

STATE OF DELAWARE
DEPARTMENT OF NATURAL RESOURCES AND
ENVIRONMENTAL CONTROL (DNREC)
DIVISION OF WATERSHED STEWARDSHIP
CONTRACT # NAT24834-KPSPPOOL

SPECIFICATIONS
FOR
KILLENS POND PARK POOL REPLACEMENT
IN
KILLENS POND STATE PARK
FELTON, DE

PREPARED
BY
MORRIS & RITCHIE ASSOCIATES, INC.

ISSUED FOR BIDDING
3/24/25

STATE OF DELAWARE
Department of Natural Resources and Environmental Control
Division of Parks and Recreation
89 Kings Highway
Dover, DE 19901
DNREC Contract No.: NAT24834-KPSPPOOL

PROJECT MANUAL

KILLENS POND WATER PARK POOL REPLACEMENT
at
KILLENS POND STATE PARK
5025 Killens Pond Road
Felton, DE 19943



DELAWARE STATE
PARKS
YOUR OUTDOOR ADVENTURE STARTS HERE

Prepared by

Architect/Engineer
Morris & Ritchie Associates, Inc.
8 West Market Street
Georgetown, DE 19947

Issued for Bidding
3/24/25

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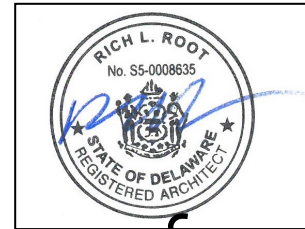
NOT FOR BIDDING PURPOSES

SECTION 00 01 07 – SEALS PAGE

1.1 DESIGN PROFESSIONALS OF RECORD

A. ARCHITECT

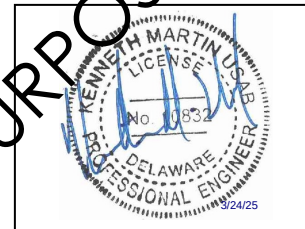
Rich L. Root, AIA
Morris & Ritchie Associates, Inc.
8 West Market Street
Georgetown, DE 19947
Tel: 302-855-5734



Who is responsible for Divisions 4, 5, 6, 7, 8, and 9

B. SITE / CIVIL ENGINEER

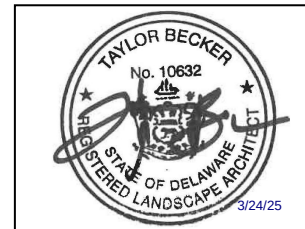
Kenneth M. Usab, P.E.
Morris & Ritchie Associates, Inc.
8 West Market Street
Georgetown, DE 19947
Tel: 302-855-5734
Cell: 443-286-5490



Who is responsible for Divisions 00, 1, 3, 31, 32, and 33

C. Landscape Architect

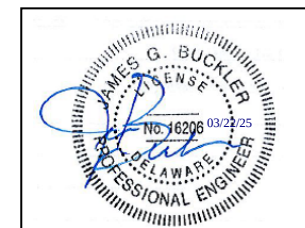
Taylor P. Becker, RLA
Morris & Ritchie Associates, Inc.
8 West Market Street
Georgetown, DE 19947
Tel: 302-855-5734



Who is responsible for Division 32

D. STRUCTURAL ENGINEER

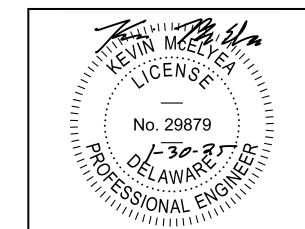
James G. Buckler, P.E.
Morris & Ritchie Associates, Inc.
8 West Market Street
Georgetown, DE 19947
Tel: 302-855-5734



Who is responsible for Division 3, 4, 5, and 6

E. POOL DESIGN AND POOL MEP

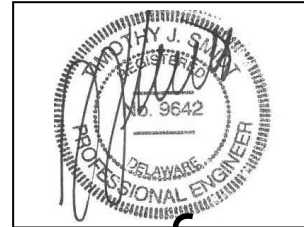
Kevin McElyea, PE
Aquatic Design Consultants
33400 Cold Water Road
Louisburg, KS 66053
Cell: 913-302-9349



Who is responsible for Section 13

F. MEP

Timothy J. Smidt, PE
Telegent Engineering, Inc.
2216 Commerce Road, Ste 1
Forest Hill, MD 21050
Tel: 410-692-5816
Cell: 443-604-8880
Who is responsible for Divisions 22-26



END OF SECTION 00 01 07

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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.

DOCUMENTS BOUND HEREWITH

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REFERENCED SPECIFICATIONS

Delaware Department of Transportation Standard Specifications for Road and Bridge Construction (January 2025, or most current at the date of advertisement) are included by reference.

SECTION 202 — EXCAVATION AND EMBANKMENT

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DATE

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PP2.01	POOL DETAILS	3/18/25
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PS1.01	POOL STRUCTURAL NOTES & DETAILS	3/18/25
PS2.00	POOL STRUCTURAL DETAILS	3/18/25
PS2.01	POOL STRUCTURAL DETAILS	3/18/25
FB1.00	FILTER ROOM PLAN	3/18/25
FB1.01	FILTER ROOM SECTIONS	3/18/25
FB1.02	FILTER ROOM ISOMETRIC VIEWS	3/18/25
FB2.00	FILTER ROOM DETAIL	3/18/25
FB2.01	FILTER ROOM DETAIL	3/18/25
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PM1.01	POOL PLUMBING PLAN – PLUMBING CONTRACTOR	3/18/25
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FEL2.00	FILTER ROOM ELECTRICAL DETAILS	3/18/25
FEL2.01	FILTER ROOM ELECTRICAL DETAILS	3/18/25

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DATE

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M200	DEMOLITION HVAC PLAN	3/18/25
M201	HVAC PLAN	3/18/25
M300	DETAILS AND SCHEDULES	3/18/25

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DATE

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P200	DEMOLITION PLUMBING PLAN	3/18/25
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P300	DETAILS AND SCHEDULES	3/18/25

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E201 - DEMOLITION POWER PLAN	3/18/25
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END OF SECTION 00 01 15

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SECTION 00 11 16

INVITATION TO BID

Sealed bids for **DNREC Contract No. NAT24834-KPSPPOOL**, will be received by the State of Delaware, DNREC, Division of Parks and Recreation at 89 Kings Highway, Dover DE 19901 until **2:00 PM** local time on **Friday, May 16, 2025**. The bids will be opened and read aloud live at **2:00 PM** local time on **Friday, May 16, 2025**, via an online video conference with an option to call in using a telephone. The bid opening will not be held in-person. To attend the bid opening, the public may join via Microsoft Teams enabled computer or mobile app, using Teams Meeting ID: **258 983 365 356** and Passcode: **"PF7CA9gs"**. Audio-only, conference call type of participation is available by calling 1-302-504-8986 and using ID: **"264 512 840#"**.

Project involves the demolition and replacement of the Main Pool at the Killens Pond State Park Waterpark and associated utilities.

A MANDATORY Pre-Bid Meeting will be held on **Thursday, May 1, 2025**, at **2:00 PM** at Killens Pond State Park – 5025 Killens Pond Road, Felton, DE 19943) for the purpose of establishing the listing of subcontractors and to answer questions. Representatives of each party to any Joint Venture must attend this meeting. **ATTENDANCE OF THIS MEETING IS A PREREQUISITE FOR BIDDING ON THIS CONTRACT.**

Sealed bids shall be addressed to the DNREC - Division of Parks and Recreation, 89 Kings Highway, Dover, DE 19901. The outer envelope should clearly indicate: **DNREC CONTRACT NO. NAT24834-KPSPPOOL - SEALED BID - DO NOT OPEN.**" We are also accepting, and prefer, emailed bids. They must be emailed to Shawn.Heacock@delaware.gov and Kevin.Rychlicki@delaware.gov prior to the bid deadline. Bidder bears the risk of late delivery regardless of submission method. Any bids received after the deadline will be rejected.

Contract documents shall be obtained by using the online form located at <https://bit.ly/2TVIu2z> and filling in the required fields. Once the information is provided, bid documents will be sent by email using Egress Switch (State's secure email drop-box type of system). The documents will be e-mailed at no cost.

Bidders will not be subject to discrimination on the basis of race, creed, color, sex, sexual orientation, gender identity or national origin in consideration of this award, and Minority Business Enterprises, Disadvantaged Business Enterprises, Women-Owned Business Enterprises and Veteran-Owned Business Enterprises will be afforded full opportunity to submit bids on this contract. 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 e-mail to those bidders receiving plans.

Gregory Patterson, Secretary

END OF SECTION 00 11 16

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SECTION 00 21 13
INSTRUCTIONS TO BIDDERS

TABLE OF ARTICLES

1. GENERAL
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 in 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.
- 1.23 **CUSTOM FABRICATION:** As defined in 29 Del. C. § 6902, the term "custom fabrication" means the offsite fabrication, assembly, or other production of non-standard goods or materials, including components, fixtures or parts thereof, specifically for a public works project. Such goods and materials shall include those used in the following trades or systems: (1) Plumbing or pipe fitting systems, including heating, ventilating, air-

conditioning, refrigeration systems, sheet metal or other duct systems; (2) Electrical systems; (3) Mechanical insulation work; (4) Ornamental iron work; and (5) Commercial signage that does not attempt or appear to direct the movement of traffic on highways or roadways or interfere with, imitate, or resemble any official traffic sign, signal or device.

ARTICLE 2: BIDDER'S REPRESENTATION

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 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.

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 initiated 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 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 24, 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 subcontractor 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.

NOT FOR BIDDING PURPOSES

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, or engaged in custom fabrication work, as that term is defined in Article 1.23 herein and as also as defined in 29 Del. C. § 6902 and described in 29 Del. C. § 6960(b), regardless of where

the work is performed, 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 As per 29 Del. C. § 6960(b), the scale of the wages to be paid must be posted by the employer in a prominent and easily accessible place at the site of the work. There may be withheld from the employer so much of accrued payments as may be considered necessary by the Department of Labor to pay laborers and mechanics employed by the employer the difference between the rates of wages required by the contract to be paid laborers and mechanics on the work and rates of wages received by such laborers and mechanics to be remitted to the Department of Labor for distribution upon resolution of any claims.
- 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 unresponsive and/or nonresponsive, 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. Any public school district and its board shall award public works contracts in accordance with this section’s requirements except it shall award the contract within 60 days of the bid opening.”
- 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 two (2) years after the date of the Certificate of Final Payment.
- 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.

NOT FOR BIDDING PURPOSES

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 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 OWNER 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 SECTION

KILLENS POND PARK POOL REPLACEMENT
FELTON, DELAWARE
5025 KILLENS POND ROAD, FELTON, DE 19943
DIVISION OF PARKS AND RECREATION CONTRACT No.: NAT24834-KPSPPOOL

BID FORM

For Bids Due: **May 16, 2025**

To: Dept. of Natural Resources and Environmental Control
Division of Parks and Recreation
Office of Design and Development
89 Kings Highway, Dover, DE 19901

Name of Bidder: _____

Delaware Business License No.: _____ Taxpayer ID No.: _____

(Other License Nos.): _____

Phone No.: () _____ - _____ Fax No.: () _____ - _____

The undersigned, representing that he has read and understands the Bidding Documents and that this bid is made in accordance therewith, that he has visited the site and has familiarized himself with the local conditions under which the Work is to be performed, and that his bid is based upon the materials, systems and equipment described in the Bidding Documents without exception, hereby proposes and agrees to provide all labor, materials, plant, equipment, supplies, transport and other facilities required to execute the work described by the aforesaid documents for the lump sum itemized below:

\$ _____

(\$ _____)

Contingency Allowance: _____ Twenty-Five Thousand Dollars and Zero Cents (\$25,000.00)

This allowance will be utilized by the Owner for Owner-elected changes to the work. Any or all unused allowance monies shall be returned to the Owner via a credit change order at the end of the project. This allowance shall be carried as an individual line item on the Application for Payment.

Acknowledge/Initial:

Total Bid

\$ _____

(\$ _____)

KILLENS POND PARK POOL REPLACEMENT
 FELTON, DELAWARE
 5025 KILLENS POND ROAD, FELTON, DE 19943
 DIVISION OF PARKS AND RECREATION CONTRACT No.: NAT24834-KPSPPOOL

BID FORM**UNIT PRICES**

Unit prices conform to applicable project specification section. Refer to the specifications for a complete description of the following Unit Prices:

ITEM	DESCRIPTION	DEDUCT	ADD
UNIT PRICE NO. 1:	Unclassified Site Excavation and Disposal of Unsuitable Material Off-Site	\$ /CY	\$ /CY
UNIT PRICE NO. 2	Unclassified Excavation Below Structures, Pool Deck, Storm Drain, and Utility Subgrades and Re-Use of Suitable Fill On-Site	\$ /CY	\$ /CY
UNIT PRICE NO. 3	Structural Fill	\$ /CY	\$ /CY
UNIT PRICE NO. 4	Graded Aggregate Base Course	\$ /CY	\$ /CY
UNIT PRICE NO. 5	Delaware No. 3 Stone	\$ /TON	\$ /TON
UNIT PRICE NO. 6	Delaware No. 57 Stone	\$ /TON	\$ /TON
UNIT PRICE NO. 7	Remove and Replace Existing Pool Deck Beyond Limit of Disturbance	\$ /SY	\$ /SY

KILLENS POND PARK POOL REPLACEMENT
FELTON, DELAWARE
5025 KILLENS POND ROAD, FELTON, DE 19943
DIVISION OF PARKS AND RECREATION CONTRACT No.: NAT24834-KPSPPOOL

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: _____

KILLENS POND PARK POOL REPLACEMENT
FELTON, DELAWARE
5025 KILLENS POND ROAD, FELTON, DE 19943
DIVISION OF PARKS AND RECREATION CONTRACT No.: NAT24834-KPSPPOOL

BID FORM

Witness: _____ **By:** _____

(Authorized Signature)

(SEAL)

(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)

NOT FOR BIDDING PURPOSES

KILLENS POND PARK POOL REPLACEMENT
 FELTON, DELAWARE
 5025 KILLENS POND ROAD, FELTON, DE 19943
 DIVISION OF PARKS AND RECREATION CONTRACT No.: NAT24834-KPSPPOOL

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.

List only those subcontractors that apply to this project.

	Subcontractor Category	Subcontractor	Address (City & State)	Subcontractors tax payer ID # or Delaware Business license #
1.	Sitework-A			
	Sitework-B			
	Sitework-C			
2.	Paving -A			
	Paving -B			
	Paving -C			
3.	Hardscape-A			
	Hardscape-B			
	Hardscape-C			
4.	Landscape-A			
	Landscape-B			

	Landscape-C			
5.	Masonry-A			
	Masonry-B			
	Masonry-C			
6.	Doors, Frames & Hardware-A			
	Doors, Frames & Hardware-B			
	Doors, Frames & Hardware-C			
7.	Painting-A			
	Painting-B			
	Painting-C			
8.	Concrete-A			
	Concrete-B			
	Concrete-C			
9.	Roofing-A			
	Roofing-B			
	Roofing-C			
10.	Mechanical-A			
	Mechanical-B			
	Mechanical-C			
11.	Plumbing-A			
	Plumbing-B			
	Plumbing-C			
12.	Electric-A			
	Electric-B			

NOT FOR BIDDING PURPOSES

	Electric-C			
13.	Site Utilities-A			
	Site Utilities-B			
	Site Utilities-C			
14.	Caging-A			
	Caging-B			
	Caging-C			
15.	Electric-A			
	Electric-B			
	Electric-C			
16.	Mechanical-A			
	Mechanical-B			
	Mechanical-C			

NOT FOR BIDDING PURPOSES

KILLENS POND PARK POOL REPLACEMENT
FELTON, DELAWARE
5025 KILLENS POND ROAD, FELTON, DE 19943
DIVISION OF PARKS AND RECREATION CONTRACT No.: NAT24834-KPSPPOOL

**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 Division of Natural Resources and Environmental Control.

All the terms and conditions of *NAT24834-KPSPPOOL* 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.

KILLENS POND PARK POOL REPLACEMENT
FELTON, DELAWARE
5025 KILLENS POND ROAD, FELTON, DE 19943
DIVISION OF PARKS AND RECREATION CONTRACT No.: NAT24834-KPSPPOOL

**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.

KILLENS POND PARK POOL REPLACEMENT
FELTON, DELAWARE
5025 KILLENS POND ROAD, FELTON, DE 19943
DIVISION OF PARKS AND RECREATION CONTRACT No.: NAT24834-KPSPPOOL

**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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NOT FOR BIDDING PURPOSES

STATE OF DELAWARE
OFFICE OF MANAGEMENT AND BUDGET

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. NAT24834-KPSPOOL, to be paid to the **State** for the use and benefit of
Department of Natural Resources and Environmental Control 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 **Department of Natural Resources and Environmental Control** a certain proposal
to enter into this contract for the furnishing of certain material and/or services within the **State**, 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 **Department of Natural Resources and
Environmental Control** 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

NOT FOR BIDDING PURPOSES

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NOT FOR BIDDING PURPOSES

SECTION 00 52 13

STANDARD FORM OF AGREEMENT BETWEEN OWNER AND CONTRACTOR AIA 101-2017

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.

NOT FOR BIDDING PURPOSES

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NOT FOR BIDDING PURPOSES



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 JAED Corporation
2500 Wrangle Hill Road
Suite 110
Bear, DE 19701

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.

NOT FOR BIDDING PURPOSES

Init.

/

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.)

[X] 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
N/A

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

N/A

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

Item

Price

#1 Owner's Contingencies

\$10,000.00

§ 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)

None

§ 4.5 Liquidated damages, if any:

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

N/A

§ 4.6 Other:

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

N/A

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:

N/A

§ 5.1.3 Provided that an Application for Payment is received by the Architect not later than the last day of a month, the Owner shall make payment of the amount certified to the Contractor not later than the last day of the following 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 Thirty (30) days after the Owner receives the valid 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.)

Five Percent (5%)

Init.

§ 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.)

N/A

§ 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.)

N/A

§ 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.)

N/A

§ 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:

Per Bid Documents

§ 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.)

One percent (1%) per month not to exceed twelve percent (12%) annum beginning thirty days after the owner receives the valid application for payment.

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)

Remedies at Law or In Equity

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.)

N/A

§ 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)

State of Delaware
John Dunham
501 S. DuPont Highway
Suite 1
Dover, DE 19901
302-744-1185

§ 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.)

N/A

§ 8.7 Other provisions:

Per Specifications and all applicable Addendums.

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.)

N/A

- .5 Drawings

Number

See EXHIBIT B

Title

List of Drawings

Date

- .6 Specifications

Section

See EXHIBIT C

Title

Table of Contents

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.)

Init.

[] 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

[X] Supplementary and other Conditions of the Contract:

Document	Title	Date	Pages
00 72 13	General Conditions		42
00 73 13	Supplementary General Conditions		10
00 73 46	Wage Rates		1
00 81 13	General Requirements		42

.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.)

Bid Form submitted by Contractor on _____

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)

Init.

AIA Document A101™ – 2017 Exhibit A

Insurance and Bonds

This Insurance and Bonds Exhibit is part of the Agreement, between the Owner and the Contractor, dated the day of in the year
(In words, indicate day, month and year.)

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

THE OWNER:
(Name, legal status and address)

THE CONTRACTOR:
(Name, legal status and address)

TABLE OF ARTICLES

- A.1 GENERAL**
- A.2 OWNER'S INSURANCE**
- A.3 CONTRACTOR'S INSURANCE AND BONDS**
- A.4 SPECIAL TERMS AND CONDITIONS**

ARTICLE A.1 GENERAL

The Owner and Contractor shall purchase and maintain insurance, and provide bonds, as set forth in this Exhibit. As used in this Exhibit, the term General Conditions refers to AIA Document A201™–2017, General Conditions of the Contract for Construction.

ARTICLE A.2 OWNER'S INSURANCE

§ A.2.1 General

Prior to commencement of the Work, the Owner shall secure the insurance, and provide evidence of the coverage, required under this Article A.2 and, upon the Contractor's request, provide a copy of the property insurance policy or policies required by Section A.2.3. The copy of the policy or policies provided shall contain all applicable conditions, definitions, exclusions, and endorsements.

§ A.2.2 Liability Insurance

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

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.

This document is intended to be used in conjunction with AIA Document A201™–2017, General Conditions of the Contract for Construction. Article 11 of A201™–2017 contains additional insurance provisions.

Init.

§ A.2.3 Required Property Insurance

§ A.2.3.1 Unless this obligation is placed on the Contractor pursuant to Section A.3.3.2.1, the Owner shall purchase and maintain, from an insurance company or insurance companies lawfully authorized to issue insurance in the jurisdiction where the Project is located, property insurance written on a builder's risk "all-risks" completed value or equivalent policy form and sufficient to cover the total value of the entire Project on a replacement cost basis. The Owner's property insurance coverage shall be no less than the amount of the initial Contract Sum, plus the value of subsequent Modifications and labor performed and materials or equipment supplied by others. The property insurance shall be maintained until Substantial Completion and thereafter as provided in Section A.2.3.1.3, unless otherwise provided in the Contract Documents or otherwise agreed in writing by the parties to this Agreement. This insurance shall include the interests of the Owner, Contractor, Subcontractors, and Sub-subcontractors in the Project as insureds. This insurance shall include the interests of mortgagees as loss payees.

§ A.2.3.1.1 **Causes of Loss.** The insurance required by this Section A.2.3.1 shall provide coverage for direct physical loss or damage, and shall not exclude the risks of fire, explosion, theft, vandalism, malicious mischief, collapse, earthquake, flood, or windstorm. The insurance shall also provide coverage for ensuing loss or resulting damage from error, omission, or deficiency in construction methods, design, specifications, workmanship, or materials. Sub-limits, if any, are as follows:

(Indicate below the cause of loss and any applicable sub-limit.)

Causes of Loss

Sub-Limit

§ A.2.3.1.2 **Specific Required Coverages.** The insurance required by this Section A.2.3.1 shall provide coverage for loss or damage to falsework and other temporary structures, and to building systems from testing and startup. The insurance shall also cover debris removal, including demolition occasioned by enforcement of any applicable legal requirements, and reasonable compensation for the Architect's and Contractor's services and expenses required as a result of such insured loss, including claim preparation expenses. Sub-limits, if any, are as follows:

(Indicate below type of coverage and any applicable sub-limit for specific required coverages.)

Coverage

Sub-Limit

§ A.2.3.1.3 Unless the parties agree otherwise, upon Substantial Completion, the Owner shall continue the insurance required by Section A.2.3.1 or, if necessary, replace the insurance policy required under Section A.2.3.1 with property insurance written for the total value of the Project that shall remain in effect until expiration of the period for correction of the Work set forth in Section 12.2.2 of the General Conditions.

§ A.2.3.1.4 **Deductibles and Self-Insured Retentions.** If the insurance required by this Section A.2.3 is subject to deductibles or self-insured retentions, the Owner shall be responsible for all loss not covered because of such deductibles or retentions.

§ A.2.3.2 **Occupancy or Use Prior to Substantial Completion.** The Owner's occupancy or use of any completed or partially completed portion of the Work prior to Substantial Completion shall not commence until the insurance company or companies providing the insurance under Section A.2.3.1 have consented in writing to the continuance of coverage. The Owner and the Contractor shall take no action with respect to partial occupancy or use that would cause cancellation, lapse, or reduction of insurance, unless they agree otherwise in writing.

§ A.2.3.3 Insurance for Existing Structures

If the Work involves remodeling an existing structure or constructing an addition to an existing structure, the Owner shall purchase and maintain, until the expiration of the period for correction of Work as set forth in Section 12.2.2 of the General Conditions, "all-risks" property insurance, on a replacement cost basis, protecting the existing structure against direct physical loss or damage from the causes of loss identified in Section A.2.3.1, notwithstanding the undertaking of the Work. The Owner shall be responsible for all co-insurance penalties.

§ A.2.4 Optional Extended Property Insurance.

The Owner shall purchase and maintain the insurance selected and described below.

Init.

(Select the types of insurance the Owner is required to purchase and maintain by placing an X in the box(es) next to the description(s) of selected insurance. For each type of insurance selected, indicate applicable limits of coverage or other conditions in the fill point below the selected item.)

- ☐ **§ A.2.4.1 Loss of Use, Business Interruption, and Delay in Completion Insurance**, to reimburse the Owner for loss of use of the Owner's property, or the inability to conduct normal operations due to a covered cause of loss.
- ☐ **§ A.2.4.2 Ordinance or Law Insurance**, for the reasonable and necessary costs to satisfy the minimum requirements of the enforcement of any law or ordinance regulating the demolition, construction, repair, replacement or use of the Project.
- ☐ **§ A.2.4.3 Expediting Cost Insurance**, for the reasonable and necessary costs for the temporary repair of damage to insured property, and to expedite the permanent repair or replacement of the damaged property.
- ☐ **§ A.2.4.4 Extra Expense Insurance**, to provide reimbursement of the reasonable and necessary excess costs incurred during the period of restoration or repair of the damaged property that are over and above the total costs that would normally have been incurred during the same period of time had no loss or damage occurred.
- ☐ **§ A.2.4.5 Civil Authority Insurance**, for losses or costs arising from an order of a civil authority prohibiting access to the Project, provided such order is the direct result of physical damage covered under the required property insurance.
- ☐ **§ A.2.4.6 Ingress/Egress Insurance**, for loss due to the necessary interruption of the insured's business due to physical prevention of ingress to, or egress from, the Project as a direct result of physical damage.
- ☐ **§ A.2.4.7 Soft Costs Insurance**, to reimburse the Owner for costs due to the delay of completion of the Work, arising out of physical loss or damage covered by the required property insurance: including construction loan fees; leasing and marketing expenses; additional fees, including those of architects, engineers, consultants, attorneys and accountants, needed for the completion of the construction, repairs, or reconstruction; and carrying costs such as property taxes, building permits, additional interest on loans, realty taxes, and insurance premiums over and above normal expenses.

