces, unless otherwise shown. Build into masonry during installation of masonry work. Where possible, anchor to formwork before concrete placement.
- C. Provide permanent grounds of dresses, preservative treated, key-bevelled lumber not less than 1 1/2" wide and of thickness required to bring face of ground to exact thickness of finish material involved. Remove temporary grounds when no longer required.
- D. Curb all roof openings. Construct curb members of single pieces per side.

3.2 INSTALLATION OF WORK SPECIFIED IN OTHER SECTIONS

- A. The Contractor shall install all rough or structural hardware, brackets, bolts, anchors, etc., shown or indicated on the drawings, and/or required for the proper execution and completion of the entire work. Secure work to structural members by means of clips, hangers or straps, welds, screws, nails, bolts, pop rivets, drilled anchors, power driven anchors of size and power required and recommended, etc., and all as required by the conditions.
- B. The Contractor shall receive, unload, check, store and protect all metal frames and doors. He shall set and temporarily brace the metal frames to be built in including bracing at masonry lintels. Frames shall be accurately installed to suit the doors.
- C. The Contractor shall receive, store, apply and set all finishing hardware fittings, equipment etc., except where the same is specified to be applied or set by the manufacturer or by other trades. He shall file all keys, properly tagged in mounted key cabinet, or dispose of keys as may be directed by the Architect. Keys shall be delivered to the Architect at the completion of the work and a written receipt obtained. Hardware shall be installed in accordance with the manufacturer's instructions, fit accurately, applied securely and adjusted carefully. Exercise care not to injure work when applying hardware.
 - 1. Doors shall be hung plumb and straight with proper clearances, and locks shall be installed with proper clearances for smooth operation.
 - 2. Installed finish hardware shall be free of dents, scratches and other damage. Cover doorknobs, pulls, etc., with masking tape and/or heavy cloth until painting has been completed. Prior to completion of building, examine all doors and other movable

parts, lubricate and adjust as required and leave hardware in perfect working order, free from defects.

3.3 TOUCH UP

- A. Provide touch up of treatment when wood framing has been cut or shaped in the field to ensure all exposed surfaces maintain the integrity of the treatment specified. Perform touch up operations according to manufacturer's recommendations.

3.4 SCHEDULES

- A. All exposed wood used for rough carpentry in buildings of Type 2 Construction must be fire retardant treated.
- B. All wood used for exterior applications, in contact with concrete or masonry, installed within 8 inches of finished grade or finished floor, or wood subject to rot, must be preservative treated.

END OF SECTION

SECTION 06 41 16 - PLASTIC-LAMINATE-CLAD ARCHITECTURAL CABINETS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Specially fabricated cabinet units.
- B. Cabinet hardware.
- C. Factory finishing.

1.2 RELATED SECTIONS

- A. Section 12 36 23.13 – Plastic-Laminate-Clad Countertops

1.3 REFERENCES

- A. ANSI A208.1 - American National Standard for Particleboard; 1999.
- B. AWI/AWMAC (QSI) - Architectural Woodwork Quality Standards Illustrated; Architectural Woodwork Institute and Architectural Woodwork Manufacturers Association of Canada; 2006, 8th Ed., Version 2.0.
- C. WI (MAN) - Manual of Millwork; Woodwork Institute; 2003.

1.4 SUBMITTALS

- A. Shop Drawings: Indicate materials, component profiles and elevations, assembly methods, joint details, fastening methods, accessory listings, hardware location and schedule of finishes.
- B. Samples: Submit actual samples of architectural cabinet construction, minimum 12 inches square, illustrating proposed cabinet, countertop, and shelf unit substrate and finish.
- C. Samples: Submit actual sample items of proposed pulls, hinges, shelf standards, and locksets, demonstrating hardware design, quality, and finish.
- D. Installers' AWI Quality Certification Program (QCP) Certificate.

1.5 QUALITY ASSURANCE

- A. Fabrication Qualifications: Shop that employs skilled workers who custom fabricate products similar to those required for this Project, and whose products have a record of successful in-service performance. Shop is a certified participant in AWI's Quality Certification Program.
- B. Installer Qualifications: Shop is a certified participant in AWI's Quality Certification Program.

1.6 PRE-INSTALLATION MEETING

- A. Convene not less than one week before starting work of this section.

1.7 FIELD CONDITIONS

- A. Do not deliver or install cabinets until building is enclosed and wet work is complete; maintain temperature and relative humidity at occupancy levels during the remainder of the construction period.

PART 2 PRODUCTS

2.1 PLASTIC-LAMINATE-FACED ARCHITECTURAL CABINETS

- A. Quality Standard: Unless otherwise indicated, comply with “Architectural Woodwork Standards” for grades of architectural plastic-laminate cabinets indicated for construction, finishes, installation, and other requirements.
 - 1. Provide labels and certificates from AWI certification program indicating that woodwork complies with requirements of grades specified.
- B. Grade: Custom
- C. Type of Construction: Frameless
- D. Cabinet, Door and Drawer Front Interface Style: Flush overlay
- E. High-Pressure Decorative Laminate: NEMA LD 3, grades as indicated or if not indicated, as required by woodwork quality standard.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by manufacturer indicated on “Finish Schedule” in the Drawings.
- F. Laminate Cladding for Exposed Surfaces:
 - 1. Horizontal Surfaces: Grade HGS
 - 2. Post-Formed Surfaces: Grade HGP
 - 3. Vertical Surfaces: Grade HGS
 - 4. Edges: PVC edge banding, 3 mm thick, matching laminate in color, pattern and finish
- G. Materials for Semi-Exposed Surfaces:
 - 1. Surfaces other than Drawer Bodies: Thermoset decorative panels.
 - a. Edges of Thermoset Decorative Panel Shelves: PVC or polyester edge banding.

- b. For semi-exposed backs of panels with exposed plastic laminate surfaces, provide surface of high-pressure decorative laminate, NEMA LD 3, Grade VGS.
- 2. Drawer Sides and Backs: Solid hardwood lumber
- 3. Drawer Bottoms: Hardwood plywood
- H. Concealed Backs of Panels with Exposed Plastic-Laminate Surfaces: High-pressure decorative laminate, NEMA LD 3, Grade BKL.
- I. Drawer Construction: Fabricate with exposed fronts fastened to subfront with mounting screws from interior of body.
- J. Colors, Patterns and Finishes: Provide materials and products that result in colors and textures of exposed laminate surfaces complying with the following requirements:
 - 1. Nevamar / Santa Rosa Plum Tree / WZ2001T (Basis of Design)

2.2 WOOD MATERIALS

- A. Wood Products: Provide materials that comply with requirements of referenced quality standard for each type of woodwork and quality grade specified unless otherwise indicated.
 - 1. Wood Moisture Content: 8 to 13 percent.
- B. Composite Wood and Agrifiber Products: Provide materials that comply with requirements of referenced quality standards for each type of woodwork and quality grade specified unless otherwise indicated.
 - 1. Medium-Density Fiberboard: ANSI 208.2, Grade 130, made with binder containing no added urea formaldehyde resins.
 - 2. Particleboard: ANSI A208.1, Grade M-2, made with binder containing no added urea formaldehyde resins.
 - 3. Softwood Plywood: DOC PS 1.
 - 4. Thermoset Decorative Panels: Particleboard or medium-density fiberboard finished with thermally fused, melamine-impregnated decorative paper and complying with requirements of NEMA LD 3, Grade VGL, for test methods 3.3, 3.4, 3.6, 3.8 and 3.10.

2.3 FIRE-RETARDANT TREATED MATERIALS

- A. Fire-Retardant Treated Materials, General: Where fire-retardant treated materials are indicated, use materials complying with requirements in this article that are acceptable to authorities having jurisdiction and with fire-test response characteristics specified as determined by testing identical products per test method indicated by a qualified testing agency.
 - 1. Identify fire-retardant treated materials with appropriate classification marking of qualified testing agency in the form of removable paper label or imprint on surfaces that will be concealed from view after installation.

- B. Fire-Retardant Treated Lumber and Plywood: Products with a flame spread index of 25 or less when testing according to ASTM E 84, with no evidence of significant progressive combustion when the test is extended an additional 20 minutes, and with the flame front not extending more than 10.5 feet beyond the centerline of the burners at any time during the test.
 - 1. Kiln dry lumber and plywood after treatment to a maximum moisture content of 19 and 15 percent, respectively.

2.4 CABINET HARDWARE AND ACCESSORIES

- A. Concealed Overlay Hinges: BHMA A156.9, B01602, 130 degrees of opening, self-closing.
- B. Pulls: Back-mounted, solid metal, Artisan Collection, modified bar 128ADA (Stevens Advantage, or approved equal).
- C. Catches: Magnetic catches, BHMA A 156.9, B03141.
- D. Adjustable Shelf Standards and Supports: BHMA A156.9, B04071; with shelf rests, B04081.
- E. Drawer Slides:
 - 1. Grade 1 and Grade 2: Side mounted and extending under bottom edge of drawer, full-extension type; zinc-plated steel with polymer rollers.
 - 2. Grade 1HD-100 and Grade 1HD-200: Side mounted; full extension type; zinc-plated steel ball bearing slides.
 - 3. For drawers not more than 3 inches high and not more than 24 inches wide, provide Grade 1.
 - 4. For drawers more than 3 inches high but not more than 6 inches high and not more than 24 inches wide, provide Grade 1HD-100.
 - 5. For drawers more than 6 inches high or more than 24 inches wide, provide Grade 1HD-200.
- F. Door and Drawer Silencers: BHMA A156.16, L03011.
- G. For concealed hardware, provide manufacturer's standard finish that complies with product class requirements in BHMA A156.9.

2.5 MISCELLANEOUS MATERIALS

- A. Furring, Blocking, Shims and Hanging Strips: Fire-retardant treated softwood lumber, kiln dried to less than 15 percent moisture content.
- B. Anchors: Select material, type, size and finish required for each substrate for secure anchorage. Provide metal expansion sleeves or expansion bolts for post-installed anchors. Use non-ferrous metal or hot-dip galvanized anchors and inserts at inside face of exterior walls and at floors.
- C. Adhesives: Do not use adhesives that contain added urea formaldehyde resins.

2.6 FABRICATION

- A. Sand fire-retardant treated wood lightly to remove raised grain on exposed surfaces before fabrication.
- B. Fabricate cabinets to dimensions, profiles and details indicated.
- C. Complete fabrication, including assembly and hardware application, to maximum extent possible before shipment to Project site. Disassemble components only as necessary for shipment and installation. Where necessary for fitting at site, provide ample allowance for scribing, trimming and fitting.
- D. Shop-cut openings to maximum extent possible to receive hardware, appliances, electrical work and similar items. Locate openings accurately and use templates or roughing-in diagrams to produce accurately sized and shaped openings. Sand edges of cutouts to remove splinters and burrs.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify adequacy of backing and support framing.
- B. Verify location and sizes of utility rough-in associated with work of this section.

3.2 INSTALLATION

- A. Set and secure custom cabinets in place, assuring that they are rigid, plumb, and level.
- B. Secure cabinets to floor using appropriate angles and anchorages.
- C. Countersink anchorage devices at exposed locations. Conceal with solid wood plugs of species to match surrounding wood; finish flush with surrounding surfaces.

END OF SECTION 06 41 16

SECTION 06 61 16 - SOLID POLYMER FABRICATIONS

PART 1 GENERAL

1.1 RELATED SECTIONS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to work of this section.
 - 1. Section 06 65 10 – Solid Surface Fabrications

1.2 DESCRIPTION OF WORK

- A. Description of Work: Provide all labor, materials and equipment necessary to provide and install solid polymer countertops as an alternate to the plastic laminate countertops in the Base Bid. Work includes that shown on the drawings and specified herein, including but not limited to:
 - 1. **Shower Stall Walls**
- B. This section includes furnishing and installing of solid polymer materials including all blocking, fasteners and anchors.
- C. The Contractor shall be responsible to verify all field conditions prior to installation of finish items.

1.3 SUBMITTALS

- A. Shop Drawings: Indicate materials, component profiles, fastening methods, jointing details, finishes, and accessories for all finish carpentry materials.
- B. Samples: Submit two 8-inch size samples illustrating color and specified finish for each item. Cut sample and seam together for representation of inconspicuous seam.

1.4 QUALITY ASSURANCE

- A. Installer's Qualifications: Firm with a minimum 5 years experience in projects of similar size. Firm shall deliver two letters of recommendation from owners of similar projects for finish carpentry.
- B. Allowable Tolerances: Component size and location – 1/8”.

1.5 REGULATORY REQUIREMENTS

- A. Conform to all applicable codes for fire retardant requirements, Class and flame spread requirements as required by type of construction noted on cover sheet of drawings.

1.6 WARRANTY

- A. Provide manufacturer's 10-year warranty against defects in materials. Warranty shall provide material and labor to repair or replace defective materials. Damage caused by physical or chemical abuse or damage from excessive heat will not be warranted.

PART 2 - PRODUCTS

2.1 SOLID POLYMER FABRICATIONS

- A. Shower Stall Walls: 1/2"-thick solid homogeneous, non-porous, filled polymer; not coated, laminated or of composite construction; with through-body colors; meeting ANSI Z124.3 and .6, Type Six, and Fed Spec. WW-P-541E/GEN.
1. Superficial damage to a depth of 0.010" shall be repairable by sanding and polishing.
- B. Manufacturers:
1. Corian (Basis of Design)
 2. Cambria
 3. Or Approved Equal

2.2 SOLID POLYMER CHARACTERISTICS

A. Homogenous Polymer Performance Characteristics:

<u>Property</u>	<u>Typical Result</u>	<u>Test</u>
Tensile Strength	6,000 psi	ASTM D 638
Tensile Modulus	1.5 x 10 ⁻⁶ psi	ASTM D 638
Tensile Elongation	0.4% min.	ASTM D 638
Flexural Strength	10,000 psi	ASTM D 790
Flexural Modulus	1.2 x 10 ⁻⁶ psi	ASTM D 790
Hardness	>85 56	Rockwell "M" Scale; ASTM D 785 Barcol Impressor; ASTM D 2583
Thermal Expansion	1.80 x 10 ⁻⁵ in./in./°F	ASTM D 696
Gloss (60° Gardner)	5-75 (matte-highly polished)	ANSI Z124
Light Resistance	(Xenon Arc) No effect	NEMA LD 3-2000; Method 3.3
Wear & Cleanability	Passes	ANSI Z124.3 & Z124.6
Stain Resistance:		
Sheets	Passes	ANSI Z124.3 & Z124.6
Fungus and Bacteria Resistance	Does not support microbial growth	ASTM G21 & G22
Boiling Water Resistance	No visible change	NEMA LD 3-2000; Method 3.5
High Temperature Resistance	No change	NEMA LD 3-2000; Method 3.6
Izod Impact	0.28 ft.-lbs./in. of notch	ASTM D 256 (Method A)
Ball Impact	No fracture – ½ lb. ball	NEMA LD 3-2000; Method 3.8
Resistance: Sheets	¼" slab – 36" drop ½" slab – 144" drop	

Weatherability	$\Delta E^*_{94} < 5$ in 1,000 hrs	ASTM G 155
Specific Gravity	1/7	
Water Absorption	Long-term 0.4% (3/4") 0.6% (1/2") 0.8% (1/4")	ASTM D 570
Toxicity	99 (solid colors) 66 (patterned colors)	Pittsburgh Protocol Test ("LC50" Test)
Flammability	All colors (Class I and Class A)	ASTM E 84, NFPA 255 & UL 723
Flame Spread Index	<25	
Smoke Developed Index	<25	

B. Homogenous Quartz Surfaces Performance Characteristics:

<u>Property</u>	<u>Typical Result</u>	<u>Test</u>
Flexural Strength	>5,300 psi	ASTM D 790
Flexural Modulus	5.3-5.7E ⁶ psi	ASTM D 790
Flexural Elongation	>0.1%	ASTM D 790
Compression Strength (Dry)	~27,000 psi	ASTM C 170
Compression Strength (Wet)	~24,000 psi	ASTM C 170
Hardness	7	Moh's Hardness Scale
Thermal Expansion	1.45 x 10 ⁻⁵ in./in./°C	ASTM D 696
Gloss (60° Gardner)	45-50	ANSI Z 124
Colorfastness	Passes	ANSI Z 124.6.5.1
Wear and Cleanability	Passes	ANSI Z 125.6.5.3
Stain Resistance	Passes	ANSI Z 124.6 (stain 5.2, chemical 5.5, cigarette 5.4 resistances)
Fungal and Bacterial Resistance	No growth	ASTM G 21 & G 22
High Temperature Resistance	None to slight effect	NEMA LD 3.3.6 *
Boiling Water Resistance	None to slight effect	NEMA LD 3.3.5 *
Freeze-Thaw Cycling	Unaffected	ASTM C 1026
Point Impact	Passes	ANSI Z 124.6.4.2
Ball Impact	164 inches	NEMA LD 3.3.8 *
Slip Resistance	Above 0.80 for textured models	ASTM C 1028
Static Coefficient of Friction (as received)	0.89/0.71 (wet/dry)	ASTM C 1028
Static Coefficient of Friction (with renovator)	0.87/0.65 (wet/dry)	ASTM C 1028
Abrasion Resistance	139	ASTM C 501
Specific Gravity	2.44	ASTM D 792
Density	~2400 kg/m ³	
Water Absorption	0.12%	ASTM C 373
Long-term & short-term	<0.04%	ASTM D 570
Moisture Expansion	<0.01% on average	ASTM C 370
Toxicity	Passes, LC50 = 68-128	Pittsburgh Protocol

Flammability	For all colors tested (Class I and Class A)	ASTM E 84, UL 723 and NFPA 255
Flame Spread Index	FSI <10 for 3 cm and <15 for 2 cm	
Smoke Developed Index	SDI <50 for 3 cm and <100 for 2 cm	
Nominal Thickness	3 cm	
Nominal Weight	10 lb./sq.ft. (2 cm) 15 lb./sq.ft. (3 cm)	

* NEMA results based on the NEMA LD 3-2000

2.3 ACCESSORY PRODUCTS

- A. Joint Adhesive: Manufacturer's standard two-part adhesive kit to create inconspicuous, non-porous joints, with a chemical bond.
- B. Sealant: Manufacturer's standard mildew-resistant, FDA/UL recognized silicone sealant in color-matching or clear formulations.

2.4 FABRICATION

- A. For warranty coverage, fabricator/installer shall be approved by solid polymer manufacturer.
- B. Fabricate components in shop to greatest extent practical to sizes and shapes indicated, in accordance with approved shop drawings and solid polymer manufacturer requirements. Shower paves to have no horizontal panel joints.
- C. Provide holes and cutouts for plumbing and bath accessories as required.
- D. Rout and finish component edges to a smooth, uniform finish. Rout all cutouts, then sand all edges smooth. Repair or reject defective or inaccurate work.
- E. Finish: All surfaces shall have uniform finish.
 - 1. Matte, with a gloss rating of 5-20.
 - 2. Form pieces to shape prior to seaming and joining.
 - 3. Cut pieces larger than finished dimensions. Sand edges. Remove all nicks and scratches.
 - 4. Heat entire component uniformly prior to forming.
 - 5. Prevent blistering, whitening and cracking of solid polymer material during forming.

PART 3 - EXECUTION

3.1 MATERIAL DELIVERY

- A. Deliver no components to Project site until areas are ready for installation.
- B. Store all components indoors.

- C. Handle materials to prevent damage.

3.2 INSTALLATION

- A. Install components plumb and level, in accordance with approved shop drawings and product installation details.
- B. Form field joints using manufacturer's recommended adhesive, with joints inconspicuous in finished work. Keep components and hands clean when making joints.
- C. Keep components and hands clean during installation. Remove adhesives, sealants and other stains. Components shall be clean on Date of Substantial Completion.
- D. Repair or replace damaged work that cannot be repaired to Architect's satisfaction and invoice for cost of repairs. Architect to pre-approved cost estimate before repairs are made.
- E. Fabricator/Installer to provide a Commercial Care and Maintenance video, and review maintenance procedures and warranty details with the director of maintenance upon completion of the project.

END OF SECTION

SECTION 06 65 10 - SOLID SURFACE FABRICATIONS

PART 1 — GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the contract, including general and supplementary conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following horizontal and trim solid surface product types:
 - 1. Solid Surface Shower Base
- B. Related Sections include the following:
 - 1. Division 06 Section “Solid Polymer Fabrication”
 - 2. Division 06 Section “Rough Carpentry” for Blocking
 - 3. Division 22 Section “Plumbing Fixtures”

1.3 DEFINITION

- A. Solid surface is defined as nonporous, homogeneous material maintaining the same composition throughout the part with a composition of acrylic polymer, aluminum trihydrate filler and pigment.

1.4 SUBMITTALS

- A. Product Data:
 - 1. For each type of product indicated.
- B. Shop Drawings:
 - 1. Show location of each item, dimensioned plans and elevations, large-scale details, attachment devices and other components.
 - a. Show full-size details, edge details, thermoforming requirements, attachments, etc.
 - b. Show locations and sizes of furring, blocking, including concealed blocking and reinforcement specified in other Sections.
 - c. Show locations and sizes of cutouts and holes for plumbing fixtures, faucets, soap dispensers, waste receptacle and other items installed in solid surface.
- C. Samples:
 - 1. For each type of product indicated.
 - a. Submit minimum 6-inch by 6-inch sample in specified gloss.

- b. Cut sample and seam together for representation of inconspicuous seam.
 - c. Indicate full range of color and pattern variation.
- 2. Approved samples will be retained as a standard for work.
- D. Product Data:
 - 1. Indicate product description, fabrication information and compliance with specified performance requirements.
- E. Product certificates:
 - 1. For each type of product, signed by product manufacturer.
- F. Maintenance data:
 - 1. Submit manufacturer's care and maintenance data, including repair and cleaning instructions.
 - a. Maintenance kit for finishes shall be submitted.
 - 2. Include in project closeout documents.

1.5 QUALITY ASSURANCE

- A. Qualifications:
 - 1. Shop that employs skilled workers who custom fabricate products similar to those required for this project and whose products have a record of successful in-service performance.
- B. Fabricator/Installer Qualifications:
 - 1. Work of this section shall be by a certified fabricator/installer, certified in writing by the manufacturer.
- C. Applicable Standards:
 - 1. Standards of the following, as referenced herein:
 - a. American National Standards Institute (ANSI)
 - b. American Society for Testing and Materials (ASTM)
 - c. National Electrical Manufacturers Association (NEMA)
 - d. NSF International
 - 2. Fire test response characteristics:
 - a. Provide with the following Class A (Class I) surface burning characteristics as determined by testing identical products per UL 723 (ASTM E84) or another testing and inspecting agency acceptable to authorities having jurisdiction:

- 1) Flame Spread Index: 25 or less.
- 2) Smoke Developed Index: 450 or less.

D. Coordination Drawings:

1. Shall be prepared indicating:
 - a. Plumbing work.
 - b. Miscellaneous steel for the general work.
2. Content:
 - a. Project-specific information, drawn accurately to scale.
 - b. Do not base coordination drawings on reproductions of the contract documents or standard printed data.
 - c. Indicate dimensions shown on the contract drawings and make specific note of dimensions that appear to be in conflict with submitted equipment and minimum clearance requirements.
 - d. Provide alternate sketches to designer for resolution of such conflicts.
 - 1) Minor dimension changes and difficult installations will not be considered changes to the contract.

E. Drawings shall:

1. Be produced in 1/2-inch scale for all fabricated items.

F. Drawings must be complete and submitted to the architect within 60 days after award of contract for record only.

1. No review or approval will be forthcoming.
2. Coordination drawings are required for the benefit of contractor's fabricators/installers as an aid to coordination of their work so as to eliminate or reduce conflicts that may arise during the installation of their work.

1.6 DELIVERY, STORAGE AND HANDLING

- A. Deliver no components to project site until areas are ready for installation.
- B. Store components indoors prior to installation.
- C. Handle materials to prevent damage to finished surfaces.
 1. Provide protective coverings to prevent physical damage or staining following installation for duration of project.

1.7 WARRANTY

- A. Provide manufacturer's warranty against defects in materials.
 1. Warranty shall provide material and labor to repair or replace defective materials.

2. Damage caused by physical or chemical abuse or damage from excessive heat will not be warranted.
- B. Manufacturer's warranty period:
1. Ten years from date of substantial completion.

1.8 MAINTENANCE

- A. Provide maintenance requirements as specified by the manufacturer.

PART 2 — PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers:
1. Subject to compliance with requirements, provide products by one of the following:
 - a. Inpro Endurant (Basis of Design)
 - b. Corian Surfaces from the DuPont company
 - c. Or Approved Equal

2.2 MATERIALS

- A. Solid polymer components
1. Cast, nonporous, filled polymer, not coated, laminated or of composite construction with through body colors meeting ANSI Z124.3 or ANSI Z124.6, having minimum physical and performance properties specified.
 2. Superficial damage to a depth of 0.010 inch (.25 mm) shall be repairable by sanding and/or polishing.
- B. Thickness: 1/2 inch
- C. Shower Receptors
- D. Performance characteristics:

<u>Property</u>	<u>Typical Result</u>	<u>Test</u>
Tensile Strength	6,000 psi	ASTM D 638
Tensile Modulus	1.5×10^{-6} psi	ASTM D 638
Tensile Elongation	0.4% min.	ASTM D 638
Flexural Strength	10,000 psi	ASTM D 790
Flexural Modulus	1.2×10^{-6} psi	ASTM D 790

Hardness	>85	Rockwell “M” Scale ASTM D 785 Barcol Impressor ASTM D 2583 ASTM D 696
	56	
Thermal Expansion	3.02×10^{-5} in./in./°C (1.80×10^{-5} in./in./°F)	
Gloss (60° Gardner)	5–75 (matte—highly polished)	ANSI Z124
Light Resistance	(Xenon Arc) No effect	NEMA LD 3-2000 Method 3.3
Wear and Cleanability	Passes	ANSI Z124.3 & Z124.6
Stain Resistance: Sheets	Passes	ANSI Z124.3 & Z124.6
Fungus and Bacteria Resistance	Does not support microbial growth	ASTM G21&G22
Boiling Water Resistance	No visible change	NEMA LD 3-2000 Method 3.5
High Temperature Resistance	No change	NEMA LD 3-2000 Method 3.6
Izod Impact (Notched Specimen)	0.28 ft.-lbs./in. of notch	ASTM D 256 (Method A)
Ball Impact Resistance: Sheets	No fracture—1/2 lb. ball: 1/4" slab—36" drop 1/2" slab—144" drop	NEMA LD 3-2000 Method 3.8
Weatherability	$\Delta E^*_{94} < 5$ in 1,000 hrs.	ASTM G 155
Specific Gravity †	1.7	
Water Absorption	Long-term 0.4% (3/4") 0.6% (1/2") 0.8% (1/4")	ASTM D 570
Toxicity	99 (solid colors) 66 (patterned colors)	Pittsburgh Protocol Test (“LC50” Test)
Flammability	All colors (Class I and Class A)	ASTM E 84, NFPA 255 & UL 723
Flame Spread Index	<25	
Smoke Developed Index	<25	

† Approximate weight per square foot: 1/4" (6 mm) 2.2 lbs., 1/2" (12.3 mm) 4.4 lbs.
Shapes meet or exceed the ANSI Z124.3 and ANSI Z124.6 standards for plastic sinks and lavatories.
NEMA results based on the NEMA LD 3-2000

2.3 ACCESSORIES

A. Joint adhesive:

1. Manufacturer’s standard one- or two-part adhesive kit to create inconspicuous, nonporous joints.

- B. Sealant:
 - 1. Manufacturer's standard mildew-resistant, UL-listed silicone sealant in colors matching components.
- C. Conductive tape:
 - 1. Manufacturer's standard aluminum foil tape, with required thickness, for use with cutouts near heat sources.
- D. Insulating felt tape:
 - 1. Manufacturer's standard for use with conductive tape in insulating solid surface material from adjacent heat source.

2.4 FACTORY FABRICATION

- A. Shop Assembly
 - 1. Fabricate components to greatest extent practical to sizes and shapes indicated, in accordance with approved shop drawings and manufacturer's printed instructions and technical bulletins.
 - 2. Form joints between components using manufacturer's standard joint adhesive without conspicuous joints.
 - a. Reinforce with strip of solid polymer material, 2" wide.
 - 3. Provide factory cutouts for plumbing fittings and bath accessories as indicated on the drawings.
 - 4. Rout and finish component edges with clean, sharp returns.
 - a. Rout cutouts, radii and contours to template.
 - b. Smooth edges.
 - c. Repair or reject defective and inaccurate work.
- B. Thermoforming:
 - 1. Comply with manufacturer's data.
 - 2. Heat entire component.
 - a. Material shall be uniform, between 275 and 325 degrees Fahrenheit during forming.
 - 3. Form pieces to shape prior to seaming and joining.
 - 4. Cut pieces to finished dimensions.
 - 5. Sand edges and remove nicks and scratches.

2.5 FINISHES

- A. Select from the manufacturer's standard color chart.
- B. Finish:
 - 1. Provide surfaces with a uniform finish.
 - a. Semigloss; gloss range of 20–50.

PART 3 — EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with fabricator present for compliance with requirements for installation tolerances and other conditions affecting performance of work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Install components plumb, level and rigid, scribed to adjacent finishes, in accordance with approved shop drawings and product data.
 - 1. Provide product in the largest pieces available.
 - 2. Form field joints using manufacturer's recommended adhesive, with joints inconspicuous in finished work.
 - a. Exposed joints/seams shall not be allowed.
 - 3. Reinforce field joints with solid surface strips extending a minimum of 1 inch on either side of the seam with the strip being the same thickness as the top.
 - 4. Cut and finish component edges with clean, sharp returns.
 - 5. Rout radii and contours to template.
 - 6. Anchor securely to supports.
 - 7. Carefully dress joints smooth, remove surface scratches and clean entire surface.

3.3 REPAIR

- A. Repair or replace damaged work which cannot be repaired to architect's satisfaction.

3.4 CLEANING AND PROTECTION

- A. Keep components clean during installation.
- B. Remove adhesives, sealants and other stains.

END OF SECTION

SECTION 07 72 00 - ROOF ACCESSORIES

PART 1 - GENERAL

1.1 RELATED SECTIONS

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

1.2 DESCRIPTION OF WORK

- A. Provide all labor, equipment, materials and services necessary for the complete installation of roof accessories. Work includes but is not limited to:
 - 1. Roof curbs
 - 2. Roof hatches
- B. Related sections include:
 - 1. Division 5 Section - Metal Fabrications for ladders and miscellaneous metal framing and supports.
 - 2. Division 6 Section - Rough Carpentry for roof sheathing, wood cants, and wood nailers.
 - 3. Division 7 Section - Sheet Metal Flashing and Trim for shop and field fabricated metal flashing and counterflashing, scuppers, gutters and downspouts, fascia, roof expansion joint covers, valleys, and miscellaneous sheet metal trim and accessories
 - 4. Division 7 Sections for roof accessories included as part of roofing work.
 - 5. Division 9, Section 09 91 00 - Painting for shop primers and field painting.

1.3 SUBMITTALS

- A. Product Data: For each type of product specified. Include construction details, materials, dimensions of individual components and profiles, and finishes.
 - 1. Size and location of roof accessories specified in this Section.
 - 2. Method of attaching roof accessories to roof or building structure.
 - 3. Other roof-mounted items including mechanical and electrical equipment, ductwork, piping and conduit.
- B. Samples for Initial Selection: Manufacturer's color charts showing the full range of colors available for roof accessories with factory-applied color finishes.

1.4 QUALITY ASSURANCE

- A. Standards: Comply with the following:
 - 1. SMACNA's "*Architectural Sheet Metal Manual*" details for fabrication of units, including flanges and cap flashing to coordinate with type of roofing indicated.
 - 2. NRCA's "*Roofing and Waterproofing Manual*" details for installing units.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Available Manufacturer: Subject to compliance with requirements, provide products by one of the following:
 - 1. Roof Curbs and Equipment Supports:
 - a. AES Industries, Inc.
 - b. Colony Custom Curbs
 - c. Commodity Products Company, Inc.
 - d. Or approved equal
 - 2. Roof Hatches: Bilco Company, or approved equal

2.2 MATERIALS, GENERAL

- A. Aluminum Sheet: ASTM B 209 (ASTM B 209M) for alclad alloy 3005H25 or alloy and temper required to suit forming operations, with mill finish, unless otherwise indicated.
- B. Extruded Aluminum: ASTM B 221 (ASTM B 221M) alloy 6063-T52 or alloy and temper required to suit structural and finish requirements, with mill finish, unless otherwise indicated.
- C. Galvanized Steel Sheet: ASTM A 653/A 653M with G90 (Z275) coating designation; commercial quality, unless otherwise indicated; Structural Quality - Grade 40 (Grade 275) where indicated or as required for strength.
- D. Aluminum-Zinc Alloy-Coated Steel Sheet: ASTM A 792/A 792M with Class AZ-50 (AZ-150) coating, structural quality - Grade 40 (Grade 275), or as required for strength.
- E. Plastic Sheet: Unless additional thickness is required for light transmittances, provide glazing plastic sheet thickness required for 40 lbf./sq.ft. external and 20 lbf./sq.ft. internal loading pressures as recommended by the manufacturer for the size and shape indicated.
 - 1. Polycarbonate: Thermoformable, monolithic poly-carbonate sheets manufactured by the extrusion process, burglar-resistance rated per UL 972 with average impact strength of 16 ft-lb/in. of width when tested according to ASTM D 526, Method A (Izod).

- F. Insulation: Manufacturer's standard rigid or semi-rigid glass fiber board of thickness indicated.
- G. Fasteners: Same metal as metals being fastened, or non-magnetic stainless steel or other non-corrosive metal as recommended by manufacturer. Match finish of exposed fasteners with finish of material being fastened.
 - 1. Where removing exterior exposed fasteners affords access to building, provide non-removable fastener heads.
- H. Gaskets: Manufacturer's standard tubular or fingered design of neoprene, EPDM, or PVC; or flat design of foam rubber, sponge neoprene, or cork.
- I. Bituminous Coating: SSPC-Paint 12, solvent-type bituminous mastic, nominally free of sulfur and containing no asbestos fibers, compounded for 15 mil dry film thickness per coating.
- J. Mastic Sealant: Polyisobutylene; non-hardening, non-skinning, non-drying, non-migrating sealant.
- K. Elastomeric Sealant: As specified in Section 07900 with joint surfaces; ASTM C 920, Type S, Grade NS, Class 25, and Uses NT, G, A, and as applicable to joint substrates indicated, O.
- L. Roofing Cement: ASTM D 4586, non-asbestos, fibrated asphalt cement designed for trowel application or other adhesive compatible with roofing system.

2.3 ROOF CURBS

- A. General: Provide roof curbs capable of supporting super-imposed live and dead loads, including equipment loads and other construction to be supported on roof curbs. Coordinate dimensions with rough-in information or shop drawings of equipment to be supported.
- B. Fabrication: Unless otherwise indicated or required for strength, fabricate units from minimum 0.063-inch thick sheet aluminum with welded corner joints.
 - 1. Provide preservative-treated wood nailers at tops of curbs and formed flange at perimeter bottom for mounting to roof.
 - 2. Provide manufacturer's standard rigid or semi-rigid insulation.
 - 3. Provide formed cants and base profile coordinated with roof insulation thickness.
 - 4. Fabricate units to minimum height of 8 inches, unless otherwise indicated.

2.4 ROOF HATCHES

- A. Furnish and install where indicated on plans metal roof hatch, size width: 36" (914mm) x length: 36" (914mm). The roof hatch shall be single leaf. The roof hatch shall be pre-assembled from the manufacturer.

B. Performance characteristics:

1. Cover shall be reinforced to support a minimum live load of 40 psf (195kg/m²) with a maximum deflection of 1/150th of the span or 20 psf (97 kg/m²) wind uplift.
2. Operation of the cover shall be smooth and easy with controlled operation throughout the entire arc of opening and closing.
3. Operation of the cover shall not be affected by temperature.
4. Entire hatch shall be weather tight with fully welded corner joints on cover and curb.

C. Cover: Shall be 14 gauge (1.9mm) paint bond G-90 galvanized steel with a 3" (76mm) beaded flange with formed reinforcing members. Cover shall have a heavy extruded EPDM rubber gasket that is bonded to the cover interior to assure a continuous seal when compressed to the top surface of the curb.

D. Cover insulation: Shall be fiberglass of 1" (25mm) thickness, fully covered and protected by a metal liner: 22 gauge (.8mm) paint bond G-90 galvanized steel.

E. Curb: Shall be 12" (305mm) in height and of 14 gauge (1.9mm) paint bond G-90 galvanized steel. The curb shall be formed with a 3-1/2" (89mm) flange with 7/16" (11.1mm) holes provided for securing to the roof deck. The curb shall be equipped with an integral metal capflashing of the same gauge and material as the curb, fully welded at the corners, that features the Bil-Clip® flashing system, including stamped tabs, 6" (153mm) on center, to be bent inward to hold single ply roofing membrane securely in place.

F. Curb insulation: Shall be rigid, high-density fiberboard of 1" (25mm) thickness on outside of curb.

G. Lifting mechanisms: Manufacturer shall provide compression spring operators enclosed in telescopic tubes to provide, smooth, easy, and controlled cover operation throughout the entire arc of opening and closing. The upper tube shall be the outer tube to prevent accumulation of moisture, grit, and debris inside the lower tube assembly. The lower tube shall interlock with a flanged support shoe through-bolted to the curb assembly.

H. Hardware

1. Heavy pintle hinges shall be provided
2. Cover shall be equipped with a spring latch with interior and exterior turn handles
3. Roof hatch shall be equipped with interior and exterior padlock hasps.
4. The latch strike shall be a stamped component bolted to the curb assembly.
5. Cover shall automatically lock in the open position with a rigid hold open arm equipped with a 1" (25mm) diameter red vinyl grip handle to permit easy release for closing.
6. All hardware shall be zinc plated and chromate sealed.
7. Cover hardware shall be bolted into heavy gauge channel reinforcing welded to the underside of the cover and concealed within the insulation space.

I. Finishes: Factory finish shall be alkyd-based red, oxide primed steel, and prepped for field painting.

2.5 GALVANIZED STEEL SHEET FINISHES

- A. Surface Preparation: Clean surfaces with non-petroleum solvent so surfaces are free of oil and other contaminants. After cleaning, apply a conversion coating suited to the organic

coating to be applied over it. Clean welds, mechanical connections, and abraded areas, and apply galvanizing repair paint specified below to comply with ASTM A 780.

1. Galvanizing Repair Paint: High zinc dust content paint for regalvanizing welds in steel, complying with SSPC-Paint 20.
- B. Factory Priming for Field-Painted Finish: Where field painting after installation is indicated, apply the air-dried primer specified below immediately after cleaning and pretreating.
 1. Shop Primer: Exterior galvanized metal primer per Division 9 Painting Section.
- C. Baked Enamel Finish: Immediately after cleaning and pre-treating, apply manufacturer's standard two-coat, baked enamel finish consisting of prime coat and thermosetting topcoat, with a minimum dry film thickness of 1 mil for topcoat. Comply with paint manufacturer's written instructions for applying and baking to achieve a minimum dry film thickness of 2 mils.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. General: Comply with manufacturer's written instructions. Coordinate installation of roof accessories with installation of roof deck, roof insulation, flashing, roofing membranes, penetrations, equipment, and other construction involving roof accessories to ensure that each element of the Work performs properly and that combined elements are waterproof and weathertight. Anchor roof accessories securely to supporting structural substrates so they are capable of withstanding lateral and thermal stresses, and inward and outward loading pressures.
- B. Install roof accessory items according to construction details of NRCA's *"Roofing and Waterproofing Manual"*, unless otherwise indicated.
- C. Separation: Separate metal from incompatible metal or corrosive substrates, including wood, by coating concealed surfaces, at locations of contact, with bituminous coating or providing other permanent separation.
- D. Flange Seals: Unless otherwise indicated, set flanges of accessory units in a thick bed of roofing cement to form a seal.
- E. Cap Flashing: Where required as component of accessory, install cap flashing to provide waterproof overlap with roofing or roof flashing (as counterflashing). Seal overlap with thick bead of mastic sealant.
- F. Operational Units: Test operate units with operable components. Clean and lubricate joints and hardware. Adjust for proper operation.

3.2 CLEANING AND PROTECTION

- A. Clean exposed surfaces according to manufacturer's written instructions. Touch up damaged metal copings.

END OF SECTION

SECTION 077233

ROOF HATCH RAIL SYSTEM

PART 1 - GENERAL

1.1 SUMMARY

- A. Work Included: Provide factory-fabricated fixed hatch railing system.

1.2 SUBMITTALS

- A. Product Data: Submit manufacturer's product data.
- B. Shop Drawings: Submit shop drawings including profiles, accessories, location, adjacent construction interface, and dimensions.
- C. Warranty: Submit executed copy of manufacturer's standard warranty.

1.3 QUALITY ASSURANCE

- A. Manufacturer: A minimum of 5 years experience manufacturing similar products.
- B. Installer: A minimum of 2 years experience installing similar products.
- C. Manufacturer's Quality System: Registered to ISO 9001 Quality Standards including in-house engineering for product design activities.

1.4 DELIVERY, STORAGE AND HANDLING

- A. Deliver products in manufacturer's original packaging. Store materials in a dry, protected, well-vented area. Inspect product upon receipt and report damaged material immediately to delivering carrier and note such damage on the carrier's freight bill of lading.

1.5 WARRANTY

- A. Manufacturer's Warranty: Provide manufacturer's standard warranty. Materials shall be free of defects in material and workmanship for a period of five years from the date of purchase. Should a part fail to function in normal use within this period, manufacturer shall furnish a new part at no charge.

PART 2 - PRODUCTS

2.1 MANUFACTURER

- A. Manufacturer:
 - 1. Bilco (Basis of Design)
 - 2. Safety Rail Company
 - 3. Babcock Davis
 - 4. Or Approved Equal

2.2 HATCH RAIL SYSTEM

- A. Furnish and install where indicated on plans hatch rail system Model RL2-E. The hatch rail system shall be field assembled and installed per the manufacturer's instructions.
- B. Performance Characteristics:
 - 1. High visibility safety yellow powder coat paint finish.
 - 2. Hatch rail system shall attach to the capflashing of the roof hatch and shall not penetrate any roofing material.
 - 3. Hatch rail system shall satisfy the requirements of OSHA 29 CFR 1910.29 and shall meet OSHA strength requirements with a factor of safety of two.
 - 4. Corrosion resistant construction with a five-year warranty.
 - 5. Hinged gate shall ensure continuous barrier around the roof hatch.
 - 6. Self-closing gate hinge and positive latching system provided with hatch rail system.
- C. Posts and Rails: 1-1/4" (32mm) 6061 T6 schedule 40 aluminum pipe
- D. Hardware: Mounting brackets shall be 3/8" (9mm) thick extruded aluminum. Pivoting post guides with compression fittings and latching mechanism shall be cast aluminum. Self-closing hinges and all fasteners shall be type 316 stainless steel.

PART 3 - EXECUTION

3.1 EXAMINATION

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

3.2 INSTALLATION

- A. Install products in strict accordance with manufacturer's instructions and approved submittals. Locate units level, plumb, and in proper alignment with adjacent work.
 - 1. Test units for proper function and adjust until proper operation is achieved.
 - 2. Repair finishes damaged during installation.
 - 3. Restore finishes so no evidence remains of corrective work.

3.3 ADJUSTING AND CLEANING

- A. Clean exposed surfaces using methods acceptable to the manufacturer which will not damage finish.

END OF SECTION

SECTION 07 92 00 - JOINT SEALERS

PART 1 - GENERAL

1.1 RELATED SECTIONS

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

1.2 DESCRIPTION OF WORK

- A. Provide all labor, equipment, materials and services necessary for the complete installation of joint sealant systems. The Contractor is responsible to seal all joints, whether indicated on drawings or not. Seal all joints between dissimilar materials. Seal toilet fixtures and accessories to adjacent surfaces. Seal around all door, storefront and window frames, both exterior and interior. Work includes but is not limited to:
 - 1. Building Joints Sealers (Type 1)
 - 2. Traffic Bearing Joint Sealers (Type 2)
 - 3. Miscellaneous Joint Sealers (Type 3)
 - 4. Sealant Backing Materials
 - 5. Miscellaneous Materials

1.3 QUALITY ASSURANCE

- A. Installer Qualifications: Engage an Installer who has successfully completed within the last 3 years at least 3 joint sealer applications similar in type and size to that of this project and who will assign experienced mechanics from earlier applications to this project, of which one will serve as lead mechanic.

1.4 SUBMITTALS

- A. Product Data: Submit manufacturer's technical data for each joint sealer product required including instructions for joint preparation and joint sealer application.
- B. Samples: For initial selection, submit manufacturer's standard bead samples consisting of strips of actual products showing full range of colors available, for each product exposed to view.
- C. Preconstruction Field Tests: Prior to installation of joint sealants, field-test their adhesion to joint substrates.
 - 1. Locate test joints, and perform field tests, as directed by Architect for each type of sealant and joint substrate application indicated.

PART 2 - PRODUCTS

2.1 SEALANT TYPES - BUILDING JOINTS

A. SEALANT TYPE 1 - BUILDING JOINTS:

1. Type
 - a. Compound: One-part polyurethane sealant, gun grade, non-sag for applications other than traffic joints.
2. Manufacturers
 - a. "Sonolastic NP 1" by Sonneborn-Contech
 - b. "Sikaflex-1a" by Sika Corp.
 - c. "Vulkem 116" by Mameco International
 - d. or Approved Equal
3. Color: As selected from manufacturer's full product line.

2.2 SEALANT TYPES - TRAFFIC BEARING

A. SEALANT TYPE 2 - TRAFFIC BEARING:

1. Type
 - a. Compound: One-part polyurethane sealant, self-leveling.
2. Manufacturers
 - a. Vulkem 45 by Mameco International
 - b. Sonomeric CT by Sonneborn-Contech
 - c. Sikaflex 12SL by Sika Corp.
 - d. or Approved Equal
3. Color: As selected from manufacturer's standard.

2.3 SEALANT TYPES - MISCELLANEOUS

A. SEALANT TYPE 3

1. Type
 - a. Compound: Acrylic-latex, one-part compound, ASTM C834-76; gun grade, non-staining, non-bleeding, non-cracking; to remain flexible with surface quick drying to permit painting with oil-base or latex paints; designed for use in interior narrow joints.
2. Manufacturer
 - a. Eternaflex Acrylic Latex Sealant by Gibson-Homans Co.,
 - b. Sonolac by Sonneborn-Contech
 - c. Acrylic Latex Caulk AS-20 by Pecora Corporation
 - d. Tremco Acrylic Latex Caulk by Tremco.
 - e. or Approved Equal

3. Color: As selected from manufacturer's standard

2.4 SEALANT BACKING MATERIALS

- A. Provide sealant backings of material and type which are non-staining; are compatible with joint substrates, sealants, primers and other joint fillers; and are approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.
- B. Backer Rod: Pre-formed, white, closed-cell polyethylene foam rod; circular in cross section, of proper sizes to fill joints; required compression of 30%; non-staining according to ASTM, D925-76; resilient, compatible with type of primer and sealant used; "Sonofom Backer Rod" by Sonneborn-Contech, "Ethafoam SB" by Dow Chemical USA, or approved equal.

2.5 MISCELLANEOUS MATERIALS

- A. Primer: Provide type recommended by joint sealer manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction tests.
- B. Cleaners for Nonporous Surfaces: Provide non-staining, chemical cleaner of type acceptable to manufacturer of sealant and sealant backing materials which are not harmful to substrates and adjacent nonporous materials.
- C. Masking Tape: Provide non-staining, non-absorbent type compatible with joint sealants and to surfaces adjacent to joints.

PART 3 - EXECUTION

3.1 INSPECTION

- A. Require Installer to inspect joints indicated to receive joint sealers for compliance with requirements for joint configuration, installation tolerances and other conditions affecting joint sealer performance. Obtain Installer's written report listing any conditions detrimental to performance of joint sealer work. Do not allow joint sealer work to proceed until unsatisfactory conditions have been corrected.
- B. It is the Contractor's responsibility to ensure that a proper substrate is in place prior to application. Should an improper condition exist, notify the appropriate party and ensure condition is corrected prior to application. If the sealant is installed over an improper condition, the Contractor shall be responsible for replacement once the condition is corrected at no additional cost.

3.2 INSTALLATION

- A. Joint Priming: Prime joint substrates where indicated or where recommended by joint sealer manufacturer based on preconstruction joint sealer-substrate tests or prior experience.
- B. Application: Comply with manufacturer's printed instructions except where more stringent requirements are shown or specified, and except where manufacturer's technical representative directs otherwise.