§ A.2.5 Other Optional Insurance.

The Owner shall purchase and maintain the insurance selected below.

(Select the types of insurance the Owner is required to purchase and maintain by placing an X in the box(es) next to the description(s) of selected insurance.)

- ☐ **§ A.2.5.1 Cyber Security Insurance** for loss to the Owner due to data security and privacy breach,

Init.

including costs of investigating a potential or actual breach of confidential or private information.
(Indicate applicable limits of coverage or other conditions in the fill point below.)

[] **§ A.2.5.2 Other Insurance**

(List below any other insurance coverage to be provided by the Owner and any applicable limits.)

Coverage

Limits

ARTICLE A.3 CONTRACTOR'S INSURANCE AND BONDS

§ A.3.1 General

§ A.3.1.1 Certificates of Insurance. The Contractor shall provide certificates of insurance acceptable to the Owner evidencing compliance with the requirements in this Article A.3 at the following times: (1) prior to commencement of the Work; (2) upon renewal or replacement of each required policy of insurance; and (3) upon the Owner's written request. An additional certificate evidencing continuation of commercial liability coverage, including coverage for completed operations, shall be submitted with the final Application for Payment and thereafter upon renewal or replacement of such coverage until the expiration of the periods required by Section A.3.2.1 and Section A.3.3.1. The certificates will show the Owner as an additional insured on the Contractor's Commercial General Liability and excess or umbrella liability policy or policies.

§ A.3.1.2 Deductibles and Self-Insured Retentions. The Contractor shall disclose to the Owner any deductible or self-insured retentions applicable to any insurance required to be provided by the Contractor.

§ A.3.1.3 Additional Insured Obligations. To the fullest extent permitted by law, the Contractor shall cause the commercial general liability coverage to include (1) the Owner, the Architect, and the Architect's consultants as additional insureds for claims caused in whole or in part by the Contractor's negligent acts or omissions during the Contractor's operations; and (2) the Owner as an additional insured for claims caused in whole or in part by the Contractor's negligent acts or omissions for which loss occurs during completed operations. The additional insured coverage shall be primary and non-contributory to any of the Owner's general liability insurance policies and shall apply to both ongoing and completed operations. To the extent commercially available, the additional insured coverage shall be no less than that provided by Insurance Services Office, Inc. (ISO) forms CG 20 10 07 04, CG 20 37 07 04, and, with respect to the Architect and the Architect's consultants, CG 20 32 07 04.

§ A.3.2 Contractor's Required Insurance Coverage

§ A.3.2.1 The Contractor shall purchase and maintain the following types and limits of insurance from an insurance company or insurance companies lawfully authorized to issue insurance in the jurisdiction where the Project is located. The Contractor shall maintain the required insurance until the expiration of the period for correction of Work as set forth in Section 12.2.2 of the General Conditions, unless a different duration is stated below:

(If the Contractor is required to maintain insurance for a duration other than the expiration of the period for correction of Work, state the duration.)

§ A.3.2.2 Commercial General Liability

§ A.3.2.2.1 Commercial General Liability insurance for the Project written on an occurrence form with policy limits of not less than (\$) each occurrence, (\$) general aggregate, and (\$) aggregate for products-completed operations hazard, providing coverage for claims including

- .1 damages because of bodily injury, sickness or disease, including occupational sickness or disease, and death of any person;
- .2 personal injury and advertising injury;
- .3 damages because of physical damage to or destruction of tangible property, including the loss of use of such property;
- .4 bodily injury or property damage arising out of completed operations; and
- .5 the Contractor's indemnity obligations under Section 3.18 of the General Conditions.

Init.

§ A.3.2.2 The Contractor's Commercial General Liability policy under this Section A.3.2.2 shall not contain an exclusion or restriction of coverage for the following:

- .1 Claims by one insured against another insured, if the exclusion or restriction is based solely on the fact that the claimant is an insured, and there would otherwise be coverage for the claim.
- .2 Claims for property damage to the Contractor's Work arising out of the products-completed operations hazard where the damaged Work or the Work out of which the damage arises was performed by a Subcontractor.
- .3 Claims for bodily injury other than to employees of the insured.
- .4 Claims for indemnity under Section 3.18 of the General Conditions arising out of injury to employees of the insured.
- .5 Claims or loss excluded under a prior work endorsement or other similar exclusionary language.
- .6 Claims or loss due to physical damage under a prior injury endorsement or similar exclusionary language.
- .7 Claims related to residential, multi-family, or other habitational projects, if the Work is to be performed on such a project.
- .8 Claims related to roofing, if the Work involves roofing.
- .9 Claims related to exterior insulation finish systems (EIFS), synthetic stucco or similar exterior coatings or surfaces, if the Work involves such coatings or surfaces.
- .10 Claims related to earth subsidence or movement, where the Work involves such hazards.
- .11 Claims related to explosion, collapse and underground hazards, where the Work involves such hazards.

§ A.3.2.3 Automobile Liability covering vehicles owned, and non-owned vehicles used, by the Contractor, with policy limits of not less than (\$) per accident, for bodily injury, death of any person, and property damage arising out of the ownership, maintenance and use of those motor vehicles along with any other statutorily required automobile coverage.

§ A.3.2.4 The Contractor may achieve the required limits and coverage for Commercial General Liability and Automobile Liability through a combination of primary and excess or umbrella liability insurance, provided such primary and excess or umbrella insurance policies result in the same or greater coverage as the coverages required under Section A.3.2.2 and A.3.2.3, and in no event shall any excess or umbrella liability insurance provide narrower coverage than the primary policy. The excess policy shall not require the exhaustion of the underlying limits only through the actual payment by the underlying insurers.

§ A.3.2.5 Workers' Compensation at statutory limits.

§ A.3.2.6 Employers' Liability with policy limits not less than (\$) each accident, (\$) each employee, and (\$) policy limit.

§ A.3.2.7 Jones Act, and the Longshore & Harbor Workers' Compensation Act, as required, if the Work involves hazards arising from work on or near navigable waterways, including vessels and docks

§ A.3.2.8 If the Contractor is required to furnish professional services as part of the Work, the Contractor shall procure Professional Liability insurance covering performance of the professional services, with policy limits of not less than (\$) per claim and (\$) in the aggregate.

§ A.3.2.9 If the Work involves the transport, dissemination, use, or release of pollutants, the Contractor shall procure Pollution Liability insurance, with policy limits of not less than (\$) per claim and (\$) in the aggregate.

§ A.3.2.10 Coverage under Sections A.3.2.8 and A.3.2.9 may be procured through a Combined Professional Liability and Pollution Liability insurance policy, with combined policy limits of not less than (\$) per claim and (\$) in the aggregate.

§ A.3.2.11 Insurance for maritime liability risks associated with the operation of a vessel, if the Work requires such activities, with policy limits of not less than (\$) per claim and (\$) in the aggregate.

§ A.3.2.12 Insurance for the use or operation of manned or unmanned aircraft, if the Work requires such activities, with policy limits of not less than (\$) per claim and (\$) in the aggregate.

§ A.3.3 Contractor's Other Insurance Coverage

§ A.3.3.1 Insurance selected and described in this Section A.3.3 shall be purchased from an insurance company or insurance companies lawfully authorized to issue insurance in the jurisdiction where the Project is located. The Contractor shall maintain the required insurance until the expiration of the period for correction of Work as set forth in Section 12.2.2 of the General Conditions, unless a different duration is stated below:

(If the Contractor is required to maintain any of the types of insurance selected below for a duration other than the expiration of the period for correction of Work, state the duration.)

§ A.3.3.2 The Contractor shall purchase and maintain the following types and limits of insurance in accordance with Section A.3.3.1.

(Select the types of insurance the Contractor is required to purchase and maintain by placing an X in the box(es) next to the description(s) of selected insurance. Where policy limits are provided, include the policy limit in the appropriate fill point.)

- ☐ § A.3.3.2.1 Property insurance of the same type and scope satisfying the requirements identified in Section A.2.3, which, if selected in this section A.3.3.2.1, relieves the Owner of the responsibility to purchase and maintain such insurance except insurance required by Section A.2.3.1.3 and Section A.2.3.3. The Contractor shall comply with all obligations of the Owner under Section A.2.3 except to the extent provided below. The Contractor shall disclose to the Owner the amount of any deductible, and the Owner shall be responsible for losses within the deductible. Upon request, the Contractor shall provide the Owner with a copy of the property insurance policy or policies required. The Owner shall adjust and settle the loss with the insurer and be the trustee of the proceeds of the property insurance in accordance with Article 11 of the General Conditions unless otherwise set forth below:
(Where the Contractor's obligation to provide property insurance differs from the Owner's obligations as described under Section A.2.3, indicate such differences in the space below. Additionally, if a party other than the Owner will be responsible for adjusting and settling a loss with the insurer and acting as the trustee of the proceeds of property insurance in accordance with Article 11 of the General Conditions, indicate the responsible party below.)

- ☐ § A.3.3.2.2 Railroad Protective Liability Insurance, with policy limits of not less than (\$) per claim and (\$) in the aggregate, for Work within fifty (50) feet of railroad property.

- ☐ § A.3.3.2.3 Asbestos Abatement Liability Insurance, with policy limits of not less than (\$) per claim and (\$) in the aggregate, for liability arising from the encapsulation, removal, handling, storage, transportation, and disposal of asbestos-containing materials.

- ☐ § A.3.3.2.4 Insurance for physical damage to property while it is in storage and in transit to the construction site on an "all-risks" completed value form.

- ☐ § A.3.3.2.5 Property insurance on an "all-risks" completed value form, covering property owned by the Contractor and used on the Project, including scaffolding and other equipment.

- ☐ § A.3.3.2.6 Other Insurance
(List below any other insurance coverage to be provided by the Contractor and any applicable limits.)

Coverage

Limits

Init.

§ A.3.4 Performance Bond and Payment Bond

The Contractor shall provide surety bonds, from a company or companies lawfully authorized to issue surety bonds in the jurisdiction where the Project is located, as follows:

(Specify type and penal sum of bonds.)

Type	Penal Sum (\$0.00)
Payment Bond	
Performance Bond	

Payment and Performance Bonds shall be AIA Document A312™, Payment Bond and Performance Bond, or contain provisions identical to AIA Document A312™, current as of the date of this Agreement.

ARTICLE A.4 SPECIAL TERMS AND CONDITIONS

Special terms and conditions that modify this Insurance and Bonds Exhibit, if any, are as follows.

NOT FOR BIDDING PURPOSES

Init.

SECTION 00 54 13

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 the box "Other" – and add the following sentence:
- "Any remedies available in law or in equity."

ARTICLE 7: TERMINATION or SUSPENSION

- 7.1.1.1 Delete paragraph 7.1.1.1 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 SECTION

SECTION 00 54 14

SUPPLEMENT TO A101-2017 – EXHIBIT A - INSURANCE & 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.3.1.1 Strike the last sentence of the paragraph.

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.3.2.2.1 Insert "\$1,000,000.00" in the blank for each occurrence. Insert "\$3,000,000.00" in the blank for general aggregate. Insert "\$3,000,000.00" in the blank for aggregate for products-completed operations hazard.

A.3.2.3 Insert "\$1,000,000.00" in the blank for per accident.

A.3.2.6 Insert "\$500,000.00" in the blank for each accident.

Insert "\$500,000.00" in the blank for each employee.
Insert "\$500,000.00" in the blank for policy limit.

A.3.2.8 Insert "\$1,000,000.00" in the blank for per claim.
Insert "\$3,000,000.00" in the blank for in the aggregate.

A.3.2.9 Insert "\$1,000,000.00" in the blank for per claim.
Insert "\$3,000,000.00" in the blank for in the aggregate.

A.3.2.10 Insert "\$2,000,000.00" in the blank for per claim.
Insert "\$4,000,000.00" in the blank for in the aggregate.

A.3.2.11 Strike in its entirety.

A.3.2.12 Strike in its entirety.

A.3.3.2.1 Delete paragraph 3.3.2.1 in its entirety

A.3.3.2.2 Strike in its entirety.

A.3.3.2.3 Insert "\$1,000,000.00" in the blanks for per claim.
Insert "\$3,000,000.00" in the blanks for in the aggregate

A.3.4 Insert the actual contract price in both the Payment Bond and the Performance Bond Penal Sum blanks. It must be 100% of the contract price.

Strike the last sentence in this section and replace with "Payment and Performance Bonds shall be in the standard form issued by the Delaware Office of Management and Budget."

END OF SECTION

STATE OF DELAWARE
OFFICE OF MANAGEMENT AND BUDGET

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 **Department of Natural Resources and Environmental Control** (“**Owner**”), 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. NAT24834-KPSPPOOL 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: _____ By: _____ (SEAL)

Name: _____

Title: _____
(Corporate Seal)

SURETY

Name: _____

Witness or Attest: Address: _____

Name: _____ By: _____ (SEAL)

Name: _____

Title: _____
(Corporate Seal)

STATE OF DELAWARE
OFFICE OF MANAGEMENT AND BUDGET

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 **Department Natural Resources and of Environmental Control** (“**Owner**”), 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. NAT24834-KPSPPOOL 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 62 76

APPLICATION & CERTIFICATION OF PAYMENT AIA G-702 WITH CONTINUATION SHEET G-703

NOT FOR BIDDING PURPOSES

Application and Certificate for Payment

TO OWNER: PROJECT: BHH
FROM CONTRACTOR: Bernardon Haber Holloway Architects
 VIA ARCHITECT: PC
 Three Mill Road, Suite 211
 Wilmington, Delaware 19806

APPLICATION NO: 001
PERIOD TO:
CONTRACT FOR: General Construction
CONTRACT DATE:
PROJECT NOS: / /

Distribution to:
 OWNER: ☐
 ARCHITECT: ☐
 CONTRACTOR: ☐
 FIELD: ☐
 OTHER: ☐

CONTRACTOR'S APPLICATION FOR PAYMENT

Application is made for payment, as shown below, in connection with the Contract Continuation Sheet, AIA Document G703, is attached.

1. ORIGINAL CONTRACT SUM \$ 0.00
2. Net change by Change Orders \$ 0.00
3. CONTRACT SUM TO DATE (Line 1 + 2) \$ 0.00
4. TOTAL COMPLETED & STORED TO DATE (Column G on G703) \$ 0.00

5. RETAINAGE:

- a. 0 % of Completed Work (Column D + E on G703) \$ 0.00
 - b. 0 % of Stored Material (Column F on G703) \$ 0.00
- Total Retainage (Lines 5a + 5b or Total in Column I of G703) \$ 0.00

6. TOTAL EARNED LESS RETAINAGE \$ 0.00

(Line 4 Less Line 5 Total)

7. LESS PREVIOUS CERTIFICATES FOR PAYMENT \$ 0.00

(Line 6 from prior Certificate)

8. CURRENT PAYMENT DUE \$ 0.00

9. BALANCE TO FINISH, INCLUDING RETAINAGE

(Line 3 less Line 6)

CHANGE ORDER SUMMARY	ADDITIONS	DEDUCTIONS
Total changes approved in previous months by Owner	\$ 0.00	\$ 0.00
Total approved this Month	\$ 0.00	\$ 0.00
TOTALS	\$ 0.00	\$ 0.00
NET CHANGES by Change Order	\$	0.00

The undersigned Contractor certifies that to the best of the Contractor's knowledge, information and belief the Work covered by this Application for Payment has been completed in accordance with the Contract Documents, that all amounts have been paid by the Contractor for Work for which previous Certificates for Payment were issued and payments received from the Owner, and that current payment shown herein is now due.

CONTRACTOR:

By: _____ Date: _____

State of: _____

County of: _____

Subscribed and sworn to before me this _____ day of _____

Notary Public in and for _____

My Commission expires: _____

ARCHITECT'S CERTIFICATE FOR PAYMENT

In accordance with the Contract Documents, based on on-site observations and the data comprising this application, the Architect certifies to the Owner that to the best of the Architect's knowledge, information and belief the Work has progressed as indicated, the quality of the Work is in accordance with the Contract Documents, and the Contractor is entitled to payment of the AMOUNT CERTIFIED.

AMOUNT CERTIFIED \$ 0.00

(Attach explanation if amount certified differs from the amount applied. Initial all figures on this Application and on the Continuation Sheet that are changed to conform with the amount certified.)

ARCHITECT:

By: _____ Date: _____

This Certificate is not negotiable. The AMOUNT CERTIFIED is payable only to the Contractor named herein. Issuance, payment and acceptance of payment are without prejudice to any rights of the Owner or Contractor under this Contract

Continuation Sheet

AIA Document G702, APPLICATION AND CERTIFICATION FOR PAYMENT, containing Contractor's signed certification is attached.

In tabulations below, amounts are stated to the nearest dollar.

Use Column I on Contracts where variable retainage for line items may apply.

APPLICATION NO: 001

APPLICATION DATE:

PERIOD TO:

ARCHITECT'S PROJECT NO:

A ITEM NO.	B DESCRIPTION OF WORK	C SCHEDULED VALUE	D WORK COMPLETED FROM PREVIOUS APPLICATION (D + E)		E THIS PERIOD	F MATERIALS PRESENTLY STORED (NOT IN D OR E)	G TOTAL COMPLETED AND STORED TO DATE (D+E+F)	H BALANCE TO FINISH (C - G)	I RETAINAGE (IF VARIABLE RATE)
		\$ 0.00	\$ 0.00		\$ 0.00	\$ 0.00	\$ 0.00	\$ 0.00	\$ 0.00
	GRAND TOTAL								

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NOT FOR BIDDING PURPOSES

SECTION 00 72 13

**GENERAL CONDITIONS OF THE CONTRACT FOR CONSTRUCTION
A201 - 2017**

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.

NOT FOR BIDDING PURPOSES



AIA® Document A201™ – 2017

General Conditions of the Contract for Construction

for the following PROJECT:

(Name and location or address)

Sample

THE OWNER:

(Name, legal status and address)

THE ARCHITECT:

(Name, legal status and address)

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14	TERMINATION OR SUSPENSION OF THE CONTRACT
15	CLAIMS AND DISPUTES

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.

Init.

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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 amount 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

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 9.4; 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.

NOT FOR BIDDING PURPOSES

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.

TABLE OF ARTICLES

1. GENERAL PROVISIONS
2. OWNER
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NOT FOR BIDDING PURPOSES

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 insure 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)

7.2 CHANGE ORDERS

Add the following Sections:

"7.2.2 In addition to the above:

7.2.2.1 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.

7.2.2.2 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 subcontractor's work.

7.2.2.3 Where the Third Tier Contractor is going to be completing the additional work, the Third-Tier contractor will be allowed a markup of fifteen percent (15%) overhead and profit on changes order work above and beyond the direct costs stated previously. To this amount, the Subcontractor will be allowed a markup not to exceed seven and one-half percent (7.5%) on the Third-Tier Contractor's work and the General Contractor will be allowed a markup not to exceed seven and one-half percent (7.5%) of the amount of the Subcontractor's markup.

7.2.2.4 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.

7.2.2.5 These markups shall include all costs including, but not limited to: overhead, profit, bonds, insurance, supervision, etc."

- 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 THE 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 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 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 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

SECTION 00 73 43

DELAWARE DEPARTMENT OF LABOR PREVAILING WAGE RATES

NOT FOR BIDDING PURPOSES

STATE OF DELAWARE
DEPARTMENT OF LABOR
DIVISION OF INDUSTRIAL AFFAIRS
OFFICE OF LABOR LAW ENFORCEMENT
PHONE: (302) 318-2769

Mailing Address:
252 Chapman Road
Suite 210
Newark, DE 19702

Located at:
252 Chapman Road
Suite 210
Newark, DE 19702

PREVAILING WAGES FOR BUILDING CONSTRUCTION EFFECTIVE MARCH 14, 2025

CLASSIFICATION	NEW CASTLE	KENT	SUSSEX
ASBESTOS WORKERS	29.89	36.79	53.56
BOILERMAKERS	89.46	45.39	66.72
BRICKLAYERS	66.79	66.79	66.79
CARPENTERS	62.56	62.56	50.80
CEMENT FINISHERS	94.36	67.12	52.04
ELECTRICAL LINE WORKERS	59.42	50.96	38.85
ELECTRICIANS	83.92	83.92	83.92
ELEVATOR CONSTRUCTORS	117.63	84.30	100.06
GLAZIERS	85.50	85.50	74.04
INSULATORS	69.12	69.12	69.12
IRON WORKERS	77.73	77.73	77.73
LABORERS	57.65	57.65	57.65
MILLWRIGHTS	88.35	88.35	70.97
PAINTERS	59.63	59.63	59.63
PILEDRIVERS	51.12	51.44	41.60
PLASTERERS	39.01	39.01	28.91
PLUMBERS/PIPEFITTERS/STEAMFITTERS	79.55	82.95	73.71
POWER EQUIPMENT OPERATORS	83.29	83.29	83.29
ROOFERS-COMPOSITION	32.40	30.53	32.76
ROOFERS-SHINGLE/SLATE/TILE	24.03	28.59	22.47
SHEET METAL WORKERS	86.84	86.84	86.84
SOFT FLOOR LAYERS	61.68	61.68	47.74
SPRINKLER FITTERS	73.13	73.13	73.13
TERRAZZO/MARBLE/TILE WORKERS	70.79	70.79	81.89
TERRAZZO/MARBLE/TILE STRS	78.73	78.73	90.82
TRUCK DRIVERS	56.88	35.86	27.91

CERTIFIED:

3-14-2025

BY

Salina Choudhary, Administrator, Office of Labor Law Enforcement

NOTE: THESE RATES ARE PROMULGATED AND ENFORCED PURSUANT TO THE PREVAILING WAGE REGULATIONS ADOPTED BY THE DEPARTMENT OF LABOR ON APRIL 3, 1992.

CLASSIFICATIONS OF WORKERS ARE DETERMINED BY THE DEPARTMENT OF LABOR. FOR ASSISTANCE IN CLASSIFYING WORKERS, OR FOR A COPY OF THE REGULATIONS OR CLASSIFICATIONS, PHONE (302) 318-2769.

NON-REGISTERED APPRENTICES MUST BE PAID THE MECHANIC'S RATE.

THESE RATES ARE BEING PROVIDED IN ACCORDANCE WITH DELAWARE'S FREEDOM OF INFORMATION ACT.

THEY ARE NOT INTENDED TO APPLY TO ANY SPECIFIC PROJECT.

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NOT FOR BIDDING PURPOSES

SECTION 00 81 13
GENERAL REQUIREMENTS

TABLE OF ARTICLES

1. GENERAL
2. OWNER
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5. SUBCONTRACTORS
6. CONSTRUCTION BY OWNER OR SEPARATE CONTRACTORS
7. CHANGES IN THE WORK
8. TIME
9. PAYMENTS AND COMPLETION
10. PROTECTION OF PERSONS AND PROPERTY
11. INSURANCE AND BONDS
12. UNCOVERING AND CORRECTION OF WORK
13. MISCELLANEOUS PROVISIONS
14. TERMINATION OR SUSPENSION OF THE CONTRACT

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:
- 7.3.3.1 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.
- 7.3.3.2 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 subcontractor's work.
- 7.3.3.3 Where the Third Tier Contractor is going to be completing the additional work, the Third-Tier contractor will be allowed a markup of fifteen percent (15%) overhead and profit on changes order work above and beyond the direct costs stated previously. To this amount, the Subcontractor will be allowed a markup not to exceed seven and one-half percent (7.5%) on the Third-Tier Contractor's work and the General Contractor will be allowed a markup not to exceed seven and one-half percent (7.5%) of the amount of the Subcontractor's markup.
- 7.3.3.4 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.
- 7.3.3.5 These markups shall include all costs including, but not limited to: overhead, profit, bonds, insurance, supervision, etc.

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 previously unknown hazardous material such as 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 to the closeout documents to be submitted at the end of the project.

10.2.1 Any activities with the potential to disturb lead-based materials should be performed by the Contractor in accordance with OSHA regulations pertaining to Lead in Construction, 29 CFR 1926.62, Lead.

- 10.2.1.1 The Contractor shall notify the Owner in the event they encounter previously unknown material that they suspect may contain "lead". The Owner will arrange with a qualified specialist for identification and testing and advise the Contractor of the results. In the case that testing identifies potential lead based materials, the contractor shall continue performance of the work that has the potential to disturb associated in accordance with OSHA regulations pertaining to Lead in Construction, 29 CFR 1926.62, Lead.
- 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	\$1,000,000 \$3,000,000	for each occurrence aggregate
Property Damage	\$1,000,000 \$3,000,000	for each occurrence aggregate

11.7.2 Contractor's Protective Liability Insurance

Minimum coverage to be:

Bodily Injury	\$1,000,000 \$3,000,000	for each occurrence aggregate
Property Damage	\$1,000,000 \$3,000,000	for each occurrence aggregate

11.7.3 Automobile Liability Insurance

Minimum coverage to be:

Bodily Injury	\$1,000,000 \$1,000,000	for each person 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 OR SUSPENSION OF THE 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 SECTION

NOT FOR BIDDING PURPOSES

SECTION 008113.5 - ADDITIONAL GENERAL REQUIREMENTS

PART 1. GENERAL

1.01 PROJECT SITE

- A. Demolition is to be completed within the old pool equipment building. Contractor shall review plans and ensure the correct items are removed.
- B. Contractor shall place timber mats as shown on the Erosion and Sediment Control Plans. These are to protect the ground between the edge of parking and existing pool deck.
- C. The directional drill is to be drilled and stabilized in the same day where the pumping pit is shown. For areas outside of the LOD, timber mats are to be used to access areas to be excavated.
- D. Contractor is to test pit areas to accurately determine location and depth of underground utilities, particularly electric service under the pool deck. DNREC will be conducting soil borings to verify the conditions of the soils under the pool deck.

1.02 SPECIAL INSTRUCTIONS TO THE CONTRACTOR

- A. Cloud-Based Document Management System: Provide, administer, and use cloud-based document management system for purposes of hosting Project communication and documentation in electronic form until Final Completion.
 - 1. Cloud-based document management data storage site includes, at a minimum, the following features:
 - a. Compilation of Project contract documents and Project communications required in individual Specification Sections, including, but not limited to, substitution requests, RFIs, submittals, construction schedule, construction progress photographs, Architect's Supplemental Instructions, Construction Change Directives, Change Order Proposals, and Change Orders, Applications and Certifications for Payment, meeting minutes, Drawings, Specifications, coordination drawings, construction progress photographs.
 - b. Compilation of Project data for each entity involved in Project, including Contractor, subcontractors, Architect, CWDI, and their consultants. Include names of individuals and contact information.
 - c. Access control for each entity for each workflow process, to determine entity's digital rights to create, modify, view, and print documents.
 - d. Document workflow planning, allowing customization of workflow between project entities.
 - e. Creation, logging, tracking, and notification for Project communications required in individual Specification Sections, including, but not limited to, substitution request, RFIs, submittals, Architect's Supplemental Instructions, Construction Change Directives, Change Order Proposals, and Change Orders.
 - f. Track status of each Project communication in real time, and log time and date when responses are provided.
 - g. Procedures for handling PDFs or similar file formats, allowing markups by each entity. Provide security features to lock markups against changes once submitted.
 - h. Processing and tracking of payment applications.
 - i. Processing and tracking of contract modifications.

- j. Creating and distributing meeting minutes.
 - k. Creating, distributing, tracking, and updating list of incomplete items (punch list) in accordance with Section 017700 "Closeout Procedures".
 - l. Mobile device compatibility, including smartphones and tablets. m. Software tutorials, training videos, and user support.
 - m. Provide free user licenses for use by CWDI, CWDI's Commissioning Authority, Tenant's Representative, Architect, and their consultants.
2. At completion of Project, provide digital archive of documents generated or stored within cloud-based document management system in format acceptable to CWDI and Architect.
3. Provide the following cloud-based document management system, or upon approval by the CWDI, one of the other listed systems:
- a. Procore Technologies, Inc.; Procore. (Basis of Design)
 - b. Other listed cloud-based document management systems:
 - i Autodesk; Construction Cloud
 - ii Corecon Technologies, Inc.; Corecon.
 - iii Trimble; Prolog or ProjectSight.
 - iv Newforma, Inc.; ConstructEx.

- END OF SECTION-

SECTION 00 81 14

DRUG TESTING FORMS

NOT FOR BIDDING PURPOSES

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NOT FOR BIDDING PURPOSES

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.

KILLENS POND PARK POOL REPLACEMENT,
FELTON, DELAWARE
NAT24834-KPSPPOOL

**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 or, if the contractor and/or subcontractor meets the requirements under Title 29, Chapter 69, Section 6960A.(b)(1)c.1.-3., payment may be made in accordance with Title 29, Chapter 69, Section 6960A.(b)(1)d. 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://laborfiles.delaware.gov/main/det/apprenticeship/DE%20Craft%20Training%20Occupation%20List%20Effective%20March%201%202022.pdf>. If you have questions regarding craft training programs, please submit all questions in writing to the Delaware Department of Labor at: apprenticeship@delaware.gov. *This Affidavit of Craft Training Compliance must be submitted prior to contract execution.*

In accordance with Title 29, Chapter 69, Section 6960A.(a)(1), a contract relating to a public works project under § 6962 of Title 29 must include a craft training program for each craft in the project if at the time the contractor executes a public works contract, all of the following apply:

- a. A project meets the prevailing wage requirement under Section 6960 of Title 29.
- b. The contractor employs 10 or more total employees.
- c. The project is not a federal highway project, except for the project under Section 6962(c)(11) of Title 29.
- d. There is an apprenticeship program for a craft in the project on the list of crafts under Section 204(b)(2) of Title 19.

Pursuant to Title 29, Chapter 69, Section 6960A.(a)(2), *a contractor must commit that all subcontractors provide craft training* if paragraph (a)(1) of this section applies to the subcontractor. Failure to provide required craft training or payment on the project may subject the successful contractor and/or subcontractor(s) to penalties as outlined in Title 29, Chapter 69, Section 6960A.(d)(1)-(3).

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

☐ A payment has been made in the amount established under Section 204(b)(2)b.2. of Title 19, for the craft into the Delaware Department of Labor's Apprenticeship and Training Fund.

Or

☐ Craft Training requirements are not applicable because:

Authorized Representative (typed or printed): _____

Authorized Representative (signature): _____

Title: _____

State of Delaware)

County of _____) ss:

Before me, a notary public, in and for said county and state, personally appeared, _____ who acknowledged to me that she/he did execute the foregoing instrument on behalf of _____.

IN TESTIMONY WHEREOF, I have subscribed my name and affixed my official seal this _____ day of _____ 20__.

Notary Public

Commission Expires _____

THIS PAGE MUST BE SIGNED AND NOTARIZED TO BE CONSIDERED.

SECTION 01 10 00 - SUMMARY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Project information.
2. Work covered by Contract Documents.
3. Work under separate contract.
4. Allowances.
5. Unit Prices.
6. Applications for Payment.
7. Owner Supplied Construction Documents.
8. Coordination.
9. Phased construction.
10. Access to site.
11. Coordination with occupants.
12. Work restrictions.
13. Specification and drawing conventions.
14. Field Engineering.
15. References and Standards.
16. Miscellaneous provisions.

B. Related Requirements:

1. Section 015000 "Temporary Facilities and Controls" for limitations and procedures governing temporary use of Owner's facilities.

1.3 PROJECT INFORMATION

A. Project Identification: Killens Pond Water Park Pool Replacement

1. Project Location: Killens Pond State Park, 5025 Killens Pond Road, Felton, Delaware 19943.

B. Owner: State of Delaware, Division of Natural Resources and Environmental Control, Parks and Recreation, 89 Kings Highway, Dover, Delaware 19901.

- C. Architect/Engineer's Identification: The Contract Documents, dated 3/24/25, were prepared for this Project by Morris & Ritchie Associates, Inc., 8 West Market St. Georgetown, Delaware.

1.4 WORK COVERED BY CONTRACT DOCUMENTS

- A. The Work of Project is defined by the Contract Documents and consists of the following:

1. The project involves providing all the required labor, materials, equipment and superintendence for complete removal and replacement of the existing pool facility deck, dewatering system, associated mechanical equipment, landscaping enhancements and the restoration of all affected surfaces as shown on the project Drawings and as specified in the Project Manual. Additionally, it includes demolition and improvements to the existing pump building and associated facilities to accommodate the mechanical, electrical and HVAC systems for the new pool facility.

- B. Type of Contract: Project will be constructed under a single, lump sum prime contract.

1.5 ALLOWANCES

- A. Schedule of Allowances: Refer to Section 012100 Allowances.

1.6 APPLICATIONS FOR PAYMENT

- A. Submit three (3) originals of each application under procedures of Section 012900 Payment Procedures.
- B. Content and Format: Use the Project Manual table of contents to develop the Schedule of Values.

1.7 OWNER SUPPLIED CONSTRUCTION DOCUMENTS

- A. The Contractor will be furnished, free of charge one electronic PDF file drawings and Project Manuals that are conformed to include all drawings and specification revised during the bid process. Paper sets will be furnished at the cost of reproduction, postage and handling.

1.8 COORDINATION

- A. Coordinate Work of the various sections of Specifications to assure efficient and orderly sequence of installation of construction elements, with provisions for accommodating items installed later.
- B. Verify characteristics of elements of interrelated operating equipment are compatible; coordinate Work of various sections having interdependent responsibilities for installing, connecting to, and placing in service, such equipment.
- C. Coordinate space requirements and installation of mechanical, electrical and plumbing work which are indicated diagrammatically on Drawings. Follow routing shown for pipes, ducts, and conduits, as closely as practicable; make runs parallel with lines of building. Utilize spaces efficiently to maximize accessibility for other installations, for maintenance, and for repairs.

- D. In finished areas (except as otherwise shown), conceal pipes, ducts, and wiring in the construction. Coordinate locations of fixtures and outlets with finish elements.
- E. Execute cutting and patching to integrate elements of Work, uncover ill-timed defective and non-conforming work, provide openings for penetrations of existing surfaces, and provide samples for testing. Seal penetrations through floors, walls, and ceilings.

1.9 ACCESS TO SITE

- A. General: Contractor shall have full use of Project site for construction operations as indicated on Drawings by the Contract limits and as indicated by requirements of this Section.
- B. Use of Site: Limit use of Project site to areas within the Contract limits. Do not disturb portions of Project site beyond areas in which the Work is indicated.
 - 1. Limits: Confine construction operations to the areas as indicated.
 - 2. Driveways, Walkways and Entrances: Keep public roads, public parking, driveways and entrances outside of the work area serving premises clear and available to Owner, Owner's employees, emergency vehicles and general public at all times. Do not use these areas for parking or storage of materials unless otherwise authorized in advance by the DNREC Park Manager and Engineer.
 - a. Schedule deliveries to minimize use of driveways and entrances by construction operations.
 - b. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on-site.
 - c. The Contractor may use a portion of the existing parking lot on the northeast side of the pool complex office for employee and equipment parking, material staging and storage and for the temporary office trailer after submitting a written plan and upon receipt of approval by the Park Manager, which shall not be reasonably withheld.
 - d. The Contractor shall videotape the condition of the area proposed to be used in the parking area outside of the designated limits of disturbance and limit of construction to document the condition at the start of construction. The video tape shall be provided to the Park Manager and Engineer at the work initiation conference.
 - e. The Contractor will be responsible for all costs for repairing any damage to the park, subject to the discretion and approval of the Park Manager prior to final acceptance of the Project.
 - 3. The adjacent building areas, site and properties are occupied and shall not be disturbed.
 - 4. Partial access is allowed for the pumphouse and adjacent building. All other buildings or areas, unless otherwise described, are not allowed access.
- C. Condition of Existing Building: Maintain portions of existing building affected by construction operations in a weather tight condition throughout construction period. Repair damage caused by construction operations.

1.10 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.
 2. Refer to Section 011400 "Work Restrictions" for additional requirements.
- 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 5:00 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.
- 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.

1.11 SPECIFICATION AND DRAWING CONVENTIONS

- A. Specification Content: The Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:
1. Imperative mood and streamlined language are generally used in the Specifications. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.
 2. Specification requirements are to be performed by Contractor unless specifically stated otherwise.
- B. Division 01 General Requirements: Requirements of Sections in Division 01 apply to the Work of all Sections in the Specifications.

- C. Drawing Coordination: Requirements for materials and products identified on Drawings are described in detail in the Specifications. One or more of the following are used on Drawings to identify materials and products:
1. Terminology: Materials and products are identified by the typical generic terms used in the individual Specifications Sections.
 2. Abbreviations: Materials and products are identified by abbreviations published as part of the U.S. National CAD Standard and scheduled on Drawings.
 3. Keynoting: Materials and products are identified by reference keynotes referencing Specification Section numbers found in this Project Manual.

1.12 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.

1.13 REFERENCES AND STANDARDS

- A. For products specified by association or trade standards, comply with requirements of the standard, except when more rigid requirements are specified or are required by applicable codes.
- B. The date of the standard is that in effect as of the Bid date, except when a specific date is specified.
- C. Obtain copies of standards when required by Contract Documents. Maintain copy at job site during progress of the specific work.

1.14 MISCELLANEOUS PROVISIONS

A. SCHEDULE

1. The following is the required schedule for this work:
 - a. Bids Due: May 16, 2025 at 2:00 PM
 - b. Notice of Building Contract Award: Within thirty (30) days of receipt and acceptance of qualified low bid.
 - c. 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 20 days of Notice of Award. A purchase order will be issued in approximately thirty days after these items have been submitted to the State of Delaware.
 - d. On-Site Mobilization: Upon receipt of State of Delaware purchase order.

- e. Substantial Completion: The work shall be completed shall be completed 12 months from on-site start of work.
- f. Completion of Punch List: 21 days from date of substantial completion.
 - 1) Refer to the General Requirements for additional details.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 10 00

NOT FOR BIDDING PURPOSES

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. Do not disturb areas to remain occupied during the renovations.
 - 2. Owner Occupancy: Owner will continue to operate in areas not included in the construction.
 - 3. Parking: Parking shall be limited to existing parking to north of pool, closest to the pool as shown on the Erosion and Sediment Control Plans.
 - 4. Dumpster: Shall be placed in the parking lot as to not unreasonably obstruct the parking lot. The dumpster shall be covered to avoid windblown debris. Debris shall be removed 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.
 - 5. Access: See access points as designated on the Erosion and Sediment Control plans.
 - 6. Storage: Materials and equipment may be staged in the parking lot and/or in temperature-controlled enclosures in the parking lot following written approval from Owner and Engineer. The Contractor shall be responsible for securing all materials and equipment during construction. The Owner will not be responsible for any loss or damage to the contractors materials equipment and facilities during construction.
 - 7. 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 without the written approval of the Owner and Engineer.
 - 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.
 - 8. Contractor and subcontractor promotional signage will not be allowed at the project site or within the Park unless approved by the Owner.

- B. Use of Existing Building: Maintain the existing building in a weathertight condition throughout renovation period. Repair damage caused by construction operations. Protect building and its contents during construction period.
1. The Contractor shall be provided partial access to pool, pumphouse, and existing building as necessary to complete the work. No access to northeastern building will be allowed.
 2. Use of the Owner's telephones will not be allowed.
 3. Flammable materials shall not be stored in any existing pool facility structures. Flammable materials shall be kept outside, away from all buildings, in a flammable liquid/material storage box.
 4. Gas powered equipment will not be allowed in the buildings or near windows and intake louvers at any time.
 5. Debris shall be removed from and around the pool/buildings including the sidewalks, trails and parking areas on a daily basis.
 6. At no times shall equipment be left operating in and around pool facility buildings after hours or when no one is present in the building.
 7. Noisy activities shall take place during the hours defined by the County and prescheduled with the Owner to avoid disruption of their activities.
 8. Access to water will be provided.
 9. There will be no restroom facilities available during the course of this project. The Contractor shall provide a self-contained toilet unit securely attached to the ground and kept locked after hours.
 10. Dogs or other animals shall not be brought onto the property at any time.
 11. Children shall not be brought onto the site at any time.
 12. The general surrounds of Killens Pond State Park are open to the public and those working at the site shall not use abusive language.
 13. Radios or other music-playing devices will not be allowed. Head phones and ear buds will not be allowed.
 14. Fire extinguishers shall be kept in the areas under renovation at each building accessed by the contractor at all times.
 15. All work taking place on the site shall be monitored by the contractor's project superintendent at all times even if the General Contractor's work forces are not working at the site.
 16. The Project superintendent shall discuss weekly with the DNREC Project Manager to review the activities planned for that week to avoid miscommunication, facilitate the renovation process and to maintain the Owner's operations.
 17. Walk off mats shall be provided at entrances to all construction areas from public ways.
 18. Provide protective barriers and covers at entrances and public access areas where work is taking place overhead.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 14 00

SECTION 01 21 00 - ALLOWANCES

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 governing allowances.
- B. Selected materials and equipment are specified in the Contract Documents by Allowances. In some cases, these Allowances include installation. Allowances have been established in lieu of additional requirements and to defer selection of actual materials and equipment to a later date when additional information is available for evaluation. If necessary, additional requirements will be issued by Proposal Request.
- C. Types of allowances include the following:
 - 1. Contingency Allowances.

1.3 SELECTION AND PURCHASE

- A. At the earliest practical date after award of the Contract, advise Owner of the date when final selection and purchase of each product or system described by an allowance must be completed to avoid delaying the Work.
- B. At Owner's request, obtain proposals for each allowance for use in making final selections. Include recommendations that are relevant to performing the Work.
- C. Purchase products and systems selected in writing by Owner from the designated supplier.

1.4 ACTION SUBMITTALS

- A. Submit proposals for purchase of products or systems included in allowances, in the form specified for Change Orders.

1.5 INFORMATIONAL SUBMITTALS

- A. Submit invoices or delivery slips to show actual quantities of materials delivered to the site for use in fulfillment of each allowance.

- B. Submit time sheets and other documentation to show labor time and cost for installation of allowance items that include installation as part of the allowance.
- C. Coordinate and process submittals for allowance items in same manner as for other portions of the Work.

1.6 COORDINATION

- A. Coordinate allowance items with other portions of the Work. Furnish templates as required to coordinate installation.

1.7 CONTINGENCY ALLOWANCES

- A. Allowance shall include cost to Contractor of specific products and materials ordered by Owner or selected by Architect under allowance and shall include taxes, freight, and delivery to Project site.
- B. Unless otherwise indicated, Contractor's costs for receiving and handling at Project site, labor, installation, overhead and profit, and similar costs related to products and materials selected by Architect under allowance shall be included as part of the Contract Sum and not part of the allowance.
- C. Unused Materials: Return unused materials purchased under an allowance to manufacturer or supplier for credit to Owner, after installation has been completed and accepted.
 - 1. If requested by Architect, stain and prepare unused material for storage by Owner. Deliver unused material to Owner's storage space as directed.

1.8 ADJUSTMENT OF ALLOWANCES

- A. Allowance Adjustment: To adjust allowance amounts, prepare a Change Order proposal based on the difference between purchase amount and the allowance, multiplied by final measurement of work-in-place where applicable. If applicable, include reasonable allowances for cutting losses, tolerances, mixing wastes, normal product imperfections, and similar margins.
 - 1. Include installation costs in purchase amount only where indicated as part of the allowance.
 - 2. If requested, prepare explanation and documentation to substantiate distribution of overhead costs and other margins claimed.
 - 3. Submit substantiation of a change in scope of work, if any, claimed in Change Orders related to unit-cost allowances.
 - 4. Owner reserves the right to establish the quantity of work-in-place by independent quantity survey, measure, or count.

- B. Submit claims for increased costs because of a change in scope or nature of the allowance described in the Contract Documents, whether for the purchase order amount or Contractor's handling, labor, installation, overhead, and profit.
 - 1. Do not include Contractor's or subcontractor's indirect expense in the Change Order cost amount unless it is clearly shown that the nature or extent of work has changed from what could have been foreseen from information in the Contract Documents.
 - 2. No change to Contractor's indirect expense is permitted for selection of higher- or lower-priced materials or systems of the same scope and nature as originally indicated.

1.9 Contingency Allowances:

- A. Use the Contingency Allowance only as directed for the Owner's purposes and only by Change Orders that indicate amounts to be charged to the Allowance.
- B. Change Orders authorizing use of funds from the Contingency Allowance, for purchase of products and equipment, will include Contractor's related costs and reasonable overhead and profit margins. These related costs include delivery, installation, taxes, insurance, equipment rental, and similar costs.
- C. At Project Closeout, credit unused amounts remaining in the Contingency Allowance to the Owner by Change Order.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine products covered by an allowance promptly on delivery for damage or defects. Return damaged or defective products to manufacturer for replacement.

3.2 PREPARATION

- A. Coordinate materials and their installation for each allowance with related materials and installations to ensure that each allowance item is completely integrated and interfaced with related work.

3.3 SCHEDULE OF ALLOWANCES

- A. Allowance No. 1 – Contingency Allowance: Include, in the Bid, a Contingency Allowance of \$ 25,000 for use according to the Owner's instructions.
1. This allowance includes material cost, receiving, handling, installation and Contractor overhead and profit.

END OF SECTION 01 21 00

NOT FOR BIDDING PURPOSES

SECTION 01 22 00 – UNIT PRICES

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 unit prices.
- B. Related Sections include the following:
 - 1. Division 1 Section "Contract Modification Procedures" for administrative procedures for handling changes to the Contract.

1.3 DEFINITIONS

- A. Unit price is an amount proposed by bidders, stated on the Bid Form, as a price per unit of measurement for materials or services added to or deducted from the Contract Sum by appropriate modification, if estimated quantities of Work required by the Contract Documents are increased or decreased.

1.4 PROCEDURES

- A. Unit prices include all necessary material, plus cost for delivery, installation, insurance, applicable taxes, overhead, equipment, superintendence, and profit.
- B. Payment: Payment for all items will be made monthly based upon the measured quantity of the item completed as mutually agreed upon between the Owner and the Contractor.
- C. Owner reserves the right to reject Contractor's measurement of work-in-place that involves use of established unit prices and to have this work measured, at Owner's expense, by an independent surveyor acceptable to Contractor.
- D. List of Unit Prices: A list of unit prices is included at the end of this Section. Specification Sections referenced in the schedule contain requirements for materials described under each unit price.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 LIST OF UNIT PRICES

- A. Unit Price No. 1 – Unclassified General Site Excavation and Disposal of Unsuitable materials
1. Description: Excavation as required to complete specified work not including below structures, pool deck, storm drain, or utility subgrades in accordance with Section 312000 - Earthwork
 2. Unit of Measurement: Cubic Yard (CY)
- B. Unit Price No. 2 – Unclassified excavation and Stockpile of Suitable Materials for Re-Use
1. Description: Remove additional unwanted fill and stockpile materials in approved stockpile area in accordance with Section 312000 - Earthwork.
 2. Unit of Measurement: Cubic Yard (CY)
- C. Unit Price No. 3 – Imported Structural Fill
1. Description: Provide, place, and compact structural fill to replace excavated materials associated with unit price item no. 2 in accordance with Section 312000 Earthwork
 2. Unit of Measurement: Cubic Yard (CY)
- D. Unit Price No. 4 – Graded Aggregate Base Course
1. Description: Provide and place GABC as needed in accordance with Section 301 – Graded Aggregate Base Course of the DelDOT Standard Specifications.
 2. Unit of Measurement: Cubic Yard (CY)
- E. Unit Price No. 5 – Delaware No. 3 Stone
1. Description: Provide and place Delaware No. 3 Stone as needed in accordance with Section 302 – Stone and Section 1004 – Coarse Aggregate of the DelDOT Standard Specifications.
 2. Unit of Measurement: Ton (TON)
- F. Unit Price No. 6 – Delaware No. 57 Stone
1. Description: Provide and place Delaware No. 57 Stone as needed in accordance with Section 302 – Stone and Section 1004 – Coarse Aggregate of the DelDOT Standard Specifications.
 2. Unit of Measurement: Ton (TON)
- G. Unit Price No. 7 – Remove and Replace Existing Pool Deck Beyond Limit of Disturbance
1. Description: Work consists of demolition of additional pool deck areas if directed by DNREC and the Engineer, excavation to the proposed deck subgrade per the deck construction details, installation of aggregate base materials, compaction of the subgrade and base materials and installation of additional concrete deck in accordance with the Project Drawings and Project Manual Sections 03300, 024119, 31200, and 315000.
 2. Unit of Measurement: Square Yard (SY)

END OF SECTION 01 22 00

SECTION 01 24 00 - 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

3.1 SCHEDULE OF ISSUED PERMITS

- A. Department of Natural Resources and Environmental Control (DNREC).
 - 1. Sediment and Stormwater Plan Approval.
- B. State of Delaware Architectural Accessibility Board.
- C. Delaware State Historic Preservation Office (SHPO).
- D. Delaware Office of State Fire Marshal

3.2 SCHEDULE OF PENDING PERMITS.

- A. Kent County Building Permit
- B. Delaware Department of Health and Social Services – Public Pool Operation Permit

END OF SECTION 01 24 00

SECTION 01 26 00 - CONTRACT MODIFICATION PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section specifies administrative and procedural requirements for handling and processing Contract modifications.
- B. Related Sections include the following:
 - 1. Division 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 01 26 00

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 G706 A, "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 01 29 00

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NOT FOR BIDDING PURPOSES

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. 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 every two weeks. 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 01 31 00

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 01 31 50

NOT FOR BIDDING PURPOSES

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 01 32 00

NOT FOR BIDDING PURPOSES

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 select CAD Drawing files 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 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 electronic copy of submittal to concurrent reviewer.

- 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 "Furnish as Submitted" or "Revise as Noted & Furnish" 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:
- B.
1. CADD files are limited to those that have been generated for this Project.
 2. CADD files for the floor plans and roof plans shall be provided. Files for details, etc. will not be provided.
 3. 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. Submit electronic files of Product Data, unless otherwise indicated. Architect will return the reviewed files. Retain copies 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 24 by 36 inches.
 3. Number of Copies: Submit electronic files of each submittal. Retain copies where copies are required for operation and maintenance manuals. The Architect will return the reviewed files.
- 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 electronic files. 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. Furnish as Submitted.
 - 2. Revise as Noted & Furnish.
 - 3. Revise as Noted & Furnish. Submit Revised Copy for Record.
 - 4. Revise & Resubmit.
- 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 01 33 00

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.
 - 2. Division 1 Section "Cutting and Patching" for repair and restoration of construction disturbed by testing and inspecting activities.

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.
 - 2. Comply with the Contract Document requirements for Division 1 Section "Cutting and Patching."
- 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 SECTION 01 40 00

NOT FOR BIDDING PURPOSES

SECTION 01 42 00 - REFERENCE STANDARDS AND DEFINITIONS

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 "Master Format" 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.

NOT FOR BIDDING PURPOSES

1.4 INDUSTRY STANDARDS

- A. Applicability of Standards: Unless the Contract Documents include more stringent requirements, applicable construction industry standards have the same force and effect as if bound or copied directly into the Contract Documents to the extent referenced. Such standards are made a part of the Contract Documents by reference.
- B. Publication Dates: Comply with standards in effect as of the date of the Contract Documents.
- C. 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.
- D. 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.
- E. 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 near 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

- A. 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.

PRODUCTS (Not Applicable)

PART 2 - EXECUTION (Not Applicable)

END OF SECTION 01 42 00

NOT FOR BIDDING PURPOSES

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. Sewer Service: Use of the Owner's existing sanitary sewer system is available without metering and without payment charge. Provide connections and extensions of services as required for construction operations.
- C. Water Service: Water from Owner's existing water system is available for use without metering and without payment of use charges. Provide connections and extensions of services as required for construction operations.
- D. Electric Power Service: Electric power from Owner's existing system is available for use without metering and without payment of use charges. Provide connections and extensions of services as required for construction operations.
- E. Telephone Service: Provide temporary phone service to the site as required to contact Contractor site representatives.