3.3 INSTALLATION - BUILDING JOINTS - SEALANT TYPE 1 (EXTERIOR)

- A. Exterior: Install all exterior building joints, other than traffic bearing locations, use specified elastomeric sealant continuously as follows:
1. In building expansion and control joints in masonry and cast-in-place concrete.
 2. Where sealant (or caulking) is noted on Drawings in other exterior building locations, except for joints in traffic surfaces.
 3. At perimeter of aluminum and steel frames for entrances, doors, louvers, dampers and all other openings through exterior surfaces including but not limited to concrete or masonry and around pipes and conduit through exterior walls above grade.
 4. Between different materials in exterior surfaces where necessary to provide watertight finish and a sealant is not otherwise specified.
 5. At head joints in precast concrete and architectural precast concrete.

3.4 INSTALLATION - BUILDING JOINTS - SEALANT TYPE 1 (INTERIOR)

- A. Interior: Install at all interior non-traffic bearing building joints elastomeric sealant continuously as follows:
1. In all vertical control joints at interior masonry walls.
 2. All interior joints between concrete or masonry and aluminum and hollow metal frames, and all dissimilar metal joints, with concrete and masonry.
 3. At interior vertical joints where exposed masonry partitions are tied to other partitions, columns or walls.

3.5 INSTALLATION - TRAFFIC BEARING JOINTS - SEALANT TYPE 2

- A. Exterior: Apply Type 2 sealant in joints of traffic-bearing exterior surfaces, where sealants are required for expansion and control joints but not in contact with bituminous joint fillers, bituminous paving, or other bituminous products; and where sealants are not otherwise specified under other Sections of these Specifications.
- B. Interior: Install traffic-bearing elastomeric joint sealant in control joints of floors and at joints between floor surfaces and built-in items, except where specified under other sections.

3.6 INSTALLATION - MISCELLANEOUS JOINTS - SEALANT TYPE 3

- A. Exterior: Not allowed.
- B. Interior: Install continuously in non-moving, interior building joints as follows (except locations specifically shown or specified to receive elastomeric sealant):

1. To fill exposed cracks and voids where metal door frames, louvers and other metal fabrications are built into painted interior partitions.
2. In interior joints at vertical and horizontal surfaces where exposed interior masonry adjoins millwork, and other similar locations to fill joints or junctures for painting.
3. At joints between toilet fixtures, sinks, urinals, toilets, and adjacent surfaces.
4. Around mechanical and electrical equipment and grilles and registers built into partitions, and at ducts, pipes and conduit through walls where necessary to fill cracks and voids or finishing.
5. Other interior wall and ceiling non-moving joint locations, specifically noted to receive "caulking" or "sealant", except where elastomeric sealant is specifically identified.

3.7 PROTECTION AND CLEANING

- A. Protect joint sealers during and after curing period as recommended by manufacturer. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated joint sealers immediately and reseal joints with new materials to produce joint sealer installations with repaired areas indistinguishable from original work.
- B. Clean off excess sealants or sealant smears adjacent to joints as work progresses by methods and with cleaning materials approved by manufacturers of joint sealers and of products in which joints occur.

3.8 SURFACE PREPARATION

- A. Joints and spaces to be caulked shall be clean, free from dust, and dry. Joints more than 3/4-inch deep and joints where suitable backstop has not been provided shall be packed with joint backing to within 2 inch of surface, before applying caulking.

3.9 APPLICATION

- A. Apply compound with gun having proper size nozzle, use sufficient pressure to fill all voids and joints solid, remove excess caulking and leave surfaces clean, neat and smooth. At completion of project, all caulking shall have a smooth finish.
- B. Caulk joints before final coat of paint is applied to adjacent work.
- C. All caulked joints shall be watertight.

END OF SECTION

SECTION 08 11 00 - STEEL DOORS AND FRAMES

PART 1 GENERAL

1.1 RELATED SECTIONS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification sections, apply to work of this section.
- B. See Section 08 71 00 - Hardware for hardware preparation.
- C. See Section 06 10 00 - Rough Carpentry for additional installation specifications.

1.2 DESCRIPTION OF WORK

- A. Provide all labor, equipment, materials and services necessary for the complete installation of steel doors and frame systems. Work includes but is not limited to:
 - 1. Doors and Frames
 - 2. Accessories
 - 3. Finishes

1.3 SUBMITTALS

- A. Shop Drawings: Indicate door and frame elevations, internal reinforcement, wall tie system, stiles, rails, and finish.
- B. Product Data: Indicate door and frame configurations, location of cut-outs for hardware reinforcement.

1.4 QUALITY ASSURANCE

- A. Conform to the following:
 - 1. SDI-100 - Standard Steel Doors and Frames.
 - 2. DHI - Door Hardware Institute - The Installation of Commercial Steel Doors and Steel Frames, Insulated Steel Doors in Wood Frames and Builder's Hardware.
 - 3. Handicapped: ANSI A117.1, ADA Guidelines.

PART 2 PRODUCTS

2.1 DOORS AND FRAMES

- A. Manufacturers:
 - 1. Ceco
 - 2. Steelcraft
 - 3. Republic Builders Products
 - 4. American Steel Products
 - 5. or Approved Equal

- B. Interior Doors: SDI 100 Grade II, 18 gauge, flush doors, cores of honeycomb impregnated Kraft paper. Doors shall have seamless one-piece face equal to Medallion series.
- C. Interior Frames: 16 gauge welded corners. All frames shall be made with 2" face and of the widths indicated. Interior frames shall be rigid type with welded corners. All welds shall be ground smooth.
 - 1. Wall Anchors: Provide metal anchors of shapes and sizes required for the adjoining type of wall construction. Fabricate jamb anchors of steel, not lighter than the gauge used from frame. Locate anchors on jambs near the top and bottom of each frame and at intermediate points not over 24" apart.
 - 2. Floor Anchors: Provide floor clips of not less than 16 gauge steel and fasten to bottom of each jamb member for anchoring frame to floor construction.
 - 3. Extension Clips: Where floor fill occurs, the bottom of frames shall terminate at the indicated finished floor levels and be supported by an adjustable extension clip angle resting on and anchored to the structural slab.
 - 4. All metal doors and door frames shall be properly mortised, reinforced, and drilled and tapped at the factory for all hardware. Hardware and fastening locations shall be determined by templates supplied by the hardware manufacturer.
- D. Stile and Rails: 16 gauge tubular steel, 1 3/4" thick. Stiles extend full height of door. Rails mechanically fastened to stiles to form neat seams on faces.

2.2 ACCESSORIES

- A. Silencers: Resilient rubber.
- B. Bituminous Coating: Fibered asphalt emulsion.
- C. Primer: Zinc chromate iron phosphate type.
- D. Glazing Stops: Minimum 20 gauge steel or .040-inch thick aluminum. Provide non-removable stops on outside of exterior doors and on secure side of interior doors and windows for glass, louvers and other panels in doors. Provide screw-applied removable glazing beads on inside of glass, louvers and other panels in doors. Provide continuous 20 gauge stainless steel channel at all exposed edges of glazing where indicated.
- E. Door Louvers (Where Applicable): Provide louvers according to SDI 111C for interior doors where indicated, with blades or baffles formed of 0.0239-inch thick cold-rolled steel sheet set into minimum 0.0359-inch thick steel frame.
 - 1. Sight-Proof Louvers: Stationary Louvers constructed with inverted V-shaped or Y-shaped blades.
 - 2. Fire-Rated Automatic Louvers: Louvers constructed with movable blades closed by actuating fusible links at 150 deg. F and labeled and listed for use in fire-rated door assemblies of type and fire resistance rating indicated by the same inspecting and testing agency who established fire resistance rating of door assembly.

2.3 FINISH

- A. Steel Sheet: Galvanized to ASTM A525, G60, A60 for exterior application.
- B. Primer: Baked for interior applications.
- C. Coat inside of exterior profiles with bituminous coating.
- D. Color: Painted to match existing adjacent building.

PART 3 EXECUTION

3.1 FABRICATION - DOORS

- A. Fabricate doors with hardware reinforcement welded in place.
- B. Attach fire rated label to each door unit.
- C. Close top and bottom edge of exterior doors with inverted steel channel closure. Seal joints watertight.
- D. Configure exterior doors with special profile to receive recessed weatherstripping.

3.2 FABRICATION - FRAMES

- A. Fabricate frames as welded unit. Provide the appropriate anchor for masonry and stud application.
- B. Fabricate frames with hardware reinforcement plates welded in place. Provide mortar guard boxes.
- C. Reinforce frames wider than 48 inches with roll formed steel channels fitted tightly into frame head, flush with top.
- D. Prepare frame for silencers and install.
- E. Fabricate frames to suit masonry wall coursing as indicated.

3.3 INSTALLATION

- A. Install doors and frames in accordance with ANSI/SDI-100.
- B. Coordinate installation of doors and frames with installation of hardware specified in Section 08 71 00.
- C. Install door louvers, plumb and level.
- D. Set frames in position, plumb, align and brace securely until permanent anchors are set. Anchor bottom of frames to floors with expansion bolts or with powder driven fasteners. Build wall anchors into walls or secure to adjoining construction as indicated or specified.

Where frames require ceiling struts or other structural overhead bracing, they shall be anchored securely to ceilings or structural framing above, as indicated. Fill behind door frames in all masonry walls solid, with mortar.

- E. All frames and doors shall be installed in strict accordance with the manufacturer's printed recommendations and directions.
- F. All frames and doors shall be installed straight, plumb and true with no play, warp or rack.

3.4 COORDINATION WITH OTHER ACTIVITIES

- A. The installation of doors and door frames shall be carefully coordinated and/or built-in with all connected and adjacent work.
- B. The Contractor is responsible to coordinate door and frame fabrication and installation with electrical requirements of electrically operated hardware and locks including, but not limited to, electric strikes and operators.

3.5 CLEANING

- A. Upon completion, metal surfaces of doors and door frames shall be thoroughly cleaned and touched up.

3.6 DELIVERY, STORAGE AND HANDLING

- A. Metal doors and frames shall be delivered, stored, handled and installed so as not to be damaged or deformed; abraded, scarred or rusty areas shall be cleaned and painted immediately upon detection. Doors and frames stored at the site before erection shall be stacked on platforms or pallets and covered with tarpaulins or other suitable covering to provide weathertight enclosure with affording proper air circulation.

3.7 TOLERANCES

- A. Maximum Diagonal Distortion: 1/16 inch measured with straight edge, corner to corner.

END OF SECTION

SECTION 08 51 13 - ALUMINUM WINDOWS

PART 1 - GENERAL

1.1 RELATED SECTIONS

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

1.2 DESCRIPTION OF WORK

- A. Provide all labor, materials and equipment necessary for the proper completion of the aluminum windows. Work includes but is not limited to:
 - 1. Aluminum windows
 - 2. Finish
 - 3. Joint Sealers
 - 4. Hardware

1.3 REFERENCES

- A. Reference Standards. Comply with following:
 - 1. AAMA 501-94 - Methods of Test for Exterior Walls.
 - 2. AAMA 605.2-92 - Voluntary Specification for High Performance Organic Coating on Architectural Extrusions and Panels.
 - 3. Architectural Spray Coaters Association (ASCA) 1.0-90 - Voluntary Supplemental Specification for Use with AAMA 605.2 to Ensure the High Standards of Quality Recommended by AAMA and ASCA.

1.4 SUBMITTALS

- A. Product Data for all materials.
- B. Shop Drawings:
 - 1. Calculations: Include calculations for review indicating framing meets Design Criteria.
 - 2. Include special glazing stop and other associated components. Indicate anchors, joint system, expansion provisions and other components not included in manufacturer's standard data. Include glazing details.
- C. Samples: Submit three samples of aluminum finish for acceptance.
 - 1. Make samples on 12-inch long extrusion or 6-inch square sheets of alloy to be used for system.
 - 2. Contractor's Review: For color and texture only.
- D. Quality Control Submittals:

1. Certificates: Submit coating manufacturer's written certification that AAMA 605.2 fluoropolymer coating applicator is approved applicator.
- E. Contract Close-out Submittals:
 1. Warranty: Provide manufacturer's standard warranty in addition to requirements of 1.6.A below.
- F. Templates: Hardware templates for hardware mounted in aluminum doors and frames shall be submitted under Section 08 71 00 directly to aluminum door and frame supplier immediately after acceptance of Hardware Schedule. Report failure to receive templates with reasonable promptness to General Contractor.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: Company specializing in aluminum entrance, storefront and ribbon window fabrication and installations.
 1. Experience: Continuously fabricated and installed entrances and storefront in state of project for three years.
- B. AAMA 605.2 Fluoropolymer Coating Applicator Qualifications: Coating manufacturer approved.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. General:
 1. Adequately protect materials from damage that are stored onsite before installation.

1.7 WARRANTY

- A. Warranty: Provide minimum one-year written warranty commencing at substantial completion covering materials and installation for entrances and storefront.
 1. Warranty includes watertight condition.

PART 2 - PRODUCTS

2.1 ALUMINUM WINDOW FRAMING

- A. Manufacturers: Match existing window system, or provide approved equal.
 1. Kawneer
 2. YKK
 3. Approved Equal
- B. Aluminum:
 1. Extruded aluminum shall be 6063-T5 alloy.

C. Design Requirements - Windows:

1. Windload: Fabricate and install framing systems to withstand a minimum windload as required by local code with maximum deflection of 1/175 of span or in accordance with local code requirements (whichever is more stringent). Reinforce framing systems as required to meet criteria
2. Air Infiltration: Not exceed 0.06 CFM/SQ FT of fixed area in accordance with ASTM E283.
3. Water Infiltration: No water penetration at test pressure of 8 PSF in accordance with ASTM E331.

D. Fabricate window system to withstand 40 years of 4,000 open/close cycles per day.

1. Expansion and Contraction: Design system and anchorage to provide fully for expansion and contraction as caused by surface temperatures ranging from minus 20 degrees F to plus 180 degrees F without causing buckling, stresses on glass, failure of joint seals, undue stress on structural elements, damaging loads on fasteners, reduction of performance, or other detrimental effects.

E. Reinforcement: If required as determined by manufacturer, add concealed steel reinforcement to meet Design Requirements.

1. Hardware Reinforcement: Provide 3/16-inch concealed steel reinforcement for hardware including door hinges, closers, panic devices, etc.
2. Accessories: Provide necessary fittings and accessories for a complete, functional and watertight frame installation. Provide matching aluminum break metal, closures, etc. where detailed or required to provide completed system.

F. Glass: Glass to be 1" insulated glass units.

G. Dissimilar Metals: All dissimilar metals must be properly insulated to prevent galvanic action.

H. Fasteners: All exposed fasteners shall be aluminum, stainless steel or zinc-plated steel.

I. Anchors: Perimeter anchors to be aluminum or steel. All steel anchors shall be properly insulated from the aluminum.

J. Thermal Barrier: The thermal barrier shall be extruded PVC used as an applied thermal isolator vertically and poured-in-place two-part polyurethane thermal barrier horizontally.

K. Gaskets: Provide true gaskets on both sides of glass. No tape product will be accepted.

2.2 FINISH

A. To Match Existing Window System.

2.3 JOINT SEALER

A. Polyurethane type in accordance with Section 07 92 00.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verification of Conditions:
 - 1. Existing Conditions: Examine openings for aluminum framing to determine that they are proper size, plumb, square and level before installation of frames is started.

3.2 INSTALLATION

- A. Frames: Securely install frames according to manufacturer's recommendations and accepted Shop Drawings.
 - 1. Coat aluminum in direct contact with concrete, masonry, steel, or other non-compatible materials with bituminous paint, zinc chromate primer, or other suitable insulating material.
- B. Adjustment: Hang and adjust doors to work freely with hardware functioning properly.
 - 1. Readjust at completion of project if directed by Owner.
- C. Window Framing Perimeter Joints: Seal in accordance with Section 07 92 00.
- D. Coordinate attachment and seal of air and vapor barrier materials. Pack fibrous insulation in shim spaces at perimeter of assembly to maintain continuity of thermal barrier.

3.3 FIELD QUALITY CONTROL

- A. Contractor's Field Testing for Water Leakage: Conduct per AAMA 501.2 in presence of Architect at locations as selected by Contractor.
 - 1. Test Areas: Complete storefront assemblies.
 - 2. Correct defects revealed by tests. Re-test corrected areas to determine effectiveness of remedial measures.
 - 3. Begin testing as early as possible during erection so accepted corrections can be incorporated into remaining work.
 - 4. Corrective Measures: Meet standards of quality of specified storefront and subject to acceptance of Owner.

END OF SECTION

SECTION 08 71 00 - DOOR HARDWARE

PART 1 GENERAL

1.1 RELATED SECTIONS

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

1.2 DESCRIPTION OF WORK

- A. Provide all labor, equipment, material and services necessary for the complete installation of finish hardware systems. Provide all material and work required to ensure that all doors operate in complete compliance with ADA Guidelines. Components specified are minimum requirements. Upgrade components specified if required to ensure they comply with the provisions of the ADA. Work includes, but is not limited to:
 - 1. Locksets/Cylinders/Keying
 - 2. Hinges
 - 3. Closers
 - 4. Wall Stops, Stays and Silencers
 - 5. Hardware Finishes
 - 6. Miscellaneous Materials and Provisions

1.3 QUALITY ASSURANCE

- A. Manufacturer: Obtain each kind of hardware (latch and lock sets, hinges, closers, etc.), from only one supplier, although several manufacturers may be indicated.
- B. Supplier: A recognized architectural finish hardware supplier who has been furnishing hardware in the project's vicinity for a period of not less than two (2) years, and who is, or employs an experienced hardware consultant who is available, at reasonable times during the course of the work, for consultation about project's hardware requirements, to Owner, Architect and Contractor.
- C. All key accessible hardware must be supplied by the manufacturer with temporary construction cores. The user will replace these construction cores with permanent cores, keyed to their own system, after accepting the building.
- D. All door hardware must meet ADA Guidelines.

1.4 SUBMITTALS

- A. Product Data: Submit manufacturer's technical product data for each item of hardware in accordance with Division-1 section "Submittals". Include whatever information may be necessary to show compliance with requirements, and include instructions for installation and for maintenance of operating parts and finish.

- B. Hardware Schedule: Submit final hardware schedule in manner indicated below. Coordinate hardware with doors, frames and related work to ensure proper size, thickness, hand, function and finish of hardware.
1. Finish Hardware Schedule Content: Based on finish hardware indicated, organize hardware schedule indicating complete designations of every item required for each door or opening. Include the following information:
 - a. Type, style, function, size and finish of each hardware item, as indicated on Door Schedule.
 - b. Name and manufacturer of each item.
 - c. Fastenings and other pertinent information.
 - d. Location of hardware set cross-referenced to indications on drawings both on floor plans and in door and frame schedule.
 - e. Explanation of all abbreviations, symbols, codes, etc., contained in schedule.
 - f. Mounting locations for hardware.
 - g. Door and frame sizes and materials.
 2. Submittal Sequence: Submit schedule at earliest possible date particularly where acceptance of hardware schedule must precede fabrication of other work (e.g., hollow metal frames) which is critical in the project construction schedule. Include with schedule the product data, samples, shop drawings of other work affected by finish hardware, and other information essential to the coordinate review of hardware schedule.
 3. Keying Schedule: Submit separate detailed schedule indicating clearly how the Owner's instructions on keying of locks has been fulfilled.
- C. Templates: Furnish hardware templates to each fabricator of doors, frames and other work to be factory-prepared for the installation of hardware. Upon request, check the shop drawings of such other work, to confirm that adequate provisions are made for the proper location and installation of hardware.

1.5 PRODUCT HANDLING

- A. Tag each item or package separately, with identification related to final hardware schedule, and include basic installation instructions with each item or package.
- B. Packaging of hardware is responsibility of supplier. As material is received by hardware supplier from various manufacturers, sort and repackage in containers clearly marked with appropriate hardware set number to match set numbers of approved hardware schedule. Two or more identical sets may be packed in same container.
- C. Inventory hardware jointly with representatives of hardware supplier and hardware installer until each is satisfied that count is correct.

- D. Deliver individually packaged hardware items at the proper times to the proper locations (shop or project site) for installation.
- E. Provide secure lock-up for hardware delivered to the project, but not yet installed. Control, handling and installation of hardware items which are not immediately replaceable, so that completion of the work will not be delayed by hardware losses, both before and after installation.

PART 2 - PRODUCTS

Provide as indicated on drawings or, if not indicated, provide as shown below:

2.1 LOCKSETS/CYLINDERS/KEYING

- A. Interior Doors: Standard Duty Commercial Grade, Best Lock Lever Lockset, Series 7K, or approved equal.
- B. Lever Style: Best Lock 14D Contour Angle Return, or approved equal.
- C. Function Type: As scheduled on drawings.
- D. Cylinders
 - 1. All final lock cylinders and keys to be provided by the Government for installation by the Contractor.
 - 2. Contractor shall provide construction cores and keys.
- E. Keying
 - 1. Supplier will meet with Owner to finalize keying requirements and obtain final instructions in writing.
 - 2. Review the keying system with the Owner and provide the type required (master, grandmaster or great-grandmaster).
 - 3. Comply with Owner's instructions for masterkeying and, except as otherwise indicated, provide individual change key for each lock which is not designated to be keyed alike with a group of related locks.
 - 4. Key Material: Provide keys of nickel silver only.
 - 5. Key Quantity: Furnish 3 change keys for each lock.
 - 6. Deliver keys to Owner's representative.
- F. Strikes
 - 1. Provide manufacturer's standard wrought box strike for each latch or lock bolt, with curved lip extended to protect frame, finished to match hardware set.

2. Provide roller type strikes where recommended by manufacturer of the latch and lock units.
- G. Lock Throw:
1. Provide 5/8" minimum throw of latch and deadbolt used on pairs of doors. Comply with UL requirements for throw of bolts and latch bolts on rated fire openings.
 2. Provide 2" minimum throw on other latch and deadlock bolts.

2.2 HINGES

- A. Manufacturer
1. Hager 1279 5-knuckle, full mortise, plain bearing steel hinge, for interior doors, or approved equal.
- B. Components
1. Templates: For hinges and pivots to be installed, provide only template-produced units.
 2. Screws: Furnish Phillips flat-head all-purpose or machine screws for installation of units. Finish screw heads to match surface of hinges or pivots.
 3. Hinge Pins: Except as otherwise indicated, provide hinge pins as follows:
 4. Steel Hinges: Steel pins.
 5. Non-Ferrous Hinges: Stainless steel pins.
 6. Interior Doors: Non-rising pins.
 7. Tips: Flat buttons and matching plug, finished to match leaves.

8. Hinge sizes shall be as follows:

a. Width

<u>Door Thickness</u>	<u>Hinge Width</u>	<u>Max. Clearance</u>
1-3/8"	3-1/3"	1-1/4"
	4"	1-3/4"
	4-1/2"	2-1/4"
1-3/4"	4"	1"
	4-1/2"	1-1/2"
	5"	2"
	6"	3"

b. Hinge Height

<u>Door Thickness</u>	<u>Door Width</u>	<u>Hinge Height</u>
1-3/8"	to 32"	3-1/2"
1-3/8"	32" to 37"	4"
1-3/4"	to 36"	4-1/2"
1-3/4"	36" to 48"	5"
1-3/4"	over 48"	6"

9. Number of Hinges Required:

a. 1-3/4" Door Thickness

- i. Doors 60" high and under 2 Butt Hinges
- ii. Doors over 60" high to 90" high 3 Butt Hinges
- iii. Doors over 90" high 3 Hinges + 1 additional hinge for each 30" of addl. height

b. 1-3/8" Door Thickness

- i. Doors 90" high and under 2 Butt Hinges
- ii. Doors over 90" high 2 Butt Hinges + 1 additional hinge for each 45" of addl. height.

2.3 CLOSERS

- A. Manufacturer: Sargent – 351 Series Power Glide, or approved equal.
- B. Size of Closers: Except of otherwise specifically indicated, comply with the manufacturer's recommendations for size of door control units, depending upon size of door, exposure to weather and anticipated frequency of use.

- C. Provide parallel arms for all overhead closers, except as otherwise indicated. Provide heavy duty, adjustable parallel arm closer units with built-in stop and hold open capability, one size larger than recommended for use with standard arms.

2.4 WALL STOPS, STAYS AND SILENCERS

- A. Wall stops shall be IVES commercial wall stop, furnished at all 90 deg. conditions. Corbin, Series 775 stays shall be provided where wall stops are not practical. Silencers shall be IVES #20, rubber silencers, or approved equal.

2.5 HARDWARE FINISHES

- A. Provide matching finishes for hardware units at each door or opening, to the greatest extent possible, and except as otherwise indicated. Reduce differences in color and textures as much as commercially possible where the base metal or metal forming process is different for individual units of hardware exposed at the same door or opening. In general, match items to the manufacturer's standard for the latch and lock set (or push-pull units if no latch-lock sets) for color and texture.
- B. Provide quality of finish, including thickness of plating or coating (if any), composition, hardness and other qualities complying with manufacturer's standards, but in no case less than specified for the applicable units of hardware by referenced standards.
- C. Hardware finishes to be as noted on drawings or, if not noted, US 26D.

2.6 MISCELLANEOUS MATERIALS AND PROVISIONS

- A. Hand of Door: The drawings show the direction of slide, swing or hand of each door leaf. Furnish each item of hardware for proper installation and operation of the door movement as shown.
- B. Base Metals: Produce hardware units of the basic metal and forming method indicated, using the manufacturer's standard metal alloy, composition, temper and hardness, but in no case of lesser (commercially recognized) quality than specified for the applicable hardware units by applicable ANSI A156 series standard for each type hardware item and with ANSI A156.18 for finish designations indicated. Do not furnish "optional" materials or forming methods for those indicated, except as otherwise specified.
- C. Fasteners: Manufacturer hardware to conform to published templates, generally prepared for machine screw installation. Do not provide hardware which has been prepared for self-tapping sheet metal screws, except as specifically indicated.
- D. Furnish screws for installation, with each hardware item. Provide Phillips flat-head screws except as otherwise indicated. Finish exposed (exposed under any condition) screws to match the hardware finish or, if exposed in surfaces of other work, to match the finish of such other work as closely as possible, including "prepared for paint" in surfaces to receive painted finish.
- E. Provide concealed fasteners for hardware units which are exposed when the door is closed, except to the extent no standard units of the type specified are available with concealed fasteners. Do not use through bolts for installation where the bolt head or the nut on the opposite face is exposed in other work, except where it is not feasible to adequately reinforce

the work. In such cases, provide sleeves for each through-bolt or use sex screw fasteners.

- F. Tools and Maintenance Instructions for Maintenance: Furnish a complete set of specialized tools and maintenance instructions as needed for Owner's continued adjustment, maintenance, and removal and replacement of finish hardware.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Mount hardware units at heights indicated in "Recommended Locations for Finish Hardware for Standard Steel Doors and Frames" by the Door and Hardware Institute, except as specifically indicated or required to comply with governing regulations, and except as may be otherwise directed by Architect. Comply with code provisions for the Handicapped, and ADA.
- B. Install each hardware item in compliance with the manufacturer's instructions and recommendations. Wherever cutting and fitting is required to install hardware onto or into surfaces which are later to be painted or finished in another way, coordinate removal, storage and reinstallation or application or surface protections with finishing work specified in the Division-9 sections. Do not install surface-mounted items until finishes have been completed on the substrate.
- C. Set units level, plumb and true to line and location. Adjust and reinforce the attachment substrate as necessary for proper installation and operation.
- D. Drill and countersink units which are not factory-prepared for anchorage fasteners. Space fasteners and anchors in accordance with industry standards.
- E. Set thresholds for exterior doors in full bed of butyl-rubber or polyisobutylene mastic sealant.

3.2 ADJUST AND CLEAN

- A. Adjust and check each operating item of hardware and each door, to ensure proper operation or function of every unit. Replace units which cannot be adjusted to operated freely and smoothly as intended for the application made.
- B. Clean adjacent surfaces soiled by hardware installation.
- C. Final Adjustment: Wherever hardware installation is made more than one month prior to acceptance or occupancy of a space or area, return to the work during the week prior to acceptance or occupancy, and make final check and adjustment of all hardware items in such space or area. Clean operating items as necessary to restore proper function and finish of hardware and doors. Adjust door control devices to compensate for final operation of heating and ventilating equipment.
- D. Instruct Owner's Personnel in proper adjustment and maintenance of hardware and hardware finishes, during the final adjustment of hardware.
- E. Continued Maintenance Service: Unless instructed otherwise by Owner, approximately six months after the acceptance of hardware in each area, the Installer, accompanied by the

representative of the latch and lock manufacturer, shall return to the project and re-adjust every item of hardware to restore proper function of doors and hardware. Consult with and instruct Owner's personnel in recommended additions to the maintenance procedures. Replace hardware items which have deteriorated or failed due to faulty design, materials or installation of hardware units. Prepare a written report of current and predictable problems (of substantial nature) in the performance of the hardware.

END OF SECTION

SECTION 08 81 00 - GLAZING

PART 1 GENERAL

1.1 RELATED SECTIONS

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

1.2 DESCRIPTION OF WORK

- A. Provide all labor, equipment, material and services necessary for the complete installation of glazing systems. Glass and glazing materials shall provide continuity of building enclosure, air barrier and vapor retarder. Size glass to withstand dead loads and positive and negative live loads acting normal to the plane of glass. Sizes shown on drawings and specified herein are minimum depths; provide thicker glass if required by the above. Glazing shall consist of, but shall not be limited to, the following:
 - 1. Glass Materials
 - 2. Glazing Compounds and Accessories

1.3 SUBMITTALS

- A. Product Data on Glass, Plastic Types Specified: Provide physical and environmental characteristics, size limitations, and special installation requirements.
- B. Product Data on Glazing Compounds: Provide chemical characteristics, limitations, special application requirements. Identify available colors.
- C. Produce shop drawings indicating plans, elevations and details of all glass installation.

1.4 QUALITY ASSURANCE

- A. Perform Work in accordance with FGMA Glazing Manual, and Laminators Safety Glass Association - Standards Manual, for glazing installation methods.
- B. Provide single source responsibility to glass: To ensure consistent quality of appearance and performance, provide materials produced by a single manufacturer.
- C. Environmental Conditions: Do not proceed with glazing when ambient and substrate temperatures are outside the limits permitted by glazing material manufacturer, or when joint substrates are wet.
- D. Comply with combined printed recommendations of glass manufacturing of manufacturers of sealants, gaskets and other glazing materials, except where more stringent requirements are indicated, including those of referenced glazing standards.

PART 2 PRODUCTS

2.1 GLASS MATERIALS

A. Manufacturers:

1. PPG Industries.
2. Lof Glass, Inc.
3. Viracon, Inc.
4. or Approved Equal

B. Insulating Glass:

1. Sealed Insulating Glass Units: Preassembled units consisting of organically sealed lites of glass separated by dehydrated air spaces complying with ASTM E 774 and with other requirements indicated, including those in Insulating Glass Product Data Sheet. All U Values and SHGC (Solar Heat Gain Coefficients) for exterior glazing are to conform to the applicable Energy Codes.
 - a. Provide heat treated, where recommended by manufacturer to comply with system performance requirements specified and Kind FT (fully tempered) where safety glass is designated or required.
 - b. Performance characteristics designated for insulating glass are nominal values based on manufacturer's published test data for units with lites 6.0 mm (0.23 inch) thick and nominal 1/2_inch dehydrated space between lites, unless otherwise indicated.
 - c. U values are expressed as Btu/hour x sq. ft. x F.

2.2 GLAZING COMPOUNDS AND ACCESSORIES

- A. Compatibility: Provide materials with proven record of compatibility with surfaces contacted in installation.
- B. Cleaners, Primers and Sealers: Type recommended by sealant or gasket manufacturer.
- C. Setting Blocks: Neoprene, EPDM or silicone blocks as required for compatibility with glazing sealants, 80 to 90 Shore A durometer hardness.
- D. Spacers: Neoprene, EPDM or silicone blocks, or continuous extrusions, as required for compatibility with glazing sealant, of size, shape and hardness recommended by glass and sealant manufacturers for application indicated.
- E. Edge Blocks: Neoprene, EPDM or silicone blocks as required for compatibility with glazing sealant, of size and hardness required to limit lateral movement (side-walking) of glass. Edge Seal Material: Black color.
- F. Compressible Filler Rods: Closed-cell or waterproof-jacketed rod stock of synthetic rubber or plastic foam, flexible and resilient with 5-10 psi compression strength for 25% deflection.

PART 3 EXECUTION

3.1 SURFACE CONDITIONS

- A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to the timely and proper completion of the work. Do not proceed until unsatisfactory conditions are corrected.
- B. Clean glazing channels, stops and rabbets to receive the glazing materials, making free from obstructions and deleterious substances which might impair the work.
 - 1. Remove protective coatings which might fail in adhesion or interfere with bond of sealants.
 - 2. Comply with manufacturer's instructions for final wiping of surfaces immediately prior to application of primer and glazing compounds or tapes.
 - 3. Prime surfaces to receive glazing compounds in accordance with manufacturer's recommendations.

3.2 INSTALLATION

- A. Inspect each piece of glass immediately prior to start of installation.
 - 1. Do not install items which are improperly sized, have damaged edges, or are scratched, abraded or damaged in any other manner.
 - 2. Do not remove labels from glass until so directed.
 - 3. Install glass so distortion waves, if present, run in the horizontal direction.
- B. Locate setting blocks at sills one quarter of the width of the glass in from each end of the glass, unless otherwise recommended by the glass manufacturer.
 - 1. Use blocks of proper size to support the glass in accordance with the manufacturer's recommendations.
 - 2. Provide spacers for all glass sizes larger than 50 united inches, to separate glass from stops; except where continuous glazing gaskets or felts are provided.
 - a. Locate spacers no more than 24" apart, and no closer than 12" to a corner.
 - b. Place spacers opposite one another.
 - c. Make bite of spacer on glass 1/4" or more.
- C. Set glass in a manner which produces the greatest possible degree of uniformity in appearance.

- D. Do not use two different glazing materials in the same joint system unless the joint use is approved in advance by the Architect.
- E. Mask, or otherwise protect, surfaces adjacent to installation of sealants.
- F. Miter-cut and seal the joints of glazing gaskets in accordance with the manufacturer's recommendations, to provide watertight and airtight seal at corners and other locations where joints are required
- G. Tool exposed surfaces of glazing materials to provide a slight wash away from glass. Install exposed tapes or gaskets with a slight protrusion above stops in the final compressed condition.

3.3 PROTECTION AND CLEANING

- A. Protect glass from breakage after installation by promptly installing streamers or ribbons, suitably attached to the framing and held free from glass. Do not apply warning markings, streamers, ribbons or other items directly to the glass except as specifically directed by the Architect.
- B. Remove and replace glass which is broken, chipped, cracked, abraded or damaged.
- C. Wash and polish glass on both faces not more than 4 days prior to substantial completion. Comply with glass product manufacturer's recommendations for final cleaning.
- D. Clean excess sealant or compound from glass and framing members immediately after application.

END OF SECTION

SECTION 09 21 16

GYPSUM BOARD SYSTEMS

PART 1 GENERAL

1.1 RELATED SECTIONS

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

1.2 DESCRIPTION OF WORK

- A. Provide all labor, equipment, material and services necessary for the complete installation of drywall systems and framing. Provide miscellaneous framing and anchors as required to complete the work. Anticipate building movement and provide slip joints where movement will impact metal stud framing and other aspects of the work. Provide bracing as required to ensure solid, secure installation in compliance with codes and standards. Work shall include, but is not limited to:
 - 1. Gypsum Board System
 - 2. Studs, Tracks, Furring, Framing and Accessories
 - 3. Fastening Devices
 - 4. Jointing System
 - 5. Miscellaneous Material
 - 6. Accessories

1.3 QUALITY ASSURANCE

- A. Perform Work in accordance with ASTM C840, GA-201 - Gypsum Board for Walls and Ceilings, GA-216 - Recommended Specifications for the Application and Finishing of Gypsum Board.
- B. References (Latest edition of all referenced standards)
 - 1. ASTM C840 and ASTM C754 Installation of Steel Framing Members to Receive Screw-Attached Gypsum Wallboard, Backing Board or Water-Resistant Backing Board.
 - 2. GA-216 - Recommended Specification for the Application and Finishing of Gypsum Board.
 - 3. Finishing Specification: Recommended Specification - Levels of Gypsum Board Finish.
 - 4. GA-201 - Gypsum Board for Walls and Ceilings

1.4 SUBMITTALS

- A. Comply with pertinent provisions of Section 01 33 00.
- B. Submit a materials list of items proposed to be provided, as specified under this Section.

- C. Submit manufacturer's recommended installation procedures which, when approved by the Architect, will become the basis for accepting or rejecting actual installation procedures used on this work.

PART 2 PRODUCTS

2.1 GYPSUM BOARD SYSTEM

- A. Manufacturers:
 - 1. United States Gypsum Co.
 - 2. National Gypsum Co., Gold Bond Building Products
 - 3. Georgia Pacific
 - 4. Or Approved Equal
- B. Gypsum Board Type: 5/8-inch thick, maximum permissible length; ends square cut, tapered edges; unless noted otherwise as follows:
 - 1. Size: 1/2 and 5/8-inch thick as indicated on drawings, 48 inches wide by length to minimize cross joints.
 - 2. Regular: ASTM C1396, tapered edge gypsum panels, USG Sheetrock Brand SW Gypsum Panels or National Gypsum, Gold Bond Brand Gypsum Board.
 - 3. Mold and Moisture Resistant: ASTM C1396/ASTM C473, ASTM D 3273
 - a. Provide Type X at fire rated assemblies.
 - 4. Cementitious Board: ANSI A119.9 Cementitious backer units, 1/2 inch thick.

2.2 STUDS, TRACKS, FURRING, FRAMING AND ACCESSORIES

- A. Manufacturers:
 - 1. United States Gypsum
 - 2. Clark Steel Framing, Inc.
 - 3. National Gypsum Co., Gold Bond Building Products
 - 4. or Approved Equal
- B. ASTM C645; GA-216 and GA-600; galvanized sheet steel according to G60 interior, G90 exterior; 20 gage minimum, C shape.
- C. Resilient Channels: USG RC-1.
- D. Steel Stud Runners: Match studs. Provide long leg runners for slip joint at structure above to allow for deflection.
- E. Runner Channels: 1-1/2" and 3/4", 16 gage cold rolled channels, black asphaltum painted.
- F. Hanger Wire: No. 9 gage galvanized wire.
- G. Tie Wire: No. 16 gage galvanized wire.

- H. Deflection track at all locations where installation is affected by structural deflection including, but not limited to, all interior stud wall applications which extend to roof structure.

2.3 FASTENING DEVICES

- A. For fastening gypsum wallboard in place, use flat-head screws, shouldered, specially design for use with powder-driven tools, not less than 1" long, with self-tapping threads and self-drilling points. Comply with ASTM C646.

2.4 JOINTING SYSTEM

- A. Provide a jointing system, including perforated reinforcing tape and joint compound, designed as a system to be used together and as recommended for this use by the manufacturer of the gypsum wallboard approved for use on this work.
- B. Provide special water-resistant type for treatment of joints, fastener heads and cut edges of water-resistant backing board.

2.5 MISCELLANEOUS MATERIALS

- A. General: Provide auxiliary materials for gypsum wallboard work of the type and grade recommended by the manufacturer of the gypsum wallboard.

2.6 ACCESSORIES

- A. Corner Beads: Metal.
- B. Edge Trim: J shape exposed reveal bead, USG 200A or 200B.
- C. Joint Materials: ASTM C475, GA 201 and GA 216, reinforcing tape, joint compound, adhesive, and water.
- D. Control Joints: USG zinc coated control joint no. 093.
- E. Fasteners: ASTM C1002 Type S12 hardened screws.
- F. Metal Trim: USG No. 200A and 200B.
- G. Extruded Aluminum Moldings: By Fry Reglet, 6063T5 alloy; or approved equal. Provide in maximum lengths.
 - 1. F-Molding: Non-vented, size to fit gypsum board thickness.
 - 2. Exposed Surfaces Finish: Baked-on white enamel.
- H. Adhesive: USG Durabond multi-purpose adhesive, or approved equal.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Existing Conditions: Before beginning installation, examine framing to receive gypsum board for defects or conditions adversely affecting quality and execution of installation.

3.2 ERECTION

A. Drywall Stud Partitions

1. Reference Standard: Erect steel framing in accordance with ASTM C754 and USG Gypsum Construction Handbook.
2. Layouts: Align partition studs accurately according to partition layout.
3. Anchoring: Anchor runner channels to concrete slabs with concrete stud nails or power-drive anchors at 24" o.c. Anchor runner channels to ceiling grid where applicable with stove bolts. Install headers and diagonal bracing to receive runners where studs extend above ceiling system.
4. Studs: Position studs vertically in runners. Anchor studs to runners with USG metal lock fastener or with 1/2" Type S pan head screws.
 - a. Space studs 16" o.c. unless noted otherwise on drawings.
 - b. Corners and Intersections: Locate studs no more than 2" from abutting partitions, corners, etc.
 - c. Install deflection track at all locations where installation is affected by structural deflection including, but not limited to, all interior stud wall applications which extend to roof structure.

B. Installation of Gypsum Drywall

1. Reference Standard: Apply and finish gypsum board in accordance with GA 216.
2. Partition Gypsum Board Layout: Apply gypsum wallboard panels vertically with abutting ends and edges occurring over stud flanges or furring.
3. Ceiling Gypsum Board: Apply gypsum board of maximum practical length with long dimensions at right angles to furring channels. End and edge joints shall occur over furring channels with end joints staggered. Properly support gypsum board around cutouts and openings with additional framing members.
4. Fasteners: Apply board to studs or furring with drywall screws spaced 12" o.c. in field of board and 8" o.c. staggered along abutting edges.
5. Water Resistant:
 - a. Use behind ceramic tile.
 - b. Apply USG W/R Sealant to raw cut edges and screw heads.
6. Cementitious Board: Use at showers and bathtubs behind ceramic tile. Install in accordance with ANSI A108.11 and manufacturer's recommendations.
 - a. Framing: Maximum of 16" o.c.
7. Outside Corner Bead: Apply as recommended by manufacturer at exposed out corners.
8. Interior Corner: Provide joint reinforcing tape at interior corners applied as recommended by manufacturer.

9. Trim: Apply as recommended by manufacturer, where gypsum board abuts other materials, and as indicated.
 - a. F-Molding and Metal Reveal: Install in accordance with manufacturer's recommendations in maximum length pieces with tight, neat joints. Miter corners.
10. Tolerances: Gypsum board surface plane within plus or minus 1/8" in 10 feet.
11. Finishing: Finish in accordance with Reference Standards (Finishing Specification): Using a ready-mix joint compound and joint tape as recommended by manufacturer of wall system materials.
 - a. Concealed Location (Not Exposed to View in Rooms): Complete tape and spackle joint finishing system including spackling of fastener dimples, using Ready Mix Joint Compounds, sanding of joints and fastener dimples may be omitted.
 - b. Beneath Tile: Complete tape and spackle joint finishing system, using Ready Mix Joint Compounds. Sand smooth.
 - c. Other Finished Areas: Complete tape and spackle joint finishing system, using Ready Mix Joint Compounds, for finish of joints, trim and fastener dimples, as recommended by USG Perf-A-Tape joint system. Sand smooth.

3.3 SCHEDULES

- A. Metal Stud Schedule: Maximum Vertical Spans (MVS) for interior non-bearing partitions having gypsum board finish (1 or 2 layers):

Values shown below are minimum values. Should drawings indicate a heavier gauge, drawings shall prevail. Should drawings show a lighter gauge, specifications shall prevail. Providing bracing at lengths shown.

Should height of wall exceed that indicated, increase gauge of stud to 16 gauge.

<u>Size in Inches</u>	<u>Gage in Inches</u>	<u>Spacing*</u>	<u>One Layer Each Side</u>	<u>Two Layers Each Side</u>
1-5/8	20	16	8'-6"	10'-6"
2-1/2	20	16	12'-6"	14'-9"
3-5/8	20	16	14'-6"	19'-0"
4	20	16	16'-6"	20'-3"
6	20	16	24'-6"	26'-0"

* Unless noted otherwise on drawings.

END OF SECTION

SECTION 09 30 00 - TILE

PART 1 GENERAL

1.1 RELATED DOCUMENTS

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

1.2 DESCRIPTION OF WORK

- A. Provide all labor, equipment, materials and services necessary for the complete installation of wall and ceiling tile. The contractor must analyze the specific job conditions and the drawings, and include all necessary products and materials, even if not specifically noted on drawings. Work includes but is not limited to:
 - 1. Porcelain floor tile
 - 2. Marble thresholds
 - 3. Waterproof membrane
 - 4. Grout
 - 5. Setting materials
 - 6. Accessories

1.3 SUBMITTALS

- A. Samples: Submit two tile panels, 8 x 10 inch in size illustrating pattern, color variations, and grout joint size variations.
 - 1. Maintenance Instructions: Include recommended cleaning methods, cleaning materials, stain removal methods and polishes and waxes.
- B. Product Data: Submit applicable reference standards, current performance data, application recommendations and product limitations.

1.4 QUALITY ASSURANCE

- A. Perform work in accordance with ANSI A137.1, TCA Handbook for Ceramic Tile Installation and ANSI A108.3.
- B. Installer's Qualifications: Five years of experience in similar applications.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, those indicated in the ceramic tile installation schedules at the end of this Section.

- B. Products: Subject to compliance with requirements, provide products indicated in the ceramic tile installation schedules at the end of this Section.
- C. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work included, but are not limited to the following:
- D. Manufacturers: Provide tile as indicated on drawings. If not indicated, provide the following:
 - 1. Tile Products:
 - a. Dal-Tile Corporation (Basis of Design)
 - b. American Olean Tile Company
 - c. Crossville Studios
 - d. or Approved Equal
 - 2. Tile Setting and Grouting Materials:
 - a. Dal-Tile Corporation
 - b. American Olean Tile Company
 - c. Crossville Studios
 - d. or Approved Equal

2.2 PRODUCTS, GENERAL

- A. ANSI Ceramic Tile Standard: Provide tile that complies with ANSI A137.1, "*Specifications for Ceramic Tile*", for types, compositions and other characteristics indicated.
 - 1. Provide tile complying with Standard Grade requirements, unless otherwise indicated.
- B. ANSI Standards for Tile Installation Materials: Provide materials complying with ANSI standards referenced in "*Setting Materials* and "*Grouting Materials*" articles.
- C. Colors, Textures and Patterns: Where manufacturer's standard products are indicated for tile, grout, and other products requiring selection of colors, surface textures, patterns, and other appearance characteristics, provide specific products or materials complying with the following requirements:
 - 1. Provide Architect's selections from manufacturer's full range of colors, textures and patterns for products of type indicated.
 - 2. Provide tile trim and accessories that match color and finish of adjoining flat tile.
- D. Factory Blending: For tile exhibiting color variations within the ranges selected during sample submittals, blend tile in the factory and package so tile units taken from one package show the same range in colors as those taken from other packages and match approved samples.
- E. Mounting: Where factory-mounted tile is required, provide back- or edge-mounted tile assemblies as standard with manufacturer, unless another mounting method is indicated.

1. Where tile is indicated for installation in wet areas, do not use back- or edge-mounted tile assemblies unless tile manufacturer specifies in writing that this type of mounting is suitable for these kinds of installations and has a record of successful in-service performance.

2.3 TILE PRODUCTS

Provide products indicated on drawings. If not indicated, provide the following:

- A. Unglazed Ceramic Mosaic Tile: Provide factory-mounted flat tile complying with the following requirements:
 1. Composition: Porcelain with abrasive admixture; matte finish
 2. Module Size: 12 by 12 inch
 3. Nominal Thickness: 5/16 inch
 4. Face: Plain with cushion edges
- B. Trim Units: Provide tile trim units to match characteristics of adjoining flat tile and to comply with the following requirements:
 1. Size: As indicated, coordinated with sizes and coursing of adjoining flat tile where applicable.
 2. Shapes: As follows, selected from manufacturer's standard shapes:
 - a. Base for Portland Cement Mortar Installations: Coved.
 - b. Wainscot Cap for Flush Conditions: Regular flat tile for conditions where tile wainscot is shown flush with wall surface above.
 - c. External Corners for Portland Cement Mortar Installations: Bullnose shape with a radius of at least 3/4 inch, unless otherwise indicated.
 - d. Internal Corners: Field-buttet square corners, except with coved base and cap angle pieces designed to member with stretcher shapes.
 - e. Tapered Transition Tile: Shape designed to effect transition between thickness of tile floor and adjoining floor finishes of different thicknesses, tapered to provide a reduction in thickness from 1/2 to 1/4 inch across nominal 4-inch dimension.

2.4 STONE THRESHOLD

- A. General: Provide stone thresholds that are uniform in color and finish, fabricated to sizes and profiles indicated to provide transition between tile surfaces and adjoining finished floor surfaces.
 1. Fabricate thresholds to heights indicated, but not more than 1/2 inch above adjoining finished floor surfaces, with transition edges beveled on a slope of no greater than 1:2.
- B. Marble Thresholds: Provide marble thresholds complying with ASTM C 503 requirements for exterior use and with a minimum abrasive-hardness value of 10 per ASTM C 241.
 1. Provide white, honed marble complying with the Marble Institute of America's Group A requirements for soundness.

2.5 WATERPROOFING FOR THIN-SET TILE INSTALLATIONS

- A. General: Provide products that comply with ANSI A118.10.

2.6 GROUTING MATERIALS

- A. Commercial Portland Cement Grout (Sanded Grout): ANSI A118.6, color as indicated, for joints 1/8 inch or wider.
- B. Dry-Set Grout: ANSI A118.6, color as indicated.
- C. Latex-Portland Cement Grout: ANSI A118.6 for materials described in Section H-2.4, composed as follows:
 - 1. Factory-Prepared, Dry Grout Mixture: Factory-prepared mixture of portland cement; dry, redispersible, ethylene vinyl acetate additive; and other ingredients to produce the following:
 - a. Unsanded grout mixture for joints 1/8 inch and narrower.
 - 2. Mixture of Dry Grout Mix and Latex Additive: Mixture of factory-prepared dry grout mix and latex additive complying with the following requirements:
 - a. Unsanded Dry Grout Mix: Dry set grout complying with ANSI A118.6 for materials described in Section H-2.3, for joints 1/8 inch and narrower.
 - b. Sanded Dry Grout Mix: Commercial portland cement grout complying with ANSI A118.6 for materials described in Section H-2.1, for joints 1/8 inch and wider.
 - c. Latex Additive: Styrene butadiene rubber.
 - d. Latex Additive: Acrylic resin.

2.7 MISCELLANEOUS MATERIALS

- A. Trowelable Underlayments and Patching Compounds: Latex-modified, portland cement based formulation provided or approved by manufacturer of tile setting materials for installations indicated.
- B. Metal Edge Strips: White zinc alloy terrazzo strips, 1/8 inch wide at top edge with integral provision for anchorage to mortar bed or substrate, unless otherwise indicated.
- C. Tile Cleaner: A neutral cleaner capable of removing soil and residue without harming tile and grout surfaces, specifically approved for materials and installations indicated by tile and grout manufacturers.

2.8 MIXING MORTARS AND GROUT

- A. Mix mortars and grouts to comply with referenced standards and mortar and grout manufacturer's written instructions.
- B. Add materials, water and additives in accurate proportions.

- C. Obtain and use type of mixing equipment, mixer speeds, mixing containers, mixing time, and other procedures to produce mortars and grouts of uniform quality with optimum performance characteristics for installations indicated.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas and conditions where tile will be installed, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of installed tile.
 - 1. Verify that substrates for setting tile are firm; dry; clean; free from oil, waxy films, and curing compounds; and within flatness tolerances required by referenced ANSI A108 series of tile installation standards for installations indicated.
 - 2. Verify that installation of grounds, anchors, recessed frames, electrical and mechanical units of work, and similar items located in or behind tile has been completed before installing tile.
 - 3. Verify that joints and cracks in tile substrates are coordinated with tile joint locations.
- B. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Remove coatings, including curing compounds, and other substances that contain soap, wax, oil or silicone and are incompatible with tile-setting materials by using a terrazzo or concrete grinder, a drum sander, or a polishing machine equipped with a heavy-duty wire brush.
- B. Provide concrete substrates for tile floors installed with dry-set or latex-portland cement mortars that comply with flatness tolerances specified in referenced ANSI A108 series of tile installation standards for installations indicated.
 - 1. Use trowelable leveling and patching compounds per tile setting material manufacturer's written instructions to fill cracks, holes and depressions.
 - 2. Remove protrusions, bumps and ridges by sanding or grinding.
- C. Blending: For tile exhibiting color variations within the ranges selected during sample submittals, verify that tile has been blended in the factory and packaged so tile units taken from one package show the same range in colors as those taken from other packages and match approved samples. If not factory blended, either return to manufacturer or blend tiles at Project site before installing.

3.3 INSTALLATION, GENERAL

- A. ANSI Tile Installation Standards: Comply with parts of ANSI A108 series of tile installation standards in "*Specifications for Installation of Ceramic Tile*" that apply to types of setting and grouting materials and to methods indicated in ceramic tile installation schedules.

- B. TCA Installation Guides: TCA's "*Handbook for Ceramic Tile Installation*". Comply with TCA installation methods indicated in ceramic tile installation schedules.
- C. Extend tile work into recesses and under or behind equipment and fixtures to form a complete covering without interruptions, unless otherwise indicated. Terminate work neatly at obstructions, edges and corners with disrupting pattern or joint alignments.
- D. Accurately form intersections and returns. Perform cutting and drilling of tile without marring visible surfaces. Carefully grind cut edges of tile abutting trim, finish, or built-in items for straight aligned joints. Fit tile closely to electrical outlets, piping, fixtures, and other penetrations so plates, collars, or covers overlap tile.
- E. Jointing Pattern: Lay tile in grid pattern, unless other-wise indicated. Align joints when adjoining tiles on floor, base, walls and trim are the same size. Lay out tile work and center tile fields in both directions in each space or on each wall area. Adjust to minimize tile cutting. Provide uniform joint widths, unless otherwise indicated.
 - 1. For tile mounted in sheets, make joints between tile sheets the same width as joints within tile sheets so joints between sheets are not apparent in finished work.
- F. Grout tile to comply with the requirements of the following tile installation standards:
 - 1. For ceramic tile grouts (sand-portland cement, dry set, commercial portland cement, and latex-portland cement grouts), comply with ANSI A108.10.
 - 2. For chemical-resistant epoxy grouts, comply with ANSI A108.6.

3.4 WATERPROOFING INSTALLATION

- A. Install waterproofing to comply with waterproofing manufacturer's written instructions to produce a waterproof membrane of uniform thickness bonded securely to substrate.
- B. Do not install tile over waterproofing until waterproofing has cured and been tested to determine that it is watertight.

3.5 FLOOR TILE INSTALLATION

- A. General: Install tile to comply with requirements in the Ceramic Tile Floor Installation Schedule, including those referencing TCA installation methods and ANSI A108 series of tile installation standards.
- B. Joint Widths: Install tile on floors with the following joint widths:
 - 1. 1/8 inch.
- C. Back Battering: For installations indicated, obtain 100% mortar coverage by complying with applicable special requirements for back buttering of tile in referenced ANSI A108 series of tile installation standards.
 - 1. Tile floors installed with chemical-resistant mortars and grouts.
- D. Stone Thresholds: Install stone thresholds at locations indicated; set in same type of setting bed as abutting field tile, unless otherwise indicated.

1. Set thresholds in latex-portland cement mortar for locations where mortar bed would otherwise be exposed above adjacent non-tile floor finish.
- E. Metal Edge Strips: Install at locations indicated or where exposed edge of tile flooring meets carpet, wood, or other flooring that finishes flush with top of tile.

3.6 CLEANING AND PROTECTION

- A. Cleaning: On completion of placement and grouting, clean all ceramic tile surfaces so they are free of foreign matter.
1. Remove latex-portland cement grout residue from tile as soon as possible.
 2. Unglazed tile may be cleaned with acid solutions only when permitted by tile and grout manufacturer's written instructions, but no sooner than 10 days after installation. Protect metal surfaces, cast iron, and vitreous plumbing fixtures from effects of acid cleaning. Flush surface with clean water before and after cleaning.
- B. Finished Tile Work: Leave finished installation clean and free of cracked, chipped, broken, unbonded, and otherwise defective tile work.
- C. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer, that ensure tile is without damage or deterioration at the time of Substantial Completion.
1. When recommended by tile manufacturer, apply a protective coat of neutral protective cleaner to completed tile floors. Protect installed tile work with kraft paper or other heavy covering during construction period to prevent staining, damage and wear.
 2. Prohibit final inspection, remove protective coverings and rinse neutral cleaner from tile surfaces.

END OF SECTION

SECTION 09 51 00 - CEILING SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 DESCRIPTION OF WORK

- A. Provide all labor, equipment, materials and services necessary for the complete installation of acoustic ceilings and grid. Provide miscellaneous anchors and framing as necessary to support grid. Anticipate building movement and provide expansion and control joints according to manufacturer's recommendations. Ensure all miscellaneous hangers including hangers for light fixtures are installed where required by local jurisdiction. Work shall include but is not limited to:

1. Acoustic ceiling tile
2. Metal suspension system
3. Hanger wire
4. Edge molding and trim
5. Hold-down clips
6. Acoustic sealant

1.3 SUBMITTALS

- A. Product Data: Submit manufacturer's technical data and installation instructions for each ceiling material required, and for each suspension system.
- B. Include manufacturer's recommendations for cleaning and refinishing metal and acoustical units, including precautions against materials and methods which may be detrimental to finishes and acoustical performances.
- C. Samples for Verification Purposes: 6" square samples for each type of acoustical unit required.
 - 1. Submit 12" long samples of each type of metal suspension system required.
 - 2. Set of 12" long samples of each type of exposed edge molding.
 - 3. Full-size sample of each tile specified.

1.4 QUALITY ASSURANCE

- A. Installer Qualifications: Firm with not less than 3 years of successful experience in installation of ceilings similar to requirements for this project.
- B. Fire Performance Characteristics: Where required, provide acoustical ceiling components that are identical to those tested for the following fire performance characteristics according to ASTM test method indicated by UL or other testing and inspecting agency

acceptable to authorities having jurisdiction. Identify acoustical ceiling components with appropriate marking of applicable testing and inspection agency.

1. Surface Burning Characteristics: As follows, tested per ASTM E 84.

- a. Flame Spread: 25 or less.
- b. Smoke Developed: 50 or less.

C. Coordination of Work: Coordinate layout and installation of ceiling units and suspension system components with other work supported by or penetrating through ceilings, including light fixtures, HVAC equipment, fire-suppression system components, if any, and partition systems, if any.

D. Certificates: Submit certificates from manufacturers attesting that their products comply with specification requirements.

1.5 DELIVERY, STORAGE AND HANDLING

A. Deliver ceiling components to project site in original, unopened packages and store them in a fully enclosed space where they will be protected against damaged from moisture, direct sunlight, surface contamination or other causes.

B. Before installation acoustical ceiling units, permit them to reach room temperature and a stabilized moisture content.

C. Handle metal and acoustical ceiling units carefully to avoid chipping edges or damaging units in any way.

1.6 PROJECT CONDITIONS

A. Space Enclosures: Do not install interior acoustical ceiling units until space is enclosed and weatherproof, wet-work in space is completed and nominally dry, work above ceilings is complete, and ambient conditions of temperature and humidity will be continuously maintained at values near those indicated for final occupancy.

1.7 EXTRA MATERIALS

A. Deliver extra materials, packaged in protective covering and matching installed materials, to Owner. Provide quantity of each type of material used as specified.

PART 2 - PRODUCTS

2.1 ACOUSTICAL CEILING TILE

A. Manufacturer: Provide product as indicated on drawings. If not indicated, provide acoustic tile as follows:

- 1. Armstrong – CIRRUS Square Lay-In (ACT-1)
- 2. Armstrong – Ceramaguard (ACT-2)
- 2. Approved Equals.

2.2 METAL SUSPENSION SYSTEMS, GENERAL

- A. Manufacturer: Provide product as indicated on drawings. If not indicated, provide suspension systems as follows:
 - 1. Armstrong
 - 2. United States Gypsum
 - 3. OR Approved Equal
- B. Provide standard 15/16 metal suspension systems of type, structural classification and finish indicated which comply with applicable ASTM C 635 requirements.
- C. Provide aluminum 15/16" suspension systems of type, structural classification, and finish indicated for toilet/shower areas.
- D. Finishes and Colors: Provide manufacturer's standard finish for type of system indicated, unless otherwise required. For exposed suspension members and accessories with painted finish, provide color indicated or, if not otherwise indicated, as selected by Architect from manufacturer's full range of standard colors.
 - 1. High Humidity Finish: Comply with ASTM C 365 requirements for "Coating Classification for Severe Environment Performance" where high humidity finishes are indicated.
- E. Attachment Devices: Size for five times design load indicated in ASTM C 635, Table 1, Direct hung.

2.3 HANGER WIRE

- A. Galvanized carbon steel wire, ASTM A 641, soft temper, prestretched, Class 1 coating, sized so that stress at 3-times hanger design load (ASTM C 635, Table 1, Direct Hung) will be less than yield stress of wire, but provide not less than 12 gage. Provide hanger wires for lighting fixtures.

2.4 EDGE MOLDING AND TRIM

- A. Metal or extruded plastic of types and profiles indicated or, if not indicated, provide manufacturer's standard molding for edges and penetrations of ceiling which fits with type of edge detail and suspension system indicated.
 - 1. For circular penetrations of ceiling, provide edge moldings fabricated to diameter required to fit penetration exactly. Trim for recessed lighting shown will be supplied with lighting.

2.5 HOLD-DOWN CLIPS

- A. For Non-Fire-Rated Ceilings: For interior ceilings composed of lay-in panels weighing less than 1 lb. per square foot, provide hold-down clips spaced 2'-0" o.c. on all cross tees. Provide hold-down clips in the Foreman's office. .

2.6 ACOUSTICAL SEALANT

- A. Resilient, non-staining, non-shrinking, non-hardening, non-skinning, non-drying, non-sag sealant intended for interior sealing or concealed construction joints.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Measure each ceiling area scheduled for acoustical ceilings and establish layout of acoustical units to balance border widths as opposite edges of each ceiling. Avoid use of less-than-half widths units at borders. Comply with reflected ceiling plans; notify Architect if conflicts arise.
- B. Coordinate with installation of lighting and HVAC system.

3.2 INSTALLATION

- A. General: Install materials in accordance with manufacturer's printed instructions, and to comply with governing regulations, fire-resistance rating requirements as indicated, and Cisca standards applicable to work.
- B. Arrange acoustical units and orient directionally-patterned units (if any) in manner shown by reflected ceiling plan.
 - 1. Unless otherwise indicated, install panels with pattern running in one direction.
- C. Install suspension system to comply with ASTM C 636, with hangers supported only from building structural members. Locate hangers not less than 6" from each end and spaced 4'-0" along each carrying channel or direct-hung runner, unless otherwise indicated, leveling to tolerance of 1/8" in 12'-0". Provide hangers for lighting fixtures as required by local codes.
 - 1. Secure wire hangers by looping and wire-tying, either directly to structures or to inserts, eye-screws, or other devices which are secure and appropriate for substrate, and which will not deteriorate or fail with age or elevated temperatures.
 - 2. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum which are not part of supporting structural or ceiling suspension system. Splay hangers only where required to miss obstructions and offset resulting horizontal force by bracing, countersplaying or other equally effective means.
- D. Install edge moldings of type indicated at perimeter of acoustical ceiling area and at locations where necessary to conceal edges of acoustical units.
 - 1. Sealant Bed: Apply continuous ribbon of acoustical sealant, concealed on back of vertical leg before installing moldings.

2. Screw-attach moldings to substrate at intervals not over 16" o.c. and not more than 3" from ends, leveling with ceiling suspension system to tolerance of 1/8" in 12'-0". Miter corners accurately and connect securely.
- E. Install acoustical panels in coordination with suspension system, with edges concealed by support of suspension members. Scribe and cut panels to fit accurately at borders and at penetrations.
1. Install hold-down clips in areas indicated, and in areas where required by governing regulations or for fire-resistance ratings; space as recommended by panel manufacturer, unless otherwise indicated or required.
- F. Do not use wire hangers for exterior applications.

3.3 CLEANING

- A. Clean exposed surfaces of acoustical ceilings, including trim, edge moldings, and suspension members; comply with manufacturer's instructions for cleaning and touch-up of minor finish damage. Remove and replace work which
- cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.

3.4 EXTRA STOCK

- A. Deliver stock of maintenance material to Owner. Furnish maintenance material matching products installed, package with protective covering for storage and identified with appropriate labels.
1. Acoustical Ceiling Units: Furnish quantity of full-size units equal to 2.0% of amount installed.
 2. Exposed Suspension Components: Furnish quantity of each exposed component required for actual installation equal to 2.0% of amount installed.

END OF SECTION

SECTION 09 65 13 - RESILIENT WALL BASE AND ACCESSORIES

PART 1 GENERAL

1.1 RELATED SECTIONS

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

1.2 DESCRIPTION OF WORK

- A. Provide all labor, materials, equipment and services necessary for the complete installation of resilient wall base and accessories. Work includes but is not limited to:
 - 1. Resilient wall base
 - 2. Resilient flooring accessories
- B. Related sections include Section 09 65 19.43 – Polyester Composition Tile Flooring

1.3 SUBMITTALS

- A. Product Data: For each type of product specified.
- B. Samples for Initial Selection: Manufacturer's standard sample sets consisting of sections of units showing the full range of colors and patterns available for each type of product indicated.
- C. Samples for Verification: In manufacturer's standard sizes, but not less than 12 inches long, of each product color and pattern specified.
- D. Product Certificates: Signed by manufacturers of resilient wall base and accessories certifying that each product furnished complies with requirements.

1.4 QUALITY ASSURANCE

- A. Installer Qualifications: Engage an experienced installer to perform work of this Section who has specialized in installing resilient products similar to those required for this Project and with a record of successful in-service performance.
- B. Source Limitations: Obtain each type and color of product specified from one source with resources to provide products of consistent quality in appearance and physical properties without delaying the Work.
- C. Fire Test Response Characteristics: Provide products with the following fire test response characteristics as determined by testing identical products per test method indicated below by a testing and inspection agency acceptable to authorities having jurisdiction.

1.5 DELIVERY, STORAGE AND HANDLING

- A. Deliver products to Project site in manufacture's original containers, each bearing names of product and manufacturer, Project identification, and shipping and handling instructions.
- B. Store products in dry spaces protected from the weather with ambient temperatures maintained between 50 and 90 deg. F.
- C. Move products into spaces where they will be installed at least 48 hours before installation, unless longer conditioning period is recommended in writing by the manufacturer.

1.6 PROJECT CONDITIONS

- A. Maintain a temperature of not less than 70 deg. F or more than 95 deg. F in spaces to receive resilient products for at least 48 hours before installation, during installation, and for at least 48 hours after installation, unless manufacturer's written instructions specify longer time periods. After post-installation period, maintain a temperature of not less than 55 deg. F or more than 95 deg. F.
- B. Do not install products until they are at the same temperature as the space where they are to be installed.
- C. For resilient products installed on traffic surfaces, close spaces to traffic during installation and for time period after installation recommended in writing by manufacturer.
- D. Coordinate resilient product installation with other construction to minimize possibility of damage and soiling during remainder of construction period. Install resilient products after other finishing operations, including painting, have been completed.

1.7 EXTRA MATERIALS

- A. Furnish extra materials described below that match products installed, are packaged with protective covering for storage, and are identified with labels describing contents.
 - 1. Furnish not less than 10 linear feet for each 500 linear feet or fraction thereof, of each different type, color, pattern, and size of resilient product installed.
 - 2. Deliver extra materials to Owner.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Provide products as indicated on drawings. If not indicated, provide products of the following:

1. Johnsonite
2. Roppe
3. Allstate
4. or Approved Equal

2.2 RESILIENT WALL BASE

- A. Rubber Wall Base: Products complying with ASTM F-1861, Type II and with requirements specified in the Resilient Wall Base and Accessory Schedule.

2.3 RESILIENT ACCESSORIES

- A. Vinyl Accessories: Products complying with requirements specified in the Resilient Wall Base and Accessory Schedule.

2.4 INSTALLATION ACCESSORIES

- A. Trowelable Leveling and Patching Compounds: Latex-modified, portland cement based formulation provided or approved by resilient product manufacturer for applications indicated.
- B. Adhesives: Water-resistant type recommended by manufacturer to suit resilient products and substrate conditions indicated.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas and conditions where installation of resilient products will occur, with Installer present, for compliance with manufacturer's requirements, including those for maximum moisture content. Verify that substrates and conditions are satisfactory for resilient product installation and comply with requirements specified. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. General: Comply with manufacturer's written installation instructions for preparing substrates indicated to receive resilient products.
- B. Use trowelable leveling and patching compounds, according to manufacturer's written instructions, to fill cracks, holes and depressions in substrate.
- C. Remove coatings, including curing compounds, and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by manufacturer. Do not use solvents.

- D. Broom and vacuum clean substrates to be covered immediately before installing resilient products. After cleaning, examine substrates for moisture, alkaline salts, carbonation, or dust. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.3 INSTALLATION

- A. General: Install resilient products according to manufacturer's written installation instructions.
- B. Apply resilient wall base to walls, columns, pilasters, casework and cabinets in toe spaces, and other permanent fixtures in rooms and areas where base is required.
 - 1. Install wall base in lengths as long as practicable without gaps at seams and with tops of adjacent pieces aligned.
 - 2. Tightly adhere wall base to substrate throughout length of each piece, with base in continuous contact with horizontal and vertical substrates.
 - 3. Do not stretch base during installation.
 - 4. On masonry surfaces or other similar irregular substrates, fill voids along to edge of resilient wall base with manufacturer's recommended adhesive filler material.
 - 5. Install premolded outside corners before installing straight pieces.
 - 6. Install premolded outside and inside corners before installing straight pieces.
 - 7. Form outside corners on job, from straight pieces of maximum lengths possible, without whitening at bends. Shave back of base at points where bends occur and remove strips perpendicular to length of base that are only deep enough to produce a snug fit without removing more than half the wall base thickness.
 - 8. Form inside corners on job, from straight pieces of maximum lengths possible, by cutting an inverted V-shaped notch in toe of wall base at the point where corner is formed. Shave back of base where necessary to produce a snug fit to substrate.
- C. Place resilient products so they are butted to adjacent materials and bond to substrates with adhesive. Install reducer strips at edges of flooring that would otherwise be exposed.

3.4 CLEANING AND PROTECTING

- A. Perform the following operations immediately after installing resilient products:
 - 1. Remove adhesive and other surface blemishes using cleaner recommended by resilient product manufacturer.
 - 2. Sweep or vacuum horizontal surfaces thoroughly.

3. Do not wash resilient products until after time period recommended by resilient product manufacturer.
 4. Damp-mop or sponge resilient products to remove marks and soil.
- B. Protect resilient products against mars, marks, indentations and other damage from construction operations and placement of equipment and fixtures during remainder of construction. Use protection methods indicated or recommended in writing by resilient product manufacturer.
1. Apply protective floor polish to vinyl resilient products installed on floors and stairs that are free from soil, visible adhesive, and surface blemishes, if recommended by manufacturer.
 - a. Use commercially available product acceptable to resilient product manufacturer.
 2. Cover resilient products installed on floors and stairs with undyed, untreated building paper until inspection for Substantial Completion.
- C. Clean resilient products not more than 4 days before dates scheduled for inspections intended to establish date of Substantial Completion in each area of the Project. Clean products according to manufacturer's written instructions.
1. Before cleaning, strip protective floor polish that was applied to vinyl products on floors after completing installation only if required to restore polish finish and if recommended by resilient product manufacturer.
 2. After cleaning, reapply polish on vinyl products on floors to restore protective finish according to resilient product manufacturer's written recommendations. Coordinate with Owner's maintenance program.

END OF SECTION

SECTION 09 65 19.43 - POLYESTER COMPOSITION TILE FLOORING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Flooring and accessories as shown on the drawings and schedules and as indicated by the requirements of this section.

B. Related Documents

1. Drawings and General Provisions of the Contract (including General and Supplementary Conditions and Division 1 sections) apply to the work of this section.

C. Related Sections:

1. Other Division 9 sections for floor finishes related to this section but not the work of this section.

1.2 REFERENCES

A. ASTM International:

1. ASTM E 648 Standard Test Method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source
2. ASTM E 662 Standard Test Method for Specific Optical Density of Smoke Generated by Solid Materials
3. ASTM F 710 Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring
4. ASTM F 1482, Standard Guide to Wood Underlayment Products Available for Use Under Resilient Flooring
5. ASTM F 1861 Standard Specification for Resilient Wall Base
6. ASTM F 1869 Standard Test Method for Measuring Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride
7. ASTM F 2170 Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes
8. ASTM F 2982 Standard Specification for Polyester Composition Floor Tile

B. National Fire Protection Association (NFPA):

1. NFPA 253 Standard Method of Test for Critical Radiant Flux of Floor Covering Systems Using a Radiant Heat Energy Source
2. NFPA 258 Standard Test Method for Measuring the Smoke Generated by Solid Materials

1.3 SYSTEM DESCRIPTION

- A. Performance Requirements:** Provide flooring which has been manufactured, fabricated and installed to performance criteria certified by manufacturer without defects, damage, or failure.

B. Administrative Requirements

1. Pre-installation Meeting: Conduct an on-site pre-installation meeting to verify project requirements, substrate conditions, manufacturer's installation instructions and manufacturer's warranty requirements. Comply with Division 1 Project Management and Coordination (Project Meetings) Section.
2. Pre-installation Testing: Conduct pre-installation testing as follows: Specify testing-moisture tests.

C. Sequencing and Scheduling

1. Install flooring and accessories after the other finishing operations, including painting, have been completed. Close spaces to traffic during the installation of the flooring.
2. Do not install flooring over concrete slabs until they are sufficiently dry to achieve a bond with the adhesive, in accordance with the manufacturer's recommended bond, moisture tests and pH test.

1.4 SUBMITTALS

- A. Submit shop drawings, seaming plan, coving details, and manufacturer's technical data, installation and maintenance instructions for flooring and accessories.
- B. Submit the manufacturer's standard samples showing the required colors for flooring and applicable accessories.
- C. Submit Safety Data Sheets (SDS) available for adhesives, moisture mitigation systems, primers, patching/leveling compounds, floor finishes (polishes) and cleaning agents and Material Information Sheets for flooring products.
- D. If required, submit the manufacturer's certification that the flooring has been tested by an independent laboratory and complies with the required fire tests.
- E. Closeout Submittals: Submit the following:
 1. Operation and Maintenance Data: Operation and maintenance data for installed products in accordance with Division 1 Closeout Submittals (Maintenance Data and Operation Data) Section. Include methods for maintaining installed products, and precautions against cleaning materials and methods detrimental to finishes and performance.
 2. Warranty: Warranty documents specified herein

1.5 QUALITY ASSURANCE

- A. Single-Source Responsibility: provide types of flooring and accessories supplied by one manufacturer, moisture mitigation systems, primers, including leveling and patching compounds, and adhesives.
- B. Select an installer who is experienced and competent in the installation of resilient polyester composition tile flooring and the use of subfloor preparation products.
 1. Engage installers certified as Certified Installers
 2. Confirm installer's certification by requesting their credentials

- C. Fire Performance Characteristics: Provide resilient vinyl composition tile flooring with the following fire performance characteristics as determined by testing material in accordance with ASTM test methods indicated below by a certified testing laboratory or other testing agency acceptable to authorities having jurisdiction:
1. ASTM E 648 Critical Radiant Flux of 0.45 watts per sq. cm. or greater, Class I
 2. ASTM E 662 (Smoke Generation) Maximum Specific Optical Density of 450 or less
 3. CAN/ULC-S102.2 – Flame Spread Rating and Smoke Developed – Results as tested.

1.6 DELIVERY, STORAGE AND HANDLING

- A. Comply with Division 1 Product Requirements Sections
- B. Comply with manufacturer's ordering instructions and lead time requirements to avoid construction delays.
- C. Deliver materials in good condition to the jobsite in the manufacturer's original unopened containers that bear the name and brand of the manufacturer, project identification, and shipping and handling instructions.
- D. Store materials in a clean, dry, enclosed space off the ground, protected from harmful weather conditions and at temperature and humidity conditions recommended by the manufacturer. Protect adhesives from freezing. Store flooring, adhesives and accessories in the spaces where they will be installed for at least 48 hours before beginning installation.

1.7 PROJECT CONDITIONS

- A. Maintain a minimum temperature in the spaces to receive the flooring and accessories of 65°F (18°C) and a maximum temperature of [100°F (38°C)][85°F (29°C)] for at least 48 hours before, during, and for not less than 48 hours after installation. Thereafter, maintain a minimum temperature of 55°F (13°C) in areas where work is completed. Protect all materials from the direct flow of heat from hot-air registers, radiators, or other heating fixtures and appliances. Refer to the Manufactures Installations Systems manual, for a complete guide on project conditions.

1.8 LIMITED WARRANTY

- A. Resilient Flooring: Submit a written warranty executed by the manufacturer, agreeing to repair or replace resilient flooring that fails within the warranty period.
- B. Limited Warranty Period: 10 years
- C. Limited Warranty shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and will be in addition to and run concurrent with other warranties made by the Contractor under the requirements of the Contract Documents.

1.9 MAINTENANCE

- A. Extra Materials: Deliver extra materials to Owner. Furnish extra materials from same production run as products installed. Packaged with protective covering for storage and identified with appropriate labels.
1. Quantity: Furnish quantity of flooring units equal to 10 % of amount installed.
 2. Delivery, Storage and Protection: Comply with Owner's requirements for delivery, storage and protection of extra material.

PART 2 - PRODUCTS

2.1 MANUFACTURER

A. Resilient tile flooring, wall base, adhesives and accessories:

1. Armstrong Flooring Inc (Basis of Design)
2. Tarkett – Lino Floor Collection
3. Forbo – Marmoleum Composite Tile
4. Or approved equal

2.2 RESILIENT TILE FLOORING MATERIALS

A. Provide: Migrations® BBT Bio-Flooring manufactured by Armstrong Flooring, Inc. (Basis of Design) – or approved equal.

2.3 ADHESIVES

A. For Tile Installation System, Full Spread: Provide Armstrong S-525 BBT® Bio-Flooring Adhesive under the tile, or approved equal.

2.4 ACCESSORIES

- A. For patching, smoothing, and leveling monolithic subfloors (concrete), provide Fast-Setting Cement-Based Patch and Underlayment
- B. Provide transition/reducing strips tapered to meet abutting materials.
- C. Provide threshold of thickness and width as required.
- D. Provide resilient edge strips of width shown on the drawings, of equal gauge to the flooring, homogeneous vinyl or rubber composition, tapered or bullnose edge, with color to match or contrast with the flooring.
- E. Provide metal edge strips of width shown on the drawings and of required thickness to protect exposed edges of the flooring. Provide units of maximum available length to minimize the number of joints. Use butt-type metal edge strips for concealed anchorage, or overlap-type metal edge strips for exposed anchorage. Unless otherwise shown, provide strips made of extruded aluminum with a mill finish.

PART 3 – EXECUTION

3.1 MANUFACTURER'S INSTRUCTIONS

A. Compliance: Comply with manufacturer's product data, including technical bulletins, product catalog, installation instructions, and product carton instructions for installation and maintenance procedures as needed.

3.2 EXAMINATION

- A. Site Verification of Conditions: Verify substrate conditions (which have been previously installed under other sections) are acceptable for product installation in accordance with manufacturer's instructions (i.e. moisture tests, bond test, pH test, etc.).
- B. Visually inspect flooring materials, adhesives and accessories prior to installation. Flooring material with visual defects shall not be installed and shall not be considered as a legitimate claim.
- C. Examine subfloors prior to installation to determine that surfaces are smooth and free from cracks, holes, ridges, and other defects that might prevent adhesive bond or impair durability or appearance of the flooring material.
- D. Inspect subfloors prior to installation to determine that surfaces are free from curing, sealing, parting and hardening compounds; residual adhesives; adhesive removers; and other foreign materials that might prevent adhesive bond. Visually inspect for evidence of moisture, alkaline salts, carbonation, dusting, mold, or mildew.
- E. Report conditions contrary to contract requirements that would prevent a proper installation. Do not proceed with the installation until unsatisfactory conditions have been corrected.
- F. Failure to call attention to defects or imperfections will be construed as acceptance and approval of the subfloor. Installation indicates acceptance of substrates with regard to conditions existing at the time of installation.

3.3 PREPARATION

- A. Subfloor Preparation: Smooth concrete surfaces, removing rough areas, projections, ridges, and bumps, and filling low spots, control or construction joints, and other defects.
- B. Subfloor Cleaning: The surface shall be free of dust, solvents, varnish, paint, wax, oil, grease, sealers, release agents, curing compounds, residual adhesive, adhesive removers and other foreign materials that might affect the adhesion of resilient flooring to the concrete or cause a discoloration of the flooring from below. Remove residual adhesives as recommended by the flooring manufacturer. Remove curing and hardening compounds not compatible with the adhesives used, as indicated by a bond test or by the compound manufacturer's recommendations for flooring. Avoid organic solvents. Spray paints, permanent markers and other indelible ink markers must not be used to write on the back of the flooring material or used to mark the concrete slab as they could bleed through, telegraphing up to the surface and permanently staining the flooring material. If these contaminants are present on the substrate they must be mechanically removed prior to the installation of the flooring material.

3.4 INSTALLATION OF FLOORING

- A. Install flooring in strict accordance with the latest edition of Manufactures Installation Systems manual.
- B. Install flooring wall to wall before the installation of floor-set cabinets, casework, furniture, equipment, movable partitions, etc. Extend flooring into toe spaces, door recesses, closets, and similar openings as shown on the drawings.
- C. Scribe, cut, and fit to permanent fixtures, columns, walls, partitions, pipes, outlets, and built-in furniture and cabinets.

- D. Install flooring with adhesives, tools, and procedures in strict accordance with the manufacturer's written instructions. Observe the recommended adhesive trowel notching, open times, and working times.

3.5 INSTALLATION OF ACCESSORIES

- A. Fill voids with plastic filler along the top edge of the resilient wall base or integral cove cap on masonry surfaces or other similar irregular substrates.
- B. Place resilient edge strips tightly butted to flooring, and secure with adhesive recommended by the edge strip manufacturer. Install edge strips at edges of flooring that would otherwise be exposed.

3.6 CLEANING

- A. Perform initial and on-going maintenance according to the latest edition of the maintenance recommendations.

3.7 PROTECTION

- A. Protect installed flooring as recommended by the flooring manufacturer against damage from rolling loads, other trades, or the placement of fixtures and furnishings.

END OF SECTION

SECTION 09 91 00 - PAINTING

PART 1 GENERAL

1.1 RELATED SECTIONS

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

1.2 DESCRIPTION OF WORK

- A. Provide all labor, equipment, material and services necessary for the complete installation of painting and coating systems. Provide proper paint type for material to be painted and for condition of material (interior/exterior, wet, dry) according to manufacturer's recommendations. Work shall include, but is not limited to:

- 1. Painting Material**
- 2. Accessory Materials**
- 3. Finishes**

Paint all items except those specifically noted not to be painted and prefinished items.

1.3 QUALITY ASSURANCE

- A. Use adequate number 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 the work of this section. Installer must have a minimum of five years of experience in specified trade and projects of this size.
- B. Tests: Should the Contractor propose to furnish materials other than those listed under 2.1 Painting Materials, representing such to be equal to those listed, the Architect may, at his discretion, require laboratory analysis at the Contractor's expense to provide evidence of quality of the proposed materials.
- C. VOC Content: Determine VOC (Volatile Organic Compound) content of solvent borne and waterborne paints and related coatings in accordance with EPA Method 24 or ASTM D3960, Standard Practice for Determining Volatile Organic Compound (VOC) Content of Paints and Related Coatings.
 1. Provide products compliant with Green Seal GS-11, Paints, and tested in accordance with ASTM D5116, Standard Guide for Small-Scale Environmental Chamber Determinations or Organic Emissions from Indoor Materials/Products and with ASTM D6670, Standard Practice for Full-Scale Determination of Volatile Organic Emissions from Indoor Materials/Products.

1.4 SUBMITTALS

- A. Product Data: Provide data on all finishing products.

- B. Samples for Preliminary Selection: Submit manufacturer's standard paint fan.
- C. Samples: Submit two samples on 8-1/2 x 11 sheets, illustrating final selected colors available for each surface finishing product scheduled.

1.5 ENVIRONMENTAL REQUIREMENTS

- A. Store and apply materials in environmental conditions required by manufacturer's instructions.

1.6 WARRANTY

- A. The Contractor shall provide a labor and materials warranty for a period of one (1) year from date of substantial completion.
- B. Manufacturer's Warranty: The paint manufacturer warrants the products to be free of manufacturing defects in accord with applicable manufacturer quality control procedures. Liability for products proven defective, if any, is limited to replacement of the defective product or the refund of the purchase price paid for the defective product as determined by the Architect.

PART 2 PRODUCTS

2.1 PAINTING MATERIALS

- A. Manufacturers:
 - 1. Sherwin Williams (Basis of Design)
 - 2. Pratt & Lambert
 - 3. Benjamin Moore
 - 4. Glidden
 - 5. McCormick
 - 6. Duron
 - 7. or Approved Equal

2.2 ACCESSORY MATERIALS

- A. Linseed oil, shellac, turpentine, paint thinners and other materials required to achieve the finishes specified.

2.3 FINISHES

- A. Refer to schedule at end of section for surface finish. Refer to drawings for color selection; if not indicated on drawings. Responsibility for timely selection of colors to be Contractor's responsibility. Architect, during the submittal process, will select colors only when full painting submittal has been received by the Architect.
- B. The coats specified under the schedule are minimum coats; Contractor must fully coat surfaces to produce full color.

PART 3 EXECUTION

3.1 EXAMINATION AND PREPARATION

- A. Verify that substrate conditions are ready to receive work.
- B. Existing walls to be painted shall be scraped, brushed and scrubbed clean; and prepped and primed for painting.
- C. Measure moisture content of porous surfaces using an electronic moisture meter. Do not apply finishes unless moisture content is less than 15 percent.
- D. Correct minor defects and clean surfaces which affect work of this Section.
- E. Remove or mask electrical plates, hardware, light fixture trim, escutcheons, and fittings prior to preparing surfaces or finishing.
- F. Galvanized Surfaces: Remove surface contamination and oils and wash with solvent. Rinse and dry before application of etching primer. Do not grind or blast. If possible, apply acrylic primer in shop.
- G. Uncoated Ferrous Surfaces: Remove scale by wire brushing or sandblasting, clean by washing with solvent. Apply treatment of phosphoric acid solution. Prime paint after repairs.
- H. Shop Primed Steel Surfaces: Sand and scrape to remove loose primer and rust, hand clean, clean surfaces with solvent. Prime bare steel surfaces.

3.2 APPLICATION

- A. Apply products in accordance with manufacturer's instructions.
- B. Back prime interior and exterior woodwork scheduled to receive paint finish with primer paint.

3.3 CLEANING

- A. As work proceeds, promptly remove finishes where spilled, splashed, or spattered.

3.4 SCHEDULE

- A. Products listed below define requirements for quality, and are manufactured by Benjamin Moore unless otherwise indicated. Equivalent products by other acceptable manufacturers listed may be furnished in lieu of those specified. All components of system shall be from a single manufacturer; need to add zinc-rich primer per architectural steel spec, can't be used with alkyd paint

B. Interior Coating Systems:

1. Gypsum Board Ceilings: Flat finish
 - a. First Coat: Regal FirstCoat Interior Latex Primer and Underbody #216
 - b. Second Coat: Regal Wall Satin #215
 - c. Third Coat: Same as second
2. Wood: Semi-gloss opaque finish
 - a. Where knots exist, seal with knot primer QD30 (202)
 - b. First Coat: Premium Wall and Wood Primer, B28W8111, low VOC
 - c. Second Coat: Pro Industrial Zero VOC Acrylic Semi-Gloss B66-650
 - d. Third Coat: Same as second
3. Wood: Transparent finish
 - a. One coat filler for open grain wood only.
 - b. One coat stain
 - c. One coat sealer
 - d. One coat polyurethane satin
 - e. One coat polyurethane satin
4. Ferrous Metals (Hollow Metal Doors, Frames, Etc.): Semi-gloss finish
 - a. Where rust has formed, apply coat of Rust Converter M82. Spot prime where factor primer is missing. Provide manufacturer's recommended primer if surface is not factory primed.
 - b. Primer: Pro Industrial Pro-Cryl Universal Primer, B66-310 Series
 - c. First Coat: Pro Industrial Zero VOC Acrylic Semi-Gloss B66-650
 - c. Second Coat: Same as first
5. Galvanized Metals: Semi-gloss finish
 - a. First Coat: Pro Industrial Pro-Cryl Universal Primer, B66-310 Series
 - b. Second Coat: Polyurethane Gloss B65-700
 - c. Third Coat: Same as second coat
6. Aluminum: Semi-gloss finish
 - a. First Coat: Pro Industrial Pro-Cryl Universal Primer, B66-310 Series
 - b. Second Coat: Polyurethane Gloss B65-700
 - c. Third Coat: Same as second coat
7. Concrete Unit Masonry: Semi-gloss finish
 - a. First Coat: MoorCraft Super-Hid Latex Block Filler #285
 - b. Second Coat: Regal Aqua Glo #333
 - c. Third Coat: Same as second

END OF SECTION

SECTION 10 28 13 - TOILET AND BATH ACCESSORIES

PART 1 GENERAL

1.1 RELATED SECTIONS

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

1.2 DESCRIPTION OF WORK

- A. Furnish all labor, equipment and materials necessary for the proper installation of washroom accessories as shown on the drawings and as specified herein. Provide the accessories indicated on the drawings, but at a minimum (whether indicated or not) provide one mirror, one paper towel dispenser and one soap dispenser per each new bathroom, and one toilet paper dispenser per each water closet. The following is specified herein:
 - 1. Manufacturer
 - 2. Fabrication
 - 3. Finish
 - 4. Grab bars
 - 5. Toilet paper dispenser
 - 6. Surface-mounted towel dispenser
 - 7. Mirror
 - 8. Soap dispenser
 - 9. Curtain rod and curtain

1.3 SYSTEM DESCRIPTION

- A. Conform to ADA Guidelines for installing work in conformance with ANSI A117.1. and ADA Guidelines.

1.4 SUBMITTALS

- A. Product Data: Provide data on accessories describing size, finish, details of function, attachment methods.
- B. Samples: Submit one sample of each component illustrating color and finish upon request for return and installation within project.
- C. Supply three keys for each accessory to Owner. Master key all accessories.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Manufacturers:
 - 1. Bobrick.
 - 2. Bradley.
 - 3. American Specialties.
- B. Stainless Steel Sheet: 22 Gauge, Type 304.
- C. Adhesive: Two component epoxy, waterproof.
- D. Fasteners, Screws, and Bolts: Hot dip galvanized steel, tamper-proof, concealed.

2.2 FABRICATION

- A. Form surfaces flat without distortion. Weld and grind joints smooth.
- B. Shop assemble components and package with anchors and fittings.
- C. Back paint components to prevent electrolysis.
- D. Provide steel anchor plates, adapters, and anchor components for installation.
- E. Hot dip galvanize exposed and painted ferrous metal and fastening devices.

2.3 FINISHES

- A. Anchors: Galvanize to 1.25 oz/sq yd.
- B. Chrome/Nickel Plating: ASTM B456, Type SC 2; satin finish.
- C. Stainless Steel: No. 4 satin luster finish.

2.4 GRAB BARS

- A. 1-1/4" diameter stainless steel toilet grab bars with concealed mounting. Bobrick Model # B-5806 x 42/36/18; mounting height 33" AFF (centerline of bar), unless otherwise indicated on drawings; or approved equal.
- B. 1-1/2" diameter stainless steel shower grab bars with concealed mounting. Bobrick Model # B-6861; vertical installation unless otherwise indicated on drawing; or approved equal.

2.5 TOILET TISSUE DISPENSER

- A. Bobrick Model #B-2888; mounting height 19" AFF unless otherwise indicated on drawings; or approved equal.

2.6 SURFACE-MOUNTED PAPER TOWEL DISPENSER

- A. Bobrick Model #B-26212; mounting height 40" AFF unless otherwise indicated on drawings; or approved equal.

2.7 MIRROR

- A. Bobrick; B – 165 Stainless Steel width x height; mounting height 40" AFF unless otherwise indicated on drawings; or approved equal.

2.8 SOAP DISPENSER

- A. Wall-Mounted: Bobrick Model #B-2112; or approved equal.

2.9 CURTAIN ROD AND CURTAINS

- A. Curtain Rod: Type 304 stainless steel alloy flange – 3" outside diameter; 5/16" thick rod – 1" outside diameter.
- B. Curtain: Inpro-Shield by Panaz anti-microbial, mold- and mildew-growth inhibiting. Color: Aloft - Morning Grass; or approved equal.
- C. Rings: Provide rings as recommended by curtain manufacturer.

PART 3 EXECUTION

3.1 EXAMINATION AND PREPARATION

- A. Verify exact location of accessories for installation.
- B. Deliver inserts and rough-in frames to site. Provide templates and rough-in measurements as required.

3.2 INSTALLATION

- A. Install fixtures, accessories and items in accordance with manufacturers' instructions.
- B. Install plumb and level, securely and rigidly anchored to substrate.

3.3 SCHEDULES - As indicated on drawings.

END OF SECTION

SECTION 12 36 23.13 - PLASTIC-LAMINATE-CLAD COUNTERTOPS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Specially fabricated countertops

1.2 RELATED SECTIONS

- A. Section 06 41 16 – Plastic-Laminate-Clad Architectural Cabinets

1.3 REFERENCES

- A. ANSI A208.1 - American National Standard for Particleboard; 1999.
- B. AWI/AWMAC (QSI) - Architectural Woodwork Quality Standards Illustrated; Architectural Woodwork Institute and Architectural Woodwork Manufacturers Association of Canada; 2006, 8th Ed., Version 2.0.
- C. WI (MAN) - Manual of Millwork; Woodwork Institute; 2003.

1.4 SUBMITTALS

- A. Shop Drawings: Indicate materials, component profiles and elevations, assembly methods, joint details, fastening methods, accessory listings, hardware location and schedule of finishes.
- B. Samples: Submit actual samples of architectural cabinet construction, minimum 12 inches square, illustrating proposed cabinet, countertop, and shelf unit substrate and finish.
- C. Samples: Submit actual sample items of proposed pulls, hinges, shelf standards, and locksets, demonstrating hardware design, quality, and finish.
- D. Installers' AWI Quality Certification Program (QCP) Certificate.

1.5 QUALITY ASSURANCE

- A. Fabrication Qualifications: Shop that employs skilled workers who custom fabricate products similar to those required for this Project, and whose products have a record of successful in-service performance. Shop is a certified participant in AWI's Quality Certification Program.
- B. Installer Qualifications: Shop is a certified participant in AWI's Quality Certification Program.

1.6 PRE-INSTALLATION MEETING

- A. Convene not less than one week before starting work of this section.

1.7 FIELD CONDITIONS

- A. Do not deliver or install cabinets until building is enclosed and wet work is complete; maintain temperature and relative humidity at occupancy levels during the remainder of the construction period.

PART 2 PRODUCTS

2.1 PLASTIC-LAMINATE COUNTERTOPS

- A. Quality Standard: Unless otherwise indicated, comply with “Architectural Woodwork Standards” for grades indicated for construction, finishes, installation, and other requirements.
 - 1. Provide labels and certificates from AWI certification program indicating that woodwork complies with requirements of grades specified.
- B. Grade: Premium
- C. Certified Wood: Plastic-laminate countertops shall be made from wood products certified as “FSC Pure” or “FSC Mixed Credit” according to FSC STD-01-001. “FSC Principles and Criteria for Forest Stewardship”, and FSC STD-40-004 “FSC Standard for Chain of Custody Certification”.
- D. High-Pressure Decorative Laminate: NEMA LD 3
 - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Wilsonart International; (Satin Stainless/4830)
 - b. Formica Corporation
 - c. Lamin-Art, Inc.
- E. Colors, Patterns and Finishes: As indicated on the Drawings, or approved equal.
- F. Edge Treatment: Same as laminate cladding on horizontal surfaces.
- G. Core Material: Exterior-grade plywood.
- H. Core Thickness: 3/4 inch
 - 1. Build up countertop thickness to 1-1/2 inches at front, back and ends with additional layers of cover material laminated to top.
- I. Paper Backing: Provide paper backing on underside of countertop substrate.

2.2 WOOD MATERIALS

- A. Wood Products: Provide materials that comply with requirements of referenced quality standard unless otherwise indicated.
 - 1. Wood Moisture Content: 5 to 10 percent.

2.3 MISCELLANEOUS MATERIALS

- A. Adhesives: Do not use adhesives that contain urea formaldehyde.
- B. VOC Limits for Installation Adhesives and Sealants: Use products that comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24):
 - 1. Wood Glue: 30 g/L
 - 2. Multi-purpose Construction Adhesives: 70 g/L
 - 3. Structural Wood Member Adhesive: 140 g/L
 - 4. Architectural Sealants: 250 g/L

2.4 FABRICATION

- A. Fabricate countertops to dimensions, profiles and details indicated. Provide front and end overhang of 1 inch over base cabinets. Ease edges to radius indicated for the following:
 - 1. Solid-Wood Members: 1/16 inch unless otherwise indicated.
- B. Complete fabrication to maximum extent possible before shipment to Project site. Disassemble components only as necessary for shipment and installation. Where necessary for fitting at site, provide ample allowance for scribing, trimming and fitting.
- C. Shop-cut openings to maximum extent possible to receive appliances, plumbing fixtures, electrical work and similar items. Locate openings accurately and use templates or roughing-in diagrams to produce accurately sized and shaped openings. Sand edges of cutouts to remove splinters and burrs. Seal edges and openings in countertops with a coat of varnish.