1.4 INFORMATIONAL SUBMITTALS

- A. Site Plan: Show temporary facilities, utility hookups, staging areas, and parking areas for construction personnel.
- B. Erosion- and Sedimentation-Control Plan: Show compliance with requirements of EPA Construction General Permit or authorities having jurisdiction, whichever is more stringent.
- C. Fire-Safety Program: Show compliance with requirements of NFPA 241 and authorities having jurisdiction. Indicate Contractor personnel responsible for management of fire-prevention program.

- D. **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.
- E. **Dust- and HVAC-Control Plan:** Submit coordination drawing and narrative that indicates the dust- and HVAC-control measures proposed for use, proposed locations, and proposed time frame for their operation. Identify further options if proposed measures are later determined to be inadequate. Include the following:
1. Locations of dust-control partitions at each phase of work.
 2. HVAC system isolation schematic drawing.
 3. Location of proposed air-filtration system discharge.
 4. Waste handling procedures.
 5. Other dust-control measures.

1.5 QUALITY ASSURANCE

- A. **Electric Service:** Comply with NEC, 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. Lumber and Plywood: Pressure-treated dimension lumber and plywood suitable for exterior exposure.
- E. Paint: Exterior latex primer and matching topcoat.

2.2 TEMPORARY FACILITIES

- A. Field Offices, General: Prefabricated or mobile units with serviceable finishes, temperature controls, and foundations adequate for normal loading.
- B. Common-Use Field Office: Of sufficient size to accommodate needs of Owner, Architect/Engineer and construction personnel office activities and to accommodate Project meetings specified in other Division 01 Sections. Keep office clean and orderly. Furnish and equip offices as follows:
 - 1. Furniture required for Project-site documents including file cabinets, plan tables, plan racks, and bookcases.
 - 2. Conference room of sufficient size to accommodate meetings of 10 individuals. Provide electrical power service and 120-V ac duplex receptacles, with no fewer than one receptacle on each wall. Furnish room with conference table, chairs, and 4-foot- (1.2-m-) square tack and marker boards.
 - 3. Drinking water and private toilet.
 - 4. Coffee machine and supplies.

5. Heating and cooling equipment necessary to maintain a uniform indoor temperature of 68 to 72 deg F (20 to 22 deg C).
6. Lighting fixtures capable of maintaining average illumination of 20 fc (215 lx) at desk height.

C. Storage and Fabrication Sheds: Provide sheds sized, furnished, and equipped to accommodate materials and equipment for construction operations.

1. Store combustible materials apart from building.

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. Water Service: Connect to Owner's existing water service facilities. Clean and maintain water service facilities in a condition acceptable to Owner. At Substantial Completion, restore these facilities to condition existing before initial use.

Provide potable water for drinking and construction purposes.

1. The Contractor shall make all necessary arrangements for temporary water service for construction purposes, and furnish at his own expense all piping and accessories required.
 2. Take positive measures to preclude cross-connections and backflow.
 3. The Contractor will assume the cost of water consumed if responsible care and restraint are not exercised by the Contractor in its use.
- D. 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.
- E. 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.
- F. 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.
- G. 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.
- H. 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.
- I. **Electric Power Service: Connect to Owner's existing electric power service. Maintain equipment in a condition acceptable to Owner.**

- J. 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.
- K. 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. General: Comply with the following:
1. Provide construction for temporary offices, shops, and sheds located within construction area or within 30 feet (9 m) of building lines that is noncombustible according to ASTM E 136. Comply with NFPA 241.
 2. Maintain support facilities until Architect/Engineer schedules Substantial Completion inspection. Remove before Substantial Completion. Personnel remaining after Substantial Completion will be permitted to use permanent facilities, under conditions acceptable to Owner.
- B. 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.

- C. Traffic Controls: Comply with requirements of authorities having jurisdiction.
1. Protect existing site improvements to remain including curbs, pavement, and utilities.
 2. Maintain access for fire-fighting equipment and access to fire hydrants and control valves.
 3. Provide and maintain uninterrupted vehicular access to site and within to temporary construction facilities and work areas for persons and equipment involved in the construction of Project.
 4. Maintain traffic areas free of excavated materials, construction equipment, products, snow, ice and debris.
- D. 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.
- E. Parking: Use designated areas of Owner's existing parking areas for construction personnel's private vehicles and of Contractor's light-weight vehicles.
- F. Project Signs: Provide Project signs as indicated. Unauthorized signs are not permitted.
1. Identification Signs: Provide Project identification signs as indicated on Drawings.
 2. Temporary Signs: Provide other signs as indicated and as required to inform public and individuals seeking entrance to Project.
 - a. Provide temporary, directional signs for construction personnel and visitors.
 3. Maintain and touchup signs so they are legible at all times.
- G. Waste Disposal Facilities: Comply with requirements specified in Section 017419 "Construction Waste Management and Disposal."
- H. Cleaning During Construction: Control accumulation of waste materials and rubbish. Periodically dispose of legally off site.
1. Clean interior areas prior to the start of finish work. Maintain areas free of dust and other contaminants during finishing operations.
- I. Lifts and Hoists: Provide facilities necessary for hoisting materials and personnel.
1. Truck cranes and similar devices used for hoisting materials are considered "tools and equipment" and not temporary facilities.
- J. Protection of Existing Facilities: Protect existing vegetation, equipment, structures, utilities, and other improvements at Project site and on adjacent properties, except those indicated to be removed or altered. Repair damage to existing facilities.

- K. 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.
- L. 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 sediment 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.
- M. 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.
- N. Site Enclosure Fence: Before construction operations begin, furnish and install site enclosure fence in a manner that will prevent people and animals from easily entering site except by entrance gates.
1. Extent of Fence: As required to enclose portion of site determined sufficient to accommodate construction operations and maintain security.
 2. Maintain security by limiting number of keys and restricting distribution to authorized personnel. Furnish 10 sets of keys to Owner.
- O. Security Enclosure and Lockup: Install temporary enclosure around partially completed areas of construction. Provide lockable entrances to prevent unauthorized entrance, vandalism, theft, and similar violations of security. Lock entrances at end of each work day.
- P. Barricades, Warning Signs, and Lights: Comply with requirements of authorities having jurisdiction for erecting structurally adequate barricades, including warning signs and lighting.
- Q. Temporary Egress: Maintain temporary egress from existing occupied facilities as indicated and as required by authorities having jurisdiction.
- R. Temporary Enclosures: Provide temporary enclosures for protection of construction, in progress and completed, from exposure, foul weather, other construction operations, and similar activities. Provide temporary weathertight enclosure for building exterior.
1. Where heating or cooling is needed and permanent enclosure is incomplete, insulate temporary enclosures.
- S. Temporary Fire Protection: Install and maintain temporary fire-protection facilities of types needed to protect against reasonably predictable and controllable fire losses. Comply with NFPA 241; manage fire-prevention program.

1. Prohibit smoking in construction areas.
2. Supervise welding operations, combustion-type temporary heating units, and similar sources of fire ignition according to requirements of authorities having jurisdiction.
3. Develop and supervise an overall fire-prevention and -protection program for personnel at Project site. Review needs with local fire department and establish procedures to be followed. Instruct personnel in methods and procedures. Post warnings and information.
4. Provide temporary standpipes and hoses for fire protection. Hang hoses with a warning sign stating that hoses are for fire-protection purposes only and are not to be removed. Match hose size with outlet size and equip with suitable nozzles.

3.4 MOISTURE AND MOLD CONTROL

- A. Contractor's Moisture-Protection Plan: Avoid trapping water in finished work. Document visible signs of mold that may appear during construction.
- B. Exposed Construction Phase: Before installation of weather barriers, when materials are subject to wetting and exposure and to airborne mold spores, protect as follows:
 1. Protect porous materials from water damage.
 2. Protect stored and installed material from flowing or standing water.
 3. Keep porous and organic materials from coming into prolonged contact with concrete.
 4. Remove standing water from decks.
 5. Keep deck openings covered or dammed.
- C. Partially Enclosed Construction Phase: After installation of weather barriers but before full enclosure and conditioning of building when installed materials are still subject to infiltration of moisture and ambient mold spores, protect as follows:
 1. Do not load or install drywall or other porous materials or components, or items with high organic content into partially enclosed building.
 2. Keep interior spaces reasonably clean and protected from water damage.
 3. Periodically collect and remove waste containing cellulose or other organic matter.
 4. Discard or replace water-damaged material.
 5. Do not install material that is wet.
 6. Discard, replace, or clean stored or installed material that begins to grow mold.
 7. Perform work in a sequence that allows any wet materials adequate time to dry before enclosing the material in drywall or other interior finishes.
- D. Controlled Construction Phase of Construction: After completing and sealing of the building enclosure but prior to the full operation of permanent HVAC systems, maintain as follows:
 1. Control moisture and humidity inside building by maintaining effective dry-in conditions.
 2. Use permanent HVAC system to control humidity.
 3. Comply with manufacturer's written instructions for temperature, relative humidity, and exposure to water limits.
 - a. Hygroscopic materials that may support mold growth, including wood and gypsum-based products, that become wet during the course of construction and remain wet for 48 hours are considered defective.

- b. Measure moisture content of materials that have been exposed to moisture during construction operations or after installation. Record readings beginning at time of exposure and continuing daily for 48 hours. Identify materials containing moisture levels higher than allowed. Report findings in writing to Architect.
- c. Remove materials that cannot be completely restored to their manufactured moisture level within 48 hours.

3.5 OPERATION, TERMINATION, AND REMOVAL

- A. Supervision: Enforce strict discipline in use of temporary facilities. To minimize waste and abuse, limit availability of temporary facilities to essential and intended uses.
- B. Maintenance: Maintain facilities in good operating condition until removal.
 - 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 017700 "Closeout Procedures."

END OF SECTION 01 50 00

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NOT FOR BIDDING PURPOSES

SECTION 01 56 00 - ENVIRONMENTAL PROTECTION

PART 1 - GENERAL

1.1 ENVIRONMENTAL PROTECTION

- A. Environmental protection 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.

1.4.1 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 present within the site.
- F. Asbestos is not present within the site.

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 01 56 00

NOT FOR BIDDING PURPOSES

SECTION 01 56 39 - TEMPORARY TREE AND PLANT PROTECTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes general protection and pruning of existing trees and plants that are affected by execution of the Work, whether temporary or permanent construction.
- B. Related Sections:
 - 1. Section 015000 "Temporary Facilities and Controls" for temporary site fencing.
 - 2. Section 311000 "Site Clearing" for removing existing trees and shrubs.

1.3 DEFINITIONS

- A. Caliper: Diameter of a trunk measured by a diameter tape at 6 inches (150 mm) above the ground for trees up to, and including, 4-inch (100-mm) size; and 12 inches (300 mm) above the ground for trees larger than 4-inch (100 mm) size.
- B. Plant-Protection Zone: Area surrounding individual trees, groups of trees, shrubs, or other vegetation to be protected during construction, and indicated on Drawings.
- C. Tree-Protection Zone: Area surrounding individual trees or groups of trees to be protected during construction, and defined by a circle concentric with each tree with a radius 1.5 times the diameter of the drip line unless otherwise indicated.
- D. Vegetation: Trees, shrubs, groundcovers, grass, and other plants.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Samples for Verification: For each type of the following:
 - 1. Organic Mulch: 1-pint (0.5-L) volume of organic mulch; in sealed plastic bags labeled with composition of materials by percentage of weight and source of mulch.
 - 2. Protection-Zone Fencing: Assembled Samples of manufacturer's standard size made from full-size components.

3. Protection-Zone Signage: Full-size Samples of each size and text, ready for installation.
- C. Tree Pruning Schedule: Written schedule detailing scope and extent of pruning of trees to remain that interfere with or are affected by construction.
 1. Species and size of tree.
 2. Location on site plan. Include unique identifier for each.
 3. Reason for pruning.
 4. Description of pruning to be performed.
 5. Description of maintenance following pruning.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For qualified arborist and tree service firm.
- B. Certification: From arborist, certifying that trees indicated to remain have been protected during construction according to recognized standards and that trees were promptly and properly treated and repaired when damaged.
- C. Maintenance Recommendations: From arborist for care and protection of trees affected by construction during and after completing the Work.
- D. Existing Conditions: Documentation of existing trees and plantings indicated to remain, which establishes preconstruction conditions that might be misconstrued as damage caused by construction activities.
 1. Use sufficiently detailed photographs or videotape.
 2. Include plans and notations to indicate specific wounds and damage conditions of each tree or other plants designated to remain.

1.6 QUALITY ASSURANCE

- A. Arborist Qualifications: Certified Arborist as certified by ISA.
- B. Tree Service Firm Qualifications: An experienced tree service firm that has successfully completed temporary tree and plant protection work similar to that required for this Project and that will assign an experienced, qualified arborist to Project site during execution of the Work.
- C. Preinstallation Conference: Conduct conference at Project site.
 1. Review methods and procedures related to temporary tree and plant protection including, but not limited to, the following:
 - a. Construction schedule. Verify availability of materials, personnel, and equipment needed to make progress and avoid delays.
 - b. Enforcing requirements for protection zones.
 - c. Arborist's responsibilities.

- d. Field quality control.

1.7 PROJECT CONDITIONS

- A. The following practices are prohibited within protection zones:

1. Storage of construction materials, debris, or excavated material.
2. Parking vehicles or equipment.
3. Foot traffic.
4. Erection of sheds or structures.
5. Impoundment of water.
6. Excavation or other digging unless otherwise indicated.
7. Attachment of signs to or wrapping materials around trees or plants unless otherwise indicated.

- B. Do not direct vehicle or equipment exhaust toward protection zones.

- C. Prohibit heat sources, flames, ignition sources, and smoking within or near protection zones and organic mulch.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Topsoil: Natural or cultivated top layer of the soil profile or manufactured topsoil; containing organic matter and sand, silt, and clay particles; friable, pervious, and black or a darker shade of brown, gray, or red than underlying subsoil; reasonably free of subsoil, clay lumps, gravel, and other objects more than 1 inch (25 mm) in diameter; and free of weeds, roots, and toxic and other nonsoil materials.
 1. Obtain topsoil only from well-drained sites where topsoil is 4 inches (100 mm) deep or more; do not obtain from bogs or marshes.
- B. Organic Mulch: Free from deleterious materials and suitable as a top dressing for trees and shrubs, consisting of one of the following:
 1. Type: Shredded hardwood.
 2. Size Range: 3 inches (76 mm) maximum, 1/2 inch (13 mm) minimum.
 3. Color: Natural.
- C. Protection-Zone Fencing: Fencing fixed in position and meeting one of the following requirements.
 1. Chain-Link Protection-Zone Fencing: Galvanized-steel fencing fabricated from minimum 2-inch (50-mm) opening, 0.148-inch- (3.76-mm-) diameter wire chain-link fabric; with 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; with 0.177-inch- (4.5-mm-) diameter top tension wire and 0.177-inch- (4.5-mm-) diameter bottom tension wire; with tie wires, hog ring ties, and other accessories for a complete fence system.

- a. Height: 4 feet (1.2 m).
2. Plastic Protection-Zone Fencing: Plastic construction fencing constructed of high-density extruded and stretched polyethylene fabric with 2-inch (50-mm) maximum opening in pattern and weighing a minimum of 0.4 lb/ft. (0.6 kg/m); remaining flexible from minus 60 to plus 200 deg F (minus 16 to plus 93 deg C); inert to most chemicals and acids; minimum tensile yield strength of 2000 psi (13.8 MPa) and ultimate tensile strength of 2680 psi (18.5 MPa); secured with plastic bands or galvanized-steel or stainless-steel wire ties; and supported by tubular or T-shape galvanized-steel posts spaced not more than 8 feet (2.4 m) apart.
 - a. Height: 4 feet (1.2 m).
 - b. Color: High-visibility orange, nonfading.
- D. Protection-Zone Signage: Shop-fabricated, rigid plastic or metal sheet with attachment holes prepunched and reinforced; legibly printed with nonfading lettering and as follows:
 1. Size and Text: DO NOT ENTER. TREE PROTECTION ZONE.
 2. Lettering: 3-inch- (75-mm-) high minimum, white characters on red background.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Erosion and Sedimentation Control: Examine the site to verify that temporary erosion- and sedimentation-control measures are in place. Verify that flows of water redirected from construction areas or generated by construction activity do not enter or cross protection zones.
- B. For the record, prepare written report, endorsed by arborist, listing conditions detrimental to tree and plant protection.

3.2 PREPARATION

- A. Locate and clearly identify trees, shrubs, and other vegetation to remain. Flag each tree trunk at 54 inches (1372 mm) above the ground.
- B. Protect tree root systems from damage caused by runoff or spillage of noxious materials while mixing, placing, or storing construction materials. Protect root systems from ponding, eroding, or excessive wetting caused by dewatering operations.
- C. Tree-Protection Zones: Mulch areas inside tree-protection zones and other areas indicated.

1. Apply 4-inch (100-mm) average thickness of organic mulch. Do not place mulch within 6 inches (150 mm) of tree trunks.

3.3 TREE- AND PLANT-PROTECTION ZONES

- A. Protection-Zone Fencing: Install protection-zone fencing along edges of protection zones before materials or equipment are brought on the site and construction operations begin in a manner that will prevent people from easily entering protected area except by entrance gates. Construct fencing so as not to obstruct safe passage or visibility at vehicle intersections where fencing is located adjacent to pedestrian walkways or in close proximity to street intersections, drives, or other vehicular circulation.
 1. Chain-Link Fencing: Install to comply with ASTM F 567 and with manufacturer's written instructions.
 2. Posts: Set or drive posts into ground one-third the total height of the fence without concrete footings. Where a post is located on existing paving or concrete to remain, provide appropriate means of post support acceptable to Architect.
- B. Protection-Zone Signage: Install protection-zone signage in visibly prominent locations in a manner approved by Architect. Install one sign spaced approximately every 20 feet (6 m) on protection-zone fencing, but no fewer than one sign with each facing a different direction.
- C. Maintain protection zones free of weeds and trash.
- D. Repair or replace trees, shrubs, and other vegetation indicated to remain or be relocated that are damaged by construction operations, in a manner approved by Architect.
- E. Maintain protection-zone fencing and signage in good condition as acceptable to Architect and remove when construction operations are complete and equipment has been removed from the site.
 1. Do not remove protection-zone fencing, even temporarily, to allow deliveries or equipment access through the protection zone.
 2. Temporary access is permitted subject to preapproval in writing by arborist if a root buffer effective against soil compaction is constructed as directed by arborist. Maintain root buffer so long as access is permitted.

3.4 EXCAVATION

- A. General: Excavate at edge of protection zones and for trenches indicated within protection zones according to requirements in Section 312000 "Earth Moving."
- B. Trenching near Trees: Where utility trenches are required within protection zones, hand excavate under or around tree roots or tunnel under the roots by drilling, auger boring, or pipe jacking. Do not cut main lateral tree roots or taproots; cut only smaller roots that interfere with installation of utilities. Cut roots as required for root pruning.

- C. Redirect roots in backfill areas where possible. If encountering large, main lateral roots, expose roots beyond excavation limits as required to bend and redirect them without breaking. If encountered immediately adjacent to location of new construction and redirection is not practical, cut roots approximately 3 inches (75 mm) back from new construction and as required for root pruning.
- D. Do not allow exposed roots to dry out before placing permanent backfill. Provide temporary earth cover or pack with peat moss and wrap with burlap. Water and maintain in a moist condition. Temporarily support and protect roots from damage until they are permanently relocated and covered with soil.

3.5 ROOT PRUNING

- A. Prune roots that are affected by temporary and permanent construction. Prune as follows:
 - 1. Cut roots manually by digging a trench and cutting exposed roots with sharp pruning instruments; do not break, tear, chop, or slant the cuts. Do not use a backhoe or other equipment that rips, tears, or pulls roots.
 - 2. Cut Ends: Coat cut ends of roots more than 1-1/2 inches (38 mm) in diameter with an emulsified asphalt or other coating formulated for use on damaged plant tissues and that is acceptable to arborist.
 - 3. Temporarily support and protect roots from damage until they are permanently redirected and covered with soil.
 - 4. Cover exposed roots with burlap and water regularly.
 - 5. Backfill as soon as possible according to requirements in Section 312000 "Earth Moving."
- B. Root Pruning at Edge of Protection Zone: Prune roots 6 inches (150 mm) inside of the protection zone, by cleanly cutting all roots to the depth of the required excavation.
- C. Root Pruning within Protection Zone: Clear and excavate by hand to the depth of the required excavation to minimize damage to root systems. Use narrow-tine spading forks, comb soil to expose roots, and cleanly cut roots as close to excavation as possible.

3.6 CROWN PRUNING

- A. Prune branches that are affected by temporary and permanent construction. Prune branches as follows:
 - 1. Prune trees to remain to compensate for root loss caused by damaging or cutting root system. Provide subsequent maintenance during Contract period as recommended by arborist.
 - 2. Pruning Standards: Prune trees according to ANSI A300 (Part 1) and the following:
 - a. Type of Pruning: Cleaning.
 - 3. Cut branches with sharp pruning instruments; do not break or chop.
 - 4. Do not apply pruning paint to wounds.

- B. Chip removed branches and spread over areas identified by Architect.

3.7 REGRADING

- A. Lowering Grade: Where new finish grade is indicated below existing grade around trees, slope grade beyond the protection zone. Maintain existing grades within the protection zone.
- B. Lowering Grade within Protection Zone: Where new finish grade is indicated below existing grade around trees, slope grade away from trees as recommended by arborist unless otherwise indicated.
 - 1. Root Pruning: Prune tree roots exposed by lowering the grade. Do not cut main lateral roots or taproots; cut only smaller roots. Cut roots as required for root pruning.
- C. Raising Grade: Where new finish grade is indicated above existing grade around trees, slope grade beyond the protection zone. Maintain existing grades within the protection zone.
- D. Minor Fill within Protection Zone: Where existing grade is 2 inches (50 mm) or less below elevation of finish grade, fill with topsoil. Place topsoil in a single uncompacted layer and hand grade to required finish elevations.

3.8 FIELD QUALITY CONTROL

- A. Inspections: Engage a qualified arborist to direct plant-protection measures in the vicinity of trees, shrubs, and other vegetation indicated to remain and to prepare inspection reports.

3.9 REPAIR AND REPLACEMENT

- A. General: Repair or replace trees, shrubs, and other vegetation indicated to remain or be relocated that are damaged by construction operations, in a manner approved by Architect.
 - 1. Submit details of proposed root cutting and tree and shrub repairs.
 - 2. Have arborist perform the root cutting, branch pruning, and damage repair of trees and shrubs.
 - 3. Treat damaged trunks, limbs, and roots according to arborist's written instructions.
 - 4. Perform repairs within 24 hours.
 - 5. Replace vegetation that cannot be repaired and restored to full-growth status, as determined by Architect.
- B. Trees: Remove and replace trees indicated to remain that are more than 25 percent dead or in an unhealthy condition before the end of the corrections period or are damaged during construction operations that Architect determines are incapable of restoring to normal growth pattern.
 - 1. Provide new trees of same size and species as those being replaced for each tree that measures 6 inches (150 mm) or smaller in caliper size.

- a. Species: Match existing tree to be replaced.
- C. Soil Aeration: Where directed by Architect, aerate surface soil compacted during construction. Aerate 10 feet (3 m) beyond drip line and no closer than 36 inches (900 mm) to tree trunk. Drill 2-inch- (50-mm-) diameter holes a minimum of 12 inches (300 mm) deep at 24 inches (600 mm) o.c. Backfill holes with an equal mix of augered soil and sand.

3.10 DISPOSAL OF SURPLUS AND WASTE MATERIALS

- A. Disposal: Remove excess excavated material, displaced trees, trash and debris, and legally dispose of them off Owner's property.

END OF SECTION 01 56 39

NOT FOR BIDDING PURPOSES

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 "Closeout Procedures" for submitting warranties for Contract closeout.
 - 2. 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.
- C. Basis-of-Design Product Specification: Where a specific manufacturer's product is named and accompanied by the words "basis of design," including make or model number or other designation, to establish the significant qualities related to type, function, dimension, in-service

performance, physical properties, appearance, and other characteristics for purposes of evaluating comparable products of other named manufacturers.

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 Action: If necessary, Architect will request additional information or documentation for evaluation within 7 days of receipt of a request for substitution. Architect 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 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 will request additional information or documentation for evaluation within one week of receipt of a comparable product request. Architect 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 25 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 **30** days after the Notice to Proceed. Requests received after that time may be considered or rejected at discretion of Architect.
- 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)

NOT FOR BIDDING PURPOSES



**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 0 160 00

SECTION 01 73 00 – EXECUTION 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 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 "Cutting and Patching" for procedural requirements for cutting and patching necessary for the installation or performance of other components of the Work.
 - 3. 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.
 - 4. Division 02 Section "Selective Demolition" for demolition and removal of selected portions of the building.

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 Division 1 Section "Cutting and Patching."
 - 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 01 73 00

SECTION 01 73 29 - CUTTING AND PATCHING

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 procedural requirements for cutting and patching.
- B. Related Sections include the but are not limited to the following:
 - 1. Division 2 Section "Selective Demolition" for demolition of selected portions of the building for alterations.

1.3 DEFINITIONS

- A. Cutting: Removal of existing construction necessary to permit installation or performance of other Work.
- B. Patching: Fitting and repair work required to restore surfaces to original conditions after installation of other Work.

1.4 QUALITY ASSURANCE

- A. Structural Elements: Do not cut and patch structural elements in a manner that could change their load-carrying capacity or load-deflection ratio.
- B. Operational Elements: Do not cut and patch the following operating elements and related components in a manner that results in reducing their capacity to perform as intended or that result in increased maintenance or decreased operational life or safety.
 - 1. Primary operational systems and equipment.
 - 2. Fire-protection systems.
 - 3. Control systems.
 - 4. Communication systems.
 - 5. Electrical wiring systems.
- C. Miscellaneous Elements: Do not cut and patch the following elements or related components in a manner that could change their load-carrying capacity, which results in reducing their capacity to perform as intended, or that result in increased maintenance or decreased operational life or safety.

1. Water, moisture, or vapor barriers.
 2. Membranes and flashings.
 3. Piping and ductwork.
- D. Visual Requirements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch construction exposed on the exterior or in occupied spaces in a manner that would, in Architect's opinion, reduce the building's aesthetic qualities. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner.
- E. Cutting and Patching Conference: Before proceeding, meet at Project site with parties involved in cutting and patching, including mechanical and electrical trades. Review areas of potential interference and conflict. Coordinate procedures and resolve potential conflicts before proceeding.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. General: Comply with requirements specified in other Sections of these Specifications.
- B. Existing Materials: Use materials identical to existing materials. For exposed surfaces, use materials that visually match existing adjacent surfaces to the fullest extent possible.
1. If identical materials are unavailable or cannot be used, use materials that, when installed, will match the visual and functional performance of existing materials.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine surfaces to be cut and patched and conditions under which cutting and patching are to be performed.
1. Compatibility: Before patching, verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
 2. Proceed with installation only after unsafe or unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Temporary Support: Provide temporary support of Work to be cut.
- B. Protection: Protect existing construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations.
- C. Adjoining Areas: Avoid interference with use of adjoining areas or interruption of free passage to adjoining areas.

3.3 PERFORMANCE

- A. General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.
 - 1. Cut existing construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.
- B. Cutting: Cut existing construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction. If possible, review proposed procedures with original Installer; comply with original Installer's written recommendations.
 - 1. In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots as small as possible, neatly to size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
 - 2. Existing Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces.
 - 3. Concrete & Masonry: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.
 - 4. Excavating and Backfilling: Comply with requirements in applicable Division 2 Sections where required by cutting and patching operations.
 - 5. Proceed with patching after construction operations requiring cutting are complete.
- C. Patching: Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other Work. Patch with durable seams that are as invisible as possible. Provide materials and comply with installation requirements specified in other Sections of these Specifications.
 - 1. Inspection: Where feasible, test and inspect patched areas after completion to demonstrate integrity of installation.
 - 2. Exposed Finishes: Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will eliminate evidence of patching and refinishing.
 - 3. Floors and Walls: Where walls or partitions that are removed extend one finished area into another, patch and repair floor and wall surfaces in the new space. Provide an even surface

of uniform finish, color, texture, and appearance. Remove existing floor and wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.

- a. Where patching occurs in a painted surface, apply primer and intermediate paint coats over the patch and apply final paint coat over entire unbroken surface containing the patch. Provide additional coats until patch blends with adjacent surfaces.
4. Ceilings: Patch, repair, or rehang existing ceilings as necessary to provide an even-plane surface of uniform appearance.
5. Exterior Building Enclosure: Patch components in a manner that restores enclosure to a weathertight condition.

END OF SECTION 01 73 29

NOT FOR BIDDING PURPOSES

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 construction waste management activities.
- B. Related Requirements:
 - 1. Section 024119 "Selective Demolition" for disposition of waste resulting from partial demolition of buildings, structures, and site improvements.
 - 2. Section 042200 "Unit Masonry" for disposal requirements for masonry waste.

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.
- B. Salvage: Recovery of materials for on-site reuse, sale or donation to a third party.
- C. 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 as mulch.
- D. Recycling: The process of sorting, cleaning, treating, and reconstituting materials for the purpose of using the material in the manufacture of a new product.
- E. 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.
- F. 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.
- G. 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.

H. Universal waste components (UWC) are as follows: electric motors, PCB ballasts, non PCB ballasts, capacitors, contactors, circuit breakers, elemental and liquid mercury containing articles, transformers, lead acid batteries, fluorescent light bulbs, and all HID light bulbs.

1.4 SUBMITTALS

- A. Contractor shall develop a Waste Management Plan: Submit 3 copies of plan within 14 days of date established for the Notice to Proceed.
- B. Contractor shall provide Waste Management Report: Concurrent with each Application for Payment, submit 3 copies of report.

1.5 PERFORMANCE REQUIREMENTS

- A. General: Divert a minimum of 75% 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

- A. CDL waste materials that can be salvaged, reused or recycled include, but are not limited to, the following:

1. Acoustical ceiling tiles
2. Asphalt
3. Asphalt shingles
4. Cardboard packaging
5. Carpet and carpet pad
6. Concrete
7. Drywall
8. Fluorescent lights and ballasts
9. Land clearing debris (vegetation, stumpage, dirt)
10. Metals
11. Paint (through hazardous waste outlets)
12. Wood
13. Plastic film (sheeting, shrink wrap, packaging)
14. Window glass
15. Wood

16. Field office waste, including office paper, aluminum cans, glass, plastic, and office cardboard.

1.6 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. Preconstruction Conference: Schedule and conduct meeting at Project site prior to construction activities.
 1. Attendees: Inform the following individuals, whose presence is required, of date and time of meeting.
 - a. Owner
 - b. Architect
 - c. Contractor's superintendent
 - d. Major subcontractors
 - e. Waste Management Coordinator
 - f. Other concerned parties.
 2. Agenda Items: Review methods and procedures related to waste management including, but not limited to, the following:
 - a. Review and discuss waste management plan including responsibilities of Waste Management Coordinator.
 - b. Review requirements for documenting quantities of each type of waste and its disposition.
 - c. Review and finalize procedures for materials separation and verify availability of containers and bins needed to avoid delays.
 - d. Review procedures for periodic waste collection and transportation to recycling and disposal facilities.
 - e. Review waste management requirements for each trade.
 3. Minutes: Record discussion. Distribute meeting minutes to all participants. Note: If there is a Project Architect, they will perform this role.

1.7 WASTE MANAGEMENT PLAN – Contactor shall develop and document the following:

- A. Develop a plan to meet the requirements listed in this section at a minimum. Plan shall consist of waste identification, waste reduction plan and cost/revenue analysis. Distinguish between demolition and construction waste. Indicate quantities by weight throughout the plan.
- B. Indicate anticipated types and quantities of demolition, site-cleaning and construction waste generated by the project. List all assumptions made for the quantities estimates.
- C. List each type of waste and whether it will be salvaged, recycled, or disposed of in an landfill. The plan should included 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 material, 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.

3.5 UNIVERSAL WASTE DIVERSION

- A. Remove all universal waste from fixtures, panels, and related devices for proper diversion and reclamation.
- B. Store all universal waste in containers provided by contact person within facilities operations.
- C. Store all universal waste in a secured location and request periodic removal from assigned contact person.
- D. Exemption: electric motors, circuit breakers, transformers and lighting contactors are exempt from this provision provided the contractor chooses to salvage or reuse the components.
- B. No identified universal waste will be discarded into the waste stream.

WASTE MANAGEMENT PROGRESS REPORT					
		Disposed in Municipal Solid Waste landfill	Diverted from Landfill by Recycling, Salvage or Reuse		
Material Category			Recycled	Salvaged	Reused
1.	Acoustical Ceiling Tiles				
2.	Asphalt				
3.	Asphalt Shingles				
4.	Cardboard Packaging				

5.	Carpet & Carpet Pad				
6	Concrete				
7.	Drywall				
8.	Fluorescent Lamps and Ballasts				
9.	Land Clearing Debris (Vegetation, Stumpage & dirt)				
10.	Metals				
11.	Paint (Through Hazardous Waste Outlets)				
12.	Wood				
13.	Plastic Film (Sheeting, Shrink Wrap & Packaging)				
14.	Window Glass				
15.	Field Office waste (Office Paper, Aluminum Cans, Glass, Plastic and Coffee Cardboard)				
16.	Other (Insert Description)				
17.	Other (Insert Description)				
	Total (In Weight)		(TOTAL OF ALL ABOVE VALUES – IN WEIGHT)		
Percentage of Waste Diverted			(TOTAL WASTE DIVIDED BY TOTAL DIVERTED)		

END OF SECTION 01 74 19

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NOT FOR BIDDING PURPOSES

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 will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect 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, 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 Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by Architect. 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 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 01 77 00

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 comments. Submit 3 copies of each corrected manual within 15 days of receipt of Architect'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 01 78 23

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 two sets of marked-up Record Prints. Print each Drawing, whether or not changes and additional information were recorded.
- B. Record Specifications: Submit two copies of Project's Specifications, including addenda and contract modifications.
- C. Record Product Data: Submit two 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 first floor.
 - d. Locations and depths of underground utilities.
 - e. Revisions to routing of piping and conduits.
 - f. Revisions to electrical circuitry.
 - g. Actual equipment locations.
 - h. Duct size and routing.
 - i. Locations of concealed internal utilities.
 - j. Changes made by Change Order or Construction Change Directive.
 - k. Changes made following Architect's written orders.
 - l. Details not on the original Contract Drawings.
 - m. Field records for variable and concealed conditions.
 - n. Record information on the Work that is shown only schematically.
 3. Mark the Contract Drawings or Shop Drawings, whichever is most capable of showing actual physical conditions, completely and accurately. If Shop Drawings are marked, show cross-reference on the Contract Drawings.
 4. Mark record sets with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at the same location.
 5. Mark important additional information that was either shown schematically or omitted from original Drawings.
 6. Note Construction Change Directive numbers, alternate numbers, Change Order numbers, and similar identification, where applicable.

- B. Record Prints: Immediately before inspection for Certificate of Substantial Completion, review marked-up Record Prints with Architect. When authorized, prepare a full set of corrected drawings and electronic files (PDF) 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. Print the Contract Drawings and Shop Drawings.
- 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 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.
 3. 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 area 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 reference during normal working hours.

END OF SECTION 01 78 39

SECTION 01 79 00 - DEMONSTRATION AND TRAINING

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes administrative and procedural requirements for instructing Owner's personnel, including the following:
 - 1. Demonstration of operation of systems, subsystems, and equipment.
 - 2. Training in operation and maintenance of systems, subsystems, and equipment.
 - 3. Demonstration and training videotapes.
- B. See Divisions 2 through 33 Sections for specific requirements for demonstration and training for products in those Sections.

1.2 SUBMITTALS

- A. Instruction Program: Submit two copies of outline of instructional program for demonstration and training, including a schedule of proposed dates, times, length of instruction time, and instructors' names for each training module. Include learning objective and outline for each training module.
- B. Demonstration and Training CDs/Flash Drives: Submit two copies within seven days of end of each training module.

1.3 QUALITY ASSURANCE

- A. Facilitator Qualifications: A firm or individual experienced in training or educating maintenance personnel in a training program similar in content and extent to that indicated for this Project, and whose work has resulted in training or education with a record of successful learning performance.
- B. Instructor Qualifications: A factory-authorized service representative, complying with requirements in Division 1 Section "Quality Requirements," experienced in operation and maintenance procedures and training.
- C. Pre-instruction Conference: Conduct conference at Project site. Review methods and procedures related to demonstration and training.
- D. Coordinate content of training modules with content of approved emergency, operation, and maintenance manuals. Do not submit instruction program until operation and maintenance data has been reviewed and approved by Architect.

PART 2 - PRODUCTS

2.1 INSTRUCTION PROGRAM

- A. Program Structure: Develop an instruction program that includes individual training modules for each system and equipment not part of a system, as required by individual Specification Sections.
- B. Training Modules: Develop a learning objective and teaching outline for each module. Include a description of specific skills and knowledge that participant is expected to master. For each module, include instruction for the following:
 - 1. Basis of System Design, Operational Requirements, and Criteria: Include system and equipment descriptions, operating standards, regulatory requirements, equipment function, operating characteristics, limiting conditions, and performance curves.
 - 2. Documentation: Review emergency, operations, and maintenance manuals; Project Record Documents; identification systems; warranties and bonds; and maintenance service agreements.
 - 3. Emergencies: Include instructions on stopping; shutdown instructions; operating instructions for conditions outside normal operating limits; instructions on meaning of warnings, trouble indications, and error messages; and required sequences for electric or electronic systems.
 - 4. Operations: Include startup, break-in, control, and safety procedures; stopping and normal shutdown instructions; routine, normal, seasonal, and weekend operating instructions; operating procedures for emergencies and equipment failure; and required sequences for electric or electronic systems.
 - 5. Adjustments: Include alignments and checking, noise, vibration, economy, and efficiency adjustments.
 - 6. Troubleshooting: Include diagnostic instructions and test and inspection procedures.
 - 7. Maintenance: Include inspection procedures, types of cleaning agents, methods of cleaning, procedures for preventive and routine maintenance, and instruction on use of special tools.
 - 8. Repairs: Include diagnosis, repair, and disassembly instructions; instructions for identifying parts; and review of spare parts needed for operation and maintenance.

PART 3 - EXECUTION

3.1 INSTRUCTION

- A. Facilitator: Engage a qualified facilitator to prepare instruction program and training modules, to coordinate instructors, and to coordinate between Contractor and Owner for number of participants, instruction times, and location.
- B. Engage qualified instructors to instruct Owner's personnel to adjust, operate, and maintain systems, subsystems, and equipment not part of a system.
 - 1. Owner will describe Owner's operational philosophy.

- C. Scheduling: Provide instruction at mutually agreed on times. For equipment that requires seasonal operation, provide similar instruction at start of each season.
 - 1. Schedule training with Owner, through Architect, with at least seven days' advance notice.
- D. Evaluation: At conclusion of each training module, assess and document each participant's mastery of module by use of a demonstration performance-based test.

3.2 DEMONSTRATION AND TRAINING RECORD

- A. General: Engage a qualified commercial photographer to record demonstration and training sessions. Record each training module separately. Include classroom instructions and demonstrations, board diagrams, and other visual aids, but not student practice.
 - 1. At beginning of each training module, record each chart containing learning objective and lesson outline.
- B. Video Format: Provide high-quality color video saved on CD's or flash drives. Save in a format acceptable to the Owner.
- C. Narration: Describe scenes on video by dubbing audio narration off-site after session is recorded. Include description of items being viewed. Describe vantage point, indicating location, direction (by compass point), and elevation or story of construction.

END OF SECTION 01 79 00

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NOT FOR BIDDING PURPOSES

SECTION 024117
STRUCTURE DEMOLITION

PART 1. GENERAL

1.01 DESCRIPTION

- A. Work consists of all labor, materials, equipment and services necessary for and incidental to the execution and completion of STRUCTURE DEMOLITION as indicated on the Drawings and specified herein.
- B. Include:
 - 1. Demolition of designated structures including termination and removal of utility services.
 - 2. Off-site disposal of above ground metallic and organic (wood framing and partitions, etc.) materials contained as part of the existing structure.
 - 3. Off-site disposal of concrete footings, slabs and miscellaneous concrete structures unless on-site placement is approved in writing by the Department following submittal of a plan for on-site placement of miscellaneous concrete.
 - 4. Removal and off-site disposal of wooden walkways, canopy structures, etc. as designated on the Drawings.

1.02 RELATED WORK IN OTHER SECTIONS

- A. Section 311000, SITE CLEARING
- B. Section 315000, EXCAVATION SUPPORT SYSTEMS
- C. Section 312000, EARTHWORK
- D. Section 312500, SEDIMENT AND EROSION CONTROL

1.03 JOB CONDITIONS

- A. Existing conditions: Accept the site in the condition which it exists at the date of the award of the Contract.
- B. Existing Utilities: Locate existing underground utilities in areas of Work. If utilities are to remain, provide adequate means of protection during earthwork and demolition operations.
- C. Use of Explosives: The use of explosives will not be permitted unless approved by the Department and any Regulatory Agency having jurisdiction.

1.04 PROTECTION

- A. Perform demolition in such manner as to eliminate hazards to persons and property; and to minimize interference with use of adjacent areas, roadways, utilities and structures or interruption of use of such utilities; and free passage to and from such adjacent areas or structures.
 - 1. Provide safeguards, including warning signs, barricades, temporary fences, warning lights, etc. that are required for protection of all personnel during demolition and removal operations.
 - 2. Fences, barricades, lights, etc. around exposed excavations shall be maintained until such excavations have been completely backfilled.

3. Care shall be taken to prevent spread of flying particles and dust during demolition and removal. Sprinkle rubbish and debris with water to keep dust down to a minimum.
- B. Standards: Comply with regulations of local authorities having jurisdiction, including all applicable O.S.H.A. requirements.

PART 2. PRODUCTS

As required to complete the Work.

PART 3. EXECUTION

3.01 SITE PREPARATION

- A. Disconnect, or arrange for the disconnection of utility service connections such as water, gas, sewers, steam, electricity and telephone in accordance with the regulations for the utility concerned.
- B. Preserve in operating condition active utilities transversing the project site; protect property, including but not limited to mains, manholes, catch basins, valve boxes, poles, guys and other appurtenances as noted on the Drawings.
- C. Install sediment control devices as shown on the Drawings. Refer to Section 312500, SEDIMENT AND EROSION CONTROL.

3.02 METHODS OF DEMOLITION

- A. Methods of demolition shall be reviewed by the Contractor with the Architect for approval prior to the commencement of demolition work. All demolition work shall be in strict accordance with all authorities having jurisdiction. All demolition procedures and operations shall be executed in the safest manner possible to prevent damage to adjacent property and structures to remain. The demolition shall comply with the requirements of agreements between the Contractor and DNREC. The contractor shall coordinate with the Architect regarding the specific historic preservation / documentation requirements prior to submitting a bid for the project.
- B. Demolish and remove all walls, paving, foundations, slabs, etc., as required by detail drawings, specifications and the intent of the total work. Unless otherwise indicated, all foundations to be demolished shall be removed to at least 1' below finish grade or new construction levels. Existing fences shall be removed where indicated.
- C. A swinging ball will not be permitted immediately adjacent to any public thoroughfare, or in areas where its use may create a public hazard.
- D. Under no circumstances shall any structure be set afire. Burning of debris or other matter shall not be permitted except by written permission of local authorities, a copy of same to be provided in advance to the Engineer. If authorized, burning shall be in conformance with regulations for burning.
- E. Remove, regardless of elevation, all floor construction over basements and cellars.

3.03 BACKFILLING EXCAVATED AREAS

- A. All excavated areas and depressions resulting from the removal of slabs, foundations and footings shall be backfilled and compacted in accordance with Section 312000, EARTHWORK.
- B. Areas designated for new paving which occur within the limits of a structure to be demolished shall be proofrolled, backfilled and compacted in accordance with Section

02200, EARTHWORK.

3.04 DISPOSAL OF MATERIAL

- A. The Contractor shall receive title of all materials and equipment to be demolished by his forces. The title to this material and equipment shall be vested to the Contractor upon receipt of the executed Contract. The Owner will not be responsible for the condition, loss, or damage to such property after executing the Contract.
- B. Demolished materials, metallic or organic in nature shall be removed from the site daily, except as otherwise approved by the Architect. Removal shall be in such a manner as to prevent spillage. Pavements and areas adjacent to the site shall be kept clean and free from mud, dirt, and debris at all times.
- C. Clean-Up: On completion of work and after removal of all debris, site shall be left in clean condition satisfactory to the Architect.

--END OF SECTION--

NOT FOR BIDDING PURPOSES

SECTION 024119 - SELECTIVE DEMOLITION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Demolition and removal of selected portions of building or structure.
 - 2. Salvage of existing items to be reused or recycled.
- B. Related Requirements:
 - 1. Section 01100 "Summary" for restrictions on the use of the premises, and Owner-occupancy requirements.

1.3 DEFINITIONS

- A. Remove: Detach items from existing construction and legally dispose of them off-site unless indicated to be removed and salvaged or removed and reinstalled.
- B. Remove and Salvage: Carefully detach from existing construction, in a manner to prevent damage, and deliver to Owner.
- C. Remove and Reinstall: Detach items from existing construction, prepare for reuse, and reinstall where indicated.
- D. Existing to Remain: Existing items of construction that are not to be permanently removed and that are not otherwise indicated to be removed, removed and salvaged, or removed and reinstalled.

1.4 MATERIALS OWNERSHIP

- A. Unless otherwise indicated, demolition waste becomes property of Contractor.

1.5 PREINSTALLATION MEETINGS

- A. Predemolition Conference: Conduct conference at Project site.
 - 1. Inspect and discuss condition of construction to be selectively demolished.
 - 2. Review structural load limitations of existing structure.
 - 3. Review and finalize selective demolition schedule and verify availability of materials, demolition personnel, equipment, and facilities needed to make progress and avoid delays.

4. Review requirements of work performed by other trades that rely on substrates exposed by selective demolition operations.
5. Review areas where existing construction is to remain and requires protection.

1.6 INFORMATIONAL SUBMITTALS

- A. Proposed Protection Measures: Submit report, including drawings, that indicates the measures proposed for protecting individuals and property for environmental protection, for dust control and for noise control. Indicate proposed locations and construction of barriers.
- B. Schedule of Selective Demolition Activities: Indicate the following:
 1. Detailed sequence of selective demolition and removal work, with starting and ending dates for each activity. Ensure Owner's on-site operations are uninterrupted.
 2. Interruption of utility services. Indicate how long utility services will be interrupted.
 3. Coordination for shutoff, capping, and continuation of utility services.
 4. Coordination of Owner's continuing occupancy of portions of existing building and of Owner's partial occupancy of completed Work.
- C. Inventory: Submit a list of items to be removed and salvaged and deliver to Owner prior to start of demolition.
- D. Predemolition Photographs or Video: Submit before Work begins.
- E. Warranties: Documentation indicated that existing warranties are still in effect after completion of selective demolition.

1.7 CLOSEOUT SUBMITTALS

- A. Inventory: Submit a list of items that have been removed and salvaged.
- B. Landfill Records: Indicate receipt and acceptance of hazardous wastes, as applicable, by a landfill facility licensed to accept hazardous wastes.

1.8 FIELD CONDITIONS

- A. Owner will occupy portions of building immediately adjacent to selective demolition area. Conduct selective demolition so Owner's operations will not be disrupted.
- B. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.
- C. Notify Architect of discrepancies between existing conditions and Drawings before proceeding with selective demolition.
- D. Hazardous Materials: It is not expected that hazardous materials will be encountered in the Work.
 1. Hazardous materials will be removed by Owner before start of the Work.

2. If suspected hazardous materials are encountered, do not disturb; immediately notify Architect and Owner. Hazardous materials will be removed by Owner under a separate contract.
- E. Hazardous Materials: Hazardous materials are present in buildings and structures to be selectively demolished. A report on the presence of hazardous materials is on file for review and use. Examine report to become aware of locations where hazardous materials are present.
 1. Hazardous material remediation is specified elsewhere in the Contract Documents.
 2. Do not disturb hazardous materials or items suspected of containing hazardous materials except under procedures specified elsewhere in the Contract Documents.
 3. Owner will provide material safety data sheets for suspected hazardous materials that are known to be present in buildings and structures to be selectively demolished because of building operations or processes performed there.
- F. Storage or sale of removed items or materials on-site is not permitted.
- G. Utility Service: Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.
 1. Maintain fire-protection facilities in service during selective demolition operations.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Regulatory Requirements: Comply with governing EPA notification regulations before beginning selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.
- B. Standards: Comply with ANSI/ASSE A10.6 and NFPA 241.

2.2 EXAMINATION

- A. Verify that utilities have been disconnected and capped before starting selective demolition operations.
- B. Review record documents of existing construction provided by Owner. Owner does not guarantee that existing conditions are same as those indicated in record documents.
- C. Survey existing conditions and correlate with requirements indicated to determine extent of selective demolition required.
- D. When unanticipated mechanical, electrical, or structural elements that conflict with intended function or design are encountered, investigate and measure the nature and extent of conflict. Promptly submit a written report to Architect.

- E. Engage a professional engineer to perform an engineering survey of condition of building to determine whether removing any element might result in structural deficiency or unplanned collapse of any portion of structure or adjacent structures during selective building demolition operations.
 - 1. Perform surveys as the Work progresses to detect hazards resulting from selective demolition activities.
 - 2. Steel Tendons: Locate tensioned steel tendons and include recommendations for de-tensioning.
- F. Survey of Existing Conditions: Record existing conditions by use of preconstruction photographs etc..

2.3 UTILITY SERVICES AND MECHANICAL/ELECTRICAL SYSTEMS

- A. Existing Services/Systems to Remain: Maintain services/systems indicated to remain and protect them against damage.
 - 1. Comply with requirements for existing services/systems interruptions specified in Section 01100 "Summary."
- B. Existing Services/Systems to Be Removed, Relocated, or Abandoned: Locate, identify, disconnect, and seal or cap off indicated utility services and mechanical/electrical systems serving areas to be selectively demolished.
 - 1. The Contractor will coordinate with the Owner to arrange to shut off indicated services/systems.
 - 2. Coordinate and arrange to shut off required utilities with utility companies.
 - 3. If services/systems are required to be removed, relocated, or abandoned, provide temporary services/systems that bypass area of selective demolition and that maintain continuity of services/systems to other parts of building.
 - 4. Disconnect, demolish, and remove fire-suppression systems, plumbing, and HVAC systems, equipment, and components indicated to be removed.

2.4 PREPARATION

- A. Site Access and Temporary Controls: Conduct selective demolition and debris-removal operations to ensure minimum interference with daily operations of the facilities.
 - 1. Comply with requirements for access and protection specified in Section 015000 "Temporary Facilities and Controls."
- B. Temporary Facilities: Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.
 - 1. Provide protection to ensure safe passage of people around selective demolition area and to and from occupied portions of building.