END OF SECTION

SECTION 20 00 00 - GENERAL MECHANICAL REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes administrative and procedural requirements for work under Division 20.
- B. Coordinate the work of this Section with the requirements of the Project.

1.2 DEFINITIONS

- A. Following are definitions of terms and expressions used in the Mechanical Sections in addition to definitions found in the Contract Conditions:
 - 1. "Piping" includes pipe, fittings, valves, hangers, and other accessories that comprise a system.
 - 2. "Ductwork" includes ducts, fittings, housings, dampers, hangers, and other accessories, which comprise a system.
 - 3. "Refurbish" shall include but not be limited to: inspecting/repairing unit cabinet, such as repairing, seals/latches, curbs, etc., cleaning coils, replacing belts, lubricating bearings, changing filters, inspecting and cleaning gas fired heat exchanger, cleaning/repairing condensate drain and secondary drain pan, check and adjust refrigeration charge on each unit, leak test and repair any refrigeration leaks, etc. to bring the piece of equipment being refurbished into the manufacturers original operating specifications/tolerances and provide warranty of operability for 60 days after the systems have been turned over to the Owner.

1.3 QUALITY ASSURANCE

- A. Regulatory Requirements
 - 1. Work shall conform to the requirements of the codes, laws and ordinances of the Delaware Army National Guard, the City of New Castle, DE, National Fire Protection Association, American Society of Mechanical Engineers and other authorities having jurisdiction.
 - 2. Comply with applicable codes, laws, standard practices.
 - 3. Comply with the standards of good practice as outlined in the ASHRAE Guide, the Sheet Metal and Air Conditioning Contractor's Association's "Duct Manual", and the Apprentice Training Manual of the Steam Fitters Union.
 - 4. The requirements of the authorities having jurisdiction shall take precedence over the Drawings and Specifications and changes required by the authorities shall be made after review by the Architect.

1.4 SUBMITTALS

- A. Shop drawings are required for the following:
 - 1. Plumbing
 - a. Drains
 - b. Water Heaters
 - c. Plumbing Fixtures

- d. Circulating Pumps
 - 2. Fire Protection
 - a. Sprinkler Piping
 - b. Equipment
 - c. Hydraulic Calculations
 - 3. Heating and Air Conditioning
 - a. Air Devices
 - b. Insulation
 - c. Exhaust Fans
 - d. Heating and Air Conditioning Equipment
 - e. Mechanical/Electrical Coordination
 - f. Temperature Controls
 - g. Testing, Adjustment and Balancing Reports and Qualifications
- B. Review of shop drawings does not relieve the Contractor of responsibility for complying with the contract documents.

1.5 PROTECTION

- A. Protect material and equipment from damage.
- B. Post notices prohibiting the use of water closets.
- C. Provide plastic protection inserts, specifically manufactured for the bathtubs and shower stalls.
- D. Cap or plug openings in equipment, piping and ductwork with proper caps and plugs.
- E. Building materials should be stored in a weather-tight, clean area prior to unpacking for installation.
- F. Accumulation of water during construction should be avoided and any porous construction materials such as insulation should be protected from moisture.

1.6 VARIANCES

- A. Where conflicts exist within the contract documents, request clarification prior to the submission of a bid. If clarification is not requested, provide the work representing the higher cost and quality.

1.7 WARRANTY

- A. During the warranty period, make the proper adjustments of systems, equipment and devices installed and perform work necessary to ensure the efficient and proper operation of the systems, equipment and devices.
- B. Certain items of equipment shall be warranted for a longer time than the general warranty period. Provide for service or replacement required in connection with the warranty of these items.
- C. The warranty period shall not begin until the project has reached substantial completion. Any warranty limits from the manufacturer related to delivery of equipment or unit startup

shall be between the contractor and the manufacturer only and shall not impact the warranty between the owner and the contractor.

PART 2 - PRODUCTS

2.1 PRODUCTS TO BE USED

- A. Items are specified by designations such as trade name, manufacturer's name, catalog number and indicate the capacity and quality of the products or materials to be used on this project.
- B. Only products indicated on Contract Documents by name and model number have been coordinated with other trades. Coordinate items of other manufacturer with other trades.

2.2 MATERIALS AND WORKMANSHIP

- A. Items shown and not specifically called for, or items specified and not specifically indicated or detailed on the Drawings, or items neither specified nor shown, but which are reasonably incidental to and commonly required to make a complete job, shall be provided.

2.3 FOUNDATIONS AND EQUIPMENT SUPPORTS

- A. Provide foundations, supports, curbs and bases for equipment, as indicated or necessary for satisfactory installation and operation of equipment. Furnish and set anchor bolts.
- B. Concrete pads shall be 4 inches thick minimum, thicker if necessary to accommodate a particular piece of equipment. Edges shall be beveled with outer edge extending 3 inches beyond equipment. Provide concrete pads for floor-mounted equipment. Exterior pads shall be reinforced and shall have edges turned down to below the frost line. Exterior pads shall extend eight inches beyond edges of equipment and shall be sloped for drainage.
- C. Exterior equipment pads shall be 3 inches thick minimum E-Lite plastic pads manufactured by Diversitech with 3" high riser legs and shall extend 6 inches beyond edges of equipment and shall be sloped for drainage.
- D. Floor mounted stands, supports, rods or legs, where required, shall be constructed of structural steel shapes (angles, channels) of Kindorf or Unistrut or steel pipe and fittings securely braced and fastened to flanges bolted to the floor. Minimum rod size shall be 3/8-inch diameter. Paint steel with rust inhibiting paint.

2.4 ROOF SUPPORTS AND CURBS

- A. Provide equipment supports and curbs for the equipment and piping installed on or through the roof. Roof curbs shall be approved for use by the National Roofing Contractors National Association and shall be a minimum of 14 inches high. Curbs shall be sloping roof type suitable for pitch of the roof and shall set the equipment level. Curbs shall be double wall insulated type.
- B. Provide wood blocking or adjust the height of the custom curb to raise the level of the bottom of the curb to be level with the top of the finished roof assembly.

- C. Pipe curb assemblies, except for plumbing vent pipes shall be constructed of 18 gauge galvanized steel with base plate, raised cant, wood nailer strip and galvanized steel counter flashing. Top shall be provided with acrylic clad ABS plastic cover and graduated neoprene boots secured to cover and pipes by stainless steel band clamps. Pipe curbs shall be Pate Company PCA-5 or equivalent of Thy Curb.
- D. Equipment supports shall be constructed of 18 gauge galvanized steel with base plate, raised cant, insulation, wood nailer strip and galvanized steel counter flashing. Equipment supports shall be Pate Company ES-5b or equivalent of Thy Curb.
- E. Roof mounted stands, supports, rods or legs, where required, shall be constructed of structural steel shapes (angles, channels) of Kindorf or Unistrut or steel pipe and fittings securely braced and fastened to flanges bolted to the associated equipment support. Minimum rod size shall be 3/8-inch diameter. Paint members which have been cut or have been damaged with touch up rust inhibiting paint.

2.5 HANGERS AND PIPE SUPPORTS

- A. Provide pipe hangers and supports to maintain required slope and alignment for equipment and piping. Pipe hangers shall be as manufactured by Carpenter & Patterson, Fee & Mason, Modern Hanger or Grinnell.
- B. Pipes may not be supported from other pipes. Trapeze hangers may be used for parallel runs of pipe with same slope.
- C. Provide sway bracing at sufficient intervals to prevent lateral motion of horizontal or vertical piping and ductwork as required by the jurisdiction to meet the appropriate regional requirements.
- D. For pipe and tubing, both horizontal and vertical, and regardless of the spacing of other supports, provide supports at or near changes in direction. Hangers shall be spaced at not over 6 feet apart for 1/2 inch pipe, not over 8 feet apart for 3/4 and 1-inch pipe and not over 10 feet for larger sizes.
- E. For steel bar joist construction, hanger rods shall be supported from the top chord of the joists or from panel points of the lower chord of the joists. Where piping runs parallel to joists or where hangers are required at other than joist locations, provide steel angles welded to joists to support hangers so that weight is supported from the top chord of the joists.
- F. Hangers for pipe shall be similar to Carpenter & Paterson "Clevis" figure 100. Hangers for insulated lines with vapor barrier and carrying fluids with temperatures below 70 degrees shall be large enough to permit continuous insulation. Hangers on vapor barrier insulated piping shall be provided with rigid protector saddles with rigid core of insulation to thickness of adjacent insulation. Saddles shall be 16 gauge galvanized steel and shall cover one half of the circumference of the pipe covering. Saddle shall be secured to insulation with adhesive.
- G. Pipes upon or within close distance of walls shall be carried by wall brackets, Carpenter & Paterson, Fig. 221, 139, or 227 as approved.

- H. Support vertical lines at floor level with extension pipe clamps. Support lowest level of riser with pipe hanger as specified above on horizontal pipe as close to riser as possible.
- I. Special supports required shall be provided to suit the conditions.
- J. Expansion bolts or wood plugs will not be permitted in slag block walls. Equipment hung on such walls shall be supported by through bolts or approved anchor bolts set into masonry as the wall is laid up.

2.6 OPENINGS, CHASES, LINTELS AND SLEEVES

- A. Determine the location and size of chases, lintels and openings necessary for the proper installation of the work and provide them during the erection of the work in which such chases and openings occur.
- B. Provide sleeves through walls and floors for pipes. Sleeves through walls shall be of sufficient size to permit the insulation, where specified, to continue through the sleeve. Sleeves through walls shall be flush with the walls.
- C. In case cutting of building construction is necessary, including cutting of structural members, such cutting shall be done and repaired to match original condition of the work.
- D. Where non-combustible pipes pass through sleeves or around ductwork through openings in fire rated wall, floor-ceiling and ceiling-roof assemblies, seal openings with a Underwriters Laboratories classified firestop method. Firestop method shall be a one part, intumescent (expands with heat), latex elastomer capable of expanding a minimum of three times. Firestop materials shall be UL listed when tested in accordance with ASTM E814 for a two hour fire (F) and temperature (T) rating.
- E. If combustible piping materials are used, a UL listed firestop method shall be provided where the combustible materials penetrate fire rated wall, floor-ceiling and ceiling-roof assemblies. Firestop method shall be classified by UL as a through-penetration firestop device when tested in accordance with ASTM E814 for a two hour fire (F) and temperature (T) rating. Plastic piping materials, including, but not limited to PVC, CPVC and ABS, are combustible. Firestop method shall be similar to Nelson Firestop Products.
- F. Escutcheon plates shall be used to conceal sleeve opening on exposed uninsulated piping. Floor plates shall be split chrome plated cast brass similar to Ritter No. 36A.

2.7 VIBRATION ISOLATION

- A. Provide vibration isolators manufactured by a firm specializing in this type of work for equipment and piping that is capable of transmitting noise and vibration to the building structures.
- B. Isolators shall be designed to suit vibration frequency to be absorbed. Provide isolator units of area distribution to obtain proper resiliency under machinery load and impact. Where unequal distribution of weight occurs, design isolators for uniform deflection under imposed load.

- C. Examine the contract drawings for sizes, horsepower, rotational speeds, equipment location, length of span between columns and beams and construction type to determine the isolator selection type and deflection required for each piece of mechanical equipment. Conform to the requirements of the American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE) Handbook, "HVAC Applications", Chapter 48, "Sound and Vibration Control"
- D. Isolators of the same type shall be the product of the same manufacturer, Mason, Vibration Eliminator or Korfund.
- E. Mountings shall be of the types indicated below:
 - 1. Type A: Double deflection neoprene mountings shall have a minimum static deflection of 0.50". Metal surfaces shall be neoprene covered to avoid corrosion and have friction pads both top and bottom so they need not be bolted to the floor. Bolt holes shall be provided for those areas where bolting is required. On equipment such as small vent sets and close coupled pumps, steel rails shall be used above the mountings to compensate for the overhang. Mountings shall be type ND or rails type DNR as manufactured by Mason Industries, Inc. Color code to indicate durometer.
 - 2. Type B: Spring type isolation shall be free standing and laterally stable without any housing and complete with 1/4" neoprene acoustical friction pads between the baseplate and the support. Mountings shall have leveling bolts that must be rigidly bolted to the equipment. Spring diameters shall be no less than 0.8 of compressed height of the spring at rated load. Springs shall have a minimum additional travel to solid equal to 50% of the rated deflection. Submittals shall include spring diameters, deflections, compressed spring height and solid spring height. Mountings shall be type SLF manufactured by Mason Industries, Inc.
 - 3. Type C: Equipment with operating weight different from the installed weight and equipment exposed to the wind such as cooling towers shall be mounted on spring mountings as described in Type B, but a housing shall be used that included vertical limit stops to prevent spring extension when weight is removed. The housing shall serve as blocking during erection and cooling tower mounts shall be located between the supporting steel and roof or the grillage and dunnage as shown on the drawings. The installed and operating heights shall be the same. A minimum clearance of 1/2" shall be maintained around restraining bolts and between the housing and the spring so as not to interfere with the spring action. Limit stops shall be out of contact during normal operations. Mounting used out of the doors shall be hot dipped galvanized. Mountings shall be SLR as manufactured by Mason Industries, Inc.
 - 4. Type D: Neoprene crossribbed or waffle pattern, 5/16 inches thick. Provide 1/4 inch hot dipped galvanized steel bearing plates. Permanently identify durometer. Mason Industries, Inc. Type W.
- F. Hangers shall be of the types indicated below:
 - 1. Type E: Vibration hangers shall contain a steel spring and 0.3" deflection neoprene element in series. The neoprene element shall be molded with a rod isolation bushing that passes through the hanger box. Spring diameters and hanger box lower hole sizes shall be large enough to permit the hanger rod to swing thru a 30-degree arc before contacting the hole and short-circuiting the spring. Springs shall have a minimum additional travel to solid equal to 50% of the rated

deflection. Submittals shall include a scale drawing of the hanger showing the 30-degree capability. Hanger shall be type 30N as manufactured by Mason Industries, Inc.

2. Type F: Vibration hangers shall be described in Type E, but they shall be pre-compressed to the rated deflection to keep the piping or equipment at a fixed elevation during installation. The hangers shall be designed with a release mechanism to free the spring after the installation is complete and the hanger is subjected to its full load. Deflection shall be clearly indicated by means of scale. Submittals shall include a scale drawing of the hanger showing the 30-degree capability. Hangers shall be type PC3ON as manufactured by Mason Industries, Inc.
3. Type G: Vibration hanger shall contain a steel spring located in a neoprene cup manufactured with a grommet to prevent short circuiting of the hanger rod. The cup shall contain a steel washer designed to properly distribute the load on the neoprene and prevent its extrusion. Spring diameters and hanger box lower hole sizes shall be large enough to permit the hanger rod to swing thru a 30-degree arc before contacting the hole and short circuiting the spring. Springs shall have minimum additional travel to solid equal to 50% of the rated deflection. Hangers shall be provided to attach the housing to the flat iron duct straps. Submittals shall include a scale drawing of the hanger showing the 30-degree capability. Hangers shall be type W30 as manufactured by Mason Industries, Inc.

G. Horizontal thrust restraints shall be of the types indicated below:

1. Type X: Air handling equipment shall be protected against excessive displacement, which might result from high air thrusts in relation to the equipment weight. The horizontal thrust restraint shall consist of a spring element in series with a neoprene pad as specified for the mountings or hangers. The spring element shall be contained within a steel frame and designed so it can be present for thrust at the factory and adjusted in the field to allow for maximum of 1/4" movement at start and stop. The assembly shall be furnished with one rod and angle brackets for attachment to both the equipment and ductwork or the equipment and structure. Horizontal restraints shall be attached at the centerline of thrust and symmetrically on either side of the unit. Horizontal thrust restraints shall be WB as manufactured by Mason Industries, Inc.

H. Bases shall be of the types indicated below:

1. Type H: Provide integral structural steel bases. Bases shall be rectangular in shape for equipment other than centrifugal refrigeration machines and pump bases which may be 'T' or 'L' shaped. Pump bases for split case pumps shall include supports for suction and discharge base ells. Perimeter members shall be beams with a minimum depth equal to 1/10th of the longest dimension of the base. Beam depth need not exceed 14" provided the deflection and misalignment is kept within acceptable limits as determined by the manufacturer. Height saving brackets shall be employed in mounting locations to provide a base clearance of one inch. Bases shall be type WFSL as manufactured by Mason Industries, Inc.
2. Type J: Provide rectangular structural beam or channel concrete forms for floating foundations. Bases for split case pumps shall be large enough to provide support for suction and discharge base ells. The base depth need not exceed 12' unless specifically recommended by the base manufacturer for mass rigidity. In general, bases shall be a minimum of 1/12th of the longest dimension of the base, but not

less than 6". Forms shall include minimum reinforcement consisting of half-inch bars or angles welded in place on 6" centers running both ways in a layer 1-1/2" above the bottom, or additional steel as is required by the structural conditions. Forms shall be furnished with steel members to hold anchor-bolt sleeves when the anchor bolts fall in concrete locations. Height saving brackets shall be employed in mounting locations to maintain a 1" clearance. Bases shall be type KSL as manufactured by Mason Industries, Inc.

I. Roof bases shall be of the types indicated below:

1. Type Y: Curb mounted rooftop air handling equipment shall be mounted on vibration isolation bases that fit over the roof curb under the isolated equipment. The extruded aluminum top member shall overlap the bottom member to provide water runoff independent of the sea;. The aluminum members shall house cadmium plated springs having a 1" minimum deflection with 50% additional travel to solid. Spring diameters shall be no less than 0.8 of the spring height at rated load. Wind resistance shall be provided by means of resilient snubbers in the corners with a means of resilient snubbers in the corners with a minimum clearance of 1/4" so as not to interfere with the spring action in high winds. The weather seal consist of continuous closed cell sponge materials both above and below the base and a waterproof flexible duct-like EPDM connection joining the outside perimeter of the aluminum members. Foam or other contact seals are unacceptable at the spring cavity closure. Caulking shall be kept to a minimum. Submittals shall include spring deflection, spring diameters, compressed spring height and solid spring height as well as seal and wind resistance details. Curb mounted bases shall be Type CMAB as manufactured by Mason Industries, Inc. Where vibration isolation bases are provided for insulated roof curbs, provide insulation of the same R-value for the isolation base as is present for the roof curb.

J. Pipe anchors shall be of types indicated below:

1. Type N: Provide an all directional acoustical pipe anchor, consisting of a telescopic arrangement of two sizes of steel tubing separated by a minimum 1 inch thickness of heavy duty neoprene and duct or neoprene isolation materials. Vertical restraints shall be provided by similar material arranged to prevent vertical travel in either direction. Allowable loads on the isolation material and shall not exceed 500 psi and the design shall be balanced for equal resistance in any direction. Deflection shall be a minimum of 1". All directional anchors shall be type ADA as manufactured by Mason Industries, Inc.

K. Pipe connectors shall be of types indicated below:

1. Type K: Flexible wire reinforced butyl or neoprene hose with integral elastomer and duct flanges and iron back-up rings, control cables with isolating bushings and washers and flange brackets to limit expansion. Length: 6 times diameter up to 36" maximum 150 psi working pressure at 250 degrees F, suction service working pressure 200 psi at 100 degrees F. Mason Industries, Inc. Type MTBF.
2. Type L: Flexible bellows type bronze hose with bronze braid, sweat connections. Length: 8 times diameter, 10" minimum. Suitable for freon refrigerant service. Compressor discharge servicing working pressure 200 psi at 100 degrees F. Mason Industries, Inc. Type BSS.

- L. The first three pipe hangers in the main lines near isolated mechanical equipment shall be supported with hangers as described in Type F. Horizontal runs in other locations in mechanical rooms and equipment rooms shall be isolated by hangers as described in Type E. Floor supported piping shall rest on isolators as describes in Type C. Heat exchangers shall be considered part of the piping run. Type F hangers or the first three type C mounts as noted above will have the same static deflection as specified for the mounting under the connected equipment. If piping is connected to equipment located in basements and hangs from ceiling under occupied spaces, the first three hangers shall have 1" deflection for pipe sizes up to and including 3", 2" deflection for pipe sizes up to and including 6", and 3" deflection thereafter. Other hangers are mounts shall have a minimum steel spring deflection of 1". Hangers shall be located as close to the overhead supports as practical.
- M. Piping risers shall be suspended from or supported by Type F Hangers or Type C mountings and the piping anchored or guided with Type N anchors. Steel spring deflections shall be minimum of 1" except in those expansion locations where additional deflection is required to limit deflection or load changes to plus minus 25% of the initial stress.
- N. Duct discharge runs for a distance of 50' from the connected equipment shall be isolated from the building structure by means of Type G hangers or Type C floor supports. Spring deflections shall be a minimum of 1".
- O. Provide vibration isolation as required above and as indicted in the following schedule:

EQUIPMENT	LOCATION	ISOLATIION TYPE	DEFL. (IN)
Inline Pumps	Water Heater Closet	E, K, X	1.0"
Packaged Rooftop Units	Roof	Y	2.0"
Exhaust Fans	Various	E – Suspended	1.0"
Radiant Heaters	Garage Bays	E - Suspended	1.0"
Air Compressors	Water Heater Closet	C, J, L	2.0"

2.8 ACCESS PANELS

- A. In general, valves, dampers, traps and equipment shall be accessible through the removable panels in the ceiling. Where ceilings are not removable and in walls where access is required for service, access panels shall be provided. Access panels shall be appropriate for the finish in which they are installed, with a fire rating to match the wall or ceiling in which they are installed.
- B. Group valves, dampers and equipment together to keep the required number of access panels to a minimum.

2.9 ELECTRICAL WORK

- A. Motors and heating elements for equipment specified under the mechanical Sections of the Specifications shall be provided with the equipment.

- B. Starters, disconnect switches, and work pertaining to equipment power connections are specified under Division 26 unless specified with the equipment of this Division of the Specifications. Electrical devices provided under this Division shall meet requirements for similar equipment specified under Division 26.
- C. Interlock wiring, and the provision of pilot devices such as push buttons, thermostats, flow switches and similar items and their related wiring associated with the Automatic Control System, shall be provided in accordance with the applicable requirements of Division 26. For ease of servicing, permanently identify both ends of conductors with W. H. Brady Co. self-sticking Perma-Code wire markers. Mark control diagrams accordingly.
- D. Coordinate control device voltages.
- E. Unless specifically noted otherwise, motors $\frac{1}{2}$ HP and over shall be wound for 208volts, 3 phase, 60 hertz current, and those under $\frac{1}{2}$ HP for 120 volts, single phase, 60 hertz current. Motors shall be equipped with grease packed ball bearings. Motors shall be rated for continuous duty at 100 percent of rated capacity with an ambient temperature of 40 degrees C.
- F. Design motors in accordance with NEMA standards and affix to each a nameplate accurately listing pertinent data. Motors shall have sufficient capacity to start and operate the machine they drive without exceeding the motor nameplate rating at the speed specified or at speeds or loads, which may be obtained, by the drive actually furnished. The motor HP or KW ratings are those estimated to be required by the driven equipment when operating at specified duties and efficiencies and are used to determine electrical feeder sizes. If the actual horsepower or KW required for the equipment to be furnished is greater than the indicated horsepower or KW, it shall be provided. Changes required in starter, feeder, branch circuit or other electrical items shall be made. Provide a shop drawing showing the mechanical/electrical coordination between trades. The shop drawing shall list all mechanical equipment with power demand, associated branch circuit feeder designation, conduit and wire size, breaker size and fused safety switch.
- G. Unless otherwise indicated, polyphase motors shall be Class B, general purpose, squirrel cage, single speed, open induction type, stamped with NEMA Class B letter designation.
- H. Single phase motors except as noted shall be open, capacitor start type. Motors 1/6 horsepower and under shall be permanent split capacitor type with built-in reset thermal overload protection, unless specifically noted otherwise. Motors 1/12 horsepower and smaller that start with no load may be shaded pole with built-in reset thermal overload protection.
- I. Mechanical equipment with a factory wired control panel shall be wired in accordance with the National Electrical Code. Additionally, components within the panel shall bear the UL label.
- J. Equipment shall be UL listed as a system or be tested by an independent electrical testing agency acceptable to the Architect to comply with requirements of the Authority having jurisdiction.
- K. Do not install equipment, ductwork or piping in the dedicated spaces above switchgear, panels and transformers as identified in the National Electrical Code.

2.10 FLASHING

- A. Sanitary vent pipes passing through the roof shall be provided with conical neoprene boots for any pitch roof with base extending minimum of eight inches from vertical portion of boot. Provide clamp for securing boot to pipe.
- B. Flashing assemblies specified above shall be set in place as part of the work under this Division of this Specification, but will be finally installed as specified in another Division of this Specification.
- C. Base flashing of roof drains, ducts, fans and other equipment, if required, is specified in Division 7 of this Specification. Cap flashings shall be provided to make a water tight seal.

2.11 IDENTIFICATION

- A. Equipment shall be identified with engraved plastic laminate or anodized aluminum nameplates with pressure sensitive backing. Plates shall also be provided with drilled holes and fastened to equipment with moly-rivets. Letters shall be at least 3/8 inch high and larger in proportion to the size of the piece of equipment. Identification shall be the same as noted on schedules on the Drawings. Labels shall be provided for the following equipment.
 - 1. Packaged Rooftop Units
 - 2. Radiant Heaters
 - 3. Exhaust Fans
 - 4. Water Heaters
 - 5. Pumps
- B. Labels shall identify the piping system. Labels shall be located where pipes enters and leaves a space and at 30 foot centers on normal runs. Duct systems shall be similarly identified by noting the system and direction of flow.
- C. On valves, except immediately adjacent to equipment, provide 1 inch diameter brass tag with embossed and painted black numbers to identify the valve. Tag numbers shall be coordinated between trades. Tags shall be attached to valve wheels with a brass link. Tags shall be manufactured by Brady, Seton Nameplate, or Wilmington Plastics.
- D. Prepare a list showing the number and location of valves and a schematic piping diagram showing the location of numbered valves. The list and diagram shall be cross indexed so that the location and purpose of valves is identified. List and diagram shall be stored in a clear plastic envelope mounted on a wall where directed by the Architect.

PART 3 - EXECUTION

3.1 EXISTING CONDITIONS

- A. Visit the site and become familiar with existing conditions. (Modifications to work required to allow for existing conditions shall be provided. Submit proposed modifications to the Architect for approval prior to installation.

- B. Relocate existing hangers and supports where necessary to install new work. Maximum spacing requirements shall apply for relocated supports.
- C. Coordinate interruptions in service of existing systems with the Owner. Provide temporary connections to maintain operation of existing systems.

3.2 MANNER OF INSTALLATION

- A. Piping and ductwork shall be installed to preserve access to valves, dampers and equipment. Valves, dampers and equipment which require frequent service, adjustment or control and which cannot be located in a readily accessible and safe place, shall be provided with extension devices and remote operators, as necessary and as accepted for use by the Architect.
- B. Piping and ductwork shall be run to follow the lines of the building and to allow the maximum headroom consistent with proper pitch. Piping subject to thermal expansion shall be arranged to permit movement without damage to the piping, ductwork and equipment.
- C. The Drawings are generally indicative of the work to be installed, but they do not show all offsets, fittings and similar details required, which shall be provided to meet the job conditions. In areas where work is installed in close proximity to work of other trades or within trades covered by this Division of the Specifications, prepare larger scale drawings consisting of plans and sections to show how work is to be installed in relation to work of other trades.
- D. Equipment and systems shall be installed in accordance with the requirements and recommendations of the associated manufacturer.

3.3 EXCAVATION AND BACKFILL

- A. Provide excavation and backfill necessary to install underground piping and other work included in this Division of the Specifications. Establish lines and grades required for the proper location of the work.
- B. After the piping has been placed, the trenches shall be backfilled to the lines of present grades or finished grade as required. No backfill shall be placed, however, until water has been removed from the trenches and joints have been set and also after the tests have been made on piping as required.

3.4 RECORD DRAWINGS

- A. Keep at the site two (2) sets of black and white prints for the express purpose of showing changes from the contract Drawings made during construction. Mark up the prints with red pencil during construction and deliver the prints, before final inspection, to the Architect as a final set of "Record Drawings". Refer to Division 1 for additional requirements.

3.5 TESTING

- A. Before concealing piping and before insulating piping, test piping per the requirements listed below or as required by the authority having jurisdiction, whichever is more stringent, and prove tight.
- B. Replace and retest to Architect's satisfaction pipe or fittings broken or damaged under test.
- C. Before testing piping systems, remove or otherwise protect from damage, control devices, air vents, plumbing fixtures and other parts which are not designed to stand pressures used in testing piping.
- D. New sanitary and storm drain piping shall be tested by a standing water test so that the highest point of the system has no less than a 10 foot head of water. Fixtures shall be removed from system and piping capped or plugged. No drop in water level shall be allowed. Test systems for a period of four (4) hours.
- E. New domestic water system shall be tested hydrostatically, pumping the system to 150 psi test pressure and holding the system at the test pressure for two hours without additional pumping. The fire protection system shall be similarly tested at 175 psi test pressure. While under pressure, visually inspect joints, welds or other connections to determine leakage. If leaks are detected, repair leak and retest.
- F. New gas piping shall be air pressure tested at 50 psi test pressure for two hours without a drop in pressure during the test period.

3.6 CLEANING OF SYSTEMS

- A. After satisfactory completion of pressure tests and before permanently connecting fixtures, equipment, strainers and other accessory items, clean systems. Remove burrs, cuttings and waste. Blow and flush piping until interiors are free of foreign matter. Take precautions to minimize scale build up. Contractor will be responsible for having a clean and scale free system at the time of substantial completion.
- B. Dust shall be removed from ductwork before Substantial Completion. Filter media shall be new at Substantial Completion.
- C. If systems become stopped with refuse, remove the obstruction and replace and repair work disturbed.
- D. Clean plumbing fixtures using non-scratching cleaners. Polish chromium plated work. Stilson type wrenches shall not be used on chrome plated work.
- E. Dust in the construction area shall be suppressed with wetting agents or sweeping compounds. Dust shall be cleaned regularly.
- F. Remove rust and clean surfaces to be insulated or painted.
- G. Leave systems in clean condition and running order.

3.7 STERILIZATION

- A. The domestic water piping systems shall be sterilized with a chlorine water solution so that the piping system contains water with a chlorine concentration of 100 ppm at the end of a three hour retention period. Systems shall be flushed before sterilization. After the chlorine water solution has remained in the piping system for the specified period and at the specified concentration, the system shall be drained, flushed with clear water until the chlorine concentration is less than 1.0 ppm. Obtain representative samples of the systems water for analysis by a recognized bacteriological laboratory. If samples are not acceptable, the process shall be repeated until the samples are acceptable.
- B. The domestic water piping system may be sterilized by other methods approved by local plumbing codes or the Health Department.
- C. As a condition of acceptance of the system, furnish a certificate under seal to certify that the system has been sterilized to meet the requirements of the Health Department and that the system is satisfactory for human consumption.
- D. Chemicals and materials used for sterilization of the systems shall meet the requirements of the authority having jurisdiction.

3.8 PAINTING

- A. Remove rust, scale, grease, and dirt from equipment and material and leave ready for finish painting. Equipment specified with factory baked enamel finish shall be touched up as required to provide a surface visually free of scratches, nicks and blemishes.
- B. Paint uninsulated ferrous piping, hangers and miscellaneous iron work in concealed spaces with one coat of Rust-O-Leum dampproof red primer.
- C. Paint gas piping systems with associated markings per ANSI/ASME standards or as required by the Authority Having Jurisdiction.
- D. Where metal duct is visible through a register or grille, paint the interior of the duct with flat black paint.

3.9 OPERATING AND MAINTENANCE MANUAL

- A. Submit operating and maintenance instructions. The manual shall include the following:
 - 1. A brief description of systems and their various components.
 - 2. Full, definite and explicit instructions for starting, stopping, controlling and changing over systems from one season to another.
 - 3. List of manufacturer's representatives with address and telephone numbers.
 - 4. Manufacturer's printed operating and maintenance instructions, parts lists, illustrations and diagrams for pieces of equipment.
 - 5. A complete schedule of periodic servicing and lubrication requirements for equipment.
 - 6. One copy of each shop drawing and Contractor's drawings.
 - 7. One copy of other items of equipment where not required as a shop drawing submittal.
 - 8. One copy of each wiring diagram.
 - 9. Motor manufacturer's certificate for motors exposed to the weather.
 - 10. The field test data specified in Section 230000 under Balancing and Adjusting.

11. Sterilization certificate for domestic water systems.

3.10 FIELD INSTRUCTION

- A. Upon completion of work, furnish services of a competent representative to instruct Owner's representative in the proper operation and maintenance of elements of the mechanical systems. Submit instructor's name and credentials to the Architect for approval.
- B. Spend not less than 16 hours in such formal instruction to prepare Owner to operate and maintain the systems.
- C. At least 8 hours of the specified 16 hours of instruction shall occur after thirty days operation by Owner's representative and may be divided into periods of 4 hours at different seasons of the year.

3.11 PERFORMANCE TEST

- A. Should the performance or capacity of the systems, equipment or devices furnished be questioned by written notice from the Architect after installation, provide necessary test equipment and complete a satisfactory test of the items in question. The test shall be run when and as directed by the Architect and in the presence of his representative. Should the items furnished not pass such a test, they shall be removed and replaced by systems, equipment or devices satisfactory to the Architect.

END OF SECTION

SECTION 21 00 00 - FIRE PROTECTION

PART 1 - GENERAL

1.1 SUMMARY

- A. The requirements of Section 200000 apply to work performed under this Section.
- B. Section includes fire protection sprinkler systems.

1.2 QUALITY ASSURANCE

- A. Regulatory requirements of the fire protection system shall be in compliance with the rules and regulations of the Fire Department and the State Fire Marshal (or his legislated authoritative representative) and in accordance with the following:
 - 1. Building Code
 - 2. NFPA 101 - Life Safety Code
 - 3. NFPA Standards
 - a. NFPA 13
 - b. NFPA 20
- B. Fire alarm system and associated wiring are specified under Division 26. Coordinate changes to the fire alarm system due to changes in the sprinkler system layout from that shown on the Contract Documents.

1.3 SUBMITTALS

- A. A sprinkler system working drawing as required by NFPA and local jurisdiction shall be submitted to the Architect for review after governmental and regulatory agency approvals have been obtained. The submittal shall include manufacturer's data sheets and hydraulic calculations. Approval agencies shall include the local fire department and the State Fire Marshal's office. No installation of the system shall be made until approval is obtained. System shown on the Contract Drawings is schematic and is intended for use as a guide.

PART 2 - PRODUCTS

2.1 VALVES

- A. Valves on fire protection system shall be Factory Mutual stamped or UL listed.
- B. Main backflow prevention device serving the fire protection main shall be a double check detector valve assembly and shall comply with ASSE Standard 1048. The assembly shall consist of a main line valve body composed of two independently acting approved clapper style check modules with replaceable seats and disc rubbers. Accessing for servicing of both check modules is through independent top entry covers. The assembly shall be fitted with approved UL/FM resilient seated shutoff valves and contain four properly located resilient seated test cocks as specified by AWWA Standard C510. The auxiliary bypass line contains a 5/8" x 3/4" water meter that complies with ANSI/AWWA Standard C700 coupled with an approved check assembly. The bypass line shall detect leaks or unauthorized water usage of the water system while protecting against possible backpressure and backsiphonage conditions. Flow and pressure loss performance parameters shall meet the requirements of AWWA Standard C510. Double check detector valve assembly shall be Febco Model LF856, Watts or as required by the Authority Having Jurisdiction.

- C. Valves at base of risers and sprinkler system service shall be Stockham G634 or similar of Acme, Fairbanks, Walworth or Jenkins, 175 pound iron body, solid wedge disc with rising stem O.S. & Y. Provide a valve tamper switch for each valve. Tamper switch shall be Edwards type OSYS-U, Simplex or Pyron.
- D. Fire department valves in stair towers shall be Croker Corporation B0165, type 2 angle pattern male and female, 2-1/2 inch size, rough chrome plated with polished trim. Valves shall have a device to limit the discharge pressure to 100 psi. Hose end threads shall match those of the local fire department. Provide hose connections at each floor for each standpipe.
- E. Fire department connections shall be Croker Corporation, 6430 series, with dual clappers, lettered "Automatic Sprinklers". Prior to ordering Siamese connections, confirm type of finish with both Owner and Architect. Basis of design is polished chrome, if approved by Owner/Architect polished brass may be substituted. Hose threads shall be compatible with local fire department requirements. Provide U.L approved check valve behind each siamese connection with standard No. 148 automatic ball drip. Extend drip through the wall to discharge on grade.

2.2 SPRINKLER SYSTEM EQUIPMENT

- A. Ceiling sprinkler heads shall be chrome plated pendant heads for installation on a suspended ceiling system. Ceiling heads shall have full 360 degree spray pattern provided with fusible links or with thermal glass bulb for ordinary temperature rating. Sprinkler and other major devices shall be as manufactured by Reliable or Viking, Automatic Sprinkler.
- B. Sidewall sprinkler heads shall be chrome plated, horizontal type with a special deflector to distribute the water in a uniform pattern. Sidewall heads shall have a fusible link or with thermal glass bulb or with thermal glass bulb with an ordinary temperature rating.
- C. Exposed piping upright sprinkler heads shall be natural bronze finish for exposed piping installation. Heads shall have full 360 degree spray pattern provided with fusible links for ordinary temperature rating.
- D. Alarm check valve shall be provided at service entrance and shall have alarm connection to the fire alarm system. Wiring from the alarm connection to the fire alarm system is specified in Division 26.
- E. Flow switches shall be Simplex, Pyrotronics, Johnson or Honeywell pneumatically damped switch with 15 second delay, actuated by a flow rate of 10 gpm or greater. Alarm shall actuate an electric switch. Wiring from the switch to the fire alarm system is specified under Division 26.

PART 3 - EXECUTION

3.1 PIPING

- A. Piping within the building shall be per NFPA 13 except that plastic pipe shall not be used.

3.2 SPRINKLER SYSTEM

- A. Sprinkler system shall be a complete automatic wet pipe system complete with piping, sprinkler heads, valves, accessories, hangers, etc. System shall be generally classified for the code application hazard.

- B. Layout of sprinkler heads and piping shall be coordinated with the Architectural, Structural, Mechanical and Electrical Drawings and field conditions. Provide offsets, sleeves, etc., required for the installation.
- C. Extend piping for fire protection use from the water service where it enters the building.
- D. The location of mains is shown on the plans. These locations have been coordinated with other work as shown on the Mechanical Drawings. Piping locations shall be coordinated and field measured to ensure proper fit.
- E. System shall be hydraulically designed. Computer readout sheets shall be submitted as required for approval and permit purposes.
- F. Have a flow test performed in accordance with the procedures established in NFPA 20. Results of this flow test shall be included with the computer calculations.

END OF SECTION

SECTION 22 00 00 - GENERAL PLUMBING REQUIREMENTS

PART 1 - GENERAL

1.1 NOTE

- A. The requirements of Section 200000 apply to work performed under this Section.

1.2 SCOPE

- A. The work under this Section of the Specification shall include the furnishing of labor, materials and equipment for the installation of complete plumbing systems, including interior sanitary soil, waste and vent piping; storm, interior domestic hot and cold water piping, plumbing fixtures and appliances to provide continuous and satisfactory service.

1.3 CONNECTIONS TO EQUIPMENT

- A. Provide labor and materials to connect equipment furnished under this Section of the Specification.
- B. Provide labor and materials to connect equipment furnished under other Sections of the Specification and requiring plumbing connections as if the equipment was furnished under this Section of the Specification. Provide traps, water stop valves, etc., for equipment requiring such connections to provide functioning systems.

PART 2 - PRODUCTS

2.1 WATER HEATER – GAS, SEALED COMBUSTION

- A. Provide an automatic gas, sealed combustion storage water heater of the size and capacity as noted on the Drawings.
- B. Storage tank shall be sodium aluminate glass lined fused to steel at 1500 degrees F and guaranteed against leakage under residential use for six years. Cold water shall enter tank at bottom of tank or be provided with dip tube that will remain stable at temperatures up to 400 degrees Fahrenheit. Tank shall be provided with screw in anode. Hot and cold water nipples shall be non ferrous. Tank insulation shall be in accordance with latest ASHRAE recommendations. Tank shall meet 2015 NAECA Energy Factor Regulations.
- C. Gas burners shall be aluminized steel multi-port controlled by adjustable thermostat and protected by high temperature sensor to shut gas supply. Provide two pipe sealed combustion system. Provide quiet combustion blower. Gas burner shall be provided with hot surface ignition.
- D. Storage heater shall be provided with magnesium anode and ASME approved temperature and pressure relief valve.
- E. Provide with manufacturers concentric vent termination kit.

- F. Gas storage water heater shall be Bradford White, State, or A.O. Smith.

2.2 EXPANSION TANKS - DIAPHRAGM

- A. Provide expansion tanks of size noted on drawings for the domestic hot water systems. Tank shall be flange grade steel treated to be corrosion resistant and given final enamel coat of paint, steel with butyl diaphragm and a rigid polypropylene liner to provide non-corrosive water reservoir. Provide with saddles for suspended mounting as required for the installation.
- B. Tanks shall be ASME Section VIII code designed and stamped for maximum working pressure of 115 psi and temperature of 240 degrees fahrenheit and air tested at 160 psi. Tanks shall be precharged to the setting of the make up water pressure reducing valve. Provide saddles and hangers for support of tanks.
- C. Tank shall be as manufactured by Amtrol or Taco.

2.3 DOMESTIC WATER CIRCULATING PUMP

- A. Provide an all bronze or stainless-steel in-line circulator to recirculate water to the storage water heater. Pump shall have a flexible coupler, coupler guard and sleeve bearings.
- B. Pump shall be Taco, Bell & Gossett or Thrush.
- C. Control of circulating pump is specified as part of automatic temperature controls.

2.4 CLEANOUTS

- A. Cleanouts shall be provided at ends of runs, at changes of direction and near the base of each vertical soil, waste, or drain pipe. Cleanouts shall be placed on horizontal lines every 50 feet unless the conditions require them at closer intervals. Cleanouts at the base of vertical pipes shall be placed in a fitting just above the floor. Cleanouts shall consist of Y branches or 1/4 bends the full size of the line for piping 4 inches and smaller, and 4 inches for larger pipes. Cleanouts in horizontal lines shall be extended to floor level or grade as necessary. Cleanouts shall be series as listed below:
1. Below concrete floors with no finish or ceramic tile finish.
 - a. Zurn - ZN-1400-3
 - b. J. R. Smith
 - c. Watts
 - d. Josam
 - e. Mifab
 2. Below carpeted floors (flush with concrete with identification screw through carpet).
 - a. Zurn - ZN-1400-15
 - b. J. R. Smith
 - c. Watts
 - d. Josam
 - e. Mifab
 3. Below resilient tile floors.
 - a. Zurn - ZN-1400-7
 - b. J. R. Smith

- c. Watts
 - d. Josam
 - e. Mifab
 4. Exposed horizontal piping.
 - a. Zurn - Z-1440A
 - b. J. R. Smith
 - c. Watts
 - d. Josam
 - e. Mifab
 5. Concealed in finished wall-prime coat.
 - a. Zurn - Z-1440-1
 - b. J. R. Smith
 - c. Watts
 - d. Josam
 - e. Mifab
 6. Base of exposed vertical pipes.
 - a. Zurn - Z-1445
 - b. J. R. Smith
 - c. Watts
 - d. Josam
 - e. Mifab
 7. Base of concealed vertical pipes.
 - a. Zurn - Z-1445-1
 - b. J. R. Smith
 - c. Watts
 - d. Josam
 - e. Mifab
- B. Cleanouts shall consist of cast iron ferrules and shall seat against a lead seal. Access covers shall be polished nickel bronze in finished areas, brass below carpeting. Access covers will be secured by non-ferrous tamperproof screws.

2.5 DRAINS

- A. Provide roof, floor and area drains shown on Drawings and/or described below. Drains shall be Zurn, J. R. Smith, Josam or Mifab.
- B. Floor drains shall have deep seal "P" traps. Provide flapper type backwater valves on drains connected directly to the storm sewer where the line serving the floor drains does not have a backwater valve. For floor drains adjacent to air handling units, provide oval funnel converting assemblies of same material as drain top.
 1. Zurn - Z-329
 2. J. R. Smith
 3. Watts
 4. Josam
 5. Mifab
- C. Floor drains shall be served by trap primers. Trap primers shall be bronze bodied "Flow – Through" type. Trap primers shall come with built-in air gap, trap primers shall meet the requirements of ASSE Standard 1018. Trap primers shall be set above the floor level of the drains they serve. Trap primer valves located behind walls shall be provided with

access doors. Access doors to be coordinated with the Architect. Extend water line from trap primer to floor drain trap.

1. J. R. Smith – 2699
2. Watts
3. Zurn
4. Josam
5. Mifab

D. Floor drains shall be of the following type:

1. FD-1 -cast iron adjustable nickel bronze 8 inch round strainer.
 - a. Zurn - Z-415B
 - b. J. R. Smith
 - c. Watts
 - d. Josam
 - e. Mifab

2.6 PLUMBING FIXTURES

- A. Provide plumbing fixtures as shown on the Drawings or as described herein. Exposed metal parts of fixtures, including faucets, waste fittings, waste plugs, strainers, flush valves, traps, supply and waste pipes and escutcheons shall be brass, chromium plated.
- B. Mounting Heights of Fixtures
 1. To provide for the physically disabled, plumbing fixtures shall be provided for their use at a mounting height suitable for the disabled as set forth by the Federal Government. Fixtures for special uses need not meet this requirement. Fixture mounting heights are generally indicated on the drawings.
 2. Hot water and drain piping accessible to a wheelchair patient shall be suitably protected against high temperature by molded vinyl piping covers with access to shut-off valves, trap cleanout, etc. Insulation shall have out of sight fastening system, tie bands are not approved. Covers shall be Truebro Lav Guard 2 E-Z.
- C. Hot and cold water connections to fixtures shall be provided with a stop valve. Stop valves, risers, etc. shall be commercial/institutional grade as manufactured by Brass Craft, Chicago, Engineered Systems or McGuire.
- D. Flush valves shall be of the non-hold open type and shall operate with 5 psi or less hand pressure.
- E. Provide metal supports necessary to adequately and substantially hang and set fixtures. Supports shall be Zurn, Josam or J. R. Smith and suitable for the wall thickness and piping arrangements shown.
- F. Plumbing fixtures shall be caulked at wall and floor with silicone caulking material of same color as the fixture.
- G. For sinks and fixtures specified under other Divisions or other contracts and not provided with faucets, tailpieces, traps, and stop valves; provide necessary fittings and completely connect the sinks and fixtures.

2.7 SHOCK ABSORBERS

- A. Provide shock absorbers in the water piping in horizontal runs where shown on drawing and elsewhere as required to prevent noise or injury to the piping system resulting from water hammer.
- B. Shock absorbers shall be J. R. Smith Hydrotrol or Zurn Z-1700 Shocktrol. Unit shall consist of stainless steel casing and air charged bellows. Shock absorbers shall be sized as recommended in the Plumbing Drainage Institute Standard WH-201.

2.8 WALL HYDRANTS

- A. Provide wall hydrants as herein specified and indicated on the Drawings. Coordinate the mounting height with the architect prior to installation.
- B. The exterior wall hydrants shall be frostproof hydrants Zurn 1310 with integral backflow preventor, J. R. Smith or Josam. The hydrant face shall be polished nickel bronze. The unit shall have bronze working parts and neoprene washers. Provide a loose key which will operate the hydrants.