2. Protect walls, ceilings, floors, and other existing finish work that are to remain or that are exposed during selective demolition operations.
 3. Cover and protect furniture, furnishings, and equipment that have not been removed.
 4. Comply with requirements for temporary enclosures, dust control, heating, and cooling specified in Section 01500 "Temporary Facilities and Controls."
- C. Temporary Shoring: Provide and maintain shoring, bracing, and structural supports as required to preserve stability and prevent movement, settlement, or collapse of construction and finishes to remain, and to prevent unexpected or uncontrolled movement or collapse of construction being demolished.
1. Strengthen or add new supports when required during progress of selective demolition.

2.5 SELECTIVE DEMOLITION, GENERAL

- A. General: Demolish and remove existing construction only to the extent required by new construction and/ or as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:
1. Proceed with selective demolition systematically, from higher to lower level. Complete selective demolition operations above each floor or tier before disturbing supporting members on the next lower level.
 2. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. Use hand tools or small power tools designed for sawing or grinding, not hammering and chopping, to minimize disturbance of adjacent surfaces. Temporarily cover openings to remain.
 3. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
 4. Do not use cutting torches until work area is cleared of flammable materials. At concealed spaces, such as duct and pipe interiors, verify condition and contents of hidden space before starting flame-cutting operations. Maintain portable fire-suppression devices during flame-cutting operations. Provide Fire Watch if appropriate or required.
 5. Maintain adequate ventilation when using cutting torches.
 6. Remove decayed, vermin-infested, or otherwise dangerous or unsuitable materials and promptly dispose of off-site.
 7. Remove structural framing members and lower to ground by method suitable to avoid free fall and to prevent ground impact or dust generation.
 8. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
 9. Dispose of demolished items and materials promptly.
- B. Removed and Salvaged Items:
1. Clean salvaged items.
 2. Pack or crate items after cleaning. Identify contents of containers.
 3. Store items in a secure area until delivery to Owner.
 4. Transport items to Owner's storage area designated by Owner.

5. Protect items from damage during transport and storage.

2.6 SELECTIVE DEMOLITION PROCEDURES FOR SPECIFIC MATERIAL

- A. Concrete: Demolish in small sections. Using power-driven saw, cut concrete to a depth of at least 3/4 inch at junctures with construction to remain. Dislodge concrete from reinforcement at perimeter of areas being demolished, cut reinforcement, and then remove remainder of concrete. Neatly trim openings to dimensions indicated.
- B. Concrete: Demolish in sections. Cut concrete full depth at junctures with construction to remain and at regular intervals using power-driven saw, then remove concrete between saw cuts.
- C. Masonry: Demolish in small sections. Cut masonry at junctures with construction to remain, using power-driven saw, then remove masonry between saw cuts.
- D. Concrete Slabs-on-Grade: Saw-cut perimeter of area to be demolished, then break up and remove.
- E. Resilient Floor Coverings: Remove floor coverings and adhesive according to recommendations in RFCI's "Recommended Work Practices for the Removal of Resilient Floor Coverings"

2.7 DISPOSAL OF DEMOLISHED MATERIALS

- A. General: Except for items or materials indicated to be reused, salvaged, reinstalled, or otherwise indicated to remain Owner's property, remove demolished materials from Project site and legally dispose of them in an EPA-approved landfill.
 1. Do not allow demolished materials to accumulate on-site.
 2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
 3. Remove debris from elevated portions of building by chute, hoist, or other device that will convey debris to grade level in a controlled descent.
- B. Burning: Do not burn demolished materials.
- C. Disposal: Transport demolished materials off Owner's property and legally dispose of them.

2.8 CLEANING

- A. Clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition operations. Return adjacent areas to condition existing before selective demolition operations began.

2.9 SELECTIVE DEMOLITION SCHEDULE

- A. See Demolition Drawings

END OF SECTION 024119

SECTION 03300
CAST-IN-PLACE CONCRETE
(MINOR CONSTRUCTION)

PART 1. GENERAL

1.01 SCOPE

- A. The Contractor shall provide all materials, labor, equipment and services necessary for, and reasonably incidental to, furnishing and installing minor cast-in-place concrete such as, but not limited to curbs, sidewalks, and utility pads.
- B. Work shall consist of necessary subbase grading, forming, reinforcing, expansion joints, mixing, pouring, curing, finishing, and protection of minor concrete structures and surfaces.
- C. Related Work not included in this Section consists of the following:
 - 1. Section 02110, SITE CLEARING
 - 2. Section 02160, EXCAVATION SUPPORT SYSTEMS
 - 3. Section 02200, EARTHWORK
 - 4. Section 02270, SEDIMENT AND EROSION CONTROL

1.02 QUALITY ASSURANCE

Skilled workforce experienced in concrete placement and finishing shall be used for all work. All materials shall be new and first order.

1.03 TESTING AGENCY

Contractor shall engage a professional testing agency to obtain concrete cylinders, conduct required breakage tests, and report findings in a suitable technical report format.

1.04 SUBMITTALS

- A. Submit the following information for approval prior to initiation of construction:
 - 1. Mix design, including complete information on all additives.
 - 2. Reinforcing steel certification.
 - 3. Expansion joint - manufacturer's catalog data.
- B. Submit all test reports upon receipt from the professional testing agency.

1.05 DELIVERY, STORAGE AND HANDLING

Do not deliver concrete until forms, reinforcement, embedded items, and chamfer strips are in place and ready for concrete placement. Follow ACI 301 for job site storage of materials. Store reinforcement on racks raised above the ground to avoid excessive rusting. Protect materials from contaminants such as grease, oil, and dirt. Ensure materials can be accurately identified after bundles are broken and tags removed.

PART 2. PRODUCTS

2.01 CONCRETE

- A. Contractor-Furnished Mix Design: ACI 211.1, ACI 301, and ACI 318 except as otherwise specified. The compressive strength (f'_c) of the concrete for each portion of the structure(s) shall be indicated and as shown in Table I at the end of this section.
- B. Maximum slump shown in Table 1 may be increased one inch for methods of consolidation other than vibration. Slump may be increased to 7 inches when superplasticizers are used. Provide air entrainment using air-entraining admixture. The water soluble chloride ion concentrations in hardened concrete at ages from 28 to 42 days shall not exceed 0.15.
- C. Required Average Strength of Mix Design: The selected mixture shall produce an average compressive strength exceeding the specified strength by the amount indicated in ACI 301.

2.02 MATERIALS

- A. Cement: ASTM C-150, Type I or II blended cement except as modified herein. The blended cement shall consist of a mixture of ASTM C-150 cement and one of the following materials: ASTM C-618 pozzolan or fly ash or ASTM C-989 ground iron blast furnace slag. The pozzolan or fly ash content shall not exceed 25% by weight of the total cementitious material. The ground iron blast furnace slag shall not exceed 50% by weight of total cementitious material. For exposed concrete, use one manufacturer for each type of cement, ground slag, fly ash, and pozzolan.
- B. Water: Water shall be fresh, clean and potable.
- C. Aggregates: ASTM C-33, except as modified herein. Furnish aggregates for exposed concrete surfaces from one source. Aggregates shall not contain any substance which may be deleteriously reactive with the alkalis in the cement.
- D. Nonshrink Grout: ASTM C-1107.
- E. Admixtures: Calcium chloride shall not be used as an admixture.
 - 1. Air-Entraining: ASTM C-260.
 - 2. Accelerating: ASTM C-494, Type C.
 - 3. Retarding: ASTM C-494, Type B, D or G.
 - 4. Water Reducing: ASTM C-494, Type A, E or F.
- F. Materials for Forms: Provide wood, plywood, or steel. Use plywood or steel forms where a smooth form finish is required. Lumber shall be square edged or tongue-and-groove boards, free of raised grain, knotholes, or other surface defects. Plywood: PS-1, B-B concrete form panels or better. Steel form surfaces shall not contain irregularities, dents, or sags.
 - 1. Form Ties and Accessories: The use of wire alone is prohibited. Form ties and accessories shall not reduce the effective cover of the reinforcement.
 - 2. Reinforcing Bars: ASTM A-615/A-615M and ASTM A-617/A-617M with the bars marked A, Grade 60; ASTM A-706/A-706M.
- G. Welded Wire Fabric: ASTM A-185 or ASTM A-497. Provide flat sheets of welded wire fabric for slabs and toppings unless otherwise specified.
- H. Materials for Curing Concrete:

1. Impervious Sheeting: ASTM C-171, waterproof paper, clear or white polyethylene sheeting, or polyethylene-coated burlap.
2. Liquid Membrane-Forming Compound: ASTM C-309, white pigmented, Type 2, Class B.
- I. Expansion/Contraction Joint Filler: ASTM D-1751 or ASTM D-1752, 1/2 inch thick, unless otherwise indicated or as directed by the Engineer.
- J. Color Admixture for Curbs Only: Provide Cromix Admixture in color C-34 Dark Grey as manufactured by Scofield Company.

PART 3. EXECUTION

3.01 FORMS

ACI 347. Provide forms and shoring for concrete placement. Set forms mortar-tight and true to line and grade. Chamfer above grade exposed joints, edges, and external corners of concrete 0.75 inch unless otherwise indicated. Provide formwork with clean-out openings to permit inspection and removal of debris.

- A. Coating: Before concrete placement, coat the contact surfaces of forms with a non-staining mineral oil, non-staining form coating compound, or two coats of nitrocellulose lacquer. Do not use mineral oil on forms for surfaces to which adhesive, paint, or other finish material is to be applied.
- B. Removal of Forms and Supports: After placing concrete forms shall remain in place for the time periods specified in ACI 347R. Prevent concrete damage during form removal.

3.02 PLACING REINFORCEMENT AND MISCELLANEOUS MATERIALS

CRSI MSP-2. Provide bars, wire fabric, wire ties, supports, and other devices necessary to install and secure reinforcement. Remove loose rust prior to placing steel.

- A. Cover: ACI 301 for minimum coverage, unless otherwise indicated.
- B. Setting Miscellaneous Material: Place and secure anchors and bolts, pipe sleeves, conduits, and other such items in position before concrete placement. Plumb anchor bolts and check location and elevation. Temporarily fill voids in sleeves with readily removable material to prevent the entry of concrete.
- C. Construction Joints: Locate joints to least impair strength. Continue reinforcement across joints unless otherwise indicated. In paved areas exposed to vehicular traffic, provide construction joints in accordance with the MD SHA Standards & Specifications and as directed by the Engineer.
- D. Expansion Joints: Provide expansion joints. Make expansion joints 1/2 inch wide unless otherwise indicated. Fill expansion joints not exposed to weather with preformed joint fill material. Completely fill joints exposed to weather with joint filler material and joint sealant. Do not extend reinforcement or other embedded material items bonded to the concrete through any expansion joint unless an expansion sleeve is used. In paved areas exposed to vehicular traffic, provide expansion joints in accordance with the MD SHA Standards & Specifications and as directed by the Engineer.

3.03 BATCHING, MEASUREING, MIXING, AND TRANSPROTING CONCRETE

ASTM C-94, ACI 301, ACI 302.1R, and ACI 304R, except as modified herein. Batching equipment shall be such that the concrete ingredients are consistently measured within the following tolerances: 1% for cement and water, 2% for aggregate, and 3% for admixtures. Furnish mandatory batch ticket information for each load of ready mix concrete.

- A. Mixing: ASTM C-94 and ACI 301. Machine mix concrete. Begin mixing within 30 minutes after the cement has been added to the aggregates. Place concrete within 90 minutes of either addition of mixing water to cement and aggregates or addition of cement to aggregates if the air temperature is less than 85° F.
- B. Transporting: Transport concrete from the mixer to the forms as rapidly as practicable. Prevent segregation or loss of ingredients. Clean transporting equipment thoroughly before each batch. Do not use aluminum pipe or chutes. Remove concrete which has segregated in transporting and dispose of as directed.

3.04 PLACING CONCRETE

Place concrete as soon as practicable after the forms and the reinforcement have been inspected and approved. Do not place concrete when weather conditions prevent proper placement and consolidation: in uncovered areas during periods of precipitation, or in standing water. Deposit concrete as close as practicable to the final position in the forms. Do not exceed a free vertical drop of 3 feet from the point of discharge. Place concrete in one continuous operation from one end of the structure towards the other.

- A. Vibration: ACI 304R. Furnish a spare vibrator on the job site whenever concrete is placed. Do not use vibrators to transport the concrete in the forms. Insert and withdraw vibrators approximately 18 inches apart. External vibrators shall be used on the exterior surface of the forms when internal vibrators do not provide adequate consolidation of the concrete.
- B. Cold Weather: ACI 306R. Do not allow concrete temperature to decrease below 50° F. Obtain approval prior to placing concrete when the ambient temperature is below 40° F or when concrete is likely to be subjected to freezing temperatures within 24 hours. Cover concrete and provide sufficient heat to maintain 50° F minimum adjacent to both the formwork and the structure while curing. Limit the rate of cooling to 5° F in any one hour and 50° F per 24 hours after heat application.
- C. Hot Weather: ACI 305R. Maintain required concrete temperature using Figure 2.1.5 in ACI 305R to prevent the evaporation rate from exceeding 0.2 pounds of water per square foot of exposed concrete per hour. Cool ingredients before mixing or use other suitable means to control concrete temperature and prevent rapid drying of newly placed concrete. Shade the fresh concrete as soon as possible after placing. Start curing when the surface of the fresh concrete is sufficiently hard to permit curing without damage.
- D. Provide water hoses, pipes, spraying equipment, and water hauling equipment, where job site is remote to water source, to maintain a moist concrete surface throughout the curing period. Provide burlap cover or other suitable, permeable material with fog spray or continuous wetting of the concrete when weather conditions prevent the use of either liquid membrane curing compound or impervious sheets. For vertical surfaces, protect forms from direct sunlight and add water to top of structure once concrete is set.

3.05 SURFACE FINISHES

- A. Concrete Utility Pads: Provide 4 inches thick minimum unless otherwise specified on the plans. Use broom finish on surface of exterior utility pads, unless otherwise indicated. Perform a floated finish, and then draw a broom or burlap belt across the surface to produce a coarse scored texture. Permit surface to harden sufficiently to retain the scoring or ridges. Broom at right angles to the slope of the slab. Unless otherwise indicated, provide a transverse slope of 1/48. Limit variation in cross section to 1/4 inch in 5 feet.
- B. Curbs & Walls: Provide contraction joints spaced every 10 feet maximum unless otherwise indicated. Cut contraction joints 3/4 inch deep with a jointing tool after the surface has been finished. Provide expansion joints 1/2 inch thick and spaced every 100 feet maximum unless otherwise indicated. Perform a wood float finish.

3.06 CURBING AND PROTECTION

ACI 301 unless otherwise specified. Begin curing immediately following form removal. Avoid damage to concrete from vibration created by blasting, pile driving, movement of equipment in the vicinity, disturbance of formwork or protruding reinforcement, and any other activity resulting in ground vibrations. Protect concrete from injurious action by sun, rain, flowing water, frost, mechanical injury, tire marks, and oil stains.

- A. Protection of Treated Surfaces: Prohibit pedestrian and vehicular traffic and other sources of abrasion at least 72 hours after compound application. Maintain continuity of the coating for the entire curing period and immediately repair the damage.

3.07 FIELD QUALITY CONTROL

- A. Sampling ASTM C-172. Collect samples of fresh concrete to perform tests specified. ASTM C-31 for making test specimens.
- B. Testing:
 - 1. Slump Tests: ASTM C-143. Take concrete samples during concrete placement. The maximum slump may be increased as specified with the addition of an approved admixture provided that the water-cement ratio is not exceeded. Perform tests at commencement of concrete placement, when test cylinders are made, and for each batch (minimum) or every 10 cubic yards (maximum) of concrete.
 - 2. Temperature Tests: Test the concrete delivered and the concrete in the forms. Perform tests in hot or cold weather conditions (below 50° F and above 80° F) for each batch (minimum) or every 10 cubic yards (maximum) of concrete, until the specified temperature is obtained, and whenever test cylinders and slump tests are made.
 - 3. Compressive Strength Tests: ASTM C-39. Make three test cylinders for each set of tests in accordance with ASTM C-31. Precautions shall be taken to prevent evaporation and loss of water from the specimen. Test one cylinder at 7 days, one cylinder at 28 days, and hold one cylinder in reserve. Samples for strength tests of each mix design and concrete placed each day shall be taken not less than once a day, not less than once for each 100 cubic yards of concrete. If the average of any three consecutive strength test results is less than f'_c or if any strength test result falls below f'_c by more than 500 psi, take a minimum of three ASTM C-42 core samples from the in-place work represented by the low test cylinder results and test. Concrete represented by core test shall be considered structurally adequate if the average of three cores is equal to at least 85% of f'_c and if no single core is less than 75% of f'_c .

Locations represented by erratic core strengths shall be retested. Remove concrete not meeting strength criteria and provide new acceptable concrete. Repair core holes with non-shrink grout. Match color and finish of adjacent concrete.

4. Air Content: ASTM C-173 or ASTM C-231 for normal weight concrete. Test air-entrained concrete for air content at the same frequency as specified for slump tests.

Location / DeIDOT Mix Designation	f'c (Min. 28 Day Comp. Strength) (psi)	Maximum Permeability (Coulombs)	Water- Cement Ratio (max. by weight)	Air Entr. (percent)
Sidewalks, Handicapped Ramps, Curbs (DeIDOT Class B)	3000	3000	0.45	4-7
Concrete Decking (DeIDOT Class A)	4500	1500	0.4	4-7

PART 4. MEASUREMENT

No measurement for payment of these items of work will be made since their cost shall be included in the lump sum bid.

-- END OF SECTION --

SECTION 03400

PRECAST CONCRETE STRUCTURES

PART 1. GENERAL

1.01 SCOPE

Precast concrete utility structures shall include, but not necessarily be limited to, furnishing and installing precast concrete storm drain structures, and other miscellaneous structures of the configuration and to the extent indicated and in accordance with the Contract Documents.

A. Related Work not included in this Section consists of the following:

1. Site Clearing provided under Section 02110
2. Excavation Support Systems provided under Section 02150
3. Earthwork provided under Section 02200.
4. Sediment and Erosion Control provided under Section 02270
5. Bituminous Concrete Paving and Base provided under Section 02510
6. Seeding For Lawns and Grasses provided under Section 02936
7. Cast-In-Place Concrete Structures provided under 03300

1.02 QUALITY ASSURANCE

- A. Precast concrete utility structures shall be supplied by a qualified firm with a minimum of 5 years of continuous operations and which has performed at least three representative jobs, 5 years or older, comparable to precast work required for this Contract.
- B. The Engineer will inspect all materials before and/or after installation to ensure compliance with the Contract Documents. Access shall be allowed the Engineer to the casting plant at any time to inspect the fabrication of units for this project.
- C. Precast units shall be substantially free of fractures and surface roughness. The plans of the ends of sections to be joined shall be perpendicular to their longitudinal axis within 5/8 inch. Precast units shall be subject to rejection on account of failure to conform to any of the Specification requirements. In addition, individual sections may be rejected because of any of the following:
1. Fractures or cracks passing through the wall, except for a single end crack that does not exceed the depth of the joint.
 2. Defects that indicate imperfect proportioning, mixing, and molding.
 3. Surface defects indicating honeycombing or open texture.
 4. Damaged or cracked ends, where such damage would prevent making a satisfactory joint.
- D. Any continuous crack having a surface width of 0.01 inch or more and extending for a length of 12 inches or more, regardless of position in the section or wall.
- E. Dimensional tolerances shall be +/- 1/4 inch.
- F. Precast units shall be set so as to be vertical. The maximum allowable deviation, when measured from the top to the bottom of the completed unit, shall not exceed 1/4 inch.

- G. The manufacturer or supplier shall store completed sections off the ground with ample space between rows and enough clearance above and below to allow full view of walls and joint ends for inspection purposes.
- H. The Engineer reserves the right to require core samples of finished products.
- I. All precast units shall be marked with the manufacturer's name or trademark, date of manufacturer, and the ASTM and/or AASHTO specification under which the unit was manufactured.

1.03 SUBMITTALS**A. Shop Drawings**

Shop drawing shall be submitted as specified in the "General Provisions" for all precast units. The shop drawings shall be fully dimensioned and show reinforcing details, joint details, design loads, pertinent design calculations, and lifting and erection inserts. Shop drawings shall also include the precast unit manufacturer's handling, assembly, and installation directions and recommendations.

B. Certificates of Compliance

Certificates of compliance shall be submitted as specified in the "General Provisions" stating that the precast units furnished, and their components, meet the design, fabrication, and testing requirements.

PART 2. PRODUCTS**2.04 CONCRETE**

- A. Portland Cement Concrete: The Contractor furnished mix design shall have a minimum compressive strength of 4500 psi at 28 days unless otherwise indicated on the Drawings. Portland cement shall be Type II. Air entraining admixtures shall be used to produce between 4 and 6 percent air by volume.
- B. Concrete Reinforcement: Per the requirements of ASTM A 615, Grade 60.
- C. Water: Water shall be fresh, clean and potable.
- D. Granular Bedding: AASHTO M-43, No. 57 Aggregate.
- E. Non-Shrink Grout and Mortar: Non-shrink grout and mortar shall conform to the requirements of the Corps of Engineers Specification CRD C-588, Type 3.1, b or d.

PART 3. EXECUTION**3.01 DESIGN CRITERIA**

- A. Miscellaneous structures not otherwise covered shall meet the requirements of ASTM C 913.

3.02 FABRICATION

- A. The precast units shall be factory cast. Job site casting will not be permitted. Concrete in the precast elements shall be continuously placed to prevent formation of seams. The finished units shall be free of voids, cracks, and have beveled corners and edges. All inserts shall be securely attached or embedded in their proper location.
- B. Concrete strength of all precast units at 28 days shall be 4500 psi minimum, unless otherwise specified. It shall be the precast unit manufacturer's responsibility to insure that the specified concrete strength is maintained throughout production of the units. Mix design shall be those previously used by the manufacturer which have proven satisfactory for casting units similar to those specified and producing the required

strength. All precast concrete shall be air entrained. Admixtures containing calcium chloride shall not be used.

- C. Precast concrete units shall be manufactured in accordance with the applicable requirements of ASTM C 858, and as modified herein except that precast concrete units manufactured by the dry cast (packerhead) process are prohibited.
- D. Wall sleeves or gaskets for piping, sumps, steps, access hatches, and other inserts as shown on the Plans shall be cast into the structure or inserted at the place of manufacture.

3.03 PRODUCT HANDLING

- A. No precast unit shall be shipped in less than 15 days from date of manufacturer, unless the unit has been tested and is shown to be in full compliance with the Specifications.
- B. Precast sections shall be transported and handled with proper equipment to protect the elements from damage. Sections shall be handled by means of lifting inserts embedded in the concrete. Damaged sections that cannot be satisfactorily repaired shall be replaced by new sections at no additional cost to CVDI.
- C. Precast sections shall be stored on wooden blocks to hold them off the ground to prevent dirt and debris from entering the joining surfaces.

3.04 INSTALLATION

- A. Excavation, foundation preparation, backfill and compaction shall be as specified in Section 02225.
- B. Precast units shall be installed where and as shown on the Plans and Standard Details or as directed by the Engineer.
- C. Pipe connection, penetrations, and other appurtenances shall be installed as specified in the following sections.
- D. Field modifications of precast units, such as cutting or enlarging holes or slots, will not be permitted without the specific approval of the precast unit's manufacturer and the Engineer. Permitted modifications shall be made in strict accordance with the manufacturer's directions and recommendations.
- E. Mating surfaces shall be cleaned of all foreign materials such as dirt, mud, stones, etc., and where appropriate, joint sealing materials applied prior to assembly of the units.

PART 4. MEASUREMENT

No measurement for payment of these items of work will be made since their cost shall be included in the lump sum bid.

--END OF SECTION--

SECTION 04 22 00 - CONCRETE UNIT MASONRY

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Concrete masonry units.
2. Steel reinforcing bars

1.2 DEFINITIONS

- A. CMU(s): Concrete masonry unit(s).
- B. Reinforced Masonry: Masonry containing reinforcing steel in grouted cells.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Sustainable Design Submittals:
1. Ensure all materials/processes comply with requirements set forth in Division 013515. Provide submittals in accordance with Division 013515 requirements.
- C. Shop Drawings: For reinforcing steel. Detail bending, lap lengths, and placement of unit masonry reinforcing bars. Comply with ACI 315.

1.4 INFORMATIONAL SUBMITTALS

- A. Material Certificates: For each type and size of product. For masonry units, include data on material properties.
- B. Mix Designs: For each type of mortar and grout. Include description of type and proportions of ingredients.
1. Include test reports for mortar mixes required to comply with property specification. Test according to ASTM C 109 for compressive strength, ASTM C 1506 for water retention, and ASTM C 91 for air content.
 2. Include test reports, according to ASTM C 1019, for grout mixes required to comply with compressive strength requirement.

1.5 FIELD CONDITIONS

- A. 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 TMS 602.
- B. Hot-Weather Requirements: Comply with hot-weather construction requirements contained in TMS 602.

PART 2 - PRODUCTS

2.1 UNIT MASONRY, GENERAL

- A. Masonry Standard: Comply with TMS 602, except as modified by requirements in the Contract Documents.
- B. Defective Units: Referenced masonry unit standards may allow a certain percentage of units to contain chips, cracks, or other defects exceeding limits stated. Do not use units where such defects are exposed in the completed work.
- C. Fire-Resistance Ratings: Comply with requirements for fire-resistance-rated assembly designs indicated.
 - 1. Where fire-resistance-rated construction is indicated, units shall be listed and labeled by a qualified testing agency acceptable to authorities having jurisdiction.

2.2 CONCRETE MASONRY UNITS

- A. Shapes: Provide shapes indicated and as follows, with exposed surfaces matching exposed faces of adjacent units unless otherwise indicated.
 - 1. Provide special shapes for lintels, corners, jambs, sashes, movement joints, headers, bonding, and other special conditions.
- B. CMUs: ASTM C 90.
 - 1. Unit Compressive Strength: Provide units with minimum average net-area compressive strength of 3250 psi
 - 2. Density Classification: Normal weight.