2.9 VALVES

- A. Provide valves as indicated on Drawings, as specified below and as required. Valves, where possible, shall be of one manufacturer, Stockham, Nibco or Jenkins, Jomar whose figure numbers are used below.
- B. Valves 2 inches and smaller, which will be operated frequently, or will be used for throttling services, shall be ball or globe valves. Stop valves shall be ball valves.
- C. Valves in the domestic hot water, cold water and hot water recirculating system shall be:

Description	FOR STEEL PIPE		
	<u>Nibco</u>	<u>Jenkins</u>	<u>Stockham</u>
Gate-4" and larger IBBT, OS & Y, flanged	F-617-0	651A	G-623
Gate-3" and smaller BBT, rising threaded stem	T-111	47	B-100
Globe-4" and larger IBBT OS&Y, flanged	F-718-B	613	G-512
Globe-3" and smaller BBT, threaded	T-211-Y		B-13-T
Check Valves 4" and larger IBBT, swing, flanged	F-918-B	624	G-931
Check Valves 3" and smaller BBT, swing, threaded	T-413-Y	92A	B-319
Description	For Copper Tube		
	<u>Nibco</u>	<u>Jenkins</u>	<u>Stockham</u>

Gate-2-1/2" and smaller, bronze rising stem, solder end.	S-111	1242	B-108
Globe-2-1/2" and smaller, bronze solder end	S-211-Y		B-14-T
Check Valves 2-1/2" and smaller, bronze, swing solder end	S-413-Y	1222	B-309

- D. Circuit Setter Plus Calibrated Balance valves by Bell and Gossett models RF, MC, CB, may be used for balancing and shut off valves in hot water circulating lines. Valve shall be lead free for use in domestic water systems. Adjustable stop and tapping on the downstream side for pressure gauge connections shall be provided with balancing services. This valve may also be used in lieu of gate and globe valves where shown.
- E. Flow measuring ball valves may be used for balancing purposes on domestic recirculation systems. Flow measuring ball valves shall be Watts LFCSM-61-S. Provide positive memory feature, positive shut-off, be bi-directional and include blowout resistant stems. Valves shall be Lead Free and meet NSF 61 Annex G.
- F. Ball valves may be used for shut off and balancing purposes except on gas piping where they shall not be used except as indicated below. Ball valves shall be NIBCO figure S-580-M, Jomar T-100 or Apollo. Provide memory stop on balancing valves. Ball valves may be used for shut off purposes in gas piping 1 inch and smaller. Ball valves in gas piping shall be NIBCO GB10/GB1A
- G. Butterfly valves may be used for shut off or balancing purposes in lieu of gate or globe valves on piping 2-1/2 inches and larger. Valves shall be 200 pound and have EPDM liner, aluminum bronze disc and lever lock operator. NIBCO LD-2000-3, Jenkins 23ZE, Centerline, or DeZurik. On piping 8 inches and larger provide gear operator NIBCO LB-2000-5.
- H. Non-slam check valves shall be installed on discharge of pumps, in vertical piping and elsewhere as shown and shall be 125 pound wafer style iron body, bronze fitted with renewable seat and disc and spring actuator, Miller 162, NIBCO W910, Hager or Smolensky.
- I. The backflow prevention device serving the domestic water service shall be an ASSE 1013, Reduced Pressure Zone Assembly that consist of two independent spring loaded "Y" pattern check valves and one differential pressure relief valve. The assembly shall automatically reduce the pressure in the zone between the check valves to at least 5 PSI lower than inlet pressure. Mainline valve body and caps including relief valve body and cover shall be Lead Free cast copper silicon alloy. Check valve and relief valve components shall be constructed so they may be serviced without removing the valve body from the line. The assembly shall be rated to 175 PSI working pressure and water temperature range from 32 deg F to 140 deg F. Assembly shall be a Febco LF825Y or Watts Regulator Company LF009.
- J. Valves in gas piping shall be corrosion resistant, double-seal, O-ring stem seal, meets ANSI 125 lb. standard, manufactured from bronze or Electroless nickel plated cast iron eccentric plug by Key Port Valve series 400.

- K. Tempered water mixer shall be Powers LFSH 1430 with lead free brass body construction and be ASSE 1017 compliant. Triple duty check stops with screens and vandal resistant locking mechanism. Valve shall control temperature from a low of 1 GPM, 28 GPM at 10 PSI and 38 GPM at 20 PSI drop across the valve. Standard temperature range, temperature and pressure gauge on outlet.

PART 3 - EXECUTION

3.1 SANITARY PIPING

- A. Sanitary piping shall be extended from fixtures, appliances, etc., to the existing sanitary sewer. Verify location, size and elevation of the existing line before performing work and notify the Architect if discrepancies are noted.
- B. Sanitary piping below the lowest finished floor to their connections to existing utilities shall be schedule 40 polyvinyl chloride sewer pipe
- C. Sanitary and storm drain piping within the building, above ground shall be service weight cast iron "no hub" pipe with neoprene and stainless steel connectors.
- D. Drain piping from air conditioning unit condensate pans above the ground, outside the building shall be schedule 40 polyvinyl chloride sewer pipe.
- E. Where lines pass under or through footings, encase them in concrete to uniform thickness as approved by the engineer.
- F. In connection with underground piping, connections and turns, unless otherwise specified, shall be made with Y fittings and 1/8 bends.

3.2 WATER PIPING

- A. Water service underground outside the building shall be cement lined ductile iron ASA 21.6 or ASA 21.8 made up with Tyton joints. Provide proper bedding for piping and concrete buttresses at all fittings according to AWWA standards.
- B. Water piping inside the building shall be type "L" hard drawn copper water tube, ASTM B88 with solder type wrought copper fittings, ANSI A40.3. Brass solder joint valves shall be used with copper tubing. Solder shall be 95-5 tin antimony type. Protect piping from materials which may cause corrosion of copper.
- C. Exposed piping at fixtures shall be IPS red brass, chromium plated.
- D. Mains, branches and connections of the hot and cold water distribution piping systems shall be provided with valves placed at the points shown on drawings or directed by the Architect for proper isolation and control of the system. Equipment or appliances shall be separately valved so that service can be shut off and the piece of equipment or appliance removed without disturbing the piping system. Valves shall be located so as to be accessible to the operator. Separate valves for equipment and appliances are in addition to faucets supplied herein or in other Sections.

- E. Provide for expansion of piping subject to temperature changes. This shall be accomplished by swings, bends or loops.

3.3 GAS PIPING - NATURAL GAS

- A. Make arrangements with the local gas utility for the installation of the gas service and meter. The Owner will pay costs levied by the utility for this work.
- B. Gas piping shall be extended from the gas meter to the appliances requiring connections.
- C. Gas piping shall be Schedule 40 black steel pipe with malleable iron fittings made up with gasoil pipe dope compound. Concealed/non-accessible piping shall be provided with welded fittings. Piping shall be installed in accordance with the NFPA code for gas piping.
- D. Provide shut off valves at branches and at pieces of equipment. Slope pipe to drain at low points and provide drip legs at these locations. Provide for thermal expansion of pipes.
- E. Provide utility company coordination.
- F. Piping system shall be tested to meet local code and inspection requirements.

3.4 INSULATION

- A. After the systems have been installed and tested, insulation as specified below shall be applied. Materials shall be UL, Inc., approved and shall be applied as recommended by the manufacturer's written instructions. Materials used shall be the products of Owens Corning, PPG, Manville, Knauff Corporation, Certainteed, Armstrong, Eagle Picher, Insul Coustic or Benjamin Foster and shall be equal to those products that meet the Specifications below.
- B. Insulate new cold water piping, hot water piping, tempered water piping, hot water circulating piping except chrome plated piping exposed at plumbing fixtures. Insulation shall be heavy density long strand fiberglass, sectional insulation with all service vapor barrier jacket and double side adhesive self-sealing lap, Johns Manville Micro-Lok system or equal of Owens Corning. Insulation shall comply with ASTM E84 with a flame spread rating of 25 or less and smoke developed rating of 50 or less. Insulation thickness shall be in accordance with the Energy Code but shall not be less than 1 inch. Fittings, valve bodies, etc., shall be covered with Zeston type precut vinyl insulation jackets with pre-shaped fiberglass insert.
- C. For combustible piping installed in a return air plenum space, piping is to be protected by a high-temperature insulation blanket designed to provide a single layer flexible enclosure. High temperature insulation blanket is to be recommended for continuous use at temperatures up to 2012 deg F, with insulation blanket completely encapsulated in an aluminum foil, fiberglass reinforced scrim covering. Plenum insulation is to pass ASTM E-136 test for non-combustibility and ASTM E-84/UL 723 test for surface burning characteristics. Plenum insulation shall be FyreWrap 0.5 Plenum Insulation or similar.

- D. On exposed insulated piping in finished areas within seven feet of the floors, provide .010 inch thick galvanized steel insulation jackets. This does not include piping exposed in unfinished areas such as boiler rooms, storage rooms, etc.
- E. At pipe hangers, for piping carrying fluids with temperatures below 70 degrees, provide a rigid core of insulation to support the pipe. Rigid insulation shall be the same thickness as the adjacent semi-rigid insulation and have the same flame spread and smoke developed ratings. Vapor barrier shall be continuous and integral between the rigid and semi-rigid sections of insulation. Rigid insulation shall be composed of hydrous calcium silicate. Rigid insulation shall be Johns Manville Thermo-12 Gold or equal of Owens Corning.

END OF SECTION

SECTION 221113 - FACILITY WATER DISTRIBUTION PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes water-distribution piping and related components outside the building for water service and fire-service mains.
- B. Utility-furnished products include water meters that will be furnished to the site, ready for installation.

1.3 DEFINITIONS

- A. EPDM: Ethylene propylene diene terpolymer rubber.
- B. LLDPE: Linear, low-density polyethylene plastic.
- C. PA: Polyamide (nylon) plastic.
- D. PE: Polyethylene plastic.
- E. PP: Polypropylene plastic.
- F. PVC: Polyvinyl chloride plastic.

1.4 ACTION SUBMITTALS

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

1.5 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: For piping and specialties including relation to other services in same area, drawn to scale. Show piping and specialty sizes and valves, meter and specialty locations, and elevations.
- B. Field quality-control test reports.

1.6 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For water valves and specialties to include in emergency, operation, and maintenance manuals.

1.7 QUALITY ASSURANCE

- A. Regulatory Requirements:
 - 1. Comply with requirements of utility company supplying water. Include tapping of water mains and backflow prevention.
 - 2. Comply with standards of authorities having jurisdiction for potable-water-service piping, including materials, installation, testing, and disinfection.
 - 3. Comply with standards of authorities having jurisdiction for fire-suppression water-service piping, including materials, hose threads, installation, and testing.
- B. Piping materials shall bear label, stamp, or other markings of specified testing agency.
- C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- D. Comply with ASTM F 645 for selection, design, and installation of thermoplastic water piping.
- E. NSF Compliance:
 - 1. Comply with NSF 14 for plastic potable-water-service piping.
 - 2. Comply with NSF 61 Annex G for materials for water-service piping and specialties for domestic water.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Preparation for Transport: Prepare valves, including fire hydrants, according to the following:
 - 1. Ensure that valves are dry and internally protected against rust and corrosion.
 - 2. Protect valves against damage to threaded ends and flange faces.
 - 3. Set valves in best position for handling. Set valves closed to prevent rattling.
- B. During Storage: Use precautions for valves, including fire hydrants, according to the following:
 - 1. Do not remove end protectors unless necessary for inspection; then reinstall for storage.
 - 2. Protect from weather. Store indoors and maintain temperature higher than ambient dew-point temperature. Support off the ground or pavement in watertight enclosures when outdoor storage is necessary.
- C. Handling: Use sling to handle valves and fire hydrants if size requires handling by crane or lift. Rig valves to avoid damage to exposed parts. Do not use handwheels or stems as lifting or rigging points.

- D. Deliver piping 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.
- E. Protect stored piping from moisture and dirt. Elevate above grade. Do not exceed structural capacity of floor when storing inside.
- F. Protect flanges, fittings, and specialties from moisture and dirt.
- G. Store plastic piping protected from direct sunlight. Support to prevent sagging and bending.

1.9 PROJECT CONDITIONS

- A. Interruption of Existing Water-Distribution Service: Do not interrupt service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary water-distribution service according to requirements indicated:
 - 1. Notify Owner no fewer than two days in advance of proposed interruption of service.
 - 2. Do not proceed with interruption of water-distribution service without Owner's written permission.

1.10 COORDINATION

- A. Coordinate connection to water main with utility company.

PART 2 - PRODUCTS

2.1 COPPER TUBE AND FITTINGS

- A. Soft Copper Tube: ASTM B 88, Type K water tube, annealed temper.
 - 1. Copper, Pressure-Seal Fittings:
 - a. Basis-of-Design Product: Subject to compliance with requirements, provide Elkhart Products Corporation; ApolloXpress fittings, made in USA, or comparable product by one of the following:
 - 1) NIBCO INC.
 - 2) Approved Equal
 - b. Description:
 - 1) For Types K, L, soft copper tubing in NPS 1/2 to NPS 1-1/4.
 - 2) Housing: Copper or bronze.
 - 3) Sealing Element: EPDM.
 - 4) Multiple leak path detection system.
 - 5) Tools: Manufacturer's special tools.
 - 6) Maximum 200 psig working-pressure rating at 250 deg F.

7) NPS 2 and Smaller: Wrought-copper fitting with EPDM O-ring seal.

2. Copper Push-on-Joint Fittings:

- a. Basis-of-Design Product: Subject to compliance with requirements, provide Elkhart Products Corporation; Copper Loc non-removable pressure fittings, made in USA, or comparable product by one of the following:
 - 1) Victaulic Company.
 - 2) Approved Equal
- b. Description:
 - 1) Cast-copper fitting complying with ASME B16.18 or wrought-copper fitting complying with ASME B 16.22.
 - 2) Maximum 200 psig working-pressure rating at 250 deg F.
 - 3) Stainless-steel grip ring and EPDM-rubber O-ring.

2.2 DUCTILE-IRON PIPE AND FITTINGS

- A. Mechanical-Joint, Ductile-Iron Pipe: AWWA C151, with mechanical-joint bell and plain spigot end unless grooved or flanged ends are indicated.
 - 1. Mechanical-Joint, Ductile-Iron Fittings: AWWA C110, ductile- or gray-iron standard pattern or AWWA C153, ductile-iron compact pattern.
 - 2. Glands, Gaskets, and Bolts: AWWA C111, ductile- or gray-iron glands, rubber gaskets, and steel bolts.
- B. Push-on-Joint, Ductile-Iron Pipe: AWWA C151, with push-on-joint bell and plain spigot end unless grooved or flanged ends are indicated.
 - 1. Push-on-Joint, Ductile-Iron Fittings: AWWA C110, ductile- or gray-iron standard pattern or AWWA C153, ductile-iron compact pattern.
 - 2. Gaskets: AWWA C111, rubber.
- C. Flanges: ASME 16.1, Class 125, cast iron.

2.3 PE PIPE AND FITTINGS

- A. Basis-of-Design Product: Subject to compliance with requirements, provide products by LASCO Fittings, Inc. or comparable product by one of the following:
 - 1. NIBCO INC.
 - 2. Spears Manufacturing Company.
 - 3. Approved Equal
- B. PE, ASTM Pipe: ASTM D 2239, SDR No. 5.3, 7, or 9; with PE compound number required to give pressure rating not less than 200 psig.

1. Insert Fittings for PE Pipe: ASTM D 2609, made of PA, PP, or PVC with serrated male insert ends matching inside of pipe. Include bands or crimp rings.
 2. Molded PE Fittings: ASTM D 3350, PE resin, socket- or butt-fusion type, made to match PE pipe dimensions and class.
- C. PE, AWWA Pipe: AWWA C906, DR No. 7.3, 9, or 9.3; with PE compound number required to give pressure rating not less than 200 psig.
1. PE, AWWA Fittings: AWWA C906, socket- or butt-fusion type, with DR number matching pipe and PE compound number required to give pressure rating not less than 200 psig.

2.4 PVC PIPE AND FITTINGS

- A. PVC, Schedule 40 Pipe: ASTM D 1785.
1. PVC, Schedule 40 Socket Fittings: ASTM D 2466.
 - a. Basis-of-Design Product: Subject to compliance with requirements, provide products by LASCO Fittings, Inc. or comparable product by one of the following:
 - 1) NIBCO INC.
 - 2) Charlotte Pipe and Foundry Company.
 - 3) Approved Equal
- B. PVC, Schedule 80 Pipe: ASTM D 1785.
1. PVC, Schedule 80 Socket Fittings: ASTM D 2467.
 - a. Basis-of-Design Product: Manufacturers: Subject to compliance with requirements, provide products by LASCO Fittings, Inc. or comparable product by one of the following:
 - 1) NIBCO INC.
 - 2) Spears Manufacturing Company.
 - 3) Approved Equal.
 2. PVC, Schedule 80 Threaded Fittings: ASTM D 2464.
 - a. Basis-of-Design Product: Manufacturers: Subject to compliance with requirements, provide products by LASCO Fittings, Inc. or comparable product by one of the following:
 - 1) NIBCO INC.
 - 2) Spears Manufacturing Company.
 - 3) Approved Equal.
- C. PVC, AWWA Pipe: AWWA C900, Class 200, with bell end with gasket, and with spigot end.
1. Comply with UL 1285 for fire-service mains if indicated.

2. PVC Fabricated Fittings: AWWA C900, Class 200, with bell-and-spigot or double-bell ends. Include elastomeric gasket in each bell.
3. PVC Molded Fittings: AWWA C907, Class 150, with bell-and-spigot or double-bell ends. Include elastomeric gasket in each bell.
4. Push-on-Joint, Ductile-Iron Fittings: AWWA C110, ductile- or gray-iron standard pattern or AWWA C153, ductile-iron compact pattern.
 - a. Gaskets: AWWA C111, rubber.
5. Mechanical-Joint, Ductile-Iron Fittings: AWWA C110, ductile- or gray-iron standard pattern or AWWA C153, ductile-iron compact pattern.
 - a. Glands, Gaskets, and Bolts: AWWA C111, ductile- or gray-iron glands, rubber gaskets, and steel bolts.

D. Ductile-Iron Deflection Fittings:

1. Manufacturers: Subject to compliance with requirements, provide products by the following:
 - a. EBAA Iron, Inc.
 - b. Approved Equal
2. Description: Compound, ductile-iron coupling fitting with sleeve and 1 or 2 flexing sections for up to 15-degree deflection, gaskets, and restrained-joint ends complying with AWWA C110 or AWWA C153. Include AWWA C111, ductile-iron glands, rubber gaskets, and steel bolts.
 - a. Pressure Rating: 250 psig minimum.

2.5 JOINING MATERIALS

- A. Refer to Section 330500 "Common Work Results for Utilities" for commonly used joining materials.
- B. Plastic Pipe-Flange Gasket, Bolts, and Nuts: Type and material recommended by piping system manufacturer, unless otherwise indicated.

2.6 PIPING SPECIALTIES

- A. Transition Fittings: Manufactured fitting or coupling same size as, with pressure rating at least equal to and ends compatible with, piping to be joined.
- B. Tubular-Sleeve Pipe Couplings:
 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Cascade Waterworks Mfg. Co.

- b. Dresser, Inc.
 - c. Ford Meter Box Company, Inc. (The).
 - d. Hays Fluid Controls.
 - e. JCM Industries, Inc.
 - f. Smith-Blair, Inc.
 - g. Viking Johnson.
 - h. Approved Equal
- 2. Description: Metal, bolted, sleeve-type, reducing or transition coupling, with center sleeve, gaskets, end rings, and bolt fasteners and with ends of same sizes as piping to be joined.
 - a. Standard: AWWA C219.
 - b. Center-Sleeve Material: Stainless steel
 - c. Gasket Material: Natural or synthetic rubber.
 - d. Pressure Rating: 200 psig minimum.
 - e. Metal Component Finish: Corrosion-resistant coating or material.

C. Split-Sleeve Pipe Couplings:

- 1. Manufacturers: Subject to compliance with requirements, provide products by the following:
 - a. Victaulic Company.
 - b. Approved Equal
 - c.
- 2. Description: Metal, bolted, split-sleeve-type, reducing or transition coupling with sealing pad and closure plates, O-ring gaskets, and bolt fasteners.
 - a. Standard: AWWA C219.
 - b. Sleeve Material: Stainless steel.
 - c. Sleeve Dimensions: Of thickness and width required to provide pressure rating.
 - d. Gasket Material: O-rings made of EPDM rubber, unless otherwise indicated.
 - e. Pressure Rating: 200 psig minimum.
 - f. Metal Component Finish: Corrosion-resistant coating or material.

2.7 GATE VALVES

A. AWWA, Cast-Iron Gate Valves:

- 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. American AVK Co.
 - b. American Cast Iron Pipe Company.
 - c. Clow Valve Company; a subsidiary of McWane, Inc.
 - d. Crane; Crane Energy Flow Solutions.
 - e. East Jordan Iron Works, Inc.
 - f. Flomatic Corporation.

- g. Kennedy Valve Company; a division of McWane, Inc.
- h. M & H Valve Company; a division of McWane, Inc.
- i. McWane, Inc.
- j. Mueller Co.
- k. NIBCO INC.
- l. Tyler Pipe; a subsidiary of McWane Inc.
- m. U.S. Pipe and Foundry Company.
- n. Zurn Industries, LLC.
- o. Approved Equal

2. Nonrising-Stem, Resilient-Seated Gate Valves:

- a. Description: Gray- or ductile-iron body and bonnet; with bronze or gray- or ductile-iron gate, resilient seats, bronze stem, and stem nut.
 - 1) Standard: AWWA C509.
 - 2) Minimum Pressure Rating: 200 psig
 - 3) End Connections: Mechanical joint.
 - 4) Interior Coating: Complying with AWWA C550.

2.8 GATE VALVE ACCESSORIES AND SPECIALTIES

A. Tapping-Sleeve Assemblies:

- 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. American Cast Iron Pipe Company.
 - b. Clow Valve Company; a subsidiary of McWane, Inc.
 - c. East Jordan Iron Works, Inc.
 - d. Flowserve Corporation.
 - e. Kennedy Valve Company; a division of McWane, Inc.
 - f. M & H Valve Company; a division of McWane, Inc.
 - g. McWane, Inc.
 - h. Mueller Co.
 - i. U.S. Pipe and Foundry Company.
 - j. Approved Equal
- 2. Description: Sleeve and valve compatible with drilling machine.
 - a. Standard: MSS SP-60.
 - b. Tapping Sleeve: Cast- or ductile-iron or stainless-steel, two-piece bolted sleeve with flanged outlet for new branch connection. Include sleeve matching size and type of pipe material being tapped and with recessed flange for branch valve.
 - c. Valve: AWWA, cast-iron, nonrising-stem, resilient-seated gate valve with one raised face flange mating tapping-sleeve flange.

- B. Valve Boxes: Comply with AWWA M44 for cast-iron valve boxes. Include top section, adjustable extension of length required for depth of burial of valve, plug with lettering

"WATER," and bottom section with base that fits over valve and with a barrel approximately 5 inches in diameter.

1. Operating Wrenches: Steel, tee-handle with one pointed end, stem of length to operate deepest buried valve, and socket matching valve operating nut.

2.9 CORPORATION VALVES AND CURB VALVES

A. Manufacturers:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. A.Y. McDonald Mfg. Co.
 - b. Amcast Industrial Corporation.
 - c. Ford Meter Box Company, Inc. (The).
 - d. Jones, James Company.
 - e. Master Meter, Inc.
 - f. Mueller Co.
 - g. Red Hed Manufacturing Company; a division of Everett J. Prescott, Inc.
 - h. Approved Equal

B. Service-Saddle Assemblies: Comply with AWWA C800. Include saddle and valve compatible with tapping machine.

1. Service Saddle: Copper alloy with seal and AWWA C800, threaded outlet for corporation valve.
2. Corporation Valve: Bronze body and ground-key plug, with AWWA C800, threaded inlet and outlet matching service piping material.
3. Manifold: Copper fitting with two to four inlets as required, with ends matching corporation valves and outlet matching service piping material.

C. Curb Valves: Comply with AWWA C800. Include bronze body, ground-key plug or ball, and wide tee head, with inlet and outlet matching service piping material.

D. Service Boxes for Curb Valves: Similar to AWWA M44 requirements for cast-iron valve boxes. Include cast-iron telescoping top section of length required for depth of burial of valve, plug with lettering "WATER," and bottom section with base that fits over curb valve and with a barrel approximately 3 inches in diameter.

1. Shutoff Rods: Steel, tee-handle with one pointed end, stem of length to operate deepest buried valve, and slotted end matching curb valve.

PART 3 - EXECUTION

3.1 PIPING APPLICATIONS

- #### A. General: Use pipe, fittings, and joining methods for piping systems according to the following applications.

- B. Transition couplings and special fittings with pressure ratings at least equal to piping pressure rating may be used, unless otherwise indicated.
- C. Do not use flanges or unions for underground piping.
- D. Flanges, unions, grooved-end-pipe couplings, and special fittings may be used, instead of joints indicated, on aboveground piping and piping in vaults.
- E. Underground water-service piping NPS 3/4 to NPS 3 shall be any of the following:
 - 1. Soft copper tube, ASTM B 88, Type K ASTM B 88, Type L (ASTM B 88M, Type B);
 - 2. PE, ASTM pipe and joints.
 - 3. PVC, Schedule 80 pipe; socket fittings; and solvent-cemented joints.
- F. Underground water-service piping NPS 4 to NPS 8 shall be any of the following:
 - 1. Soft copper tube, ASTM B 88, Type K, Type L wrought-copper, solder-joint fittings, and brazed joints.
 - 2. Ductile-iron, [push-on-joint pipe; ductile-iron, push-on-joint fittings; and gasketed] [mechanical-joint pipe; ductile-iron, mechanical-joint fittings; and mechanical] [ductile-iron-pipe appurtenances] joints.
 - 3. PE, AWWA pipe; PE, AWWA fittings; and heat-fusion joints.
 - 4. PVC, Schedule 80 pipe socket fittings; and solvent-cemented joints.
 - 5. NPS 4 and NPS 6 NPS 6 PVC, AWWA Class 150 pipe; PVC, AWWA Class 150 fittings; and gasketed joints.
- G. Underground Fire-Service-Main Piping NPS 4 to NPS 12 shall be any of the following:
 - 1. Ductile-iron, ductile-iron, push-on-joint fittings; and mechanical-joint pipe.
 - 2. PE, Class 200, fire-service pipe; molded PE fittings; and heat-fusion joints.
 - 3. PVC, AWWA Class 150 pipe listed for fire-protection service; PVC Class 150 fabricated or molded fittings; and gasketed joints.
 - 4. PVC, AWWA Class 200 pipe listed for fire-protection service; PVC Class 200 fabricated fittings; and gasketed joints.

3.2 VALVE APPLICATIONS

- A. General Application: Use mechanical-joint-end valves for NPS 3 and larger underground installation. Use threaded- or flanged-end valves for installation in vaults. Use UL/FMG, nonrising-stem gate valves for installation with indicator posts. Use corporation valves and curb valves with ends compatible with piping, for NPS 2 and smaller installation.
- B. Drawings indicate valve types to be used. Where specific valve types are not indicated, the following requirements apply:
 - 1. Underground Valves, NPS 3 and Larger: AWWA, cast-iron, non-rising stem, resilient-seated gate valves with valve box.
 - 2. Underground Valves, NPS 4 and Larger, for Indicator Posts: UL/FMG, cast-iron, nonrising-stem gate valves with indicator post.

3. Pressure-Reducing Valves: Use for water-service piping in vaults and aboveground to control water pressure.
4. Relief Valves: Use for water-service piping in vaults and aboveground.
 - a. Air-Release Valves: To release accumulated air.
 - b. Air/Vacuum Valves: To release or admit large volume of air during filling of piping.
 - c. Combination Air Valves: To release or admit air.
5. Detector Check Valves: Use for water-service piping in vaults and aboveground to detect unauthorized use of water.

3.3 PIPING SYSTEMS - COMMON REQUIREMENTS

- A. See Section 330500 "Common Work Results for Utilities" for piping-system common requirements.

3.4 PIPING INSTALLATION

- A. Water-Main Connection: Arrange with utility company for tap of size and in location indicated in water main.
- B. Water-Main Connection: Tap water main according to requirements of water utility company and of size and in location indicated.
- C. Make connections larger than NPS 2 with tapping machine according to the following:
 1. Install tapping sleeve and tapping valve according to MSS SP-60.
 2. Install tapping sleeve on pipe to be tapped. Position flanged outlet for gate valve.
 3. Use tapping machine compatible with valve and tapping sleeve; cut hole in main. Remove tapping machine and connect water-service piping.
 4. Install gate valve onto tapping sleeve. Comply with MSS SP-60. Install valve with stem pointing up and with valve box.
- D. Make connections NPS 2 and smaller with drilling machine according to the following:
 1. Install service-saddle assemblies and corporation valves in size, quantity, and arrangement required by utility company standards.
 2. Install service-saddle assemblies on water-service pipe to be tapped. Position outlets for corporation valves.
 3. Use drilling machine compatible with service-saddle assemblies and corporation valves. Drill hole in main. Remove drilling machine and connect water-service piping.
 4. Install corporation valves into service-saddle assemblies.
 5. Install manifold for multiple taps in water main.
 6. Install curb valve in water-service piping with head pointing up and with service box.
- E. Comply with NFPA 24 for fire-service-main piping materials and installation.
 1. Install PE corrosion-protection encasement according to ASTM A 674 or AWWA C105.

2. Install copper tube and fittings according to CDA's "Copper Tube Handbook."
- F. Install ductile-iron, water-service piping according to AWWA C600 and AWWA M41.
 1. Install PE corrosion-protection encasement according to ASTM A 674 or AWWA C105.
- G. Install PE pipe according to ASTM D 2774 and ASTM F 645.
- H. Install PVC, AWWA pipe according to ASTM F 645 and AWWA M23.
- I. Bury piping with depth of cover over top at least 42 inches and according to the following:
- J. Install piping by tunneling or jacking, or combination of both, under streets and other obstructions that cannot be disturbed.
- K. Extend water-service piping and connect to water-supply source and building-water-piping systems at outside face of building wall in locations and pipe sizes indicated.
 1. Terminate water-service piping at building wall until building-water-piping systems are installed. Terminate piping with caps, plugs, or flanges as required for piping material. Make connections to building-water-piping systems when those systems are installed.
- L. Sleeves are specified in Section 220517 "Sleeves and Sleeve Seals for Plumbing Piping."
- M. Mechanical sleeve seals are specified in Section 220517 "Sleeves and Sleeve Seals for Plumbing Piping."
- N. Install underground piping with restrained joints at horizontal and vertical changes in direction. Use restrained-joint piping, thrust blocks, anchors, tie-rods and clamps, and other supports.
- O. See Section 221116 "Domestic Water Piping" for potable-water piping inside the building.

3.5 JOINT CONSTRUCTION

- A. See Section 330500 "Common Work Results for Utilities" for basic piping joint construction.
- B. Make pipe joints according to the following:
 1. Copper-Tubing, Pressure-Sealed Joints: Use proprietary crimping tool and procedure recommended by copper, pressure-seal-fitting manufacturer.
 2. Ductile-Iron Piping, Gasketed Joints for Water-Service Piping: AWWA C600 and AWWA M41.
 3. Ductile-Iron Piping, Gasketed Joints for Fire-Service-Main Piping: UL 194.
 4. Ductile-Iron Piping, Grooved Joints: Cut-groove pipe. Assemble joints with grooved-end, ductile-iron-piping couplings, gaskets, lubricant, and bolts according to coupling manufacturer's written instructions.
 5. PE Piping Insert-Fitting Joints: Use plastic insert fittings and fasteners according to fitting manufacturer's written instructions.
 6. PVC Piping Gasketed Joints: Use joining materials according to AWWA C900. Construct joints with elastomeric seals and lubricant according to ASTM D 2774 or ASTM D 3139 and pipe manufacturer's written instructions.

3.6 ANCHORAGE INSTALLATION

- A. Anchorage, General: Install water-distribution piping with restrained joints. Anchorages and restrained-joint types that may be used include the following:
 - 1. Concrete thrust blocks.
 - 2. Locking mechanical joints.
 - 3. Set-screw mechanical retainer glands.
 - 4. Bolted flanged joints.
 - 5. Heat-fused joints.
 - 6. Pipe clamps and tie rods.
 - 7. Approved Equal
- B. Install anchorages for tees, plugs and caps, bends, crosses, valves, and hydrant branches. Include anchorages for the following piping systems:
 - 1. Gasketed-Joint, Ductile-Iron, Water-Service Piping: According to AWWA C600.
 - 2. Gasketed-Joint, PVC Water-Service Piping: According to AWWA M23.
 - 3. Bonded-Joint Fiberglass, Water-Service Piping: According to AWWA M45.
 - 4. Fire-Service-Main Piping: According to NFPA 24.
- C. Apply full coat of asphalt or other acceptable corrosion-resistant material to surfaces of installed ferrous anchorage devices.

3.7 VALVE INSTALLATION

- A. AWWA Gate Valves: Comply with AWWA C600 and AWWA M44. Install each underground valve with stem pointing up and with valve box.
- B. AWWA Valves Other Than Gate Valves: Comply with AWWA C600 and AWWA M44.
- C. UL/FMG, Gate Valves: Comply with NFPA 24. Install each underground valve and valves in vaults with stem pointing up and with vertical cast-iron indicator post.
- D. UL/FMG, Valves Other Than Gate Valves: Comply with NFPA 24.
- E. MSS Valves: Install as component of connected piping system.
- F. Corporation Valves and Curb Valves: Install each underground curb valve with head pointed up and with service box.
- G. Pressure-Reducing Valves: Install in vault or aboveground between shutoff valves.
- H. Relief Valves: Comply with AWWA C512. Install aboveground with shutoff valve on inlet.

3.8 DETECTOR-CHECK VALVE INSTALLATION

- A. Install in vault or aboveground.

- B. Install for proper direction of flow. Install bypass with water meter, gate valves on each side of meter, and check valve downstream from meter.
- C. Support detector check valves, meters, shutoff valves, and piping on brick or concrete piers.

3.9 BACKFLOW PREVENTER INSTALLATION

- A. Install backflow preventers of type, size, and capacity indicated. Include valves and test cocks. Install according to requirements of plumbing and health department and authorities having jurisdiction.
- B. Do not install backflow preventers that have relief drain in vault or in other spaces subject to flooding.
- C. Do not install bypass piping around backflow preventers.
- D. Support NPS 2-1/2 (DN 65) and larger backflow preventers, valves, and piping near floor and on brick or concrete piers.

3.10 WATER METER BOX INSTALLATION

- A. Install water meter boxes in paved areas flush with surface.
- B. Install water meter boxes in grass or earth areas with top 2 inches above surface.

3.11 CONNECTIONS

- A. See Section 330500 "Common Work Results for Utilities" for piping connections to valves and equipment.
- B. Connect water-distribution piping to existing water main. Use tapping sleeve and tapping valve.
- C. Connect water-distribution piping to interior domestic water and fire-suppression piping.

3.12 FIELD QUALITY CONTROL

- A. Piping Tests: Conduct piping tests before joints are covered and after concrete thrust blocks have hardened sufficiently. Fill pipeline 24 hours before testing and apply test pressure to stabilize system. Use only potable water.
- B. Hydrostatic Tests: Test at not less than one-and-one-half times working pressure for two hours.
 - 1. Follow AWWA C600-10 Standards for hydrostatic testing.
- C. Prepare reports of testing activities.

3.13 IDENTIFICATION

- A. Install continuous underground, detectable warning tape during backfilling of trench for underground water-distribution piping. Locate below finished grade, directly over piping. Underground warning tapes are specified in Section 312000 "Earth Moving."
- B. Permanently attach equipment nameplate or marker indicating plastic water-service piping, on main electrical meter panel. See Section 330500 "Common Work Results for Utilities" for identifying devices.

3.14 CLEANING

- A. Clean and disinfect water-distribution piping as follows:
 - 1. Purge new water-distribution piping systems and parts of existing systems that have been altered, extended, or repaired before use.
 - 2. Use purging and disinfecting procedure prescribed by authorities having jurisdiction or, if method is not prescribed by authorities having jurisdiction, use procedure described in NFPA 24 for flushing of piping. Flush piping system with clean, potable water until dirty water does not appear at points of outlet.
 - 3. Use purging and disinfecting procedure prescribed by authorities having jurisdiction or, if method is not prescribed by authorities having jurisdiction, use procedure described in AWWA C651 or do as follows:
 - a. Fill system or part of system with water/chlorine solution containing at least 50 ppm of chlorine; isolate and allow to stand for 24 hours.
 - b. Drain system or part of system of previous solution and refill with water/chlorine solution containing at least 200 ppm of chlorine; isolate and allow to stand for 3 hours.
 - c. After standing time, flush system with clean, potable water until no chlorine remains in water coming from system.
 - d. Submit water samples in sterile bottles to authorities having jurisdiction. Repeat procedure if biological examination shows evidence of contamination.
- B. Prepare reports of purging and disinfecting activities.

END OF SECTION 221113

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SECTION 23 00 00 - HEATING & AIR CONDITIONING

PART 1 - GENERAL

1.1 NOTE

- A. The requirements of Section 200000 apply to work performed under this Section.

1.2 SCOPE

- A. The Work under this Section of the Specification shall include the furnishing of labor, equipment and materials for the installation of heating, air conditioning and ventilating systems as specified, shown on the Drawings or implied to provide continuous and satisfactory service.

PART 2 - PRODUCTS

2.1 AIR CONDITIONING UNITS - ROOFTOP - GAS HEAT

- A. Provide rooftop gas fired heating-electric cooling unit of the capacity noted on the Drawings. Unit shall be complete with casing, hermetic condensing unit, furnace, economizer cycle controls, power exhaust fan, and dampers, roof curb, evaporator coil, fan section and related controls and wiring for complete installation. Curb shall be as specified in Section 200000.
- B. Casing of unit shall include plenum section for supply, return and outside air duct connections with dampers for economizer operation. Casing shall be galvanized steel, bonderized and finished with standard factory baked enamel finish. Casing shall be internally insulated to prevent heat loss, condensation and to reduce noise transfer. Provide drain pans and extend trapped drains to roof drain.
- C. Compressor shall be semi or fully hermetic provided with internal vibration control, crank case heater and motor winding over temperature and over current safety devices. Unit shall contain multiple compressors or be provided with suction pressure actuated unloaders. Compressor shall be guaranteed for five years.
- D. Evaporator coil shall be copper or aluminum tube with aluminum plate fins. Coils shall provide subcooling and shall be capable of storing refrigerant in system when 80 percent full or it shall be provided with an accumulator receiver. Heat rejection fan shall be deep pitch corrosion resistant propeller fan protected by a fan guard. Fan shall be direct driven by permanently lubricated motor with inherent overload protection and class B insulation.
- E. Gas heating section shall consist of aluminized steel heat exchangers and stainless steel slotted port burners. Heat exchanger shall have 10 year unlimited warranty. Combustion air fan shall be provided if necessary to eliminate extended flue. Provide furnace with complete gas train and electric ignition.
- F. Indoor air fan shall be adjustable vee belt drive or multiple speed direct driven, forwardly curved centrifugal fan statically and dynamically balanced. Fan motor shall be

permanently lubricated.

- G. Filters shall be 2 inch thick throw away type.
- H. Provide operating and safety controls with units coordinated with the automatic temperature controls. Included shall be a wet bulb controller in addition to other specified safety controls.
- I. Provide unit with high and low pressure safety controls, time delay relay to prevent short cycling and automatic restart on resumption of electric service after a power failure. Controls shall be solid state. Provide thermal overloads in power phases to provide single phase protection of motor.
- J. Provide internal power and control wiring including contactors, transformers, fusing, etc. wired to a single point connection for the unit. Unit furnished controls shall be coordinated and compatible with the controls furnished under automatic temperature controls.
- K. Rooftop units shall be York, Carrier, or Lennox.

2.2 EXHAUST FANS – CEILING

- A. Provide ceiling fans in accordance with the schedule on the drawings and the specification below.
- B. Ceiling fans shall be complete with heavy gauge galvanized steel housing lined with 0.5 inch of acoustical insulation, white finish polystyrene/aluminum ceiling grille, spring loaded aluminum back-draft damper, mounting brackets and direct drive centrifugal fan.
- C. Fan wheel shall be forward curved centrifugal wheel constructed of galvanized steel or carbonate filled polypropylene that has been both statically and dynamically balanced.
- D. Motor enclosure to be open drip-proof type. Motor to be a DC electronic communication type motor (ECM) specifically designed for fan applications. AC induction type motors are not acceptable. Motor to be permanently lubricated heavy duty ball bearing type to match with the fan load and pre-wired to the scheduled voltage and phase. Internal motor circuitry to convert AC power supplied to the fan to DC power to operate the motor. Motor shall be speed controllable down to 20% of full speed. Speed shall be controlled by either a potentiometer dial mounted at the motor or by a 0-10 VCD signal. Motor shall be a minimum of 85% efficient at all speeds.
- E. Disconnect means for motor shall be provided inside housing by cord and plug.
- F. Ceiling and cabinet fans shall be Greenheck, Cook, or Penn.

2.3 UNIT HEATERS - ELECTRIC

- A. Provide electric unit heaters where shown on the plans of arrangements, capacities and sizes listed on the drawings. Units shall be constructed and rated in accordance with the standards of the Air Moving and Conditioning Association and ASHRAE and have a U.L. approved disconnect means.

- B. Heating elements shall be aluminum finned, copper clad steel sheath resistance heating elements.
- C. Motors shall be permanent split capacitor type. Unit shall be complete with automatic reset thermal cutouts, fan and motors with built-in thermal overload protection.
- D. Unit heaters shall be constructed of 16 gauge die-formed steel housing with individually adjustable discharge louvers. Finish shall be the standard factory baked enamel finish.
- E. Provide wall mounted thermostat. Unit shall have fan delay feature.
- F. Unit heaters shall be Q-Mark, Chromalox, or Berko.

2.4 BASEBOARD HEATERS (ELECTRIC)

- A. Baseboard heaters shall be complete with 20 gauge steel enclosure, finned grid or sheath type heating element with ni-chrome embedded wire, tamperproof built-in thermostat, and automatic thermal cutout. Capacities shall be as listed on the drawings.
- B. Heaters shall be Q-Mark, Singer Electromode, or Markel.

2.5 INFRARED HEATERS - GAS

- A. Provide gas fired infrared heaters where shown on the drawings and of the capacities indicated.
- B. Unit heater shall be complete with casing, heat exchanger, gas burner, venting termination kit, and reflecting hood.
- C. Install gas fired infrared heaters as indicated, in accordance with manufacturer's installation operation and service manual and in compliance with applicable codes and approvals. Allow adequate space for servicing or removal of the unit without disturbing other piping or equipment. Maintain clearance to combustibles as outlined and printed on burner nameplate and in manufacturer's product data. Measure clearance distance from surface of heat exchanger or as indicated by approval agency's listing.
- D. Provide burner assemblies consisting of heavy duty cast iron burner heads or chrome plated steel. Pre-wired gas controls with direct spark ignition module, and combustion air filters supplied. Provide minimum numbers of burners indicated to insure proper radiant heat distribution. If combustion air flow is impeded for any reason, gas flow rate will decrease in constant proportion to maintain proper gas/air mixture for complete combustion.
- E. The system shall vent all products of combustion outdoors by means of the vacuum pump.-The connection between the inlet and tailpipe is made with acoustic boot and clamps provided.
- F. Provide high radiant reflective aluminum reflectors installed over all heat exchanger tube. Provide wide parabolic design reflector with 12 reflective surfaces and additional ribbing formed into reflector sides for added rigidity. Provide reflector joint pieces over heat exchanger fittings such as elbows so reflector covers heat exchanger continuously. In

order to maximize radiant output and reduce convective heat losses, reflectors are to extend below the bottom of the heat exchanger tube.

- G. Provide fresh outside air to supply each burner and end vent for the support of combustion air. Fresh outside air supply must be installed in accordance with the requirements within the installation operation and service manual.
- H. Condensate piping shall be per the recommendations and requirements of the manufacturer. Provide and install condensate neutralization tube as per the manufacturer's instructions in the installation operation and service manual.
- I. Gas vacuum-firing burner units shall be equipped with a Direct Spark Ignition Module (DSI). The DSI module shall have a 15-second flame safety time per ignition trial before lockout occurs. In addition, the DSI module shall be capable of a minimum of 3 trials for ignition to provide maximum reliability.
- J. To assure a high degree of fail-safe operation, the design shall preclude main flow of gas if any or all of the following abnormal conditions occur: Power fails (Gas valves in burners close in safe position), Main Valve fails in open position,
- K. Provide a single control panel capable of managing multiple zones of burners' temperature control and power. The control panel shall have indicator lights showing: Line Power, Pressure Switch 1 Power, Pressure Switch 2 power and 4-Zones. The panel shall include a 24 VAC power supply to supply power to electronic thermostats and shall be capable of using mechanical thermostats equipped with a heat anticipator. The control panel enclosure shall be painted steel and shall include indicator lights to display when line power is available to the panel and when the burner zone relays are energized. The control panel shall have separate line voltage and low voltage terminal strips for ease of wiring. The control panel shall be manufactured by the same manufacture as the infrared burners for single-source accountability.
- L. Infrared heater shall be Superior Radiant Products, Roberts Gordon (CoRayVac), ReVerberRay, or Reznor.

2.6 AIR DEVICES

- A. Provide air devices to complete the heating, air conditioning and ventilating systems. Air devices in ceiling shall have flat white lacquered finish unless noted otherwise. Coordinate the appropriate border and mount for the specific application.
- B. Air devices shall be as manufactured by Titus, Tuttle & Bailey, Price, Anemostat, Krueger, or Metalaire.
- C. Air devices used for relief shall have backdraft dampers installed behind the air device or in the ductwork connected to the device. Damper shall be gravity operated with extruded aluminum frame and blades, metal axles turning in synthetic bearings and have extruded vinyl, polyurethane sponge or neoprene blade seals. Backdraft damper shall be Greenheck model EM, or similar of American Warming and Ventilating, or Ruskin.
- D. Supply air diffusers in the ceiling shall be square or rectangular pattern with removable directional multi-blade core. Pattern shall be four-way, unless noted otherwise on

drawings. Construction shall be steel. Where diffuser is to be installed in a lay-in ceiling, diffuser shall have panels to fit into 24 x 24 modular lay-in ceiling. Provide diffusers with horizontal to vertical pattern, adjusting tabs and opposed blade damper. Where indicated on the Drawings to be connected to flexible ductwork, provide square to round adaptor.

1. Titus TDCA

- E. Sidewall supply air registers shall be double deflection with vertical face bars and opposed blade damper. Construction shall be steel with white finish.

1. Titus 300RL

- F. Sidewall return/exhaust registers (more than 7'-0" above floor) shall be horizontal fixed bar set at 35 degrees or fixed curved bar with opposed blade damper. Register shall be steel construction with white finish. Omit damper where indicated as grilles.

1. Titus 350RL

- G. Sidewall return registers (below 7'-0" above floor) shall be heavy duty 14 gauge reinforced steel bars set at 1/2 inch centers on 40 degree angle. Provide with opposed blade damper (delete damper where noted as grilles). Finish shall be white enamel.

1. Titus 355RL-HD

- H. Ceiling return/exhaust registers shall be extruded aluminum frame and grid with 1/2 inch spacing vertical blade lattice core and provide with opposed blade damper. Delete damper where noted as grilles.

1. Titus 50F

2.7 DUCTWORK

- A. Provide ductwork and plenums of the sizes shown on the Drawings and the materials, gauges and construction as listed below.

- B. Ductwork shall not be fabricated or installed until clearances and dimensions have been verified in the field. Discrepancies between the duct sizes and configurations shown on the Contract Documents and those required to meet field conditions shall be brought to the attention of the Architect for his direction. Ductwork fabricated or installed prior to field verification that the ductwork will fit is done at the Contractor's risk and expense.

- C. For details of duct construction not specified below refer to the latest editions of the Sheet Metal and Air Conditioning Contractors National Association (SMACNA) Manuals. Duct systems shall be defined as follows with the applicable manual.

1. All systems "HVAC Duct Construction Standards" metal and flexible.

- D. Ductwork shall be galvanized steel except as specified hereinafter of sizes indicated with sheets shaped and constructed as noted in the SMACNA Manual.

- E. Shower room exhaust ductwork shall be 3S-1/2 hard aluminum duct. Joints on bottom of ducts and 1/2 of the vertical sides shall be caulked to be water tight. Ducts shall slope up and away from the grilles and registers.

- F. Flexible ductwork shall consist of a coated spring steel wire helix, polymeric liner, fiberglass insulation and fiberglass reinforced metallized film vapor barrier. Flexible

ductwork shall be listed by Underwriters Laboratories under UL 181 standards as Class I flexible Air Duct Material and shall comply with NFPA Standards 90A and 90B. Flexible duct shall be rated for two inches positive and negative pressure and 2500 fpm maximum velocity. Flexible ducts shall be Thermoflex M-KE, Wiremold or General.