2.3 CONCRETE LINTELS

- A. Concrete Lintels: ASTM C1623, matching CMUs in color, texture, and density classification; and with reinforcing bars indicated. Provide lintels with net-area compressive strength not less than that of CMUs.

2.4 MORTAR AND GROUT MATERIALS

- A. 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.
- B. Hydrated Lime: ASTM C 207, Type S.
- C. Portland Cement-Lime Mix: Packaged blend of portland cement and hydrated lime containing no other ingredients.
- D. Masonry Cement: ASTM C 91.
- E. Aggregate for Mortar: ASTM C 144.
 - 1. White-Mortar Aggregates: Natural white sand or crushed white stone.

2. Colored-Mortar Aggregates: Natural sand or crushed stone of color necessary to produce required mortar color.

- F. Aggregate for Grout: ASTM C 404.
- G. Cold-Weather Admixture: Nonchloride, noncorrosive, accelerating admixture complying with ASTM C 494, Type C, and recommended by manufacturer for use in masonry mortar of composition indicated.
- H. Water: Potable.

2.5 REINFORCEMENT

- A. Uncoated-Steel Reinforcing Bars: ASTM A 615 or ASTM A 996, Grade 60.
- B. Reinforcing Bar Positioners: Wire units designed to fit into mortar bed joints spanning masonry unit cells and to hold reinforcing bars in center of cells. Units are formed from 0.148-inch steel wire, hot-dip galvanized after fabrication. Provide units designed for number of bars indicated.
- C. Masonry-Joint Reinforcement, General: ASTM A 951/A 951M.
 - 1. Interior Walls: Hot-dip galvanized carbon steel.
 - 2. Exterior Walls: Hot-dip galvanized carbon steel.
 - 3. Wire Size for Side Rods: 0.148-inch diameter.
 - 4. Wire Size for Cross Rods: 0.148-inch diameter.
 - 5. Wire Size for Veneer Ties: 0.148-inch diameter.
 - 6. Spacing of Cross Rods, Tabs, and Cross Ties: Not more than 16 inches o.c.
 - 7. Provide in lengths of not less than 18 feet, with prefabricated corner and tee units.

2.6 TIES AND ANCHORS

- A. Materials: Provide ties and anchors specified in this article that are made from materials that comply with the following unless otherwise indicated:
 - 1. Hot-Dip Galvanized, Carbon-Steel Wire: ASTM A 82, with ASTM A 153/A 153M, Class B-2 coating.
 - 2. Steel Sheet, Galvanized after Fabrication: ASTM A 1008, Commercial Steel, with ASTM A 153, Class B coating.
 - 3. Steel Plates, Shapes, and Bars: ASTM A 36.
- B. Adjustable Anchors for Connecting to Structural Steel Framing: Provide anchors that allow vertical or horizontal adjustment but resist tension and compression forces perpendicular to plane of wall.
 - 1. Anchor Section for Welding to Steel Frame: Crimped 1/4-inch-diameter, hot-dip galvanized-steel wire.
 - 2. Tie Section: Triangular-shaped wire tie made from 0.187-inch-diameter, hot-dip galvanized-steel wire.
- C. Adjustable Anchors for Connecting to Concrete: Provide anchors that allow vertical or horizontal adjustment but resist tension and compression forces perpendicular to plane of wall.

1. Connector Section: Dovetail tabs for inserting into dovetail slots in concrete and attached to tie section; formed from 0.060-inch thick steel sheet, galvanized after fabrication.
 2. Tie Section: Triangular-shaped wire tie made from 0.187-inch diameter, hot-dip galvanized-steel wire.
 3. Corrugated-Metal Ties: Metal strips not less than 7/8 inch wide with corrugations having a wavelength of 0.3 to 0.5 inch and an amplitude of 0.06 to 0.10 inch made from 0.060-inch-thick steel sheet, galvanized after fabrication with dovetail tabs for inserting into dovetail slots in concrete.
- D. Partition Top Anchors: 0.105-inch-thick metal plate with a 3/8-inch-diameter metal rod 6 inches long welded to plate and with closed-end plastic tube fitted over rod that allows rod to move in and out of tube. Fabricate from steel, hot-dip galvanized after fabrication.
- E. Rigid Anchors: Fabricate from steel bars 1-1/2 inches wide by 1/4 inch thick by 24 inches long, with ends turned up 2 inches or with cross pins unless otherwise indicated.

1. Corrosion Protection: Hot-dip galvanized to comply with ASTM A 153.

2.7 MISCELLANEOUS MASONRY ACCESSORIES

- A. Compressible Filler: Premolded filler strips complying with ASTM D 1056, Grade 2A1; compressible up to 35 percent; of width and thickness indicated; formulated from urethane or PVC.
- B. Preformed Control-Joint Gaskets: Made from styrene-butadiene-rubber compound, complying with ASTM D 2000, Designation M2AA-805 or PVC, complying with ASTM D 2287, Type PVC-65406 and designed to fit standard sash block and to maintain lateral stability in masonry wall; size and configuration as indicated.
- C. Bond-Breaker Strips: Asphalt-saturated felt complying with ASTM D 226/D 226M, Type I (No. 15 asphalt felt).

2.8 MASONRY-CELL FILL

- A. Loose-Fill Insulation: Perlite complying with ASTM C 549, Type II (surface treated for water repellency and limited moisture absorption) or Type IV (surface treated for water repellency and to limit dust generation).
- B. Lightweight-Aggregate Fill: ASTM C 331/C 331M.

2.9 MORTAR AND GROUT MIXES

- A. General: Do not use admixtures, including pigments, air-entraining agents, accelerators, retarders, water-repellent agents, antifreeze compounds, or other admixtures unless otherwise indicated.
1. Do not use calcium chloride in mortar or grout.
 2. Use portland cement-lime mortar unless otherwise indicated.
 3. For exterior masonry, use portland cement-lime mortar.
 4. For reinforced masonry, use portland cement-lime mortar.
 5. Add cold-weather admixture (if used) at same rate for all mortar that will be exposed to view, regardless of weather conditions, to ensure that mortar color is consistent.

- B. Preblended, Dry Mortar Mix: Furnish dry mortar ingredients in form of a preblended mix. Measure quantities by weight to ensure accurate proportions, and thoroughly blend ingredients before delivering to Project site.
- C. Mortar for Unit Masonry: Comply with ASTM C 270, [Proportion] [Property] Specification. Provide the following types of mortar for applications stated unless another type is indicated.
 - 1. For masonry below grade or in contact with earth, use Type S.
 - 2. For reinforced masonry, use Type S.
 - 3. For exterior, above-grade, load-bearing and nonload-bearing walls and parapet walls; for interior load-bearing walls; for interior nonload-bearing partitions; and for other applications where another type is not indicated, use Type N.
- D. Grout for Unit Masonry: Comply with ASTM C 476.
 - 1. Use grout of type indicated or, if not otherwise indicated, of type (fine or coarse) that will comply with TMS 602 for dimensions of grout spaces and pour height.
 - 2. Proportion grout in accordance with ASTM C 476, Table or paragraph 4.2.2 for specified 28-day compressive strength indicated, but not less than 2000 psi.
 - 3. Provide grout with a slump of 8 to 11 inches as measured according to ASTM C 143/C 143M.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Use full-size units without cutting if possible. If cutting is required to provide a continuous pattern or to fit adjoining construction, cut units with motor-driven saws; provide clean, sharp, unchipped edges. Allow units to dry before laying unless wetting of units is specified. Install cut units with cut surfaces and, where possible, cut edges concealed.

3.2 TOLERANCES

- A. Dimensions and Locations of Elements:

- 1. For dimensions in cross section or elevation, do not vary by more than plus 1/2 inch minus 1/4 inch.
- 2. For location of elements in plan, do not vary from that indicated by more than plus or minus 1/2 inch.
- 3. For location of elements in elevation, do not vary from that indicated by more than plus or minus 1/4 inch in a story height or 1/2 inch total.

- B. Lines and Levels:

- 1. For bed joints and top surfaces of bearing walls, do not vary from level by more than 1/4 inch in 10 feet, or 1/2-inch maximum.
- 2. For conspicuous horizontal lines, such as lintels, sills, parapets, and reveals, do not vary from level by more than 1/8 inch in 10 feet, or 1/2-inch maximum.
- 3. For vertical lines and surfaces, do not vary from plumb by more than 1/4 inch in 10 feet, or 1/2-inch maximum.

4. For conspicuous vertical lines, such as external corners, door jambs, reveals, and expansion and control joints, do not vary from plumb by more than 1/8 inch in 10 feet, or 1/2-inch maximum.
5. For lines and surfaces, do not vary from straight by more than 1/4 inch in 10, 3/8 inch in 20 feet or 1/2-inch maximum.

C. Joints:

1. For bed joints, do not vary from thickness indicated by more than plus or minus 1/8 inch, with a maximum thickness limited to 1/2 inch.
2. For head and collar joints, do not vary from thickness indicated by more than plus 3/8 inch or minus 1/4 inch.
3. For exposed head joints, do not vary from thickness indicated by more than plus or minus 1/8 inch.

3.3 LAYING MASONRY WALLS

- A. Lay out walls in advance for accurate spacing of surface bond patterns with uniform joint thicknesses and for accurate location of openings, movement type joints, returns, and offsets. Avoid using less-than-half-size units, particularly at corners, jambs, and, where possible, at other locations.
- B. Bond Pattern for Exposed Masonry: Unless otherwise indicated, lay exposed masonry in running bond; do not use units with less-than-nominal 4-inch horizontal face dimensions at corners or jambs.
- C. Built-in Work: As construction progresses, build in items specified in this and other Sections. Fill in solidly with masonry around built-in items.
- D. Fill space between steel frames and masonry solidly with mortar unless otherwise indicated.
- E. Fill cores in hollow CMUs with grout 24 inches under bearing plates, beams, lintels, posts, and similar items unless otherwise indicated.

3.4 MORTAR BEDDING AND JOINTING

- A. Lay CMUs as follows:
 1. Bed face shells in mortar and make head joints of depth equal to bed joints.
 2. Bed webs in mortar in all courses of piers, columns, and pilasters.
 3. Bed webs in mortar in grouted masonry, including starting course on footings.
 4. Fully bed entire units, including areas under cells, at starting course on footings where cells are not grouted.
- B. Lay solid masonry units with completely filled bed and head joints; butter ends with sufficient mortar to fill head joints and shove into place. Do not deeply furrow bed joints or slush head joints.
- C. Tool exposed joints slightly concave when thumbprint hard, using a jointer larger than joint thickness unless otherwise indicated.
- D. Cut joints flush for masonry walls to receive plaster or other direct-applied finishes (other than paint) unless otherwise indicated.

3.5 MASONRY-CELL FILL

- A. Pour loose-fill insulation into cavities to fill void spaces. Maintain inspection ports to show presence of fill at extremities of each pour area. Close the ports after filling has been confirmed. Limit the fall of fill to one story high, but not more than 20 feet.

3.6 MASONRY-JOINT REINFORCEMENT

- A. General: Install entire length of longitudinal side rods in mortar with a minimum cover of 5/8 inch on exterior side of walls, 1/2 inch elsewhere. Lap reinforcement a minimum of 6 inches.
 - 1. Space reinforcement not more than 16 inches o.c.
 - 2. Space reinforcement not more than 8 inches o.c. in foundation walls and parapet walls.
 - 3. Provide reinforcement not more than 8 inches above and below wall openings and extending 12 inches beyond openings in addition to continuous reinforcement.
- B. Interrupt joint reinforcement at control and expansion joints unless otherwise indicated.
- C. Provide continuity at wall intersections by using prefabricated T-shaped units.
- D. Provide continuity at corners by using prefabricated L-shaped units.

3.7 ANCHORING MASONRY TO STRUCTURAL STEEL AND CONCRETE

- A. Anchor masonry to structural steel and concrete where masonry abuts or faces structural steel or concrete, to comply with the following:
 - 1. Provide an open space not less than 1/2 inch wide between masonry and structural steel or concrete unless otherwise indicated. Keep open space free of mortar and other rigid materials.
 - 2. Anchor masonry with anchors embedded in masonry joints and attached to structure.
 - 3. Space anchors as indicated, but not more than 24 inches o.c. vertically and 24 inches o.c. horizontally.

3.8 REINFORCED UNIT MASONRY INSTALLATION

- A. Temporary Formwork and Shores: Construct formwork and shores as needed to support reinforced masonry elements during construction.
 - 1. Construct formwork to provide shape, line, and dimensions of completed masonry as indicated. Make forms sufficiently tight to prevent leakage of mortar and grout. Brace, tie, and support forms to maintain position and shape during construction and curing of reinforced masonry.
 - 2. Do not remove forms and shores until reinforced masonry members have hardened sufficiently to carry their own weight and that of other loads that may be placed on them during construction.
- B. Placing Reinforcement: Comply with requirements in TMS 602.
- C. Grouting: Do not place grout until entire height of masonry to be grouted has attained enough strength to resist grout pressure.

1. Comply with requirements in TMS 602 for cleanouts and for grout placement, including minimum grout space and maximum pour height.
2. Limit height of vertical grout pours to not more than 60 inches.

3.9 FIELD QUALITY CONTROL

- A. Testing and Inspecting: Owner will engage special inspectors to perform tests and inspections and prepare reports. Allow inspectors access to scaffolding and work areas as needed to perform tests and inspections. Retesting of materials that fail to comply with specified requirements shall be done at Contractor's expense.
- B. Inspections: Special inspections according to Level B in TMS 402.
 1. Begin masonry construction only after inspectors have verified proportions of site-prepared mortar.
 2. Place grout only after inspectors have verified compliance of grout spaces and of grades, sizes, and locations of reinforcement.
 3. Place grout only after inspectors have verified proportions of site-prepared grout.
- C. Testing Prior to Construction: One set of tests.
- D. Testing Frequency: One set of tests for each 5000 sq. ft. of wall area or portion thereof.
- E. Concrete Masonry Unit Test: For each type of unit provided, according to ASTM C 140 for compressive strength.
- F. Mortar Aggregate Ratio Test (Proportion Specification): For each mix provided, according to ASTM C 780.
- G. Mortar Test (Property Specification): For each mix provided, according to ASTM C 780. Test mortar for mortar air content and compressive strength.
- H. Grout Test (Compressive Strength): For each mix provided, according to ASTM C 1019.
- I. Prism Test: For each type of construction provided, according to ASTM C 1314 at seven days and at 28 days.

3.10 PARGING

- A. Parge exterior faces of below-grade masonry walls, where indicated, in two uniform coats to a total thickness of 3/4 inch. Dampen wall before applying first coat, and scarify first coat to ensure full bond to subsequent coat.
- B. Use a steel-trowel finish to produce a smooth, flat, dense surface with a maximum surface variation of 1/8 inch per foot. Form a wash at top of parging and a cove at bottom.
- C. Damp-cure parging for at least 24 hours and protect parging until cured.

3.11 REPAIRING, POINTING, AND CLEANING

- A. In-Progress Cleaning: Clean unit masonry as work progresses by dry brushing to remove mortar fins and smears before tooling joints.
- B. Final Cleaning: After mortar is thoroughly set and cured, clean exposed masonry as follows:

1. Remove large mortar particles by hand with wooden paddles and nonmetallic scrape hoes or chisels.
2. Test cleaning methods on sample wall panel; leave one-half of panel uncleaned for comparison purposes.
3. Protect adjacent surfaces from contact with cleaner.
4. Wet wall surfaces with water before applying cleaners; remove cleaners promptly by rinsing surfaces thoroughly with clear water.
5. Clean brick by bucket-and-brush hand-cleaning method described in BIA Technical Notes 20.
6. Clean masonry with a proprietary acidic cleaner applied according to manufacturer's written instructions.

3.12 MASONRY WASTE DISPOSAL

- A. Waste Disposal as Fill Material: Dispose of clean masonry waste, including excess or soil-contaminated sand, waste mortar, and broken masonry units, by crushing and mixing with fill material as fill is placed.
 1. Do not dispose of masonry waste as fill within 18 inches of finished grade.
- B. Masonry Waste Recycling: Return broken CMUs not used as fill to manufacturer for recycling.
- C. Excess Masonry Waste: Remove excess clean masonry waste that cannot be used as fill, as described above or recycled, and other masonry waste, and legally dispose of off Owner's property.

END OF SECTION 04 22 00

SECTION 024119 – METAL FABRICATIONS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Miscellaneous framing and supports.
 - 2. Metal Ladders
- B. Products furnished, but not installed, under this Section include the following:
 - 1. Steel weld plates and angles for casting into concrete for applications where they are not specified in other Sections.
 - 2. Steel weld plates and angles for casting into concrete for applications where they are not specified in other Sections.
 - 3. Anchor bolts, steel pipe sleeves, slotted-channel inserts, and wedge-type inserts indicated to be cast into concrete or built into unit masonry.
- C. Related Requirements:
 - 1. Section 042200 "Unit Masonry" for installing loose lintels, anchor bolts, and other items built into unit masonry.

1.2 COORDINATION

- A. Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint and coating manufacturer's written instructions to ensure that shop primers and topcoats are compatible with one another.
- B. Coordinate installation of metal fabrications that are anchored to or that receive other work. 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.

1.3 ACTION SUBMITTALS

- A. Product Data:
 - 1. Nonslip aggregates and nonslip-aggregate surface finishes.
 - 2. Fasteners.
 - 3. Shop Primers
 - 4. Manufactured metal ladders
- B. Shop Drawings: Show fabrication and installation details. Provide Shop Drawings for the following:

1. Miscellaneous framing and supports for applications where framing and supports are not specified in other Sections.
2. Metal ladders.

1.4 INFORMATIONAL SUBMITTALS

- A. Mill Certificates: Signed by stainless steel manufacturers, certifying that products furnished comply with requirements.
- B. Welding certificates.
- C. Paint Compatibility Certificates: From manufacturers of topcoats applied over shop primers, certifying that shop primers are compatible with topcoats.
- D. Research Reports: For post-installed anchors.
- E. Delegated design engineer qualifications.

1.5 QUALITY ASSURANCE

- A. Welding Qualifications: Qualify procedures and personnel in accordance with the following welding codes:
 1. AWS D1.1/D1.1M, "Structural Welding Code - Steel."
 2. AWS D1.2/D1.2M, "Structural Welding Code - Aluminum."
 3. AWS D1.6/D1.6M, "Structural Welding Code - Stainless Steel."
- B. Landfill Records: Indicate receipt and acceptance of hazardous wastes, as applicable, by a landfill facility licensed to accept hazardous wastes.

1.6 FIELD CONDITIONS

- A. Field Measurements: Verify actual locations of walls, floor slabs, decks, and other construction contiguous with metal fabrications by field measurements before fabrication.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Engage a qualified professional engineer, as defined in Section 014000 "Quality Requirements," to design ladders.
- B. Structural Performance of Aluminum Ladders: Ladders, including landings, are to withstand the effects of loads and stresses within limits and under conditions specified in ANSI/ASC A14.3.
- C. Structural Performance of Alternating Tread Devices: Alternating tread devices are to withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated:

1. Uniform Load: 100 lbf/sq. ft..
2. Concentrated Load: 300 lbf applied on an area of 4 sq. in..
3. Uniform and concentrated loads need not be assumed to act concurrently.
4. Comply with applicable railing loadings in Section 055213 "Pipe and Tube Railings."

2.2 FASTENERS

- A. Cast-in-Place Anchors in Concrete: Either threaded or wedge type unless otherwise indicated; galvanized ferrous castings, either ASTM A47/A47M malleable iron or ASTM A27/A27M cast steel. Provide bolts, washers, and shims as needed, all hot-dip galvanized per ASTM F2329/F2329M.
- B. Post-Installed Anchors:
 1. Material for Interior Locations: Carbon-steel components zinc plated to comply with ASTM B633 or ASTM F1941/F1941M, Class Fe/Zn 5, unless otherwise indicated.

2.3 MISCELLANEOUS MATERIALS

- A. Shop Primers: Provide primers that comply with Section 099123 "Interior Painting."
- B. Universal Shop Primer: Fast-curing, lead- and chromate-free, universal modified-alkyd primer complying with MPI#79 and compatible with topcoat.
 1. Use primer that contains pigments that make it easily distinguishable from zinc-rich primer.
- C. Water-Based Primer: Emulsion type, anticorrosive primer for mildly corrosive environments that is resistant to flash rusting when applied to cleaned steel, complying with MPI#107 and compatible with topcoat.
- D. Epoxy Zinc-Rich Primer: Complying with MPI#20 and compatible with topcoat.
- E. Galvanizing Repair Paint: High-zinc-dust-content paint complying with SSPC-Paint 20 and compatible with paints specified to be used over it.
- F. Concrete: Comply with requirements in Section 033000 "Cast-in-Place Concrete" for normal-weight, air-entrained concrete with a minimum 28-day compressive strength of 3000 psi.

2.4 METAL LADDERS

- A. General.
 1. Comply with ANSI A14.3.
- B. Aluminum Ladders:

1. Basis-of-Design Product: Subject to compliance with requirements, provide O'Keeffe's Inc.; Model 504 Tubular Rail Low Parapet Access Ladder with Walk-through Rail Extensions or comparable product.
2. Source Limitations: Obtain aluminum ladders from single source from single manufacturer.
3. Space siderails 16 inches apart unless otherwise indicated.
4. Siderails: Continuous extruded-aluminum channels or tubes, not less than 2-1/2 inches deep, 3/4 inch wide, and 1/8 inch thick.
5. Rungs: Extruded-aluminum tubes, not less than 3/4 inch deep and not less than 1/8 inch thick, with ribbed tread surfaces.
6. Fit rungs in centerline of siderails; fasten by welding or with stainless steel fasteners or brackets and aluminum rivets.

2.5 GENERAL FINISH REQUIREMENTS

- A. Finish metal fabrications after assembly.

2.6 ALUMINUM FINISHES

- A. As-Fabricated Finish: AA-M12.
- B. Clear Anodic Finish: AAMA 611, Class I, AA-M12C22A41.
- C. Masonry: Demolish in small sections. Cut masonry at junctures with construction to remain, using power-driven saw, then remove masonry between saw cuts.

PART 3 – EXECUTION

3.1 INSTALLATION GENERAL

- A. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installing metal fabrications. Set metal fabrications accurately in location, alignment, and elevation; with edges and surfaces level, plumb, true, and free of rack; and measured from established lines and levels.
- B. Fit exposed connections accurately together to form hairline joints. Weld connections that are not to be left as exposed joints but cannot be shop welded because of shipping size limitations. Do not weld, cut, or abrade surfaces of exterior units that have been hot-dip galvanized after fabrication and are for bolted or screwed field connections.
- C. Field Welding: Comply with the following requirements:
 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 2. Obtain fusion without undercut or overlap.
 3. Remove welding flux immediately.

4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.
 - D. Fastening to In-Place Construction: Provide anchorage devices and fasteners where metal fabrications are required to be fastened to in-place construction. Provide threaded fasteners for use with concrete and masonry inserts, toggle bolts, through bolts, lag screws, wood screws, and other connectors.
 - E. Provide temporary bracing or anchors in formwork for items that are to be built into concrete, masonry, or similar construction.
 - F. Corrosion Protection: Coat concealed surfaces of aluminum that come into contact with grout, concrete, masonry, wood, or dissimilar metals with the following:
 1. Cast Aluminum: Heavy coat of bituminous paint.
 2. Extruded Aluminum: Two coats of clear lacquer.
- 3.2 INSTALLATION OF METAL LADDERS
- A. Install brackets as required for securing of ladders welded or bolted to structural steel or built into masonry or concrete.

END OF SECTION 055000

SECTION 055150 - Ladders

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Aluminum access ladders

1.2 RELATED SECTIONS

- A. Section 055000– Metal Fabrications: Fasteners and installation requirements used to attach ladders to structure.

1.3 REFERENCES

- A. OSHA 1910.27– Fixed Ladders.

1.4 SUBMITTALS

- A. Submit under provisions of Section 013300.
- B. Product Data: Manufacturer's data sheets on each product.
- C. Shop Drawings:
 - 1. Detail fabrication and erection of each ladder indicated. Include plans, elevations, sections, and details of metal fabrications and their connections.
 - 2. Provide templates for anchors and bolts specified for installation under other Sections.
 - 3. Provide reaction loads for each hanger and bracket.
- D. Qualification Data:
 - 1. Refer to Quality Assurance provisions for submittal requirements evidencing experience, certifications and resources.
- E. Selection Samples: For each finish specified, two complete sets of color chips representing manufacturer's full range of available colors.
- F. Verification Samples: For each finish specified, two samples, minimum size 6 inches (150 mm) square, represent actual product color.

1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications: A firm experienced in producing aluminum metal ladders similar to those indicated for this Project.
 - 1. Record of successful in-service performance.
 - 2. Sufficient production capacity to produce required units.
 - 3. Professional engineering competent in design and structural analysis to fabricate ladders in compliance with industry standards and local codes.
- B. Installer Qualifications: Competent and experienced firm capable of selecting fasteners and installing ladders to attain designed operational and structural performance.
- C. Product Qualification: Product design shall comply with OSHA 1910.27 minimum standards for ladders.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Store products in manufacturer's unopened packaging until ready for installation.

1.7 PROJECT CONDITIONS

- A. Field Measurements: Verify dimensions by field measurement before fabrication.
 - 1. Established Dimensions: Where field measurements cannot be made without delaying the Work, indicate established dimensions on shop drawing submittal and proceed with fabrication.