- G. Where ducts are noted to be acoustically lined, they shall be lined with one half inch thickness of coated and edge sealed lining system. Liner and insulation shall meet requirements of UL 181 and NFPA 90A/B. Liner shall meet bacteriological standards of ASTM C 1071. Seams and cut edges shall be sealed from airstream using metal brackets. Use of adhesive-backed tape is unacceptable. Insulation shall be 3 lb/cubic foot density with a minimum R-Value of 2.0. Duct sizes shown on drawings are the interior sizes of insulated duct. As a minimum, supply and return ducts from heating, ventilating and air conditioning units for a distance of fifteen feet from the units shall be acoustically lined. Duct lining shall be Owens Corning QuietR Duct Liner or equal of Johns Manville, Certain Teed or Knauf.
- H. Ductwork shall be galvanized steel except as specified hereinafter of sizes indicated with sheets shaped and constructed as noted in the SMACNA Manual and of the pressure classification required to meet the pressures listed in the equipment schedules.
- I. Duct connections to air handling units and elsewhere as required to compensate for expansion and contraction and noise reduction shall be made with UL approved glass fabric such as Ventglas as manufactured by Vent Fabrics, Inc.
- J. On low pressure systems duct details shall be as follows:
 - 1. Square elbows Figure 4-2
 - 2. Hangers Figure 5-1
 - 3. Tee connections Figure 3-6
 - 4. Register on trunk Figure 7-6
 - 5. Volume dampers Figures 7-4 and 7-5
- K. Provide manual volume dampers as shown on the Drawing and additionally as required to properly balance the air distribution systems as directed by the independent Test and Balance Agency.
- L. Fire dampers shall be provided where indicated and elsewhere as required to comply with requirements of NFPA 90A and Building Code Requirements. Fire dampers shall be multi-leaf accordion type, held open by adequate heavy gauge wires and suitable, calibrated fusible links. Fire dampers shall be Ruskin, Prefco, Nailor or Air Balance, Inc. Fire dampers shall be of a suitable type and rating for the wall construction in which they are to be installed. See the finish schedule on the Architectural Drawings. Fire dampers shall have UL label of acceptance or proof of acceptance to meet local requirements for the wall construction in which they are installed. Vertical dampers (horizontal air flow) shall close by gravity. Horizontal dampers (vertical air flow) shall be closed by suitable and positive spring closing devices. Provide adequately sized hinged access doors with cam locks to allow access to fire dampers for replacement of fusible link and resetting damper.
- M. Fire dampers in HVAC systems that might not cycle the blower off during a building fire shall be listed and labeled for dynamic closure by Underwriters Laboratories. Dynamic

fire dampers shall be tested and approved for use up 4" w.c.

- N. Fire damper sleeves shall be constructed of galvanized metal in gauges of 20 ga, 18 ga and 16 ga and standard lengths of 12", 14" and 16". Sleeves shall extend 3" on either side of wall or floor for joining of sleeve to the duct.
- O. Fire dampers installed in a fire rated wall, floor or partition shall be attached to a sleeve that is held in place by framed retaining angles.
 - 1. Dampers located in duct sections that are not adjacent to wall mounted air devices shall be type B dampers. Damper frames shall provide a pocket which shall store damper leaves in open position outside of air stream and shall allow 100% free air flow when open.
 - 2. Verify that field conditions allow for the installation of type B dampers. Where field conditions do not allow the use of type B dampers, provide type A dampers. Dampers shall be designed and constructed to provide a minimum of 90% free area when the damper leaves are in the open position.
 - 3. Behind air devices, provide thin line, type A fire dampers. Dampers shall be flangeless type with 1-7/8" galvanized steel frame with 20 gauge steel enclosure.
- P. Type A and B dampers shall be rated for low pressure, less than 3" w.c. and shall not be used in medium/high pressure and high pressure applications.
- Q. Type C fire dampers shall be used in medium/high pressure application, from 3" w.c. up to 10" w.c. The damper frame shall be wrapped with a 5" wide piece of metal. The transition plate to be spot welded to the damper frame or narrow sleeve depending on the application. The transition plate is sealed with caulk around the perimeter. Sleeved dampers do not require the 5" metal wrap.
- R. Type C fire dampers shall be used for high pressure application, 10" w.c. The damper frame shall be wrapped with a 5" wide piece of metal. The transition plate to be welded around the entire perimeter to the damper frame. Sleeved dampers do not require the 5" metal wrap.

(Following is manual reset)

- S. Smoke dampers shall be provided where indicated and elsewhere as required to comply with requirements of NFPA 90A and Building Code Requirements. Smoke dampers shall be of a type suitable for the wall/ceiling construction in which they are to be installed. See the finish schedule on the Architectural Drawings. Smoke dampers shall have UL label 555S leakage rated or proof of acceptance to meet local requirements for the wall/ceiling construction in which they are installed. Smoke damper shall be steel curtain damper and shall also serve as a fire damper. Damper actuator shall be an electro-thermal link which shall be actuated by a temperature of 165 degrees F or greater or any 0.2 amp or greater charge at 6 to 30 volts AC or DC. Separation shall occur in less than 10 seconds following electrical stimulation. Electrical stimulation shall be provided by smoke detectors furnished under Division 26. Wiring from the smoke detector to the damper shall be furnished under Division 26. Smoke dampers shall be designed and constructed to provide minimum 90 percent free area of duct. Provide access to smoke

dampers for replacement of the electro-thermal link and resetting damper. Dampers shall be Ruskin series SD of the classification required to meet the project conditions.

2.8 LOUVERS & DAMPERS

- A. Provide louvers and dampers required for the operation of the mechanical systems as indicated on the drawings. Units shall be fabricated after field measurements have been made.

Louvers shall be constructed of 0.081 inch thick type 6063-T5 aluminum alloy with integral caulking slot and retaining bead for installation in masonry openings. Fasteners shall be aluminum or stainless steel. Louvers shall be stationary type with drainable blades in a 4" louver frame. Each stationary blade shall incorporate an integral drain gutter and each jamb shall incorporate an integral downspout so water drains to blade end, then down the downspouts and out at the louver sill rather than cascading from blade to blade. Each louver shall be equipped with a framed, removable, rear-mounted bird screen of 0.75" x 0.051" expanded, flattened aluminum. Each factory assembled louver section shall be designed to withstand wind loadings of 25 PSF (100.0 MPH wind equivalent). The beginning point of water penetration for the louver shall be above 1250 fpm free area velocity. Louver frames, mullions, and section joints shall be adequately supported from the building structure to withstand this same wind loading. Louver performance data shall be licensed under the AMCA Certified Ratings Program and shall bear the AMCA Certified Ratings Seal. This certified performance data shall include air flow pressure loss and water penetration, and shall demonstrate performance equal to or better than the model specified. Louver shall be supplied with a baked enamel finish applied after a thorough cleaning and preparation of the metal surface. A total dry film thickness of approximately 1.2 mm shall be provided. Color to be selected by the Architect from the standard color chart. Louvers shall be Greenheck ESD-403 drainable type, or similar of American Warming and Ventilating, or Construction Specialties.

- B. Provide backdraft dampers behind louvers that are used for relief or exhaust. Damper shall be gravity operated with extruded aluminum frame and blades, metal axles turning in synthetic bearings and have extruded vinyl, polyurethane sponge or neoprene blade seals. Backdraft damper shall be Greenheck model EM, or similar of American Warming and Ventilating, or Ruskin.
- C. Barometric relief dampers shall consist of: 16 ga insert mount galvanized steel hat channel frame with 5.000 in. depth; blades from 0.063 in. thick formed aluminum, eccentrically pivoted; 0.375 in. square plated steel axles with galvanized steel press-fit ball bearings; damper shall be equipped with pressure activated vinyl blade seals; and internal plated steel blade-to-blade linkage with blade mounted counterbalance weights. Damper manufacturer's printed application and performance data including pressure, velocity and temperature limitations shall be submitted for approval showing damper suitable for pressures to 2 in. wg, velocities to 2,000 ft/min and temperatures to 180.0 F. Testing and ratings to be in accordance with AMCA Standard 500D. Barometric relief dampers shall be Greenheck model BR-30, or similar of American Warming and Ventilating, or Construction Specialties.
- D. Motor operated damper blades shall be 16 ga galvanized steel 3V type with three longitudinal grooves for reinforcement. Blades shall be completely symmetrical relative to their axle pivot point, presenting identical resistance to airflow and operation in either

direction through the damper (blades that are non-symmetrical relative to their axle pivot point or utilize blade stops larger than 0.500 in. are unacceptable). Blade seals shall be TPE. Linkage shall be blade-to-blade concealed in jamb (out of the airstream) to protect linkage and reduce pressure drop and noise. Damper frame shall be 16 ga galvanized steel formed into a structural hat channel shape with reinforced corners to meet 11 ga criteria. Bearings shall be corrosion resistant, permanently lubricated, synthetic (acetal) sleeve type rotating in extruded holes in the damper frame for maximum service. Axles shall be square and positively locked into the damper blade. Jamb seals shall be flexible stainless steel compression type to prevent leakage between blade end and damper frame. The Damper Manufacturer's submittal data shall certify all air leakage and air performance pressure drop data is licensed in accordance with the AMCA Certified Ratings Program for Test Figures 5.2, 5.3 and 5.5. Damper air performance data shall be developed in accordance with the latest edition of AMCA Standard 500-D. Motor operated dampers shall be Greenheck model VCD-23, or similar of American Warming and Ventilating, or Construction Specialties.

PART 3 - EXECUTION

3.1 INSULATION

- A. After the systems have been installed and tested, insulation as specified below shall be applied. Materials shall be Underwriters Laboratory, Inc., approved and shall be applied as recommended by the manufacturer's written instructions. Materials used shall be the products of Owens Corning, Manville, Knauff Corporation, Armstrong, Certainteed, Miracle Adhesive, Monoco or Benjamin Foster and shall be similar to those products that meet the specifications below.
- B. Ductwork
 - 1. Exposed supply ductwork and return air ductwork except where ductwork located in the room supplied and exposed outside air ductwork shall be insulated with a minimum 1-1/2 inch thickness of 3 PCF density, a minimum R-Value of 6.0 for attic/concealed spaces and R 8.0 for exterior use fiberglass board with reinforced foil faced ASJ vapor barrier jacket secured to duct with Graham weld pins or perforated base stick clips set in Monoco M46420 adhesive. Pins shall be covered with finish cap to match insulation. Butt joints and seams and cover with vapor barrier mastic. Finish with a coat of lagging adhesive such as Benjamin Foster 30-35 or Monoco 55-10 embedding 8.5 glass cloth fabric over the adhesive. Use corner beads on edges of the duct.
 - 2. Concealed supply air duct, return air duct, outside air duct, and exhaust duct within apartment units shall be covered with minimum 2 inch thickness of 3/4 PCF density, a minimum R-Value of 6.0 for attic/concealed spaces and R 8.0 for exterior use flexible fiberglass duct covering with reinforced foil and kraft paper vapor barrier FRK jacket. Insulation shall be applied to duct over 100 percent coverage of duct adhesive such as Benjamin Foster 85-20. Edges shall be butted together with a vapor barrier lap of 2 inch minimum. Seal joint and punctures with Benjamin Foster 30-35. Where ducts are over 24 inches in width, weld pins and caps shall be used to secure insulation to underside of duct. Secure laps with adhesive and flared staples on 4 inch center.
 - 3. Ductwork that is internally lined with energy code compliant liner is required to be insulated externally as indicated herein.

3.2 TESTING AND BALANCING AIR & WATER SYSTEMS

- A. The air distribution system shall be balanced and adjusted to distribute the air quantities as noted on the drawings. Demonstrate to the Architect's satisfaction knowledgeability in this work and familiarity with the test instruments to be used. If the Architect does not approve of the Contractor's qualifications, the Contractor shall engage the services of an independent test organization specializing in this work and is a member of the Associated Air Balance Council or other nationally recognized air balancing organization.
- B. Test equipment must be approved by the Architect and properly calibrated prior to starting work. Repairs, alterations, adjustments and readjustments necessary to meet the design conditions shall be made.
- C. The balancing agency shall review the drawings before installation and advise the Contractor of additional dampers required in the ductwork, flow devices and balancing valves in the water piping, etc., to effectively and properly balance the systems. These devices shall be installed at no additional cost to the Owner.
- D. At the completion of the balancing and adjusting and prior to the operating test, submit to the Architect three (3) certified typewritten reports to be retained by the Architect. Reports shall include:
 - 1. Velocities and air quantities at supply returns and exhaust outlets installed under this contract.
 - 2. Pressure and/or temperature difference across various pieces of equipment.
 - 3. Air temperature delivered from heating and cooling equipment.
 - 4. Water quantities at flow indicators.
 - 5. Schedule of equipment.
 - 6. Speed of belt driven equipment.
 - 7. Nameplate data on motors installed under this contract.
 - 8. Actual operating voltage and ampacity readings on motors.
 - 9. Separate six hour operating tests shall be made during the cooling season and during the heating season in which an hourly record shall be made of the following:
 - a. Settings of control equipment.
 - b. Outside weather conditions.
 - c. Thermostat readings.
 - d. Dry and wet bulb temperatures in spaces.Outside temperatures shall be below 40 degrees Fahrenheit during the heating test and above 85 degrees Fahrenheit during the cooling test.

3.3 AUTOMATIC TEMPERATURE CONTROLS

- A. Provide labor, materials, equipment, services, etc., to install a system of automatic temperature controls to perform the functions noted on the drawings. Coordinate with unit supplied controls.
- B. System shall be DDC and shall be installed under the supervision of the manufacturer's authorized representative.
- C. Power source for the system shall be taken from 120 volt sources. Provide motors,

starters, overload protection, control power transformers and related wiring devices, etc., in accordance with the applicable requirements of the Division 26 as appropriate for the voltage used. Interlock wiring to fans, pumps, motors, dampers, valves, etc., shall be provided as part of this work.

- D. Automatic dampers shall be furnished by the temperature control manufacturer, but shall be installed by the trade normally installing such item, under the supervision of the control manufacturer.
- E. The temperature control system, as hereinafter specified and designated on the drawings and plans, shall be guaranteed free of original defects in material and workmanship for a period of two years. After completion of the installation, thermostats, control valves, control motors, dampers, etc., shall be regulated and adjusted to perform the proper function.
- F. Prepare a schematic drawing of the temperature control system and submit them to the Architect for his review prior to starting work.
- G. Upon completion of the work, revise the diagrammatic layouts to record conditions and mount the revised layouts in clear plastic envelopes where directed.
- H. Control devices shall be identified by embossed nameplates to identify control devices as shown on control diagram.
- I. Dampers shall be Arrow Foil double seal dampers with a maximum 0.5 percent leakage or Honeywell D642 or D643 Type.

END OF SECTION

SECTION 26 00 00 - GENERAL ELECTRICAL REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes administrative and procedural requirements for work under Division 26.
- B. Coordinate the work of this Section with the requirements of the Project.

1.2 DEFINITIONS

- A. Following are definitions of terms and expressions used in the Electrical Sections in addition to definitions found in the Contract Conditions:
 - 1. "Wiring" includes wire, fittings, conduit, boxes and other accessories that comprise a system.

1.3 QUALITY ASSURANCE

- A. Regulatory Requirements
 - 1. Work shall conform to the requirements of the codes, laws and ordinances of the local authority having jurisdiction, National Fire Protection Association, National Electrical Code (NEC), National Electrical Manufacturer's Association (NEMA) and other authorities having jurisdiction.
 - 2. The requirements of the authorities having jurisdiction shall take precedence over the Drawings and Specifications and changes required by the authorities shall be made after review by the Architect.

1.4 SUBMITTALS

- A. Shop drawings are required for the following:
 - 1. Lighting Fixtures (including lighting calculations where required by Specification 265000).
 - 2. Panelboards
 - 3. Wiring Devices
 - 4. Enclosed Switches/Circuit Breakers
 - 5. Fire Detection and Alarm Systems
 - 6. Motor Starters/Safety Switches
 - 7. Power System Analysis
- B. Review of shop drawings does not relieve the Contractor of responsibility for complying with the Contract Documents.
- C. Shop drawings shall reflect manufacturer being provided for project. Shop drawings that contain multiple manufacturers for the same product will not be reviewed.
- D. Shop drawings shall be clearly marked to indicate product being provided for project. Shop drawings that do not indicate which product is being supplied will not be reviewed.

1.5 PROTECTION

- A. Protect material and equipment from damage.
- B. Cap or plug openings in equipment and conduits with proper caps and plugs.

1.6 VARIANCES

- A. Where conflicts exist within the contract documents, request clarification prior to the submission of a bid. If clarification is not requested, provide the work representing the higher cost and quality.

1.7 WARRANTY

- A. During the warranty period, make the proper adjustments of systems, equipment and devices installed and perform work necessary to ensure the efficient and proper functioning of the systems, equipment and devices.
- B. Certain items of equipment shall be warranted for a longer time than the general warranty period. Provide for service or replacement required in connection with the warranty of these items.

1.8 TEMPORARY POWER AND LIGHT

- A. Temporary electric service and lighting is not covered under this Division of the Specifications.

PART 2 - PRODUCTS

2.1 PRODUCTS TO BE USED

- A. Items specified by designations such as trade name, manufacturer's name, and catalog number indicate the capacity and quality of the products or materials to be used on this project.
- B. Only products indicated on Contract Documents by name, series and/or model number have been coordinated with other trades. Coordinate items of other manufacturers listed with other trades, and make any necessary modifications required by use of the alternate product.

2.2 MATERIALS AND WORKMANSHIP

- A. Items shown and not specifically called for, or items specified and not specifically indicated or detailed on the Drawings, or items neither specified nor shown, but which are reasonably incidental to and commonly required to make a complete job, shall be provided.

2.3 FOUNDATIONS AND EQUIPMENT SUPPORTS

- A. Provide foundations, supports, curbs and bases for equipment, as indicated or necessary for satisfactory installation and operation of equipment. Furnish and set anchor bolts.
- B. Concrete pads shall be 4 inches thick minimum, thicker if necessary to accommodate a particular piece of equipment. Utilize minimum 3500psi concrete. Edges shall be chamfered with outer edge extending 3 inches beyond equipment. Provide concrete pads for floor mounted equipment. Exterior pads shall be reinforced and shall have edges turned down to below the frost line. Exterior pads shall extend eight inches beyond edges of equipment and shall be sloped for drainage.
- C. Floor mounted stands, rods or legs, where required, shall be constructed of structural steel shapes (angles, channels) of Kindorf or Unistrut or steel pipe, and fittings securely braced and fastened to flanges bolted to the floor. Minimum rod size shall be 3/8 inch diameter. Paint steel with rust inhibiting primer.

2.4 ROOF SUPPORTS AND CURBS

- A. Provide equipment supports and curbs for the equipment and piping installed on or through the roof. Roof curbs shall be approved for use by the National Roofing Contractors Association and shall be a minimum of 14 inches high. Curbs shall be sloping roof type suitable for pitch of the roof and shall set the equipment level. Curbs shall be double wall insulated type.
- B. Provide wood blocking to raise the level of the bottom of the curb to be level with the top of the roof insulation.
- C. Pipe curb assemblies shall be constructed of 18 gauge galvanized steel with base plate, raised cant, wood nailer strip and galvanized steel counter flashing. Top shall be provided with acrylic clad ABS plastic cover and graduated neoprene boots secured to cover and pipes by stainless steel band clamps. Pipe curbs shall be Pate Company PCA-5 or Thy Curb.
- D. Equipment supports shall be constructed of 18 gauge galvanized steel with base plate, raised cant, wood nailer strip and galvanized steel counter flashing. Equipment supports shall be Pate Company ES-5a or Thy Curb TEMS-1.
- E. Where conduits penetrate the roof to feed equipment specified under Division 20, route the conduits through pipe curbs provided under Division 20 or inside the roof curb provided under Division 20.
- F. Wherever possible, install conduits to stub up immediately below the rooftop equipment fed by the conduit. Where horizontal routing across rooftop is required, derate cable ampacity per the National Electrical Code.

2.5 HANGERS AND CONDUIT SUPPORTS

- A. Provide conduit hangers and supports to maintain required alignment for equipment and conduits.
- B. Conduits may not be supported from other conduits. Trapeze hangers may be used for parallel runs of conduit.
- C. Provide supports for equipment and materials under these Specifications. Supports shall be structural steel shapes (angles, channels) of Kindorf or Unistrut. Minimum rod size shall be 3/8 inch.
- D. For wood joist construction, hanger rods shall be supported from wood joists with hangers bolted through or attached with lag crews to the joists.
- E. For steel bar joist construction, hanger rods shall be supported from the top chord of the joists or from panel points of the lower chord of the joists. Where conduit runs parallel to joists or where hangers are required at other than joist locations, provide steel angles welded to joists to support hangers so that weight is supported from the top chord of the joists.
- F. Expansion bolts or wood plugs will not be permitted in slag block walls. Equipment hung on such walls shall be supported by through bolts or approved anchor bolts set into masonry as the wall is laid up.

2.6 OPENINGS, CHASES, LINTELS AND SLEEVES

- A. Determine the location and size of chases, lintels and openings necessary for the proper installation of the work and provide them during the erection of the work in which such chases and openings occur.

- B. Provide sleeves through walls and floors for conduit. Sleeves through walls shall be flush with the walls.
- C. In case cutting of building construction is necessary, including cutting of structural members, such cutting shall be done and repaired to match original condition of the work. Do not cut structural members without Architect's approval.
- D. Where non-combustible conduits pass through sleeves or openings in fire rated wall, floor-ceiling and ceiling-roof assemblies, seal openings with a UL classified firestop method. Firestop method shall be a one part, intumescent (expands with heat), latex elastomer capable of expanding a minimum of three times. Firestop materials shall be UL listed when tested in accordance with ASTM E814 for a two hour fire (F) and temperature (T) rating.
- E. If combustible conduit materials are used, a UL listed firestop method shall be provided where the combustible materials penetrate fire rated wall, floor-ceiling and ceiling-roof assemblies. Firestop method shall be classified by UL as a through-penetration firestop device when tested in accordance with ASTM E814 for a two hour fire (F) and temperature (T) rating. Plastic conduit materials, including, but not limited to PVC, CPVC and ABS, are combustible. Firestop method shall be similar to Nelson Firestop Products.
- F. Escutcheon plates shall be used to conceal sleeve opening on exposed conduit. Floor plates shall be split, chrome plated, cast brass, similar to Ritter No. 36A.

2.7 ACCESS PANELS

- A. In general, boxes, devices and equipment shall be accessible through the removable panels in the ceiling. Where ceilings are not removable and in walls where access is required for service, access panels shall be provided. Access panels shall be appropriate for the finish in which they are installed, with a fire rating to match the wall or ceiling in which they are installed. Refer to other specification section covering access panels.
- B. Coordinate with other divisions and group boxes, devices and equipment together to keep the required number of access panels to a minimum.

2.8 IDENTIFICATION

- A. Equipment shall be identified with engraved plastic laminate or anodized aluminum nameplates with pressure sensitive backing. Plates shall also be provided with drilled holes and fastened to equipment with moly-rivets. Letters shall be at least 3/8 inch high and larger in proportion to the size of the piece of equipment. Identification shall be the same as noted on schedules on the Drawings. Include voltage and source panel on labels. Label all service disconnects per NEC requirements. Labels shall be provided for the following equipment.
 - 1. Panelboards
 - 2. Motor starting and control switches
 - 3. Disconnects
 - 4. Starters
- B. Junction boxes and pull boxes, except those located at the fixture or equipment to which system is connected, shall be identified with permanent marker in large legible lettering to indicate system and circuiting on which installed. In exposed areas mark the inside of the cover.
- C. Panels shall be provided with a typed directory listing load served and associated circuit numbers.

2.9 FLASHING

- A. Conduit passing through the roof shall be provided with conical neoprene boots for any pitch roof with base extending minimum of eight inches from vertical portion of boot. Provide clamp for securing boot to conduit.
- B. Flashing assemblies specified above shall be set in place as part of the work under this Division of this Specification, but will be finally installed as specified in another Division of this Specification.
- C. Base flashing of conduit and other equipment, if required, is specified in another Division of this Specification. Cap flashings shall be provided to make a water tight seal.

PART 3 - EXECUTION

3.1 EXISTING CONDITIONS

- A. Visit the site and become familiar with existing conditions. Modifications to work required to allow for existing conditions shall be provided. Submit proposed modifications to the Architect for approval prior to installation.
- B. Where electrical systems pass through the renovated areas to serve other portions of the premises, they shall be suitably relocated and the systems restored to normal operation. Any outages in systems shall be coordinated with the Owner. Where duration of proposed outages cannot be tolerated by the Owner, provide temporary connection as required to maintain service.
- C. Coordinate interruptions in service of existing systems with the Owner. Provide temporary connections to maintain operation of existing systems.
- D. Relocate existing hangers and supports where necessary to install new work. Maximum spacing requirements shall apply for relocated supports.
- E. Where new devices are added to existing walls and ceilings, new wiring shall be concealed by chasing existing walls as required. Devices shall be installed flush.
- F. Where new finishes or treatments are added to existing walls and ceilings by the Architect, provide necessary outlet box extensions, plaster rings, etc., so that devices are installed in the same manner as existing, i.e., flush, concealed, surface, etc.

3.2 DEMOLITION

- A. Equipment removed that is salvageable and desired by the Owner to be retained, shall be stored on the site where directed by the Owner. Otherwise, other materials and equipment which are removed shall become the property of the contractor and shall be removed by him from the premises.
- B. In each area to be renovated, remove the entire existing electrical installation except those portions indicated to be reused. When existing electrical work is removed, remove conduit, ducts, supports, etc. to a point below the finished floors or behind finished walls and cap. Such points shall be far enough behind finished surfaces to allow for the installation of the normal thickness of finished material. Unused wiring and cable shall be removed back to source.

3.3 MANNER OF INSTALLATION

- A. The Drawings showing the layout of the electrical systems indicate the approximate location of outlets and equipment. The runs of feeders and branch circuits as shown on the Drawings are schematic only and are not intended to show the routing and location of conduits. The final determination of routing and location shall be governed by structural

conditions, obstructions and connection locations on equipment. Detailed drawings showing major deviations shall be submitted to the Architect for acceptance before such changes are made.

- B. The Drawings are generally indicative of the work to be installed, but they do not show all offsets, fittings and similar details required, which shall be provided to meet the job conditions. In areas where work is installed in close proximity to work of other trades or within trades covered by this Division of the Specifications, prepare larger scale drawings consisting of plans and sections to show how work is to be installed in relation to work of other trades.
- C. The Architect reserves the right to a reasonable amount of shifting of outlet locations at no additional cost to the Owner until the time of roughing-in the work.

3.4 EXCAVATION AND BACKFILL

- A. Provide excavation and backfill necessary to install underground conduits and other work included in this Division of the Specifications. Establish lines and grades required for the proper location of the Work.
- B. After the conduit has been placed, the trenches shall be backfilled to the lines of present grades or finished grade as required. No backfill shall be placed, however, until water has been removed from the trenches and joints have been set.

3.5 RECORD DRAWINGS

- A. Keep at the site one (1) set of black and white prints for the express purpose of showing changes from the contract Drawings made during construction. Mark up the prints with red pencil during construction and deliver the prints, before final inspection, to the Architect as a final set of "Record Drawings". Refer to other specification section for additional requirements.

3.6 TESTING

- A. Perform tests and inspections as noted below and in specific section for the different electrical systems. Prepare test and inspection reports indicating procedures used, results and corrective action taken to achieve compliance with requirements for items that do not comply with requirements.
- B. Tests shall be conducted before equipment is connected that would be subject to damage from the test.
- C. Notify the Architect of the date and time of the test at least three days prior to that date.
- D. The tests shall demonstrate to the satisfaction of the Architect the following:
 - 1. That lighting, power and control circuits are continuous and free from short circuits.
 - 2. That circuits are free from unspecified grounds, and grounded where specified.
 - 3. That the resistance to ground of non-grounded circuits is at least one megohm.
 - 4. That circuits are properly connected in accordance with the applicable wiring diagrams.
 - 5. That circuits are operable, which demonstration shall include functioning of controls and continuous operation of lighting and power circuits for not less than 1/2 hour.
 - 6. That the resistance of the ground field system does not exceed 5 ohms.

3.7 PAINTING

- A. Remove rust, scale, grease, and dirt from equipment and material and leave ready for finish painting. Equipment specified with factory baked enamel finish shall be touched up as required to provide a surface visually free of scratches, nicks and blemishes.

3.8 OPERATING AND MAINTENANCE MANUAL

- A. Submit operating and maintenance instructions. Unless covered in another specification section, provide a minimum of four copies in three-ring binders and one CD. The manual shall include the following:
 - 1. A brief description of systems and their various components.
 - 2. Full, definite and explicit instructions for starting, stopping, and controlling systems.
 - 3. List of manufacturer's representatives with address and telephone numbers.
 - 4. Manufacturer's printed operating and maintenance instructions, parts lists, illustrations and diagrams for pieces of equipment.
 - 5. One copy of each shop drawing, engineer's shop drawing review comments, and Contractor's drawings.
 - 6. One copy of other items of equipment where not required as a shop drawing submittal.
 - 7. One copy of each wiring diagram.
 - 8. Manufacturer's data report from UL certifying code compliance for equipment specified.
 - 9. Certificate of field test check by manufacturer's representation of the Fire Detection and Alarm System.
 - 10. Certificate of approval from the code authority.

3.9 FIELD INSTRUCTION

- A. Upon completion of work, furnish services of a competent representative to instruct Owner's representative in the proper operation and maintenance of elements of the electrical systems. Submit instructor's name and credentials to the Architect for approval.
- B. Spend not less than 4 hours in such formal instruction to prepare Owner to operate and maintain the systems.

3.10 PERFORMANCE TEST

- A. Should the performance or capacity of the systems, equipment or devices furnished be questioned by written notice from the Architect after installation, provide necessary test equipment and complete a satisfactory test of the items in question. The test shall be run when and as directed by the Architect and in the presence of his representative. Should the items furnished not pass such a test, they shall be removed and replaced by systems, equipment or devices satisfactory to the Architect.

3.11 GROUNDING

- A. Provide grounding system as shown on the Drawings and as required.
- B. Grounds and connections shall be provided in accordance with the latest provisions of the National Electrical Code, and as indicated on the Drawings and specified.
- C. Unless otherwise noted, ground conductors shall be of copper, sized as required by the National Electrical Code. Ground lugs and clamps shall be cast non-ferrous metal, bolt-on type.
- D. The required equipment grounding conductors and straps shall be sized in compliance with National Electrical Code. Equipment grounding conductors shall be provided with green

insulation equivalent to the insulation on the associated phase conductors. The related feeder and the branch circuit grounding conductors shall be connected to the grounding bus with approved pressure connectors.

- E. Provided a separate green insulated equipment grounding conductor for each feeder and branch circuit. The required grounding conductor shall be installed in the common raceway with the related phase and/or neutral conductors. Flexible metallic conduit equipment connections utilized in conjunction with the above shall be provided with suitable green insulated grounding conductors connected to approved grounding terminals at ends of the flexible conduit.

3.12 MOUNTING HEIGHTS

- A. Mounting heights indicated on the drawings provide a general location of the outlets for bidding purposes only. Where mounting height information is not given, or contradicting information is given, request the information from the architect. Field coordinate final location of outlets.
- B. Prior to rough-in, coordinate and adjust the location and mounting height of power, data and telephone outlets with architectural casework, shelving, counters, millwork, furniture, or other appurtenance. Adjust locations as necessary to avoid conflicts without having to cut out portions of countertop backsplashes and similar items.

END OF SECTION

SECTION 26 05 00 - ELECTRICAL METHODS AND MATERIALS

PART 1 - GENERAL

1.1 NOTE

- A. The requirements of Section 26 00 00 apply to work performed under this Section.
- B. The requirements of this Section of the Specifications apply to and form a part of the individual Electrical Sections of the Specifications.

1.2 SCOPE

- A. The Work under this Section of the Specification includes the furnishing of labor, materials and equipment for the installation of a complete electrical system as shown and as specified herein.

PART 2 - PRODUCTS

2.1 POWER SYSTEM ANALYSIS

A. Arc Flash Analysis

1. Submit a fault, coordination, and arc flash analysis prior to procurement of electrical equipment to determine maximum and minimum fault current at each bus, demonstrate selective coordination of series overcurrent devices, and determine arc flash hazard boundary and PPE requirements at each bus.
2. Study shall be performed by a company regularly engaged in power system analysis, and shall be done utilizing one of the following software platforms: SKM Systems Analysis PTW, ETAP, or Easy Power.
3. Input to the power system analysis shall include actual equipment being provided, per the equipment submittals.
4. Obtain the available fault current (both maximum and minimum) from the utility for use in the fault analysis. Do not use an infinite bus for the utility contribution. The fault analysis shall include motor contribution from downstream loads.
5. The scope of the analysis shall include the proposed panelboard being installed under this contract, as well as any upstream or downstream panels required to be included in order to appropriately analyze the proposed panelboard.
6. Provide a one-line diagram labeled with input data, including nominal equipment ratings, cable lengths, and component names.
7. Prepare a tabulation report indicating equipment AIC ratings and maximum calculated fault current. Include a narrative to highlight any overdutied equipment.
8. Prepare a Time-Current Characteristic Curve (TCC) of the branch associated with the proposed panelboard, a narrative report explaining the curve and chosen settings, and a tabulated list of overcurrent device sizes and settings. Adjust the overcurrent device trip settings to maximize selective coordination while minimizing the arc flash incident energy. The narrative shall include a description of any compromises made between coordination and arc flash incident energy.
9. Include all operating scenarios in the analysis.
10. When two overcurrent devices are in series, with no other loads fed from the upstream device, coordination between the two devices is not required.

11. Set all adjustable-trip circuit breakers according to the approved coordination study prior to placing the system in service.
12. Prepare a table of each system bus, with associated arc flash hazard boundary, working distance, and PPE category. Include a narrative with recommendations for reducing the PPE category.
13. After obtaining Owner and Engineer approval, provide a self-adhesive, durable arc flash label for the proposed panelboard. Label shall include, at a minimum, the equipment name, arc flash boundary, working distance, and required PPE category. Match format and appearance of existing labels on site. Provide sample label to Owner for approval.

2.2 PANELBOARDS

- A. Subject to compliance with requirements, provide products by one of the following:
 1. Square D
 2. ABB General Electric
 3. Eaton Cutler Hammer
 4. Siemens
- B. Provide panelboards constructed in accordance with NEMA Standard PB1 and which bear the UL service entrance label.
- C. Provide panelboard enclosures as follows:
 1. General interior – NEMA 1 enclosure.
 2. Exterior work - NEMA 3R enclosure.
 3. Damp Location – NEMA 3R enclosure.
 4. Mounting – as indicated within the contract documents.
- D. For multi-section panelboards, provide separate cabinets of the same height and trims for each section, mounted adjacent to one another at the same height.
- E. Panelboard enclosures shall contain front hinged to box.
- F. Indicate circuit number on or adjacent to circuit breakers and provide a typed circuit directory on the inside of panelboard doors which clearly describes the loads served by breakers. Also provide the following information on the directory:
 1. Panel designation
 2. Voltage, Phase and Amps
 3. AIC rating
 4. Feeder and conduit size
 5. Feeder source and overcurrent protection size.
- G. Provide panelboards with copper bus.
- H. Provide panelboard assemblies with sufficient ampere interrupting capacity for available fault current. Provide fully-rated panelboard assemblies. Series rating is not permitted.
- I. Provide bolt-on thermal-magnetic circuit breakers.
- J. Provide common trip type two or three-pole breakers. Single pole units with a handle tie are not acceptable. Provide multi-pole breakers for all multiwire branch circuits.
- K. Provide circuit breaker type power and distribution panelboards with thermal-magnetic circuit breakers. Breakers feeding HVAC loads shall be HACR rated. When circuit breakers are used in combination with motor starters with overload relay for the protection

of motors, provide motor circuit protector (MCP) type breakers with adjustable instantaneous trip which is adjustable and accessible from the front of the circuit breaker.

- L. In multi-section panelboards provide conductors required for sub-feed purposes within the panels. Provide sub-feed cables of the same ampacity as the main buses or main circuit breaker. Provide each section of multi-section panelboards with frame rating indicated. Provide sub-feed or through-feed lugs to supply the next section.
- M. Arrange circuits such that loads are balanced as closely as practical over the phases and that a branch circuit neutral conductor does not serve as a shared neutral for two or more single phase circuits connected to the same phase in the panelboard. Circuit numbers indicated on the plans are to indicate grouping of loads on circuits and do not necessarily indicate actual circuit numbers in panelboard.

2.3 SAFETY SWITCHES

- A. Subject to compliance with requirements, provide products by one of the following:
 - 1. Square D
 - 2. ABB General Electric
 - 3. Eaton Cutler Hammer
 - 4. Siemens
- B. General
 - 1. Horsepower rated switches, of the appropriate size, where applicable.
 - 2. 240 Volt
 - a. 30-100 Amp - heavy duty
 - b. 200 and greater - heavy duty
 - 3. Fused
 - a. Heavy duty switches - rated 200,000 RMS symmetrical amperes at 480 volts.
 - b. General duty switches - rated 100,000 RMS symmetrical amperes at 240 volts.
 - 4. Cover interlock to prevent operation with cover open.
 - 5. Visible blade
 - 6. Externally handle operated with current carrying parts silver or tin plated.
 - 7. Provisions for two or more external padlocks
 - 8. Capable of accepting copper or aluminum cables.
 - 9. Ground kit and neutral kit as required.
 - 10. Labeled for use as service equipment.
 - 11. Pull out switch type disconnects are not acceptable.

2.4 LIGHTING CONTACTORS

- A. Subject to compliance with requirements, provide products by one of the following:
 - 1. Square D
 - 2. Eaton Cutler Hammer
 - 3. ABB General Electric
 - 4. Siemens.
- B. Electrically operated and mechanically held.
- C. Coil voltage: as required for control.

- D. Current rating for switching: listing or rating consistent with type of load served. Minimum 30A contact rating.
- E. Fault current withstand rating equal to or exceeding the available fault current at the point of installation.
- F. Enclosure: NEMA 1 for dry locations, NEMA 3R for damp and wet locations.
- G. Switch shall be U.L. listed according to U.L. 508, 10th edition.

2.5 OCCUPANCY/VACANCY SENSOR SWITCHES

- A. Subject to compliance with requirements, provide products by one of the following:
 - 1. Sensor Switch (basis of design, model as noted)
 - 2. Leviton
 - 3. Watt Stopper
 - 4. Hubbell
 - 5. Lutron
 - 6. Crestron
- B. Unless otherwise noted, all sensors for interior applications (excluding corridors, restrooms, primary building entrance areas, and lobbies,) shall be wired as vacancy sensors (manual on, automatic off).
 - 1. Ceiling-mount sensors shall achieve manual-on via low-voltage wall station.
- C. All sensors shall utilize dual technology (infrared and ultrasonic).
- D. Wall-mount
 - 1. Wall switch sensors shall be rated for 120/277V operation, compatible with load to be controlled and with capacity exceeding load connected.
 - 2. Sensors shall be factory set to manual-on operation.
 - 3. Sensors shall be equipped with the following: manual override switch for on/off operation; adjustable timer settings; minimum on time to maximize lamp life; optional ambient light sensing override.
 - 4. Basis-of-design product is Sensor Switch WSX PDT SA.
- E. Ceiling-mount
 - 1. Ceiling sensors shall be rated for 120/277V operation, up to 2000 square feet coverage area, surface-mountable to suspended ceiling.
 - 2. Provide low voltage power packs as required. Each power pack shall be capable of accepting at least six sensors.
 - 3. Sensors shall be equipped with the following: adjustable timer settings; self-adjusting technology to minimize nuisance switching; low voltage auxiliary relay/contacts; optional ambient light sensing override.
 - 4. Basis-of-design product is Sensor Switch CM PDT 10.
- F. Low Voltage Wall Station
 - 1. Low voltage wall stations shall be configured for manual on operation to comply with energy code requirements. Stations shall include soft-click buttons and LED indicator lights, and shall be designed for use with low voltage ceiling sensors and related power packs.
 - 2. Provide 0-10V dimming control where indicated on Drawings.
 - 3. Basis-of-design product is Sensor Switch sPODM series.

2.6 PHOTOELECTRIC SENSORS

- A. Subject to compliance with requirements, provide products by one of the following:
 - 1. Intermatic
 - 2. Tork
 - 3. Paragon
- B. General
 - 1. Solid state with dry contacts rated for intended load.
 - 2. Light level monitoring range: 1.5 to 10 fc with an adjustment for turn on/off levels with that range.
 - 3. Directional lens in front of photocell to prevent fixed light sources from causing turn off.
 - 4. 15 second time delay to prevent false operation.
 - 5. Surge protection.

2.7 WIRING DEVICES

- A. Subject to compliance with requirements, provide products by one of the following:
 - 1. Hubbell
 - 2. Leviton
 - 3. Pass & Seymour
- B. Lighting switches:
 - 1. Single pole, Three-way and Four-way
 - 2. Pilot light (where noted): illuminated when switch is on
 - 3. Toggle type
 - 4. Back and side wired
 - 5. Industrial grade
 - a. 120/277V
 - b. 20A
 - 6. Color per Architect
- C. Receptacle outlets:
 - 1. Duplex or simplex as noted.
 - 2. Polarized grounding
 - 3. Back and side wired
 - 4. Tamper resistant where required by code
 - 5. Industrial Grade
 - a. 120V
 - b. 20A
 - 6. Color per Architect.
- D. GFI outlets:
 - 1. Duplex
 - 2. Industrial grade
 - a. 120V
 - b. 20A
 - 3. Tamper resistant where required
 - 4. Weather-resistant type in wet or damp locations
 - 5. Self-testing with red LED for lost capability to provide protection.

- 6. Color per Architect
- E. Wiring Device Coverplates:
 - 1. Interior use
 - a. sheetmetal
 - b. Color per Architect
 - 2. Exterior use or in damp or wet locations:
 - a. Specification grade
 - b. Weatherproof cast aluminum construction
 - c. Gasketed plate & device covers
 - d. U.L. Listed for its intended use as follows:
 - i. Type 1: U.L. Listed & suitable for wet locations while in use (plug inserted at all times).
 - ii. Type 2: U.L. Listed & suitable for wet locations for portable tools and/or equipment connected to an outlet only when attended. Cover to be closed and sealed when not in use.
- F. Provide appropriate DS covers on exposed FS boxes. Plates on narrow partitions or in locations too narrow for standard width plates shall be 1-11/16 inches wide, single or two gang tandem.

2.8 BOXES AND FITTINGS

- A. Provide metal boxes manufactured by one of the following:
 - 1. ABB/Steel City
 - 2. ABB/Thomas & Betts
 - 3. Racor
 - 4. Crouse-Hinds
 - 5. Walker
- B. Provide pressed steel galvanized boxes, #14 gauge minimum, for boxes less than 50 cubic inches installed:
 - 1. flush in walls and concrete slabs
 - 2. above removable ceilings and similar spaces
 - 3. exposed at ceilings of unfinished spaces
- C. Provide O-Z/Gedney type "FS" or "FD" cast aluminum device boxes, equipped with matching covers for boxes less than 50 cubic inches accommodating wiring devices installed:
 - 1. flush in exterior locations
 - 2. exposed on walls of unfinished interior spaces
- D. Provide boxes 50 cubic inches and larger and wire troughs as follows:
 - 1. Constructed of sheet steel
 - 2. Equipped with flat sheet steel covers held in place with round headed machine screws
 - 3. Weld and grind joints to remove burrs.
 - 4. Provide hot dip galvanized boxes and covers.
 - 5. Provide covers to flush boxes which overlap box approximately 3/4 inch on sides.

- E. Provide pull boxes, junction boxes and wire troughs indicated in the construction documents, or required by field conditions or the National Electrical Code to facilitate wiring installation. Obtain approval prior to installing boxes in finished areas.
- F. Provide a 4 inches square, 1-1/2 inches deep or larger box with appropriate raised covers or plaster rings for flush mounted switches and receptacles.
- G. Locate boxes in face block, brick or tile walls at the course line and fit with square tile covers similar to Raco Series 782 or 792, or ABB/Steel City Series GW where walls are 6 inches or more in thickness.
- H. Provide 4 inch octagonal boxes for ceiling and wall recessed outlets for lighting fixtures, except where required by fixture design.
- I. Where switches and receptacles are indicated in close proximity to each other provide one multi-gang box with single plate. Install one device in each gang. Use solid gang boxes or sectional boxes for three or more devices.
- J. Provide gang boxes containing both low voltage or communications system wiring and branch circuit conductors or containing normal and emergency system wiring equipped with internal barriers to separate the two systems as required by the National Electrical Code.
- K. Do not use, unless specifically indicated, through-wall boxes or boxes mounted back-to-back.
- L. In fire-rated assemblies, install boxes in a manner listed for such purpose.
- M. Mount flush boxes in or exposed on walls plumb. Install flush boxes such that the distance between the lip of the box and the wall is less than 1/8 inch. Mount receptacles vertically, unless noted otherwise.
- N. Provide gasketed covers for boxes in exterior, damp, or wet locations.
- O. Provide blank stainless steel device plates as covers for pressed steel pull and junction boxes installed flush in walls of finished areas. Provide flat galvanized steel covers for pressed steel pull and junction boxes in other locations.
- P. Provide device-specific cover plates for boxes used to accommodate wiring devices.
- Q. Provide two-point support for wall and ceiling mounted boxes whose largest surface is less than 200 square inches in area. Provide additional support where the conduit system in conjunction with these supports does not provide a rigid installation. Provide a minimum of four-point support for boxes whose largest surface exceeds 200 square inches in area.
- R. Provide 3/8 inch threaded steel rod studs, securely anchored to the building, which pass through the center knockout in the back of boxes for connection and support of lighting fixtures weighing 50 pounds or more.
- S. Provide sheet steel pull and junction boxes and wire troughs with metal gauges as follows, the dimensions being those of the largest surface:

Maximum Dim. Inches	Maximum Square Inches	Box Gauge	Cover Gauge
26	600	16	14
40	1000	14	12

60	1500	12	12
over 60	over 1500	10	10

T. Provide wire troughs as follows:

1. Steel enclosed wireway
2. UL listed and labeled for use and application
3. 16 gauge steel for size 6" x 6" and smaller
4. 14 gauge steel for larger sizes.
5. Raintight when installed in wet or damp locations
6. Manufactured by Square D, General Electric, Siemens, Cutler-Hammer, Hoffman, Rittal Corp, or Keystone.

2.9 GROUND RODS

- A. Ground rods shall conform to UL 467 and shall be made of copper-clad steel. Rods shall be one piece, 5/8 inch diameter, and 10 feet in length. All connections to ground rods shall be by exothermic weld.

2.10 GROUND TEST WELLS

- A. Ground test wells shall be concrete, minimum 12" diameter, with cast iron lid and frame. Lid shall have cast lettering reading "GROUND."
- B. Ground rod shall be centered in well, with grounding receptacle at top of rod. Top of grounding receptacle shall be a maximum 6" below finished grade.

2.11 CONDUCTORS

- A. Provide soft drawn, 98 percent conductivity, copper conductors with 600 volt insulation, and manufactured in accordance with the requirements of the National Electrical Code, the Board of Fire Underwriters, A.S.A., N.E.M.A. and I.C.E.A.
- B. Provide conductors with 90 °C "THHN-THWN" insulation.

2.12 CABLE

- A. Metal clad cable
1. Provide type "MC" cable with galvanized steel armor, "THHN/THWN" 90° C, 600 volt, insulated copper conductors and insulated green grounding conductor.
 2. Comply with Federal Specification A-A-59544 and bears the UL label.

2.13 RACEWAYS AND WIRING METHODS

- A. Rigid metal conduit (RMC)
1. Galvanized threaded heavy-wall steel conduit and threaded couplings
 2. Comply with UL 6 and ANSI Standard C80.1.
- B. Electrical Metallic Tubing (EMT)
1. Galvanized steel conduit
 2. Comply with UL797 and ANSI C80.3.
 3. Couplings and box connectors for use in concrete and masonry walls:
 - a. concrete-tight
 - b. steel
 - c. compression ring type

- 4. Couplings and box connectors for all other locations:
 - a. steel
 - b. compression ring type
- C. Flexible metal conduit
 - 1. Zinc coated steel.
 - 2. Comply with UL 1.
- D. Liquid tight flexible metal conduit
 - 1. Flexible steel conduit with PVC jacket.
 - 2. Comply with UL 360.

PART 3 - EXECUTION

3.1 EQUIPMENT CONNECTIONS

- A. Conduit, outlets, wiring and other necessary fittings or accessories for power connections for heating equipment, fans and special furnishings shall be provided under this Section. Motor and equipment of different ratings shall be furnished, and circuit components shall be adjusted accordingly.
- B. Make final connections to electrical equipment specified under this Section and other Sections of these Specifications.

3.2 PANELBOARDS

- A. Coordinate layout and installation of panelboards and components with other construction that penetrates walls or is supported by them, including electrical and other types of equipment, raceways, piping, encumbrances to workspace clearance requirements, and adjacent surfaces. Maintain required workspace clearances and required clearances for equipment access doors and panels.
- B. Install filler plates in unused spaces.

3.3 WIRING DEVICES

- A. Protect installed devices and their boxes. Do not place wall finish materials over device boxes and do not cut holes for device boxes with routers that are guided by riding against outside of boxes.
- B. Clean boxes prior to installation of devices.
- C. When conductors larger than what is recommended for termination by the manufacturer are installed, splice #12AWG pigtails for device connection. Do not exceed box fill requirements.

3.4 SAFETY SWITCHES

- A. Provide enclosure at installed locations with the following environmental ratings:
 - 1. Indoor, dry and clean locations: NEMA 250 Type 1
 - 2. Indoor damp and wet locations: NEMA 250 Type 3R
 - 3. Outdoor Locations: NEMA 250, Type 3R
 - 4. Kitchen or wash down areas: NEMA 250, Type 4X
- B. Coordinate layout of switches to maintain required workspace clearances and clearances/access for equipment access doors and panels.

- C. Install fuses in fusible switches.

3.5 MOTORS, EQUIPMENT, CONTROLS AND CONTROL WIRING

- A. Motors, air handling units, compressors, etc., and built-in control devices will be provided under other Sections unless noted otherwise.
- B. Provide control connections for devices and equipment.
- C. Provide power connections for equipment furnished under other Sections.
- D. The installation, connections and operation of controls not noted will be done under other Sections, including provisions for conduits, wiring, outlet boxes, control components and connections.
- E. Control wiring shall be in accordance with the drawings and/or manufacturer's certified and approved wiring diagrams.
- F. Control wires shall be marked with "E-Z" tape markers at terminal points. Terminal blocks shall be marked to correspond to wire terminated.
- G. Provide conduit and wires, install and connect control equipment (starters, push buttons, etc.) and connect motors, air handling units, air conditioning equipment, and built-in control devices, in accordance with wiring diagrams furnished under other Sections.

3.6 CONDUCTOR APPLICATIONS

- A. Sizes are AWG or kcmil. Minimum size for power and lighting circuits is #12. Minimum size for 120 volt control circuits is #14. Minimum insulation rating of conductors is 600 volts.
- B. Unless specifically noted otherwise on Drawings, feeders and conduits are sized for copper.
- C. Provide stranded wire for No. 8 and larger. Make conductors continuous from outlet with no splices made except within outlet or junction boxes.

3.7 CONDUCTOR INSULATION AND MULTICONDUCTOR CABLE APPLICATIONS

- A. Exposed Feeders: Type THHN/THWN, single conductors in raceway
- B. Feeders concealed in ceilings, wall, partitions and crawl spaces: Type THHN/THWN, single conductors in raceway.
- C. Feeders concealed in concrete, below slabs on grade and underground: Type THHN/THWN, single conductors in raceway.
- D. Exposed branch circuits: Type THHN/THWN, single conductors in raceway.
- E. Branch circuits concealed in ceilings, walls, partitions and crawl spaces:
 - 1. Type THHN/THWN, single conductors in raceway.
 - 2. MC cable (#8 AWG and smaller)

3.8 CONDUCTOR AND CABLE INSTALLATION

- A. Conceal cables in finished walls, ceiling and floors unless otherwise indicated.
- B. Use manufacturer approved pulling compound or lubricant where necessary. Compound used must not deteriorate conductor or insulations. Do not exceed manufacturer's recommended maximum pulling tensions.
- C. Install concealed and exposed cables parallel and perpendicular to structural members.

- D. A color coding system shall be as follows throughout the building's network of feeders and circuits and used as a basis of balancing the load. The color code shall be continuous from fixture to fixture or other outlet.

Color System	Phase A	Phase B	Phase C	Neutral
208Y/120V	Black	Red	Blue	White

- E. Wire and cable shall be delivered to the job site in full coils or reels, each bearing a tag containing the UL approval stamp, name of manufacturer, trade name, code, type of wire, and month and year manufactured.

3.9 RACEWAY APPLICATIONS

- A. Outdoors:

1. Exposed Conduit: RMC

- B. Indoors:

1. Exposed above 8 feet above finished floor: EMT
2. Exposed below 8 feet above finished floor: RMC
3. Concealed in ceilings, interior walls and partitions:
 - a. MC cable
4. Connection to vibrating equipment:
 - a. Interior dry locations: FMC
 - b. Interior/Exterior damp and wet locations: LFMC
5. Damp or wet locations: RMC
6. Hazardous locations: RMC

3.10 RACEWAY INSTALLATION

- A. Minimum Raceway Size: 3/4" trade size. 1/2" may be used for control cabling.
- B. Raceway Fittings: compatible with raceways and suitable for use and location.
- C. Do not fasten conduits onto the bottom side of a metal roof deck.
- D. Run conduits and cabling parallel and perpendicular to structural members.
- E. Install no more than the equivalent of three 90 degree bends in any conduit run.
- F. Provide bushings on the ends of all conduits.
- G. Install pull wires in empty raceways. Utilize polypropylene or monofilament plastic line with not less than 200 lb tensile strength.
- H. Install devices to seal raceway interiors at accessible locations in the following locations:
1. Where conduits pass from warm to cold locations, such as boundaries of refrigerated spaces.
 2. Heated to unheated spaces.
 3. Where otherwise required by the NEC.
- I. Provide expansion joint fittings in the following locations:
1. Where conduits cross building or structure expansion joints
- J. Use a maximum of 6'-0" of flexible conduit or MC cable for connection to recessed/semi-recessed light fixtures and equipment subject to vibration.

- K. Bends in conduits for high voltage, telephone, data, television and similar cables shall be made with wide-sweep field bends. Radius of wide sweep bends shall be as required by the National Electrical Code for conduits containing cables with lead sheath. No manufactured elbows permitted.

3.11 WIRING METHODS

- A. Cable methods shall conform to the National Electrical Code requirements and these Specifications and shall produce a complete, safe, well-built electrical system.
- B. Conduit nipples connecting outlets in adjoining rooms shall be packed with Johns-Manville "Duxseal" after wires are in place to prevent transmission of noise between rooms unless nipples are 12 inches or more in length.
- C. Provide blank cover plates for unused data outlet assemblies.
- D. Provide wallplate blanks for unused data termination ports.
- E. Provide a grounded ("neutral") conductor at each light switch location.
- F. Where electrical equipment or material is installed in or through fire-rated building elements, provide appropriate UL-listed firestop material to maintain the rated integrity of the affected surface.
- G. Provide fiberglass fire-rated outlet boxes or listed putty pads where required to maintain fire rating of wall.

3.12 SPLICES AND TERMINATIONS

- A. Splices in branch circuits and control wiring shall be made with 3-M Company "Scotchlocks", Ideal "Wirenuts" or equivalent. Splices shall be insulation rated for 90°C at 600 volts.
- B. Splices, taps and terminations for feeder and motor wiring shall be made with approved set screw mechanical taps, sleeves or lugs. Provide terminations with a minimum 75°C rating at 600 volts.
- C. Vinyl electrical tape shall be 90°C, 600 volt insulation rated for use whenever added insulation is required. Rubber and friction tape shall not be used.

3.13 TESTING

- A. Panelboards
 - 1. Perform Tests and Inspections
 - a. Test continuity of each circuit.
 - b. Perform each visual and mechanical inspection test for low-voltage air circuit breakers stated in NETA ATS, Paragraph 7.6 Circuit Breakers. Certify compliance with test parameters.
 - i. Correct malfunctioning units on-site, where possible, and retest to demonstrate compliance; otherwise, replace with new units and retest.
 - 2. Adjusting
 - a. Adjust moving parts and operable components to function smoothly, and lubricate as recommended by manufacturer.
 - 3. Prepare and submit test and inspection reports.
- B. Disconnect Switches
 - 1. Perform tests and inspections:

- a. Visual and Mechanical Inspection:
 - i. Inspect physical and mechanical condition.
 - ii. Inspect anchorage, alignment, grounding, and clearances.
 - iii. Verify unit is clean.
 - iv. Verify blade alignment and mechanical operation.
 - v. Verify fuse sizes and types match the specifications and drawings.
 - vi. Verify tightness of bolted electrical connections.
 - b. Prepare and submit test and inspection report.
- C. Wiring Devices
- 1. Perform the following tests and inspections
 - a. In healthcare facilities, prepare reports that comply with NFPA 99.
 - b. Test Instruments: Use instruments that comply with UL 1436.
 - c. Test Instrument for Receptacles: Digital wiring analyzer with digital readout or illuminated digital-display indicators of measurement.
 - d. Test for Receptacles:
 - i. Using the test plug, verify that the device and its outlet box are securely mounted.
 - 2. Wiring device will be considered defective if it does not pass tests and inspections.
 - 3. Prepare and submit test and inspection reports.

END OF SECTION

SECTION 26 50 00 - LIGHTING

PART 1 - GENERAL

1.1 SCOPE

- A. Provide a lighting fixture for each lighting fixture symbol shown on the Drawings, of the type and quality described herein and on the drawings. Fixtures shall be installed complete with lamps of the wattage indicated, sockets, housing, driver, shades, diffusers and supports, and wired for operation.

1.2 SUBMITTALS

- A. Submit product data for each lighting fixture type. Cut sheets shall indicate all options/accessories being provided.
- B. When alternate fixtures than the basis of design are proposed (and allowed by owner), submit a photometric plan indicating point-by-point footcandle levels. Photometric plan shall include a schedule indicating all data relevant to the calculation (ies file used, LLF, average, avg-to-max, max-to-min, etc.).

PART 2 - PRODUCTS

2.1 LIGHTING FIXTURES

- A. Provide fixtures according to the designation indicated on the plans. Fixture designations are explained and specified in the Lighting Fixture Schedule.
- B. Where a letter designating fixture type is adjacent to a row of fixtures, it shall be understood that fixtures in the row shall be of the same type and shall consist of the total lengths indicated. Although the descriptions of the fixtures described may refer to 4 foot units, 2 foot, 3 foot, and 8 foot units may be used where applicable to obtain the fixture length necessary.
- C. Construction Features
 - 1. General Requirements
 - a. Provide galvanized support hangers, channels and bolts.
 - b. Provide rustproof exterior hardware such as screws, nuts, washers and anchor bolts.
 - c. Provide stem suspended fixtures with self-aligning type semi-rigid ball joints so that fixtures hang level with vertical stems.
 - d. Fixtures shall be wired for polarized system with one wire in each fixture to be distinctly marked for its entire length. Wire shall bear the UL label.
 - e. Verify fixture finishes with Architect prior to ordering.
 - 2. Exterior Fixtures:
 - a. Cast aluminum housing, unless noted.
 - b. UL Listed for damp or wet location, as required.
 - c. Weatherproof gasketing.
 - d. Corrosion resistant stainless-steel hardware.

2.2 LED FIXTURES

- A. General

1. Refer to lighting fixture schedule on drawings for manufacturer and fixture information.
2. Individual LEDs shall be connected such that a catastrophic loss or the failure of one LED will not result in the loss of the entire luminaire.
3. Lumen output shall not decrease by more than 20% over the minimum operational life of 50,000 hours.
4. Provide thermal management to ensure proper operation of luminaire over its expected useful life. Thermal management shall be passive type only.

B. Driver

1. 120-277V, UL-listed, CSA-certified. Driver shall be at least 80% efficient at full load.
2. Driver shall be suitable for continuous 0-10V dimming without perceivable flicker over a range of 100% to 5% of rated lumen output with a smooth shutoff function.
3. Provide driver disconnect per NEC requirement.
4. Ambient Temperature Range:
 - a. Indoor air conditioned/heated spaces: -20 °C to 40 °C
 - b. Indoor heated/ventilated only spaces: -20 °C to 50 °C
 - c. Outdoor: -40 °C to 40 °C

2.3 EMERGENCY BATTERY PACK (INTEGRAL TO FIXTURE)

A. Subject to compliance with requirements, provide products by one of the following:

1. Bodine
2. Iota
3. Lithonia Power Sentry
4. Dual Lite

B. General Requirements:

1. Provide factory-installed battery pack where indicated on Drawings
2. UL 924-listed to provide indicated lumen output for 90 minutes. If lumen output is not indicated unit shall provide a minimum of 1000 lumens.
3. Provide remote test switch if test switch is not integral to fixture.

2.4 EXIT SIGNS

A. General Requirements:

1. Operating input voltage: 120/277V
2. Red or Green lettering as required by the AHJ.
3. Integral nickel cadmium battery for self-powered exit signs.
4. UL 924-listed.
5. Integral dual led heads where indicated.
6. Integral self-diagnostic capability.
7. Ceiling or wall mounted.
8. Removable chevrons.
9. Single and dual sided as required.

2.5 EMERGENCY LIGHTING UNIT

A. General Requirements

1. Operating input voltage: 120/277V
2. Operating output voltage: 6 or 12V dc.
3. Wall mount.

4. UV stabilized white thermoplastic housing
5. Integral battery.
6. Integral dual led heads where indicated.
7. Integral self-test diagnostic capability.

2.6 PHOTOCELLS

- A. Provide integral button type photocells by the fixture manufacturer, installed at the factory.

PART 3 - EXECUTION

3.1 LOCATION

- A. Coordinate the location of lighting fixtures with the Architect before final installation. Allow for a reasonable amount of shifting of fixture locations.
- B. Consult the Architect's reflected ceiling plans and the installer of the ceilings to ensure that fixtures are properly aligned, ventilated and located.
- C. Coordinate actual fixture depths with piping, duct work, bulkheads, etc. prior to rough-in.
- D. Install exit signs above a doorway with two active leafs that swing in opposite directions centered above egress leaf, not centered above the doorway.

3.2 INSTALLATION

- A. Provide "Earthquake" hold down clips on recessed fixtures where required by AHJ.
- B. Provide necessary accessories, as required, to support the fixtures independently of the ceiling suspension system. Securely fasten box and fixture supports to structural system main supports. Where fixtures are surface mounted, cut neat holes in the hung ceilings as required for the fixture supports.
- C. Provide at least two (2) grid drop wires, 12 gauge minimum, supported from building structural system on recessed fixtures. Provide additional support wires where required by AHJ.
- D. Lighting fixtures installed in rated walls or ceilings shall be listed for the purpose or suitably tented with approved material.
- E. Wire emergency light units, emergency battery pack and exit lighting fixtures with unswitched circuit leg, unless otherwise noted.
- F. Test all fixtures for proper operation and correct any deficiencies.

END OF SECTION

SECTION 28 31 76 - FIRE ALARM AND MASS NOTIFICATION SYSTEM

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ACOUSTICAL SOCIETY OF AMERICA (ASA)

ASA S3.2 (2009; R 2014) Method for Measuring the Intelligibility of Speech Over Communication Systems (ASA 85)

FM GLOBAL (FM)

FM APP GUIDE (updated on-line) Approval Guide
<http://www.approvalguide.com/>

INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS (IEEE)

IEEE C62.41.1 (2002; R 2008) Guide on the Surges Environment in Low-Voltage (1000 V and Less) AC Power Circuits

IEEE C62.41.2 (2002) Recommended Practice on Characterization of Surges in Low-Voltage (1000 V and Less) AC Power Circuits

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 4 (2018) Standard for Integrated Fire Protection and Life Safety System Testing

NFPA 70 (2020; ERTA 20-1 2020; ERTA 20-2 2020; TIA 20-1; TIA 20-2; TIA 20-3; TIA 20-4) National Electrical Code

NFPA 72 (2019; TIA 19-1; ERTA 1 2019) National Fire Alarm and Signaling Code

NFPA 90A (2021) Standard for the Installation of Air Conditioning and Ventilating Systems

NFPA 170 (2021) Standard for Fire Safety and Emergency Symbols

U.S. DEPARTMENT OF DEFENSE (DOD)

UFC 3-601-02 (2010) Operations and Maintenance: Inspection, Testing, and Maintenance of Fire Protection Systems

UFC 4-010-06 (2016; with Change 1, 2017) Cybersecurity of Facility-Related Control Systems

U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)

47 CFR 15 Radio Frequency Devices

47 CFR 90 Private Land Mobile Radio Services

UNDERWRITERS LABORATORIES (UL)

UL 268 (2016; Reprint Oct 2019) UL Standard for Safety Smoke Detectors for Fire Alarm Systems

UL 268A (2008; Reprint Oct 2014) Smoke Detectors for Duct Application

UL 464 (2016; Reprint Sep 2017) UL Standard for Safety Audible Signaling Devices for Fire Alarm and Signaling Systems, Including Accessories

UL 497A (2001; Bul. 2019) UL Standard for Safety Secondary Protectors for Communications Circuits

UL 497B (2004; Reprint Dec 2012) Protectors for Data Communication Circuits

UL 521 (1999; Reprint Dec 2017) UL Standard for Safety Heat Detectors for Fire Protective Signaling Systems

UL 864 (2014; Reprint May 2020) UL Standard for Safety Control Units and Accessories for Fire Alarm Systems

UL 1283 (2017) UL Standard for Safety Electromagnetic Interference Filters

UL 1449 (2021) UL Standard for Safety Surge Protective Devices

UL 1480 (2016; Reprint Sep 2017) UL Standard for Safety Speakers for Fire Alarm and Signaling Systems, Including Accessories

UL 1638 (2016; Reprint Sep 2017) UL Standard for Safety Visible Signaling Devices for Fire Alarm and Signaling Systems, Including Accessories

UL 1971 (2002; Reprint Oct 2008) Signaling Devices for the Hearing Impaired

UL 2017 (2008; Reprint Dec 2018) UL Standard for Safety General-Purpose Signaling Devices and Systems

UL 2034	(2017; Reprint Sep 2018) UL Standard for Safety Single and Multiple Station Carbon Monoxide Alarms
UL 2075	(2013; Bul. 2019) UL Standard for Safety Gas and Vapor Detectors and Sensors
UL 2572	(2016; Bul. 2018) UL Standard for Safety Mass Notification Systems
UL Fire Prot Dir	(2012) Fire Protection Equipment Directory

1.2 SUMMARY

1.2.1 Scope

- A. This work includes designing and providing a new, complete, fire alarm and mass notification (MNS) system as described herein and on the contract drawings. Include system wiring, raceways, pull boxes, terminal cabinets, outlet and mounting boxes, control equipment, initiating devices, notification appliances, supervising station fire alarm transmitters/mass notification transceiver, and other accessories and miscellaneous items required for a complete operational system even though each item is not specifically mentioned or described. Provide system complete and ready for operation. Design and installation must comply with UFGS 25 05 11, UFC 4-010-06 and AFGM 2019-320-02.
- B. Provide equipment, materials, installation, workmanship, inspection, and testing in strict accordance with NFPA 72, except as modified herein. The system layout on the drawings shows the intent of coverage and suggested locations. Final quantity, system layout, and coordination are the responsibility of the Contractor.
- C. The fire alarm and mass notification system must be independent of the building security, building management, and energy/utility monitoring systems other than for control functions.

1.2.2 Qualified Fire Protection Engineer (QFPE)

Services of the QFPE must include:

- A. Reviewing SD-02, SD-03, and SD-05 submittal packages for completeness and compliance with the provisions of this specification. Construction (shop) drawings and calculations must be prepared by, or prepared under the immediate supervision of, the QFPE. The QFPE must affix their professional engineering stamp with signature to the shop drawings, calculations, and material data sheets, indicating approval prior to submitting the shop drawings to the DFPE.
- B. Providing a letter documenting that the SD-02, SD-03, and SD-05 submittal package has been reviewed and noting any outstanding comments.
- C. Performing in-progress construction surveillance prior to installation of ceilings (rough-in inspection).
- D. Witnessing pre-Government and final Government functional performance testing and performing a final installation review.

- E. Signing applicable certificates under SD-07.

1.3 DEFINITIONS

Wherever mentioned in this specification or on the drawings, the equipment, devices, and functions must be defined as follows:

1.3.1 Interface Device

An addressable device that interconnects hard wired systems or devices to an analog/addressable system.

1.3.2 Fire Alarm and Mass Notification Control Unit (FMCU)

A master control unit having the features of a fire alarm control unit (FACU) and an autonomous control unit (ACU) where these units are interconnected to function as a combined fire alarm/mass notification system. The FACU and ACU functions may be contained in a single cabinet or in independent, interconnected, and co-located cabinets.

1.3.3 Remote Fire Alarm and Mass Notification Control Unit

A control unit, physically remote from the fire alarm and mass notification control unit, that receives inputs from automatic and manual fire alarm devices; may supply power to detection devices and interface devices; may provide transfer of power to the notification appliances; may provide transfer of condition to relays or devices connected to the control unit; and reports to and receives signals from the fire alarm and mass notification control unit.

1.3.4 Local Operating Console (LOC)

A unit designed to allow emergency responders and/or building occupants to operate the MNS including delivery of recorded messages and/or live voice announcements, initiate visual, textual visual, and audible appliance operation and other relayed functions.

1.3.5 Terminal Cabinet

A steel cabinet with locking, hinge-mounted door where terminal strips are securely mounted inside the cabinet.

1.3.6 Control Module and Relay Module

Terms utilized to describe emergency control function interface devices as defined by NFPA 72.

1.3.7 Designated Fire Protection Engineer (DFPE)

The DoD fire protection engineer that oversees that Area of Responsibility for that project. This is sometimes referred to as the "cognizant" fire protection engineer. Interpret reference to "authority having jurisdiction" and/or AHJ in referenced standards to mean the Designated Fire Protection Engineer (DFPE). The DFPE may be responsible for review of the contractor submittals having a "G" designation, and for witnessing final inspection and testing.

1.3.8 Qualified Fire Protection Engineer (QFPE)

A QFPE is an individual who is a licensed professional engineer (P.E.), who has passed the fire protection engineering written examination administered by the National Council of Examiners for Engineering and Surveying (NCEES) and has relevant fire protection engineering experience.

1.4 SUBMITTALS

Government approval is required for submittals with a "G" classification. Submittals not having a "G" classification are for information only. When used, a code following the "G" classification identifies the office that will review the submittal for the Government.

Shop drawings (SD-02), product data (SD-03) and calculations (SD-05) must be prepared by the fire alarm designer and combined and submitted as one complete package. The QFPE must review the SD-02/SD-03/SD-05 submittal package for completeness and compliance with the Contract provisions prior to submission to the Government. The QFPE must provide a Letter of Confirmation that they have reviewed the submittal package for compliance with the contract provisions. This letter must include their registered professional engineer stamp and signature. Partial submittals and submittals not reviewed by the QFPE will be returned by the Government disapproved without review.

Submit the following:

SD-01 Preconstruction Submittals

Qualified Fire Protection Engineer (QFPE); G

Fire alarm system designer; G

Installer; G

Test Technician; G

SD-02 Shop Drawings

Instructions; G

Wiring Diagrams; G

System Layout; G

Notification Appliances; G

Initiating devices; G

Amplifiers; G

Battery Power; G

Voltage Drop Calculations; G

SD-03 Product Data

Fire Alarm and Mass Notification Control Unit (FMCU); G

Local Operating Console (LOC); G

Amplifiers; G

Tone Generators; G

Digitalized voice generators; G

LCD Annunciator; G

Manual Stations; G

Smoke Detectors; G

Duct Smoke Detectors; G

Heat Detectors; G

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Addressable Interface Devices; G

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As-Built Drawings

Spare Parts

1.5 SYSTEM OPERATION

Fire alarm system/mass notification system including textual display sign control panel(s), components requiring power, except for the FMCU(s) power supply, must operate on 24 volts DC unless noted otherwise in this section.

The interior fire alarm and mass notification system must be a complete, supervised, noncoded, analog/addressable fire alarm and mass notification system conforming to NFPA 72, UL 864, and UL 2572. Systems meeting UL 2017 only are not acceptable. The system must be activated into the alarm mode by actuation of an alarm initiating device. The system must remain in the alarm mode until the initiating device is reset and the control unit is reset and restored to normal. The system may be placed in the alarm mode by local microphones, LOC, FMCU, or remotely from authorized locations/users.

1.5.1 Alarm Initiating Devices and Notification Appliances (Visual, Voice, Textual)

- A. Connect alarm initiating devices to initiating device circuits (IDC) Class "B", or to signaling line circuits (SLC) Class "B" and installed in accordance with NFPA 72.
- B. Connect notification appliances to notification appliance circuits (NAC) Class "B".

1.5.2 Functions and Operating Features

The system must provide the following functions and operating features:

- A. Power, annunciation, supervision, and control for the system. Addressable systems must be microcomputer (microprocessor or microcontroller) based with a minimum word size of eight bits with sufficient memory to perform as specified.
- B. Visual alarm notification appliances must be synchronized as required by NFPA 72.
- C. Electrical supervision of the primary power (AC) supply, presence of the battery, battery voltage, and placement of system modules within the control unit.
- D. An audible and visual trouble signal to activate upon a single break or open condition, or ground fault. The trouble signal must also operate upon loss of primary power (AC) supply, absence of a battery supply, low battery voltage, or removal of alarm or supervisory control unit modules. After the system returns to normal operating conditions, the trouble signal must again sound until the trouble is acknowledged. A smoke detector in the process of being verified for the actual presence of smoke must not initiate a trouble condition.
- E. A trouble signal silence feature that must silence the audible trouble signal, without affecting the visual indicator.
- F. Program capability via switches in a locked portion of the FMCU to bypass the automatic notification appliance circuits, fire reporting system, and air handler shutdown features. Operation of this programmed action must indicate on the FMCU display as a supervisory or trouble condition.
- G. Alarm functions must override trouble or supervisory functions. Supervisory functions must override trouble functions.
- H. The system must be capable of being programmed from the control unit keyboard. Programmed information must be stored in non-volatile memory.
- I. The system must be capable of operating, supervising, and/or monitoring non-addressable alarm and supervisory devices.
- J. There must be no limit, other than maximum system capacity, as to the number of addressable devices that may be in alarm simultaneously.
- K. Where the fire alarm/mass notification system is responsible for initiating an action in another emergency control device or system, such as HVAC, the addressable fire alarm relay must be located in the vicinity of the emergency control device.
- L. An alarm signal must automatically initiate the following functions:
 - 1. Transmission of an alarm signal to a remote supervising station.
 - 2. Visual indication of the device operated on the FMCU, and on the annunciator.
 - 3. Actuation of alarm notification appliances.
 - 4. Recording of the event electronically in the history log of the FMCU.
- M. A supervisory signal must automatically initiate the following functions:
 - 1. Visual indication of the device operated on the FMCU, and on the annunciator.
 - 2. Transmission of a supervisory signal to a remote supervising station.

3. Operation of a duct smoke detector must shut down the appropriate air handler in accordance with NFPA 90A in addition to other requirements of this paragraph and as allowed by NFPA 72.
4. Recording of the event electronically in the history log of the FMCU.

N. A trouble condition must automatically initiate the following functions:

1. Visual indication of the device operated on the FMCU, and on the annunciator.
2. Transmission of a trouble signal to a remote supervising station.
3. Recording of the event electronically in the history log of the FMCU.

O. Activation of a carbon monoxide alarm initiating device must automatically initiate the following functions:

1. Visual indication of the device operated on the FMCU and on the annunciator.
2. Transmission of a carbon monoxide alarm signal to a remote supervising station.
3. Activation of all strobes and the audible carbon monoxide message throughout the building.
4. Recording of the event electronically in the history log of the FMCU.

P. System control equipment must be programmed to provide a 60-minute to 180-minute delay in transmission of trouble signals resulting from primary power failure.

Q. Activation of a LOC pushbutton must activate the audible and visual alarms in the facility. The audible message must be the one associated with the pushbutton activated.

1.6 TECHNICAL DATA AND SITE-SPECIFIC SOFTWARE

Technical data and site-specific software (meaning technical data that relates to computer software) that are specifically identified in this project, and may be required in other specifications, must be delivered, strictly in accordance with the CONTRACT CLAUSES. The fire alarm system manufacturer must submit written confirmation of this contract provision as "Fire Alarm System Site-Specific Software Acknowledgement". Identify data delivered by reference to the specification paragraph against which it is furnished. Data to be submitted must include complete system, equipment, and software descriptions. Descriptions must show how the equipment will operate as a system to meet the performance requirements of this contract. The site-specific software data package must also include the following:

- A. Items identified in NFPA 72, titled "Site-Specific Software".
- B. Identification of programmable portions of the system equipment and capabilities.
- C. Description of system revision and expansion capabilities and methods of implementation detailing both equipment and software requirements.
- D. Provision of operational software data on all modes of programmable portions for fire alarm and mass notification.
- E. Description of Fire Alarm and Mass Notification Control Unit equipment operation.
- F. Description of auxiliary and remote equipment operations.

G. Library of application software.

H. Operation and maintenance manuals.

1.7 QUALITY ASSURANCE

1.7.1 Submittal Documents

1.7.1.1 Preconstruction Submittals

Within 36 days of contract award but not less than 14 days prior to commencing any work on site, the Contractor must submit the following for review and approval. SD-02, SD-03 and SD-05 submittals received prior to the review and approval of the qualifications of the fire alarm subcontractor and QFPE must be returned disapproved without review. All resultant delays must be the sole responsibility of the Contractor.

1.7.1.2 Shop Drawings

Shop drawings must not be smaller than ISO A1. Drawings must comply with the requirements of NFPA 72 and NFPA 170. Minimum scale for floor plans must be 1/8"=1'.

1.7.1.3 Nameplates

Nameplate illustrations and data to obtain approval by the Contracting Officer before installation.

1.7.1.4 Wiring Diagrams

Point-to-point wiring diagrams showing the points of connection and terminals used for electrical field connections in the system, including interconnections between the equipment or systems that are supervised or controlled by the system. Diagrams must show connections from field devices to the FMCU and remote FMCU, initiating circuits, switches, relays and terminals, including pathway diagrams between the control unit and shared communications equipment within the protected premises. Point-to-point wiring diagrams must be job specific and must not indicate connections or circuits not being utilized. Provide complete riser diagrams indicating the wiring sequence of all devices and their connections to the control equipment. Include a color-code schedule for the wiring.

1.7.1.5 System Layout

Plan view drawing showing device locations, terminal cabinet locations, junction boxes, other related equipment, conduit routing, conduit sizes, wire counts, conduit fill calculations, wire color-coding, circuit identification in each conduit, and circuit layouts for all floors. Indicate candela rating of each visual notification appliance. Indicate the wattage of each speaker. Clearly identify the locations of isolation modules. Indicate the addresses of all devices, modules, relays, and similar. Show/identify all acoustically similar spaces. Indicate if the environment for the FMCU is within its environmental listing (e.g. temperature/humidity).

Provide a complete description of the system operation in matrix format similar to the "Typical Input/Output Matrix" included in the Annex of NFPA 72.

1.7.1.6 Notification Appliances

Calculations and supporting data on each circuit to indicate that there is at least 25 percent spare capacity for notification appliances. Annotate data for each circuit on the drawings.

1.7.1.7 Initiating Devices

Calculations and supporting data on each circuit to indicate that there is at least 25 percent spare capacity for initiating devices. Annotate data for each circuit on the drawings.

1.7.1.8 Amplifiers

Calculations and supporting data to indicate that amplifiers have sufficient capacity to simultaneously drive all notification speakers at tapped settings plus 25 percent spare capacity. Annotate data for each circuit on the drawings.

1.7.1.9 Battery Power

Calculations and supporting data as required in paragraph Battery Power Calculations for alarm, alert, and supervisory power requirements. Calculations including ampere-hour requirements for each system component and each control unit component, and the battery recharging period, must be included on the drawings.

1.7.1.10 Voltage Drop Calculations

Voltage drop calculations for each notification circuit indicating that sufficient voltage is available for proper operation of the system and all components, at a minimum rated voltage of the system operating on batteries. Include the calculations on the system layout drawings.

1.7.1.11 Product Data

Annotated descriptive data to show the specific model, type, and size of each item. Catalog cuts must also indicate the NRTL listing. The data must be highlighted to show model, size, and options that are intended for consideration. Data must be adequate to demonstrate compliance with all contract requirements. Product data for all equipment must be combined into a single submittal.

Provide an equipment list identifying the type, quantity, make, and model number of each piece of equipment to be provided under this submittal. The equipment list must include the type, quantity, make and model of spare equipment. Types and quantities of equipment submitted must coincide with the types and quantities of equipment used in the battery calculations and those shown on the shop drawings.

1.7.1.12 Operation and Maintenance (O&M) Instructions

Six copies of the Operation and Maintenance Instructions. The O&M Instructions must be prepared in a single volume or in multiple volumes, with each volume indexed, and may be submitted as a Technical Data Package. Manuals must be approved prior to training. The Interior Fire Alarm and Mass Notification System Operation and Maintenance Instructions must include the following:

- A. Operating manual outlining step-by-step procedures required for system startup, operation, and shutdown. The manual must include the manufacturer's name, model number, service manual,

parts list, and preliminary equipment list complete with description of equipment and their basic operating features.

- B. Maintenance manual listing routine maintenance procedures, possible breakdowns and repairs, and troubleshooting guide. The manuals must include conduit layout, equipment layout and simplified wiring, and control diagrams of the system as installed.
- C. Complete procedures for system revision and expansion, detailing both equipment and software requirements.
- D. Software submitted for this project on CD/DVD media utilized.
- E. Printouts of configuration settings for all devices.
- F. Routine maintenance checklist. The routine maintenance checklist must be arranged in a columnar format. The first column must list all installed devices, the second column must state the maintenance activity or state no maintenance required, the third column must state the frequency of the maintenance activity, and the fourth column provided for additional comments or reference. All data (devices, testing frequencies, and similar) must comply with UFC 3-601-02.
- G. A final Equipment List must be submitted with the Operating and Maintenance (O&M) manual.

1.7.1.13 As-Built Drawings

The drawings must show the system as installed, including deviations from both the project drawings and the approved shop drawings. These drawings must be submitted within two weeks after the final Government test of the system. At least one set of the as-built (marked-up) drawings must be provided at the time of, or prior to the final Government test.

1.7.2 Qualifications

1.7.2.1 Fire Alarm System Designer

The fire alarm system designer must be certified as a Level III (minimum) Technician by National Institute for Certification in Engineering Technologies (NICET) in the Fire Alarm Systems subfield of Fire Protection Engineering Technology or meet the qualifications for a QFPE.

1.7.2.2 Supervisor

A NICET Level III or IV fire alarm technician must supervise the installation of the fire alarm/mass notification system. The fire alarm technicians supervising the installation of equipment must be factory trained in the installation, adjustment, testing, and operation of the equipment specified herein and on the drawings.

1.7.2.3 Technician

Fire alarm technicians with a minimum of four years of experience must be utilized to install and terminate fire alarm/mass notification devices, cabinets and control units. The fire alarm technicians installing the equipment must be factory trained in the installation, adjustment, testing, and operation of the equipment specified herein and on the drawings.

1.7.2.4 Installer

Fire alarm installer with a minimum of two years of experience utilized to assist in the installation of fire alarm/mass notification devices, cabinets and control units. A licensed electrician must be allowed to install wire, cable, conduit and backboxes for the fire alarm system/mass notification system. The fire alarm installer must be factory trained in the installation, adjustment, testing, and operation of the equipment specified herein and on the drawings.

1.7.2.5 Test Technician

Fire alarm technicians with a minimum of eight years of experience and NICET Level III or IV utilized in testing and certification of the installation of the fire alarm/mass notification devices, cabinets and control units. The fire alarm technicians testing the equipment must be factory trained in the installation, adjustment, testing, and operation of the equipment installed as part of this project.

1.7.2.6 Manufacturer

Components must be of current design and must be in regular and recurrent production at the time of installation. Provide design, materials, and devices for a protected premises fire alarm system, complete, conforming to NFPA 72, except as specified herein.

1.7.3 Regulatory Requirements

Equipment and material must be listed or approved. Listed or approved, as used in this section, means listed, labeled or approved by a Nationally Recognized Testing Laboratory (NRTL) such as UL Fire Prot Dir or FM APP GUIDE. The omission of these terms under the description of any item of equipment described must not be construed as waiving this requirement. All listings or approvals by testing laboratories must be from an existing ANSI or UL published standard. The recommended practices stated in the manufacturer's literature or documentation must be considered as mandatory requirements.

1.8 DELIVERY, STORAGE, AND HANDLING

Protect equipment delivered and placed in storage from the weather, humidity, and temperature variation, dirt and dust, and other contaminants.

1.9 MAINTENANCE

1.9.1 Spare Parts

Furnish the following spare parts in the manufacturers original unopened containers:

- A. Five complete sets of system keys.
- B. Two of each type of detector installed.
- C. Two of each type of detector base and head installed.
- D. Two of each type of audible and visual alarm device installed.

1.9.2 Special Tools

Software, connecting cables and proprietary equipment, necessary for the maintenance, testing, and reprogramming of the equipment must be furnished to the Contracting Officer, prior to the instruction of Government employees.

PART 2 - PRODUCTS

2.1 GENERAL PRODUCT REQUIREMENT

All fire alarm and mass notification equipment must be listed for use under the applicable reference standards. Interfacing of UL 864 or similar approved industry listing with Mass Notification equipment listed to UL 2572 must be done in a laboratory listed configuration, if the software programming features cannot provide a listed interface control.

2.2 MATERIALS AND EQUIPMENT

2.2.1 Standard Products

Provide materials, equipment, and devices that have been tested by a nationally recognized testing laboratory and listed for fire protection service when so required by NFPA 72 or this specification. Select material from one manufacturer, where possible, and not a combination of manufacturers, for any particular classification of materials. Material and equipment must be the standard products of a manufacturer regularly engaged in the manufacture of the products for at least 2 years prior to bid opening.

2.2.2 Nameplates

Major components of equipment must have the manufacturer's name, address, type or style, model or serial number, catalog number, date of installation, installing Contractor's name and address, and the contract number provided on a new name plate permanently affixed to the item or equipment. Major components include, but are not limited to, the following:

A. FMCU

Nameplates must be etched metal or plastic, permanently attached by screws to control units or adjacent walls.

2.2.3 Keys

Keys and locks for equipment, control units and devices must be identical. Master all keys and locks to a single key as required by the Installation Fire Department.

2.2.4 Instructions

Provide a typeset printed or typewritten instruction card mounted behind a Lexan plastic or glass cover in a stainless steel or aluminum frame. Install the frame in a conspicuous location observable from the FMCU. The card must show those steps to be taken by an operator when a signal is received as well as the functional operation of the system under all conditions, normal, alarm, supervisory, and trouble. The instructions must also include procedures for operating live voice

microphones. The instructions and their mounting location must be approved by the Contracting Officer before being posted.

2.3 FIRE ALARM AND MASS NOTIFICATION CONTROL UNIT

Provide a complete fire alarm and mass notification control unit (FMCU) fully enclosed in a lockable steel cabinet as specified herein. The FMCU shall be suitable for installation in an unconditioned environment (full range of temperature and humidity). Operations required for testing or for normal care, maintenance, and use of the system must be performed from the front of the enclosure. If more than a single unit is required at a location to form a complete control unit, the unit cabinets must match exactly. The system must be capable of defining any module as an alarm module and report alarm trouble, loss of polling, or as a supervisory module, and reporting supervisory short, supervisory open or loss of polling such as waterflow switches, valve supervisory switches, independent smoke detection systems, relays for output function actuation.

- A. Each control unit must provide power, supervision, control, and logic for the entire system, utilizing solid state, modular components, internally mounted and arranged for easy access. Each control unit must be suitable for operation on a 120 volt, 60 hertz, normal building power supply. Provide each control unit with supervisory functions for power failure, internal component placement, and operation.
- B. Visual indication of alarm, supervisory, or trouble initiation on the FMCU must be by liquid crystal display or similar means with a minimum of 80 characters. The mass notification control unit must have the capability of temporarily deactivate the fire alarm audible notification appliances while delivering voice messages.
- C. Provide secure operator console for initiating recorded messages, strobes and displays; and for delivering live voice messages. Provide capacity for at least eight prerecorded messages. Provide the ability to automatically repeat prerecorded messages. Provide a secure microphone for delivering live messages. Provide adequate discrete outputs to temporarily deactivate fire alarm audible notification, initiate/synchronize strobes and initiate textual visual notification appliances. Provide a complete set of self-diagnostics for controller and appliance network. Provide local diagnostic information display and local diagnostic information and system event log file.

2.3.1 Cabinet

Install control unit components in cabinets large enough to accommodate all components and also to allow ample gutter space for interconnection of control units as well as field wiring. The cabinet must be a sturdy steel housing, complete with back box, hinged steel door with cylinder lock, and surface mounting provisions. The enclosure must be identified by an engraved phenolic resin nameplate. Lettering on the nameplate must say "Fire Alarm and Mass Notification control unit" and must not be less than 1-inch high. Provide prominent rigid plastic or metal identification plates for lamps, circuits, meters, fuses, and switches.

2.3.2 Silencing Switches

2.3.2.1 Alarm Silencing Switch

Provide an alarm silencing switch at the FMCU that must silence the audible and visual notification appliances. Subsequent activation of initiating devices must cause the notification appliances to re-activate.

2.3.2.2 Supervisory/Trouble Silencing Switch

Provide supervisory and trouble silencing switch(es) that must silence the audible trouble and supervisory signal(s), but not extinguish the visual indicator. This switch must be overridden upon activation of a subsequent supervisory or trouble condition. Audible trouble indication must resound automatically every 24 hours after the silencing feature has been operated if the supervisory or trouble condition still exists.

2.3.3 Non-Interfering

Power and supervise each circuit such that a signal from one device does not prevent the receipt of signals from any other device. Initiating devices must be manually reset by switch from the FMCU after the initiating device or devices have been restored to normal.

2.3.4 Audible Notification System

The Audible Notification System must comply with the requirements of NFPA 72 for Emergency Voice/Alarm Communications System requirements, except as specified herein. The system must be a one-way, multi-channel voice notification system incorporating user selectability of a minimum eight distinct sounds for tone signaling, and the incorporation of a voice module for delivery of recorded messages. Audible appliances must produce a three-pulse temporal pattern for three cycles followed by a voice message that is repeated until the control unit is reset or silenced. For carbon monoxide detector activation, audible appliances must produce a four-pulse temporal pattern for three cycles followed by a voice message that is repeated until the control unit is reset or silenced. Automatic messages must be broadcast through speakers throughout the building/facility but not in stairs or elevator cabs. A live voice message must override the automatic audible output through use of a microphone input at the control unit or the LOC.

- A. When using the microphone, live messages must be broadcast selectable by zone, or all call. The system must be capable of operating all speakers at the same time.
- B. The microprocessor must actively interrogate circuitry, field wiring, and digital coding necessary for the immediate and accurate rebroadcasting of the stored voice data into the appropriate amplifier input. Loss of operating power, supervisory power, or any other malfunction that could render the digitalized voice module inoperative must automatically cause the three-pulse temporal pattern to take over all functions assigned to the failed unit in the event an alarm is activated.

2.3.4.1 Outputs and Operational Modules

All outputs and operational modules must be fully supervised with on-board diagnostics and trouble reporting circuits. Provide form "C" contacts for system alarm and trouble conditions. Provide circuits for operation of auxiliary appliance during trouble conditions. During a Mass Notification event, the control unit must not generate nor cause any trouble alarms to be generated with the Fire Alarm system.

2.3.4.2 Mass Notification

- A. The system must have the capability of utilizing an LOC with redundant controls of the FMCU. Notification Appliance Circuits (NAC) must be provided for the activation of strobe appliances. Audio output must be selectable for line level. A hand-held microphone must be provided and,

upon activation, must take priority over any tone signal, recorded message or PA microphone operation in progress, while maintaining the strobe NAC circuit activation.

- B. The Mass Notification functions must override the manual or automatic fire alarm notification. Other fire alarm functions including transmission of a signal(s) to the fire department must remain operational. When a mass notification announcement is disengaged and a fire alarm condition still exists, the audible and visual notification appliances must resume activation for alarm conditions. The fire alarm message must be of lower priority than all other messages (except any "test" messages) and must not override any other messages.
- C. Messages must be recorded professionally utilizing standard industry methods, in a professional voice. Message and tone volumes must both be at the same decibel level. Messages recorded from the system microphone must not be accepted. A 1000 Hz tone (as required by NFPA 72) must precede messages and be similar to the following unless Installation or Facility specific messages are required:
 - 1. "May I have your attention please. May I have your attention please. (Insert installation specific message here.)" (Provide a 2 second pause.) "May I have your attention please, (repeat the tones and message on a continuous loop).
 - 2. Carbon Monoxide: "May I have your attention please. May I have your attention please. Carbon monoxide has been detected in the building. Please walk to the nearest exit and leave the building." (Provide a 2 second pause.) "May I have your attention please, (repeat the tones and message on a continuous loop times)."
 - 3. Fire: "May I have your attention please. May I have your attention please. A fire emergency has been reported in the building. Please leave the building by the nearest exit." (Provide a 2 second pause.) "May I have your attention please, (repeat the tones and message on a continuous loop)."
 - 4. Test: "May I have your attention please. May I have your attention please. This is a test of the building mass notification system. Please continue your normal duties. This is only a test." (Provide a 2 second pause.)
 - 5. All Clear: "May I have your attention please. May I have your attention please. An all clear has been issued, resume normal activities." (Provide a 2 second pause.)
- D. Auxiliary Input Module must be designed to be an outboard expansion module to either expand the number of optional LOC's, or allow a telephone interface.

2.3.4.3 Installation-Wide Control

If an installation-wide control system for mass notification exists on the Base, the autonomous control unit must communicate with the central control unit of the Installation-wide system. The autonomous control unit must receive commands/messages from the central control unit and provide status information.

2.3.5 Memory

Provide each control unit with non-volatile memory and logic for all functions. The use of long life batteries, capacitors, or other age-dependent devices must not be considered as equal to non-volatile processors, PROMS, or EPROMS.

2.3.6 Field Programmability

Provide control units and control units that are fully field programmable for both input and output of control, initiation, notification, supervisory, and trouble functions. The system program configuration must be menu driven. System changes must be password protected. Any proprietary equipment and proprietary software needed by qualified technicians to implement future changes to the fire alarm system must be provided as part of this contract.

2.3.7 Input/Output Modifications

The FMCU must contain features that allow the bypassing of input devices from the system or the modification of system outputs. These control features must consist of a control unit mounted keypad. Any bypass or modification to the system must indicate a trouble condition on the FMCU.

2.3.8 Resetting

Provide the necessary controls to prevent the resetting of any alarm, supervisory, or trouble signal while the alarm, supervisory or trouble condition on the system still exists.

2.3.9 Walk Test

The FMCU must have a walk test feature. When using this feature, operation of initiating devices must result in limited system outputs, so that the notification appliances operate for only a few seconds and the event is indicated in the history log, but no other outputs occur.

2.3.10 History Logging

The control unit must have the ability to store a minimum of 400 events in a log. These events must be stored in a battery-protected memory and must remain in the memory until the memory is downloaded or cleared manually. Resetting of the control unit must not clear the memory.

2.3.11 Manual Access

An operator at the control unit, having a proper access level, must have the capability to manually access the following information for each initiating device.

- A. Primary status.
- B. Device type.
- C. Present average value.
- D. Present sensitivity selected.
- E. Detector range (normal, dirty).

2.3.12 Heat Detector Self-Test Routines

Automatic self-test routines must be performed on each detector that will functionally check detector sensitivity electronics and ensure the accuracy of the value being transmitted. Any detector that fails this test must indicate a trouble condition with the detector location at the control unit.

2.4 LOCAL OPERATING CONSOLES (LOC)

2.4.1 General

The LOC must consist of a remote microphone station incorporating a push-to-talk (PTT) hand-held microphone and system status indicators. The LOC must have the capability of being utilized to activate prerecorded messages. The unit must incorporate microphone override of any tone generation or recorded messages. The unit must be fully supervised from the FMCU. The housing for the LOC must not be lockable. The LOC shall be suitable for installation in an unconditioned environment (full range of temperature and humidity).

2.4.2 Multiple LOCs

When an installation has more than one LOC, the LOCs must be programmed to allow only one LOC to be available for paging or messaging at a time. Once one LOC becomes active, all other LOC's will have an indication that the system is busy (Amber Busy Light) and cannot be used at that time. This is to avoid two messages being given at the same time. It must be possible to override or lockout the LOC's from the FMCU.

2.5 AMPLIFIERS, PREAMPLIFIERS, TONE GENERATORS

Any amplifiers, preamplifiers, tone generators, digitalized voice generators, and other hardware necessary for a complete, operational, textual audible circuit conforming to NFPA 72 must be housed in a remote FMCU, terminal cabinet, or in the FMCU. Individual amplifiers must be 100 watts maximum.

2.5.1 Operation

The system must automatically operate and control all building speakers.

2.5.2 Construction

Amplifiers must utilize computer grade solid state components and must be provided with output protection devices sufficient to protect the amplifier against any transient up to 10 times the highest rated voltage in the system.

2.5.3 Inputs

Equip each system with separate inputs for the tone generator, digitalized voice driver and control unit mounted microphone. Microphone inputs must be of the low impedance, balanced line type. Both microphone and tone generator input must be operational on any amplifier.

2.5.4 Tone Generator

The tone generator must produce a three-pulse temporal pattern and must be constantly repeated until interrupted by either the digitalized voice message, the microphone input, or the alarm silence mode as specified. The tone generator must be single channel with an automatic backup generator per channel such that failure of the primary tone generator causes the backup generator to automatically take over the functions of the failed unit and also causes transfer of the common trouble relay. The tone generator must be provided with securely attached labels to identify the component as a tone generator and to identify the specific tone it produces.

2.5.5 Protection Circuits

Each amplifier must be constantly supervised for any condition that could render the amplifier inoperable at its maximum output. Failure of any component must cause illumination of a visual "amplifier trouble" indicator on the control unit, appropriate logging of the condition in the history log, and other actions for trouble conditions as specified.

2.6 REMOTE ANNUNCIATOR

2.6.1 LCD Annunciator

Provide an annunciator that includes an LCD display. The annunciator shall be suitable for installation in an unconditioned environment (full range of temperature and humidity). The display must indicate the device in trouble/alarm or any supervisory device. Display the device name and address. The remote annunciator must duplicate functions of the FMCU for message display, fire alarm, supervisory alarm, and trouble conditions, visual and audible notification, and system reset functions. Remote annunciator must require the use of a key for accessing the reset, control and other functions.

A building floor plan must be provided and mounted (behind Plexiglass or similar protective material) at the annunciator location. The floor plan must indicate all rooms by name and number. The floor plan must show all devices and their programmed address to facilitate identification of their physical location from the LCD display information.

2.7 MANUAL STATIONS

Provide metal or plastic, surface mounted, double-action, addressable manual stations, that are not subject to operation by jarring or vibration. Stations must be equipped with screw terminals for each conductor. Stations that require the replacement of any portion of the device after activation are not permitted. Stations must be finished in red with molded raised lettering operating instructions of contrasting color. The use of a key must be required to reset the station.

2.8 SMOKE DETECTORS

2.8.1 Spot Type Detectors

Provide addressable photoelectric smoke detectors as follows:

- A. Provide analog/addressable photoelectric smoke detectors utilizing the photoelectric light scattering principle for operation in accordance with UL 268. Smoke detectors must be listed for use with the FMCU.
- B. Provide self-restoring type detectors that do not require any readjustment after actuation at the FMCU to restore them to normal operation. The detector must have a visual indicator to show actuation.
- C. Vibration must have no effect on the detector's operation. Protect the detection chamber with a fine mesh metallic screen that prevents the entrance of insects or airborne materials. The screen must not inhibit the movement of smoke particles into the chamber.

- D. Provide twist lock bases with screw terminals for each conductor. The detectors must maintain contact with their bases without the use of springs.
- E. The detector address must identify the particular unit, its location within the system, and its sensitivity setting. Detectors must be of the low voltage type rated for use on a 24 VDC system.

2.8.2 Duct Smoke Detectors

Duct-mounted addressable photoelectric smoke detectors must consist of a smoke detector, as specified in paragraph Spot Type Detectors, mounted in a special housing fitted with duct sampling tubes. Detector circuitry must be mounted in a metallic or plastic enclosure exterior to the duct. It is not permitted to cut the duct insulation to install the duct detector directly on the duct. Detectors must be listed for operation over the complete range of air velocities, temperature and humidity expected at the detector when the air-handling system is operating. Detectors must be powered from the FMCU.

- A. Sampling tubes must run the full width of the duct. The duct detector package must conform to the requirements of NFPA 90A, UL 268A, and must be listed for use in air-handling systems. The control functions, operation, reset, and bypass must be controlled from the FMCU.
- B. Lights to indicate the operation and alarm condition must be visible and accessible with the unit installed and the cover in place. Remote indicators must be provided where required by NFPA 72. Remote indicators as well as the affected fan units must be properly identified in etched plastic placards.
- C. Detectors must provide for control of auxiliary contacts that provide control, interlock, and shutdown functions. Auxiliary contacts provide for this function must be located within 3 feet of the controlled circuit or appliance. The auxiliary contacts must be supplied by the fire alarm system manufacturer to ensure complete system compatibility.

2.9 HEAT DETECTORS

2.9.1 Heat Detectors

Heat detectors must be analog/addressable and designed for detection of fire by combination fixed temperature and rate-of-rise principle in accordance with UL 521. The alarm condition must be determined by comparing detector value with the stored values. Detectors located in areas subject to moisture, exterior atmospheric conditions, or hazardous locations as defined by NFPA 70 and as indicated, must be types approved for such locations.

2.9.1.1 Combination Fixed-Temperature and Rate-of-Rise Detectors

Detectors must be surface mounted and supported independently of wiring connections. Detectors must be self-resetting. Detector must feature rate compensation. Detectors rated to operate at 135 degrees F must not respond to momentary temperature fluctuations less than 30 degrees F per minute between 60 and 100 degrees F. Detectors rated to operate at 194 degrees F must not respond to momentary temperature fluctuations less than 50 degrees F per minute between 60 and 150 degrees F. The detector assembly must be weatherproof.

2.10 CARBON MONOXIDE DETECTOR

Analog/addressable carbon monoxide (CO) detectors must be listed to UL 2075 and set to respond to the sensitivity limits of UL 2034. Carbon monoxide detectors must be listed for use with fire alarm control units. Detectors must be surface mounted and supported independently of wiring connections. Detectors must be self-restoring. For FMCU with no listed compatible addressable CO detectors, provide listed 4-wire detectors. Detector must be provided with an LED status indicator.

- A. Where 4-wire CO detectors are necessary, each 4-wire CO detector must be individually monitored via addressable interface modules for alarm and off normal/trouble conditions (including loss of power to the individual detector). Power circuits for 4-wire CO detectors must be dedicated to powering the CO detectors only. Battery powered and 120 VAC powered detectors are prohibited.
- B. Wiring connections must be made by means of screw terminals and detectors must be equipped with trouble relays. Detectors must be able to mount a single-gang electrical box.
- C. A trouble condition at an individual CO detector must not affect any other CO detectors. CO detectors must be powered by the FMCU.
- D. Detectors must be provided with a means to test CO gas entry into the CO sensing cell.

2.11 ADDRESSABLE INTERFACE DEVICES

The initiating device being monitored must be configured as a Class "B" initiating device circuit. The module must be listed as compatible with the control unit. The module must provide address setting means compatible with the control unit's SLC supervision and store an internal identifying code. Monitor module must contain an integral LED that flashes each time the monitor module is polled and is visible through the device cover plate. Pull stations with a monitor module in a common backbox are not required to have an LED. Modules must be listed for the environmental conditions in which they will be installed.

2.12 ADDRESSABLE CONTROL MODULES

The control module must be capable of operating as a relay (dry contact form C) for interfacing the control unit with other systems, and to control door holders or initiate elevator fire service. The module must be listed as compatible with the control unit. The indicating device or the external load being controlled must be configured as Class B notification appliance circuits. The system must be capable of supervising, audible, visual and dry contact circuits. The control module must have both an input and output address. The supervision must detect a short on the supervised circuit and must prevent power from being applied to the circuit. The control module must provide address setting means compatible with the control unit's SLC supervision and store an internal identifying code. The control module must contain an integral LED that flashes each time the control module is polled and is visible through the device cover plate. Control Modules must be listed for the environmental conditions in which they will be installed.

2.13 NOTIFICATION APPLIANCES

2.13.1 Audible Notification Appliances

Audible appliances must conform to the applicable requirements of UL 464. Appliances must be connected into notification appliance circuits. Surface mounted audible appliances must be painted red. Recessed audible appliances must be installed with a grill that is painted red.

2.13.1.1 Speakers

- A. Speakers must conform to the applicable requirements of UL 1480. Speakers must have six different sound output levels and operate with audio line input levels of 70.7 VRMs and 25 VRMs, by means of selectable tap settings. Interior speaker tap settings must include taps of 1/4, 1/2, 1, and 2 watt, at a minimum. Exterior speakers must also be multi-tapped with no more than 15 watt maximum setting. Speakers must incorporate a high efficiency speaker for maximum output at minimum power across a frequency range of 400 Hz to 4,000 Hz, and must have a sealed back construction. Speakers must be capable of installation on standard 4-inch square electrical boxes. Where speakers and strobes are provided in the same location, they may be combined into a single unit. All inputs must be polarized for compatibility with standard reverse polarity supervision of circuit wiring via the FMCU.
- B. Provide speaker mounting plates constructed of cold rolled steel having a minimum thickness of 16 gage or molded high impact plastic and equipped with mounting holes and other openings as needed for a complete installation. Fabrication marks and holes must be ground and finished to provide a smooth and neat appearance for each plate. Each plate must be primed and painted.
- C. Speakers must utilize screw terminals for termination of all field wiring.

2.13.2 Visual Notification Appliances

Visual notification appliances must conform to the applicable requirements of UL 1638, UL 1971 and conform to the Architectural Barriers Act (ABA). Visual Notification Appliances must have clear high intensity optic lens, xenon flash tubes, or light emitting diode (LED) and be marked "Alert" in letters of contrasting color. The light pattern must be dispersed so that it is visible above and below the strobe and from a 90-degree angle on both sides of the strobe. Strobe flash rate must be 1 flash per second and a minimum of 15 candela based on the UL 1971 test. Strobe must be surface mounted.

2.13.3 Textual Display Signs

Textual display signs must be LED and must not exceed 16 inches long by 6 inches high by 3 inches deep with a height necessary to meet the requirements of NFPA 72. The text display must spell out the word "EVACUATE" or "ANNOUNCEMENT" as appropriate. The design of text display must be such that it cannot be read when not illuminated.

2.14 ELECTRIC POWER

2.14.1 Primary Power

Power must be 120 VAC 60 Hz service for the FMCU from the AC service to the building in accordance with NFPA 72.

2.15 SECONDARY POWER SUPPLY

Provide for system operation in the event of primary power source failure. Transfer from normal to auxiliary (secondary) power or restoration from auxiliary to normal power must be automatic and must not cause transmission of a false alarm.

2.15.1 Batteries

Provide sealed, maintenance-free, batteries as the source for emergency power to the FMCU. Batteries must contain suspended electrolyte. The battery system must be maintained in a fully charged condition by means of a solid-state battery charger. Provide an automatic transfer switch to transfer the load to the batteries in the event of the failure of primary power.

2.15.1.1 Capacity

Battery size must be the greater of the following two capacities. This capacity applies to every control unit associated with this system, including supplemental notification appliance circuit panels, auxiliary power supply panels, fire alarm transmitters, and Base-wide mass notification transceivers. When determining the required capacity under alarm condition, visual notification appliances must include both textual and non-textual type appliances.

- A. Sufficient capacity to operate the fire alarm system under supervisory and trouble conditions, including audible trouble signal devices for 48 hours and audible and visual signal devices under alarm conditions for an additional 15 minutes.
- B. Sufficient capacity to operate the mass notification for 60 minutes after loss of AC power.

2.15.1.2 Battery Power Calculations

- A. Verify that battery capacity exceeds supervisory and alarm power requirements for the criteria noted in the paragraph "Capacity" above.
 - 1. Substantiate the battery calculations for alarm and supervisory power requirements. Include ampere-hour requirements for each system component and each control unit component, and compliance with UL 864.
 - 2. Provide complete battery calculations for both the alarm and supervisory power requirements. Submit ampere-hour requirements for each system component with the calculations.
 - 3. Provide voltage drop calculations to indicate that sufficient voltage is available for proper operation of the system and all components. Calculations must be performed using the minimum rated voltage of each component.
- B. For battery calculations assume a starting voltage of 24 VDC for starting the calculations to size the batteries. Calculate the required Amp-Hours for the specified standby time, and then calculate the required Amp-Hours for the specified alarm time. Using 20.4 VDC as starting voltage, perform a voltage drop calculation for circuits containing device and/or appliances remote from the power sources.

2.15.2 Battery Chargers

Provide a solid state, fully automatic, variable charging rate battery charger. The charger must be capable of providing 120 percent of the connected system load and must maintain the batteries at full charge. In the event the batteries are fully discharged (20.4 Volts dc), the charger must recharge the batteries back to 95 percent of full charge within 48 hours after a single discharge cycle as described in paragraph CAPACITY above. Provide pilot light to indicate when batteries are manually placed on a high rate of charge as part of the unit assembly if a high-rate switch is provided.

2.16 SURGE PROTECTIVE DEVICES

Surge protective devices must be provided to suppress all voltage transients which might damage fire alarm control unit components. Systems having circuits located outdoors, communications equipment must be protected against surges induced on any signaling line circuit. Cables and conductors, that serve as communications links, must have surge protection circuits installed at each end. The surge protective device must wire in series to the power supply of the protected equipment with screw terminations. Line voltage surge arrestor must be installed directly adjacent to the power panel where the FMCU breaker is located.

- A. Surge protective devices for nominal 120 VAC must be UL 1449 listed with a maximum 500 volt suppression level and have a maximum response time of 5 nanoseconds. The surge protective device must also meet IEEE C62.41.1 and IEEE C62.41.2 category B tests for surge capacity. The surge protective device must feature multi-stage construction and be provided with a long-life indicator lamp (either light emitting diode or neon) which extinguishes upon failure of protected components. Any unit fusing must be externally accessible.
- B. Surge protective devices for nominal 24 VAC, fire alarm telephone dialer, or ethernet connection must be UL 497B listed, meet IEEE C62.41.1 and have a maximum response time of 1-nanosecond. The surge protective device must feature multi-stage construction and be self-resetting. The surge protective device must be a base and plug style. The base assembly must have screw terminals for fire alarm wiring. The base assembly must accept "plug-in" surge protective module.
- C. All surge protective devices (SPD) must be the standard product of a single manufacturer and be equal or better than the following:
 - 1. For 120 VAC nominal line voltage: UL 1449 and UL 1283 listed, series connected 120 VAC, 20A rated, surge protective device in a NEMA 4x enclosure. Minimum 50,000 amp surge current rating with EMI/RFI filtering and a dry contact circuit for remote monitoring of surge protection status.
 - 2. For 24-volt nominal line voltage: UL 497B listed, series connected low voltage, 24-volt, 5A rated, loop circuit protector, base and replaceable module.
 - 3. For alarm telephone dialers: UL 497A listed, series connected, 130-volt, 150 mA rated with self-resetting fuse, dialer circuit protector with modular plug and play.
 - 4. For IP-DACTS: UL 497B listed, series connected, 6.4-volt, 1.5A rated with 20 kA/pair surge current, data network protector with modular plug and play.

2.17 WIRING

2.17.1 Alarm Wiring

IDC and SLC wiring must be solid copper cable in accordance with the manufacturer's requirements. Visual notification appliance circuit conductors, that contain audible alarm appliances, must be copper No. 14 AWG size conductors at a minimum. Speaker circuits must be copper No. 16 AWG size twisted and shielded conductors at a minimum. Wire size must be sufficient to prevent voltage drop problems. Circuits operating at 24 VDC must not operate at less than the listed voltages for the detectors and/or appliances. Power wiring, operating at 120 VAC minimum, must be a minimum No. 12 AWG solid copper having similar insulation. Acceptable power-limited cables are FPL, FPLR or FPLP as appropriate with red colored covering. Nonpower-limited cables must comply with NFPA 70.

2.19 AUTOMATIC FIRE ALARM TRANSMITTERS

2.19.1 Owner will contract with monitoring company under separate contract to provide dialer and/or antenna necessary for offsite monitoring. Coordinate with owner's monitoring company as required.

2.19.2 Signals to Be Transmitted to the Monitoring Company

The following signals must be sent to the monitoring company:

- A. Sprinkler waterflow
- B. Manual pull stations
- C. Smoke detectors
- D. Duct smoke detectors
- E. Carbon monoxide detectors
- F. Heat detectors
- G. Sprinkler valve supervision
- H. CO/NX system alarm supervision

2.20 SYSTEM MONITORING

2.20.1 Valves

Each valve affecting the proper operation of a fire protection system, including automatic sprinkler control valves, sprinkler service entrance valve, isolating valves for pressure type waterflow or supervision switches, and valves at backflow preventers, whether supplied under this contract or existing, must be electrically monitored to ensure its proper position. Provide each tamper switch with a separate address, unless they are within the same room, then a maximum of five can use the same address.

2.21 ENVIRONMENTAL ENCLOSURES OR GUARDS

Environmental enclosures must be provided to permit fire alarm/mass notification components to be used in areas that exceed the environmental limits of the listing. The enclosure must be listed for the device or appliance as either a manufactured part number or as a listed compatible accessory for the component is currently listed. Guards required to deter mechanical damage must be either a listed manufactured part or a listed accessory for the category of the initiating device or notification appliance.

PART 3 - EXECUTION

3.1 VERIFYING ACTUAL FIELD CONDITIONS

Before commencing work, examine all adjoining work on which the contractor's work is in any way dependent for perfect workmanship according to the intent of this specification section, and report to the Contracting Officer's Representative any condition which prevents performance of first class work. No "waiver of responsibility" for incomplete, inadequate, or defective adjoining work will be considered unless notice has been filed before submittal of a proposal.

3.2 INSTALLATION

3.2.1 Fire Alarm and Mass Notification Control Unit (FMCU)

Locate the FMCU where indicated on the drawings. Surface mount the enclosure with the bottom of the cabinet no less than 18 inches above the finished floor. Conductor terminations must be labeled and a drawing containing conductors, their labels, their circuits, and their interconnection must be permanently mounted in the FMCU. Locate the document storage cabinet adjacent to the FMCU unless the Contracting Officer directs otherwise.

3.2.2 Battery Cabinets

When batteries will not fit in the FMCU, locate battery cabinets adjacent to the FMCU. Battery cabinets must be installed at an accessible location when standing at floor level. Battery cabinets must not be installed lower than 18 inches above finished floor, measured to the bottom of the cabinet. Installing batteries above drop ceilings or in inaccessible locations is prohibited. Battery cabinets must be large enough to accommodate batteries and also to allow ample gutter space for interconnection of control units as well as field wiring. The cabinet must be provided in a sturdy steel housing, complete with back box, hinged steel door with cylinder lock, and surface mounting provisions. The cabinet must be identified by an engraved phenolic resin nameplate. Lettering on the nameplate must indicate the control unit(s) the batteries power and must not be less than 1-inch high.

3.2.3 Manual Stations

Locate manual stations as required by NFPA 72[and as indicated on the drawings. Mount stations so they are located no farther than 5 feet from the exit door they serve, measured horizontally.

3.2.4 Notification Appliances

- A. Locate notification appliance devices as required by NFPA 72 and to meet the intelligibility requirements. Where two or more visual notification appliances are located in the same room or corridor or field of view, provide synchronized operation. Devices must use screw terminals for all field wiring. Audible and visual notification appliances mounted in acoustical ceiling tiles must be centered in the tiles plus or minus 2 inches.
- B. Audible and visual notification appliances mounted on the exterior of the building, within unconditioned spaces, or in the vicinity of showers must be listed weatherproof appliances installed on weatherproof backboxes.
- C. Speakers must not be located in close proximity to the FMCU or LOC so as to cause feedback when the microphone is in use.

3.2.5 Smoke and Heat Detectors

Locate detectors as required by NFPA 72 and their listing on a 4-inch mounting box. Install heat detectors not less than 4 inches from a side wall to the near edge. Heat detectors located on the wall must have the top of the detector at least 4 inches below the ceiling, but not more than 12 inches below the ceiling. Smoke detectors are permitted to be on the wall no lower than 12 inches from the ceiling with no minimum distance from the ceiling. Install smoke detectors no closer than 3 feet from air handling supply diffusers. Detectors installed in acoustical ceiling tiles must be centered in the tiles plus or minus 2 inches.

3.2.6 Carbon Monoxide Detectors

Locate detectors as required by NFPA 72 and their listings on a 4-inch mounting box. Carbon monoxide detectors must be installed separate from smoke and/or heat detectors.

3.2.7 LCD REMOTE Annunciator

Locate the LCD annunciator as shown on the drawings. Mount the annunciator, with the top 6 feet above the finished floor.

3.2.8 Local Operating Console (LOC)

Locate the LOC(s) as required by NFPA 72 and as indicated. Mount the console so that the top message button and microphone is no higher than 4 feet above the floor and the bottom of the enclosure is at least 18 inches above the finished floor.

3.2.9 Ceiling Bridges

Provide ceiling bridges for ceiling-mounted appliances. Ceiling bridges must be as recommended/required by the manufacturer of the ceiling-mounted notification appliance.

3.3 SYSTEM FIELD WIRING

3.3.1 Wiring within Cabinets, Enclosures, and Boxes

Provide wiring installed in a neat and workmanlike manner and installed parallel with or at right angles to the sides and back of any box, enclosure, or cabinet. Conductors that are terminated, spliced, or otherwise interrupted in any enclosure, cabinet, mounting, or junction box must be connected to screw-type terminal blocks. Mark each terminal in accordance with the wiring diagrams of the system. The use of wire nuts or similar devices is prohibited. Wiring to conform with NFPA 70.

Indicate the following in the wiring diagrams:

- A. Point-to-point wiring diagrams showing the points of connection and terminals used for electrical field connections in the system, including interconnections between the equipment or systems that are supervised or controlled by the system. Diagrams must show connections from field devices to the FMCU and remote fire alarm/mass notification control units, initiating circuits, switches, relays and terminals.
- B. Complete riser diagrams indicating the wiring sequence of devices and their connections to the control equipment. Include a color code schedule for the wiring. Include floor plans showing the locations of devices and equipment.

3.3.2 Alarm Wiring

- A. Voltages must not be mixed in any junction box, housing or device, except those containing power supplies and control relays.
- B. Utilize shielded wiring where recommended by the manufacturer. For shielded wiring, ground the shield at only one point, in or adjacent to the FMCU.
- C. Color coding is required for circuits and must be maintained throughout the circuit. Conductors used for the same functions must be similarly color coded. Conform wiring to NFPA 70.
- D. Pull all conductors splice free. The use of wire nuts, crimped connectors, or twisting of conductors is prohibited. Where splices are unavoidable, the location of the junction box or pull box where they occur must be identified on the as-built drawings. The number and location of splices must be subject to approval by the Designated Fire Protection Engineer (DFPE).

3.3.3 Back Boxes and Conduit

In addition to the requirements of Section 260500, provide all wiring in rigid metal conduit. Minimum conduit size must be 3/4-inch in diameter. Do not use electrical non-metallic tubing (ENT) or flexible non-metallic tubing and associated fittings.

- A. Galvanized rigid steel (GRS) conduit must be utilized where exposed to weather, where subject to physical damage, and where exposed on exterior of buildings. Intermediate metal conduit (IMC) may be used in lieu of GRS as allowed by NFPA 70.
- B. Electrical metallic tubing (EMT) is permitted above suspended ceilings or exposed where not subject to physical damage. Do not use EMT underground, encased in concrete, mortar, or grout, in hazardous locations, where exposed to physical damage, or outdoors. Use die-cast compression connectors.
- C. For rigid metallic conduit (RMC), only threaded type fittings are permitted for wet or damp locations.
- D. Flexible metal conduit is permitted for initiating device circuits 6 feet in length or less. Flexible metal conduit is prohibited for notification appliance circuits and signaling line circuits. Use liquid tight flexible metal conduit in damp and wet locations.
- E. Exterior wall penetrations must be weathertight. Conduit must be sealed to prevent the infiltration of moisture.

3.3.4 Conductor Terminations

Labeling of conductors at terminal blocks in terminal cabinets, FMCU, and the LOC must be provided at each conductor connection. Each conductor or cable must have a shrink-wrap label to provide a unique and specific designation. Each terminal cabinet, FMCU, and remote FMCU must contain a laminated drawing that indicates each conductor, its label, circuit, and terminal. The laminated drawing must be neat, using 12-point lettering minimum size, and mounted within each cabinet, control unit, or unit so that it does not interfere with the wiring or terminals. Maintain existing color code scheme where connecting to existing equipment.

3.4 FIRESTOPPING

Provide firestopping for holes at conduit penetrations through fire-rated walls and partitions with fire-rated doors.

3.5 PAINTING

- A. In unfinished areas (including areas above drop ceilings), paint all exposed electrical conduit (serving fire alarm equipment), fire alarm conduit, surface metal raceway, junction boxes and covers red. In lieu of painting conduit, the contractor may utilize red conduit with a factory applied finish.
- B. In finished areas, paint exposed electrical conduit (serving fire alarm equipment), fire alarm conduit, surface metal raceways, junction boxes, and electrical boxes to match adjacent finishes. The inside cover of the junction box must be identified as "Fire Alarm" and the conduit must have painted red bands 3/4-inch wide at 10-foot centers and at each side of a floor, wall, or ceiling penetration.

3.6 FIELD QUALITY CONTROL

3.6.1 Test Procedures

Submit detailed test procedures, prepared and signed by the NICET Fire Alarm Technician, and the representative of the installing company, 30 days prior to performing system tests. Detailed test procedures must list all components of the installed system such as initiating devices and circuits, notification appliances and circuits, signaling line devices and circuits, control devices/equipment, batteries, transmitting and receiving equipment, power sources/supply, annunciators, special hazard equipment, emergency communication equipment, interface equipment, and surge protective devices. Test procedures must include sequence of testing, time estimate for each test, and sample test data forms. The test data forms must be in a check-off format (pass/fail with space to add applicable test data; similar to the forms in NFPA 72 and NFPA 4.) The test procedures and accompanying test data forms must be used for the pre-Government testing and the Government testing. The test data forms must record the test results and must:

- A. Identify the NFPA Class of all Initiating Device Circuits (IDC), and Notification Appliance Circuits (NAC), Voice Notification System Circuits (NAC Audio), and Signaling Line Circuits (SLC).
- B. Identify each test required by NFPA 72 Test Methods and required test herein to be performed on each component, and describe how these tests must be performed.
- C. Identify each component and circuit as to type, location within the facility, and unique identity within the installed system. Provide necessary floor plan sheets showing each component location, test location, and alphanumeric identity.
- D. Identify all test equipment and personnel required to perform each test (including equipment necessary for smoke detector testing. The use of magnets is not permitted.
- E. Provide space to identify the date and time of each test. Provide space to identify the names and signatures of the individuals conducting and witnessing each test.

3.6.2 Pre-Government Testing

3.6.2.1 Verification of Compliant Installation

Conduct inspections and tests to ensure that devices and circuits are functioning properly. Tests must meet the requirements of paragraph entitled "Minimum System Tests" as required by NFPA 72. The contractor and an authorized representative from each supplier of equipment must be in attendance at the pre-Government testing to make necessary adjustments. After inspection and testing is complete, provide a signed Verification of Compliant Installation letter by the QFPE that the installation is complete, compliant with the specification and fully operable. The letter must include the names and titles of the witnesses to the pre-Government tests. Provide all completion documentation as required by NFPA 72 including all referenced annex sections and the test reports noted below.

- A. NFPA 72 Record of Completion.
- B. NFPA 72 Record of Inspection and Testing.
- C. Fire Alarm and Emergency Communication System Inspection and Testing Form.
- D. Audibility test results with marked-up test floor plans.
- E. Intelligibility test results with marked-up floor plans.
- F. Documentation that all tests identified in the paragraph "Minimum System Tests" are complete.

3.6.2.2 Request for Government Final Test

When the verification of compliant installation has been completed, submit a formal request for Government final test to the Designated Fire Protection Engineer (DFPE). Government final testing will not be scheduled until the DFPE has received copies of the request for Government final testing and Verification of Compliant Installation letter with all required reports. Government final testing will not be performed until after the connections to the installation-wide fire reporting system[and the installation-wide mass notification system have] been completed and tested to confirm communications are fully functional. Submit request for test at least 15 calendar days prior to the requested test date.

3.6.3 Correction of Deficiencies

If equipment was found to be defective or non-compliant with contract requirements, perform corrective actions and repeat the tests. Tests must be conducted and repeated if necessary until the system has been demonstrated to comply with all contract requirements.

3.6.4 Government Final Tests

The tests must be performed in accordance with the approved test procedures in the presence of the DFPE. Furnish instruments and personnel required for the tests. The following must be provided at the job site for Government Final Testing:

- A. The manufacturer's technical representative.

- B. Marked-up red line drawings of the system as actually installed.
- C. Loop resistance test results.
- D. Complete program printout including input/output addresses.
- E. Copy of pre-Government Test Certificate, test procedures and completed test data forms.
- F. Audibility test results with marked-up floor plans.
- G. Intelligibility test results with marked-up floor plans.

Government Final Tests will be witnessed by the Designated Fire Protection Engineer. At this time, any and all required tests noted in the paragraph "Minimum System Tests" must be repeated at their discretion.

3.7 MINIMUM SYSTEM TESTS

3.7.1 System Tests

Test the system in accordance with the procedures outlined in NFPA 72. The required tests are as follows:

- A. Loop Resistance Tests: Measure and record the resistance of each circuit with each pair of conductors in the circuit short-circuited at the farthest point from the circuit origin. The tests must be witnessed by the Contracting Officer and test results recorded for use at the final Government test.
- B. Verify the absence of unwanted voltages between circuit conductors and ground. The tests must be accomplished at the pre-Government test with results available at the final system test.
- C. Verify that the control unit is in the normal condition as detailed in the manufacturer's O&M manual.
- D. Test each initiating device and notification appliance and circuit for proper operation and response at the control unit. Smoke detectors must be tested in accordance with manufacturer's recommended calibrated test method. Use of magnets is prohibited. Testing of duct smoke detectors must comply with the requirements of NFPA 72 except disconnect at least 20 percent of devices. If there is a failure at these devices, then supervision must be tested at each device.
- E. Carbon Monoxide Detector Tests: Carbon monoxide detectors must be tested in accordance with NFPA 72 and the manufacturer's recommended calibrated test method.
- F. Test the system for specified functions in accordance with the contract drawings and specifications and the manufacturer's O&M manual.
- G. Test both primary power and secondary power. Verify, by test, the secondary power system is capable of operating the system for the time period and in the manner specified.
- H. Determine that the system is operable under trouble conditions as specified.

- I. Visually inspect wiring.
- J. Test the battery charger and batteries.
- K. Verify that software control and data files have been entered or programmed into the FMCU. Hard copy records of the software must be provided to the Contracting Officer.
- L. Verify that red-line drawings are accurate.
- M. Measure the current in circuits to ensure there is the calculated spare capacity for the circuits.
- N. Measure voltage readings for circuits to ensure that voltage drop is not excessive.
- O. Disconnect the verification feature for smoke detectors during tests to minimize the amount of smoke needed to activate the sensor. Testing of smoke detectors must be conducted using real smoke or the use of canned smoke which is permitted.
- P. Measure the voltage drop at the most remote appliance (based on wire length) on each notification appliance circuit.
- Q. Verify the documentation cabinet is installed and contains all as-built shop drawings, product data sheets, design calculations, site-specific software data package, and all documentation required by paragraph titled "Test Reports".

3.7.2 Audibility Tests

Sound pressure levels from audible notification appliances must be a minimum of 15 dBA over ambient with a maximum of 110 dBA in any occupiable area. The provisions for audible notification (audibility and intelligibility) must be met with doors, fire shutters, movable partitions, and similar devices closed.

3.7.3 Intelligibility Tests

Intelligibility testing of the System must be accomplished in accordance with NFPA 72 for Voice Evacuation Systems, and ASA S3.2. Following are the specific requirements for intelligibility tests:

- A. Intelligibility Requirements: Verify intelligibility by measurement after installation.
- B. Ensure that a CIS value greater than the required minimum value is provided in each area where building occupants typically could be found. The minimum required value for CIS is .7. Rounding of values is permitted.
- C. Areas of the building provided with hard wall and ceiling surfaces (such as metal or concrete) that are found to cause excessive sound reflections may be permitted to have a CIS score less than the minimum required value if approved by the DFPE, and if building occupants in these areas can determine that a voice signal is being broadcast and they must walk no more than 33 feet to find a location with at least the minimum required CIS value within the same area.
- D. Areas of the building where occupants are not expected to be normally present are permitted to have a CIS score less than the minimum required value if personnel can determine that a voice

signal is being broadcast and they must walk no more than 50 feet to a location with at least the minimum required CIS value within the same area.

- E. Take measurements near the head level applicable for most personnel in the space under normal conditions (e.g., standing, sitting, sleeping, as appropriate).
- F. The distance the occupant must walk to the location meeting the minimum required CIS value must be measured on the floor or other walking surface as follows:
 - 1. Along the centerline of the natural path of travel, starting from any point subject to occupancy with less than the minimum required CIS value.
 - 2. Curving around any corners or obstructions, with a 12 inches clearance there from.
 - 3. Terminating directly below the location where the minimum required CIS value has been obtained.

Use commercially available test instrumentation to measure intelligibility as specified by NFPA 72 as applicable. Use the mean value of at least three readings to compute the intelligibility score at each test location.

3.8 SYSTEM ACCEPTANCE

Following acceptance of the system, as-built drawings and O&M manuals must be delivered to the Contracting Officer for review and acceptance. The drawings must show the system as installed, including deviations from both the project drawings and the approved shop drawings. These drawings must be submitted within two weeks after the final Government test of the system. At least one set of as-built (marked-up) drawings must be provided at the time of, or prior to the Final Government Test.

- A. The drawings must be prepared electronically and sized no less than the contract drawings.
- B. Include complete wiring diagrams showing connections between devices and equipment, both factory and field wired.
- C. Include a riser diagram and drawings showing the as-built location of devices and equipment.
- D. Provide Operation and Maintenance (O&M) Instructions.

3.9 INSTRUCTION OF GOVERNMENT EMPLOYEES

3.9.1 Instructor

Provide the services of an instructor, who has received specific training from the manufacturer for the training of other persons regarding the operation, inspection, testing, and maintenance of the system provided. The instructor must train the Government employees designated by the Contracting Officer, in the care, adjustment, maintenance, and operation of the fire alarm system. The instructor must be thoroughly familiar with all parts of this installation. The instructor must be trained in operating theory as well as in practical O&M work. Submit the instructor's information and qualifications including the training history.

3.9.2 Required Instruction Time

Provide 4 hours of instruction after final acceptance of the system. The instruction must be given during regular working hours on such dates and times selected by the Contracting Officer. The instruction may be divided into two or more periods at the discretion of the Contracting Officer. The training must allow for rescheduling for unforeseen maintenance and/or fire department responses.

3.9.2.1 Technical Training

Equipment manufacturer or a factory representative must provide 1 day of onsite training. Training must allow for classroom instruction as well as individual hands-on programming, troubleshooting and diagnostics exercises.

3.9.3 Technical Training Manual

Provide, in manual format, lesson plans, operating instructions, maintenance procedures, and training data for the training courses. The operations training must familiarize designated government personnel with proper operation of the installed system. The maintenance training course must provide the designated government personnel adequate knowledge required to diagnose, repair, maintain, and expand functions inherent to the system.

3.10 EXTRA MATERIALS

3.10.1 Repair Service/Replacement Parts

Repair services and replacement parts for the system must be available for a period of 10 years after the date of final acceptance of this work by the Contracting Officer. During the warranty period, the service technician must be on-site within 24 hours after notification. All repairs must be completed within 24 hours of arrival on-site.

During the warranty period, the installing fire alarm contractor is responsible for conducting all required testing and maintenance in accordance with the requirements and recommended practices of NFPA 72 and the system manufacturer[s]. Installing fire alarm contractor is NOT responsible for any damage resulting from abuse, misuse, or neglect of equipment by the end user.

3.10.2 Spare Parts

Spare parts furnished must be directly interchangeable with the corresponding components of the installed system[s]. Spare parts must be suitably packaged and identified by nameplate, tagging, or stamping. Spare parts must be delivered to the Contracting Officer at the time of the Government testing and must be accompanied by an inventory list.

3.10.3 Document Storage Cabinet

Upon completion of the project, but prior to project close-out, place in the document storage cabinet copies of the following record documentation:

- A. As-built shop drawings
- B. Product data sheets
- C. Design calculations

- D. Site-specific software data package
- E. All documentation required by SD-06.

END OF SECTION

SECTION 31 20 00 - EARTH MOVING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Excavating and filling for rough grading the Site.
2. Preparing subgrades for slabs-on-grade walks pavements turf and grasses and plants.
3. Excavating and backfilling for buildings and structures.
4. Drainage course for concrete slabs-on-grade.
5. Subbase course for concrete walks and pavements.
6. Subbase course and base course for asphalt paving.
7. Excavating and backfilling trenches for utilities and pits for buried utility structures.

1.2 DEFINITIONS

A. Backfill: Soil material used to fill an excavation.

1. Initial Backfill: Backfill placed beside and over pipe in a trench, including haunches to support sides of pipe.
2. Final Backfill: Backfill placed over initial backfill to fill a trench.

B. Base Course: Aggregate layer placed between the subbase course and hot-mix asphalt paving.

C. Bedding Course: Aggregate layer placed over the excavated subgrade in a trench before laying pipe.

D. Borrow Soil: Satisfactory soil imported from off-site for use as fill or backfill.

E. Drainage Course: Aggregate layer supporting the slab-on-grade that also minimizes upward capillary flow of pore water.

F. Excavation: Removal of material encountered above subgrade elevations and to lines and dimensions indicated.

1. Authorized Additional Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions as directed by Architect. Authorized additional excavation and replacement material will be paid for according to Contract provisions for changes in the Work.
2. Unauthorized Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions without direction by Architect. Unauthorized excavation, as well as remedial work directed by Architect, shall be without additional compensation.

G. Fill: Soil materials used to raise existing grades.

- H. Structures: Buildings, footings, foundations, retaining walls, slabs, tanks, curbs, mechanical and electrical appurtenances, or other man-made stationary features constructed above or below the ground surface.
- I. Subbase Course: Aggregate layer placed between the subgrade and base course for hot-mix asphalt pavement, or aggregate layer placed between the subgrade and a cement concrete pavement or a cement concrete or hot-mix asphalt walk.
- J. Subgrade: Uppermost surface of an excavation or the top surface of a fill or backfill immediately below subbase, drainage fill, drainage course, or topsoil materials.
- K. Utilities: On-site underground pipes, conduits, ducts, and cables as well as underground services within buildings.

1.3 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct preexcavation conference at Project site.

1.4 INFORMATIONAL SUBMITTALS

- A. Material test reports.

1.5 FIELD CONDITIONS

- A. Utility Locator Service: Notify utility locator service for area where Project is located before beginning earth-moving operations.

PART 2 - PRODUCTS

2.1 SOIL MATERIALS

- A. General: Provide borrow soil materials when sufficient satisfactory soil materials are not available from excavations.
- B. Satisfactory Soils: Soil Classification Groups GW, GP, GM, SW, SP, and SM according to ASTM D 2487, or a combination of these groups; free of rock or gravel larger than 3 inches in any dimension, debris, waste, frozen materials, vegetation, and other deleterious matter.
- C. Unsatisfactory Soils: Soil Classification Groups GC, SC, CL, ML, OL, CH, MH, OH, and PT according to ASTM D 2487, or a combination of these groups.
 - 1. Unsatisfactory soils also include satisfactory soils not maintained within 2 percent of optimum moisture content at time of compaction.
- D. Subbase Material: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940/D 2940M; with at least 90 percent passing a 1-1/2-inch sieve and not more than 12 percent passing a No. 200 sieve.

- E. Base Course: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 294/D 2940M 0; with at least 95 percent passing a 1-1/2-inch sieve and not more than 8 percent passing a No. 200 sieve.
- F. Engineered Fill: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940/D 2940M; with at least 90 percent passing a 1-1/2-inch sieve and not more than 12 percent passing a No. 200 sieve.
- G. Bedding Course: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940/D 2940M; except with 100 percent passing a 1-inch sieve and not more than 8 percent passing a No. 200 sieve.
- H. Drainage Course: Narrowly graded mixture of washed crushed stone, or crushed or uncrushed gravel; ASTM D 448; coarse-aggregate grading Size 57; with 100 percent passing a 1-1/2-inch sieve and zero to 5 percent passing a No. 8 sieve.

2.2 ACCESSORIES

- A. Detectable Warning Tape: Acid- and alkali-resistant, polyethylene film warning tape manufactured for marking and identifying underground utilities, a minimum of 6 inches wide and 4 mils thick, continuously inscribed with a description of the utility, with metallic core encased in a protective jacket for corrosion protection, detectable by metal detector when tape is buried up to 30 inches deep; colored to comply with local practice or requirements of authorities having jurisdiction.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earth-moving operations.
- B. Protect and maintain erosion and sedimentation controls during earth-moving operations.
- C. Protect subgrades and foundation soils from freezing temperatures and frost. Remove temporary protection before placing subsequent materials.

3.2 EXCAVATION, GENERAL

- A. Unclassified Excavation: Excavate to subgrade elevations regardless of the character of surface and subsurface conditions encountered. Unclassified excavated materials may include rock, soil materials, and obstructions. No changes in the Contract Sum or the Contract Time will be authorized for rock excavation or removal of obstructions.
 - 1. If excavated materials intended for fill and backfill include unsatisfactory soil materials and rock, replace with satisfactory soil materials.

3.3 EXCAVATION FOR STRUCTURES

- A. Excavate to indicated elevations and dimensions within a tolerance of plus or minus 1 inch. If applicable, extend excavations a sufficient distance from structures for placing and removing concrete formwork, for installing services and other construction, and for inspections.
 - 1. Excavations for Footings and Foundations: Do not disturb bottom of excavation. Excavate by hand to final grade just before placing concrete reinforcement. Trim bottoms to required lines and grades to leave solid base to receive other work.

3.4 EXCAVATION FOR WALKS AND PAVEMENTS

- A. Excavate surfaces under walks and pavements to indicated lines, cross sections, elevations, and subgrades.

3.5 EXCAVATION FOR UTILITY TRENCHES

- A. Excavate trenches to uniform widths to provide the following clearance on each side of pipe or conduit. Excavate trench walls vertically from trench bottom to 12 inches higher than top of pipe or conduit unless otherwise indicated.
 - 1. Clearance: 12 inches each side of pipe or conduit.
- B. Trench Bottoms: Excavate and shape trench bottoms to provide uniform bearing and support of pipes and conduit. Shape subgrade to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits. Remove projecting stones and sharp objects along trench subgrade.
 - 1. Excavate trenches 6 inches deeper than elevation required in rock or other unyielding bearing material to allow for bedding course.

3.6 SUBGRADE INSPECTION

- A. Proof-roll subgrade below the building slabs and pavements with a pneumatic-tired dump truck to identify soft pockets and areas of excess yielding. Do not proof-roll wet or saturated subgrades.
- B. Reconstruct subgrades damaged by freezing temperatures, frost, rain, accumulated water, or construction activities, as directed by Architect, without additional compensation.

3.7 STORAGE OF SOIL MATERIALS

- A. Stockpile borrow soil materials and excavated satisfactory soil materials without intermixing. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.
 - 1. Stockpile soil materials away from edge of excavations. Do not store within drip line of remaining trees.

3.8 UTILITY TRENCH BACKFILL

- A. Place backfill on subgrades free of mud, frost, snow, or ice.
- B. Place and compact bedding course on trench bottoms and where indicated. Shape bedding course to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits.
- C. Trenches under Roadways: Provide 4-inch- thick, concrete-base slab support for piping or conduit less than 30 inches below surface of roadways. After installing and testing, completely encase piping or conduit in a minimum of 4 inches of concrete before backfilling or placing roadway subbase course.
- D. Initial Backfill: Place and compact initial backfill of satisfactory soil, free of particles larger than 1 inch in any dimension, to a height of 12 inches over the pipe or conduit.
 - 1. Carefully compact initial backfill under pipe haunches and compact evenly up on both sides and along the full length of piping or conduit to avoid damage or displacement of piping or conduit. Coordinate backfilling with utilities testing.
- E. Final Backfill: Place and compact final backfill of satisfactory soil to final subgrade elevation.
- F. Warning Tape: Install warning tape directly above utilities, 12 inches below finished grade, except 6 inches below subgrade under pavements and slabs.

3.9 SOIL FILL

- A. Plow, scarify, bench, or break up sloped surfaces steeper than 1 vertical to 4 horizontal so fill material will bond with existing material.
- B. Place and compact fill material in layers to required elevations as follows:
 - 1. Under grass and planted areas, use satisfactory soil material.
 - 2. Under walks and pavements, use satisfactory soil material.
 - 3. Under steps and ramps, use engineered fill.
 - 4. Under building slabs, use engineered fill.
 - 5. Under footings and foundations, use engineered fill.

3.10 SOIL MOISTURE CONTROL

- A. Uniformly moisten or aerate subgrade and each subsequent fill or backfill soil layer before compaction to within 2 percent of optimum moisture content.
 - 1. Do not place backfill or fill soil material on surfaces that are muddy, frozen, or contain frost or ice.
 - 2. Remove and replace, or scarify and air dry, otherwise satisfactory soil material that exceeds optimum moisture content by 2 percent and is too wet to compact to specified dry unit weight.

3.11 COMPACTION OF SOIL BACKFILLS AND FILLS

- A. Place backfill and fill soil materials in layers not more than 8 inches in loose depth for material compacted by heavy compaction equipment and not more than 4 inches in loose depth for material compacted by hand-operated tampers.
- B. Place backfill and fill soil materials evenly on all sides of structures to required elevations and uniformly along the full length of each structure.
- C. Compact soil materials to not less than the following percentages of maximum dry unit weight according to ASTM D 1557:
 - 1. Under structures, building slabs, steps, and pavements, scarify and recompact top 8 inches of existing subgrade and each layer of backfill or fill soil material at 95 percent.
 - 2. Under walkways, scarify and recompact top 6 inches below subgrade and compact each layer of backfill or fill soil material at 92 percent.
 - 3. Under turf or unpaved areas, scarify and recompact top 6 inches below subgrade and compact each layer of backfill or fill soil material at 85 percent.
 - 4. For utility trenches, compact each layer of initial and final backfill soil material at 85 percent.

3.12 GRADING

- A. General: Uniformly grade areas to a smooth surface, free of irregular surface changes. Comply with compaction requirements and grade to cross sections, lines, and elevations indicated.
- B. Site Rough Grading: Slope grades to direct water away from buildings and to prevent ponding. Finish subgrades to elevations required to achieve indicated finish elevations, within the following subgrade tolerances:
 - 1. Turf or Unpaved Areas: Plus or minus 1 inch.
 - 2. Walks: Plus or minus 1 inch.
 - 3. Pavements: Plus or minus 1/2 inch.

3.13 SUBBASE AND BASE COURSES UNDER PAVEMENTS AND WALKS

- A. Place subbase course and base course on subgrades free of mud, frost, snow, or ice.
- B. On prepared subgrade, place subbase course and base course under pavements and walks as follows:
 - 1. Shape subbase course and base course to required crown elevations and cross-slope grades.
 - 2. Place subbase course and base course that exceeds 6 inches in compacted thickness in layers of equal thickness, with no compacted layer more than 6 inches thick or less than 3 inches thick.
 - 3. Compact subbase course and base course at optimum moisture content to required grades, lines, cross sections, and thickness to not less than 95 percent of maximum dry unit weight according to ASTM D 1557.

3.14 DRAINAGE COURSE UNDER CONCRETE SLABS-ON-GRADE

- A. Place drainage course on subgrades free of mud, frost, snow, or ice.
- B. On prepared subgrade, place and compact drainage course under cast-in-place concrete slabs-on-grade as follows:
 - 1. Place drainage course that exceeds 6 inches in compacted thickness in layers of equal thickness, with no compacted layer more than 6 inches thick or less than 3 inches thick.
 - 2. Compact each layer of drainage course to required cross sections and thicknesses to not less than 95 percent of maximum dry unit weight according to ASTM D 698.

3.15 FIELD QUALITY CONTROL

- A. Special Inspections: Owner will engage a qualified special inspector to perform inspections:
- B. Testing Agency: Owner will engage a qualified geotechnical engineering testing agency to perform tests and inspections.
- C. Allow testing agency to inspect and test subgrades and each fill or backfill layer. Proceed with subsequent earth moving only after test results for previously completed work comply with requirements.
- D. Footing Subgrade: At footing subgrades, at least one test of each soil stratum will be performed to verify design bearing capacities. Subsequent verification and approval of other footing subgrades may be based on a visual comparison of subgrade with tested subgrade when approved by Architect.
- E. When testing agency reports that subgrades, fills, or backfills have not achieved degree of compaction specified, scarify and moisten or aerate, or remove and replace soil materials to depth required; recompact and retest until specified compaction is obtained.

3.16 PROTECTION

- A. Protecting Graded Areas: Protect newly graded areas from traffic, freezing, and erosion. Keep free of trash and debris.
- B. Repair and reestablish grades to specified tolerances where completed or partially completed surfaces become eroded, rutted, settled, or where they lose compaction due to subsequent construction operations or weather conditions.
- C. Where settling occurs before Project correction period elapses, remove finished surfacing, backfill with additional soil material, compact, and reconstruct surfacing.
 - 1. Restore appearance, quality, and condition of finished surfacing to match adjacent work, and eliminate evidence of restoration to greatest extent possible.

3.17 DISPOSAL OF SURPLUS AND WASTE MATERIALS

- A. Remove surplus satisfactory soil and waste materials, including unsatisfactory soil, trash, and debris, and legally dispose of them off Owner's property.

END OF SECTION 31 20 00

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Appendix #1

State of Delaware Architectural Accessibility Board

Appendix #2

State of Delaware Department of Labor

Appendix #3

State of Delaware Fire Marshal