1.8 WARRANTY

- A. Manufacturer has responsibility for an extended Corrective Period for work of this Section for a period of 5 years commencing on the shipment date of the product against all the conditions indicated below, and when notified in writing from Owner, manufacturer shall promptly and without inconvenience and cost to Owner correct said deficiencies.
 - 1. Defects in materials and workmanship.
 - 2. Deterioration of material and surface performance below minimum OSHA standards as certified by independent third party testing laboratory. Ordinary wear and tear, unusual abuse or neglect excepted.
 - 3. Within the warranty period, the manufacturer shall, at its option, repair, replace, or refund the purchase price of defective ladder.
- B. Manufacturer shall be notified immediately of defective products, and be given a reasonable opportunity to inspect the goods prior to return. Manufacturer will not assume responsibility, or compensation, for unauthorized repairs or labor. Manufacturer makes no other warranty, expressed

or implied, to the merchantability, fitness for a particular purpose, design, sale, installation, or use, of the ladder; and shall not be liable for incidental or consequential damages, losses of or expenses, resulting from the use of ladder products.

1.9 EXTRA MATERIALS

- A. Furnish touchup kit for each type and color of paint finish provided.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Manufacturer: O’Keeffe’s, Inc.; 100 N Hill Drive, Suite 12, Brisbane, CA 94005. Toll Free Tel: (888) 653-3333. Tel: (415) 824-4900. Fax: (415) 824-5900. Email: info@okeeffes.com. Web: <http://www.okeeffes.com>.
- B. Or approved equal

2.2 APPLICATIONS/SCOPE

- A. Fixed Access Ladder:
 - 1. Tubular Rail Low Parapet Access Ladder with Walk-through Rail Extension.
 - a. Model 504 as manufactured by O’Keeffe’s Inc.

2.3 FINISHES

- A. Mill finish. As extruded.
- B. Clear Anodic Finish: AA-M10C22A41 Mechanical finish as fabricated. Architectural Class I, clear coating 0.018 mm or thicker.
- C. Paint. Urethane over chemically pretreated substrate.
 - 1. Fire Red (RAL 2002).
 - 2. Alert Orange (RAL 2003).
 - 3. Warning Blue (RAL 5005).
 - 4. Caution Yellow (RAL 1018).
 - 5. Safety Green (RAL 6001).

2.4 MATERIALS

- A. Aluminum Sheet: Alloy 5005-H34 to comply with ASTM B209.
- B. Aluminum Extrusions: Alloy 6063-T6 to comply with ASTM B221.

2.5 FABRICATION

- A. Rungs: Not less than 1-1/4 inches (32 mm) in section and 18-3/8 inches (467mm) long, formed from tubular aluminum extrusions. Squared and deeply serrated on all sides.
 - 1. Rungs shall withstand a 1,500 pound (454 kg) load without deformation or failure.
- B. Channel Side Rails: Not less than 1/8 inch (3 mm) wall thickness by 3 inches (76 mm) wide.
- C. Heavy Duty Tubular Side Rails: Assembled from two interlocking aluminum extrusions no less than 1/8 inch (3 mm) wall thickness by 3 inches (76 mm) wide. Construction shall be self-locking stainless steel fasteners, full penetration TIG welds and clean, smooth and burr-free surfaces.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Coordinate anchorages. Furnish setting drawings, templates, and anchorage structural loads for fastener resistance.
- B. Do not begin installation until supporting structure is complete and ladder installation will not interfere with supporting structure work.
- C. If supporting structure is the responsibility of another installer, notify Architect of unsatisfactory supporting work before proceeding.

3.2 INSTALLATION

- A. Install in accordance with manufacturer's instructions and in proper relationship with adjacent construction.

3.3 PROTECTION

- A. Protect installed products until completion of project.
- B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION 055150

SECTION 055213 – HANDRAILS AND RAILINGS

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Permanent guard rails

1.2 RELATED SECTIONS

- A. Section 05 50 00 - Metal Fabrications.

1.3 REFERENCES

- A. American National Standards Institute (ANSI):
 - 1. ANSI A14.3 - American National Standards for Ladders - Fixed - Safety Requirements.
- B. Occupational Safety and Health Administration (OSHA):
 - 1. 29 CFR 1910.23 - Fixed Ladders.
 - 2. 29 CFR 1910.28 - Duty to Have Fall Protection and Falling Object Protection.
 - 3. 29 CFR 1910.29 - Walking-Working Surfaces.
 - 4. 29 CFR 1926.500 - Scope, Application, and Definitions Applicable to this Subpart.
 - 5. 29 CFR 1926.501 - Duty to Have Fall Protection.
 - 6. 29 CFR 1926.502 - Fall Protection Systems Criteria and Practices.
 - 7. 29 CFR 1926.503 - Training Requirements.

1.4 SUBMITTALS

- A. Submit under provisions of Section 01 33 00 - Administrative Requirements.
- B. Product Data: Manufacturer's data sheets on each product to be used, including:
 - 1. Preparation instructions and recommendations.
 - 2. Storage and handling requirements and recommendations.
 - 3. Installation methods.
- C. Shop Drawings: Drawings showing plans, elevations, sections, and details of components. Show member sizes and part identification, fasteners, anchors, fittings, and evidence of compliance with structural performance requirements.
- D. Selection Samples: For each finish product specified, two complete sets of color chips representing manufacturer's full range of available colors and patterns.
- E. Manufacturer's Certificates:

1. Certify that Railings and Base Castings are made in USA. Provide steel mill and foundry certificates for verification prior to shipment.
2. Manufacturer must be American Welding Society Welding Certified for Welding Standards AWS D1.1 and AWS D1.3. Third party qualification documentation required prior to shipment.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to the job site in good condition and adequately protected against damage as handrails are a finished product.
- B. Inspect rail sections for damage before signing the receipt from the trucking company. Truck driver must note damaged goods on the bill of lading if damaged product is found.
- C. Store products in manufacturer's unopened packaging until ready for installation.
- D. Products to be palletized and labeled by roof level or designated drop zone.

1.6 PROJECT CONDITIONS

- A. Field Measurements: Where handrails and railings are indicated to fit to other construction, check actual dimensions of other construction by accurate field measurements before fabrication.

1.7 WARRANTY

- A. Warranty: Provide manufacturer's limited two year warranty.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Manufacturer: Safety Rail Company, which is located at: 4244 Shoreline Dr.; Spring Park, MN 55384; Toll Free Tel: 888-434-2720; Fax: 888-471-4931 ; Email: request info (sales@safetyrailcompany.com); Web: <http://www.safetyrailcompany.com>
- B. Or approved equal.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Do not begin installation until substrates have been properly prepared.

- B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 PREPARATION

- A. Clean surfaces thoroughly prior to installation.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.3 INSTALLATION

- A. Install in accordance with manufacturer's instructions, approved submittals and in proper relationship with adjacent construction.

3.4 PROTECTION

- A. Protect installed products until completion of project.
- B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION 055213

NOT FOR BIDDING PURPOSES

SECTION 061000 – ROUGH CARPENTRY

1.1 SUMMARY

A. Section Includes:

1. Framing with dimension lumber.
2. Framing with engineered wood products.
3. Wood blocking, and nailers.
4. Wood furring and grounds.

1.2 ACTION SUBMITTALS

- #### **A. Product Data:** For each type of process and factory-fabricated product.
- #### **B. Sustainable Design Submittals:**

1.3 INFORMATIONAL SUBMITTALS

- #### **A. Material Certificates:** For dimension lumber specified to comply with minimum allowable unit stresses. Indicate species and grade selected for each use and design values approved by the ALSC Board of Review.
- #### **B. Evaluation Reports:** For the following, from ICC-ES:
1. Wood-preserved-treated wood.
 2. Fire-retardant-treated wood.
 3. Engineered wood products.

PART 2 - PRODUCTS

2.1 WOOD PRODUCTS, GENERAL

- #### **A. Lumber:** DOC PS 20 and applicable rules of grading agencies indicated. If no grading agency is indicated, comply with the applicable rules of any rules-writing agency certified by the ALSC Board of Review. Grade lumber by an agency certified by the ALSC Board of Review to inspect and grade lumber under the rules indicated.
1. Factory mark each piece of lumber with grade stamp of grading agency.
 2. For exposed lumber indicated to receive a stained or natural finish, mark grade stamp on end or back of each piece.
 3. Dress lumber, S4S, unless otherwise indicated.

- B. Maximum Moisture Content of Lumber: 19 percent
- C. Engineered Wood Products: Acceptable to authorities having jurisdiction and for which current model code research or evaluation reports exist that show compliance with building code in effect for Project.
 - 1. Allowable design stresses, as published by manufacturer, shall meet or exceed those indicated. Manufacturer's published values shall be determined from empirical data or by rational engineering analysis and demonstrated by comprehensive testing performed by a qualified independent testing agency.

2.2 WOOD-PRESERVATIVE-TREATED LUMBER

- A. Preservative Treatment by Pressure Process: AWPAC U1; Use Category UC2 for interior construction not in contact with ground, Use Category UC3b for exterior construction not in contact with ground, and Use Category UC4a for items in contact with ground.
 - 1. Preservative Chemicals: Acceptable to authorities having jurisdiction and containing no arsenic or chromium. Do not use inorganic boron (SBX) for sill plates.
 - 2. For exposed items indicated to receive a stained or natural finish, chemical formulations shall not require incising, contain colorants, bleed through, or otherwise adversely affect finishes.
- B. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent. Do not use material that is warped or that does not comply with requirements for untreated material.
- C. Mark lumber with treatment quality mark of an inspection agency approved by the ALSC Board of Review.
- D. Application: Treat all rough carpentry unless otherwise indicated items indicated on Drawings, and the following:
 - 1. Wood cants, nailers, curbs, equipment support bases, blocking, stripping, and similar members in connection with roofing, flashing, vapor barriers, and waterproofing.
 - 2. Wood sills, sleepers, blocking, [furring,] [stripping,] and similar concealed members in contact with masonry or concrete.
 - 3. Wood framing and furring attached directly to the interior of below-grade exterior masonry or concrete walls.
 - 4. Wood framing members that are less than 18 inches (460 mm) above the ground in crawlspaces or unexcavated areas.
 - 5. Wood floor plates that are installed over concrete slabs-on-grade.

2.3 DIMENSION LUMBER FRAMING

- A. Non-Load-Bearing Interior Partitions: Construction, Stud, or No. 3 grade.
 - 1. Species:
 - a. Spruce-pine-fir; NLGA.
- B. Load-Bearing Partitions: No. 1 / No. 2 grade.
 - a. Spruce-pine-fir; NLGA.

2.4 TIMBER FRAMING

- A. Comply with the following requirements, according to grading rules of grading agency indicated:
 - 1. Species and Grade: Spruce pine fir #2; NLGA; or Southern pine; No2 grade; SPIB.
 - 2. Maximum Moisture Content: 19 percent.
 - 3. Additional Restriction: Free of heart centers.

2.5 ENGINEERED WOOD PRODUCTS

- A. Source Limitations: Obtain each type of engineered wood product from single source from a single manufacturer.
- B. Laminated-Veneer Lumber: Structural composite lumber made from wood veneers with grain primarily parallel to member lengths, evaluated and monitored according to ASTM D5456 and manufactured with an exterior-type adhesive complying with ASTM D2559.
 - 1. Extreme Fiber Stress in Bending, Edgewise: 2900 psi.
 - 2. Modulus of Elasticity, Edgewise: 1,900,000 psi.

2.6 MISCELLANEOUS LUMBER

- A. General: Provide miscellaneous lumber indicated and lumber for support or attachment of other construction, including the following:
 - 1. Blocking.
 - 2. Nailers.
 - 3. Cants.
 - 4. Furring.
 - 5. Grounds.
 - 6. Utility shelving.

B. Dimension Lumber Items: grade lumber of any of the following species:

1. Hem-fir (north); NLGA.
2. Mixed southern pine or southern pine; SPIB.
3. Spruce-pine-fir; NLGA.
4. Hem-fir; WCLIB or WWPA.
5. Spruce-pine-fir (south); NeLMA, WCLIB, or WWPA.
6. Western woods; WCLIB or WWPA.
7. Northern species; NLGA.
8. Eastern softwoods; NeLMA.

2.7 FASTENERS

- A. General: Fasteners shall be of size and type indicated and shall comply with requirements specified in this article for material and manufacture.
1. Where rough carpentry is exposed to weather, in ground contact, pressure-preservative treated, or in area of high relative humidity, provide fasteners with hot-dip zinc coating complying with ASTM A153.
- B. Nails, Brads, and Staples: ASTM F1667.
- C. Power-Driven Fasteners: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC70.

2.8 METAL FRAMING ANCHORS

- A. Allowable design loads, as published by manufacturer, shall meet or exceed those indicated. Manufacturer's published values shall be determined from empirical data or by rational engineering analysis and demonstrated by comprehensive testing performed by a qualified independent testing agency. Framing anchors shall be punched for fasteners adequate to withstand same loads as framing anchors.
- B. Galvanized-Steel Sheet: Hot-dip, zinc-coated steel sheet complying with ASTM A653, G60 coating designation.
1. Use for interior locations unless otherwise indicated.
- C. Hot-Dip, Heavy-Galvanized Steel Sheet: ASTM A653; structural steel (SS), high-strength low-alloy steel Type A (HSLAS Type A), or high-strength low-alloy steel Type B (HSLAS Type B); G185 coating designation; and not less than 0.036 inch thick.

1. Use for wood-preservative-treated lumber and where indicated.
- D. Post Bases: Adjustable-socket type for bolting in place with standoff plate to raise post 1 inch (25 mm) above base and with 2-inch- (50-mm-) minimum side cover, socket 0.062 inch (1.6 mm) thick, and standoff and adjustment plates 0.108 inch (2.8 mm) thick.
- E. Rafter Tie-Downs: Bent strap tie for fastening rafters or roof trusses to wall studs below, 1-1/2 inches (38 mm) wide by 0.050 inch (1.3 mm) thick
- F. Hold-Downs: Brackets for bolting to wall studs and securing to foundation walls with anchor bolts or to other hold-downs with threaded rods and designed with first of two bolts placed seven bolt diameters from reinforced base.
 1. Bolt Diameter: 3/4 inch.
 2. Width: 3-3/16 inches.
 3. Body Thickness: 0.138 inch.
 4. Base Reinforcement Thickness: 0.239 inch.

2.9 MISCELLANEOUS MATERIALS

- A. Sill-Sealer Gaskets: Closed-cell neoprene foam, 1/4 inch (6.4 mm) thick, selected from manufacturer's standard widths to suit width of sill members indicated.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Framing Standard: Comply with AF&PA's WCD 1, "Details for Conventional Wood Frame Construction," unless otherwise indicated.
- B. Framing with Engineered Wood Products: Install engineered wood products to comply with manufacturer's written instructions.
- C. Set rough carpentry to required levels and lines, with members plumb, true to line, cut, and fitted. Fit rough carpentry accurately to other construction. Locate furring, nailers, blocking, grounds, and similar supports to comply with requirements for attaching other construction.
- D. Install plywood backing panels by fastening to studs; coordinate locations with utilities requiring backing panels. Install fire-retardant-treated plywood backing panels with classification marking of testing agency exposed to view.
- E. Install shear wall panels to comply with manufacturer's written instructions.

- F. Install metal framing anchors to comply with manufacturer's written instructions. Install fasteners through each fastener hole.
- G. Install sill sealer gasket to form continuous seal between sill plates and foundation walls.
- H. Do not splice structural members between supports unless otherwise indicated.
- I. Provide blocking and framing as indicated and as required to support facing materials, fixtures, specialty items, and trim.
 - 1. Provide metal clips for fastening gypsum board or lath at corners and intersections where framing or blocking does not provide a surface for fastening edges of panels. Space clips not more than 16 inches (406 mm) o.c.
- J. Use steel common nails unless otherwise indicated. Select fasteners of size that will not fully penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections between members. Install fasteners without splitting wood. Drive nails snug but do not countersink nail heads unless otherwise indicated.

3.2 INSTALLATION OF WOOD BLOCKING AND NAILERS

- A. Provide permanent grounds of dressed, pressure-preservative-treated, key-beveled lumber not less than 1-1/2 inches (38 mm) wide and of thickness required to bring face of ground to exact thickness of finish material. Remove temporary grounds when no longer required.

3.3 INSTALLATION OF WALL AND PARTITION FRAMING

- A. General: Provide single bottom plate and double top plates using members of 2-inch nominal thickness whose widths equal that of studs, except single top plate may be used for non-load-bearing partitions[and for load-bearing partitions where framing members bearing on partition are located directly over studs]. Fasten plates to supporting construction unless otherwise indicated.
 - 1. Provide continuous horizontal blocking at mid height of partitions more than 96 inches (2438 mm) high, using members of 2-inch nominal thickness and of same width as wall or partitions.
- B. Construct corners and intersections with three or more studs. Construct posts at hold downs with three or more studs.
- C. Frame openings with multiple studs and headers as indicated. Provide nailed header members of thickness equal to width of studs. Support headers on jamb studs.

3.4 INSTALLATION OF TIMBER FRAMING

- A. Install wood posts using metal anchors indicated.
- B. Treat ends of timber beams and posts exposed to weather by dipping in water-repellent preservative for 15 minutes.

3.5 PROTECTION

- A. Protect wood that has been treated with inorganic boron (SBK) from weather. If, despite protection, inorganic boron-treated wood becomes wet, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.
- B. Protect rough carpentry from weather. If, despite protection, rough carpentry becomes wet enough that moisture content exceeds that specified, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.

END OF SECTION 061000

NOT FOR BIDDING PURPOSES

SECTION 062013 – EXTERIOR FINISH CARPENTRY

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Exterior wood primed hardboard trim.
2. Lumber Engineered wood siding.

1.2 DEFINITIONS

- A. MDO:** Plywood with a medium-density overlay on the face.
- B. PVC:** Polyvinyl chloride.

1.3 ACTION SUBMITTALS

- A. Product Data:** For each type of process and factory-fabricated product.
- B. Samples:** For each exposed product and for each color and texture specified.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

- A. Lumber:** DOC PS 20 and applicable rules of grading agencies indicated. If no grading agency is indicated, comply with applicable rules of any rules-writing agency certified by the American Lumber Standard Committee's (ALSC) Board of Review. Grade lumber by an agency certified by the ALSC's Board of Review to inspect and grade lumber under the rules indicated.
1. Factory mark each piece of lumber with grade stamp of inspection agency, indicating grade, species, moisture content at time of surfacing, and mill.
 2. For exposed lumber, mark grade stamp on end or back of each piece, or omit grade stamp and provide certificates of grade compliance issued by inspection agency.
- B. Softwood Plywood:** DOC PS 1.
- C. Hardboard:** ANSI A135.4.

2.2 EXTERIOR TRIM

A. Softwood Dutch Lap profile Paneling for Transparent Finish (Stain or Clear Finish):

1. Species and Grade: Southern Yellow pine, SPIB (Southern Pine Inspection Bureau) C & Btr finish.
2. Maximum Moisture Content: 19 percent with at least 85 percent of shipment at 12 percent or less.
3. Finger Jointing: Not allowed.
4. Face Surface: Surfaced (smooth).

2.3 MISCELLANEOUS MATERIALS

A. Fasteners for Exterior Finish Carpentry: Provide nails or screws, in sufficient length to penetrate not less than 1-1/2 inches (38 mm) into wood substrate.

1. For face-fastening siding, provide ringed-shank siding nails or hot-dip galvanized-steel siding nails unless otherwise indicated.
2. For redwood, provide stainless steel fasteners.
3. For prefinished items, provide matching prefinished aluminum fasteners where face fastening is required.
4. For pressure-preservative-treated wood, provide stainless steel fasteners.
5. For applications not otherwise indicated, provide stainless steel or aluminum fasteners.

B. Low-Emitting Materials: Adhesives shall comply with testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

C. Glue: Aliphatic-resin, polyurethane, or resorcinol wood glue recommended by manufacturer for general carpentry use.

D. Paneling Adhesive: Comply with paneling manufacturer's written instructions for adhesives.

E. Multipurpose Construction Adhesive: Formulation, complying with ASTM D3498, that is recommended for indicated use by adhesive manufacturer.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Clean substrates of projections and substances detrimental to application.
- B. Prime lumber and moldings to be painted, including both faces and edges, unless factory primed.
 - 1. Cut to required lengths and prime ends.

3.2 INSTALLATION, GENERAL

- A. Install exterior finish carpentry level, plumb, true, and aligned with adjacent materials.
 - 1. Use concealed shims where necessary for alignment.
 - 2. Scribe and cut exterior finish carpentry to fit adjoining work.
 - 3. Refinish and seal cuts as recommended by manufacturer.
 - 4. Install to tolerance of 1/8 inch in 96 inches (3 mm in 2438 mm) for level and plumb. Install adjoining exterior finish carpentry with 1/32-inch (0.8-mm) maximum offset for flush installation and 1/16-inch (1.5-mm) maximum offset for reveal installation.
 - 5. Coordinate exterior finish carpentry with materials and systems in or adjacent to it.
 - 6. Provide cutouts for mechanical and electrical items that penetrate exterior finish carpentry.

3.3 INSTALLATION OF STANDING AND RUNNING TRIM

- A. Install flat-grain lumber with bark side exposed to weather.
- B. Install trim with minimum number of joints as is practical, using full-length pieces from maximum lengths of lumber available. Do not use pieces less than 24 inches (610 mm) long, except where necessary.
 - 1. Use scarf joints for end-to-end joints.
 - 2. Stagger end joints in adjacent and related members.
- C. Fit exterior joints to exclude water.
 - 1. Cope at returns and miter at corners to produce tight-fitting joints, with full-surface contact throughout length of joint.
 - 2. Plane backs of casings to provide uniform thickness across joints, where necessary for alignment.
- D. Where face fastening is unavoidable, countersink fasteners, fill surface flush, and sand unless otherwise indicated.

3.4 INSTALLATION OF SIDING

- A. Install siding to comply with manufacturer's written instructions and warranty requirements.
- B. Horizontal Lumber Siding:
 - 1. Apply starter strip along bottom edge of sheathing or sill.
 - 2. Install first course of siding, with lower edge at least 1/8 inch (3 mm) below starter strip and subsequent courses lapped 1 inch (25 mm) over course below.
 - a. Nail at each stud.
 - b. Do not allow nails to penetrate more than one thickness of siding.
 - 3. Leave 1/8-inch (3-mm) gap at trim and corners unless otherwise recommended by manufacturer, and apply sealant.
 - 4. Butt joints only over framing or blocking, nailing top and bottom on each side and staggering joints in subsequent courses.
 - 5. Install prefabricated outside corners as recommended by manufacturer of siding materials.
- C. Engineered Wood Siding:
 - 1. Install engineered wood siding to comply with manufacturer's written instructions.
 - 2. Install panels with edges over framing or blocking.
 - 3. Leave 3/16-inch (5-mm) gap at perimeter, openings, and horizontal panel joints unless otherwise recommended by panel manufacturer.
 - 4. Seal butt joints at inside and outside corners and at trim locations.
 - 5. Install continuous metal flashing at horizontal panel joints.
 - 6. Apply battens and corner trim as indicated.
 - 7. Conceal fasteners to greatest practical extent by placing in grooves of siding pattern or by concealing with applied trim or battens as detailed.
- D. Flashing: Install metal flashing as indicated on Drawings and as recommended by siding manufacturer.
- E. Finish: Apply finish within two weeks of installation.

END OF SECTION 062013

SECTION 064013 - EXTERIOR ARCHITECTURAL WOODWORK

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes the following:

1. Fiber cement exterior trim.
2. Fiber cement exterior siding.
3. Fiber cement board soffits.

- B. Related Requirements:

1. Division 06 Section "Rough Carpentry" for furring, blocking, and other carpentry work not exposed to view and for framing exposed to view.
2. Division 09 Section "Exterior painting" for finishing exterior carpentry.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of process and factory-fabricated product. Indicate component materials, dimensions, profiles, textures, and colors and include construction and application details.
- C. Samples for Initial Selection: For each type of product involving selection of colors, profiles, or textures.

1.4 INFORMATIONAL SUBMITTALS

- A. Sample Warranties: For manufacturer's warranties.

1.5 QUALITY ASSURANCE

- A. Testing Agency Qualifications: For testing agency providing classification marking for Fire retardant-treated material, an inspection agency acceptable to authorities having jurisdiction that periodically performs inspections to verify that the material bearing the classification marking is representative of the material tested.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Stack lumber, plywood, and other panels flat with spacers between each bundle to provide air

circulation. Protect materials from weather by covering with waterproof sheeting, securely anchored. Provide for air circulation around stacks and under coverings.

1.7 FIELD CONDITIONS

- A. Weather Limitations: Proceed with installation only when existing and forecast weather conditions permit work to be performed and at least one coat of specified finish can be applied without exposure to rain, snow, or dampness.
- B. Do not install finish carpentry materials that are wet, moisture damaged, or mold damaged.
 - 1. Indications that materials are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
 - 2. Indications that materials are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

PART 2 – PRODUCTS

2.1 FIBER-CEMENT TRIM

- A. General: ASTM C 1186, Type A, Grade II, fiber-cement board, noncombustible when tested according to ASTM E 136; with a flame-spread index of 25 or less when tested according to ASTM E 84.
 - 1. Basis-of-Design Product: Subject to compliance with requirements, provide James Hardie, HardiTrim lap siding, Select Cedarmill pattern, pre-finished, see Section 074600 for detailed specifications or approved equal.

2.2 FIBER-CEMENT SIDING

- A. General: ASTM C 1186, Type A, Grade II, fiber-cement board, noncombustible when tested according to ASTM E 136; with a flame-spread index of 25 or less when tested according to ASTM E 84.
 - 1. Basis-of-Design Product: Subject to compliance with requirements, provide James Hardie products:
 - a. HardiPlank lap siding, Select Cedarmill pattern, pre-finished, see Section 074600 for detailed specifications or approved equal.
 - b. HardiPlank board and batten, Select Cedarmill pattern, pre-finished, see Section 074600 for detailed specifications or approved equal.
 - c. HardiPlank Straight edge panel, 5-inch exposure, Select Cedarmill pattern, prefinished, see Section 074600 for detailed specifications or approved equal.

2.3 FIBER-CEMENT SOFFIT

- A. General: ASTM C 1186, Type A, Grade II, fiber-cement board, noncombustible when tested according to ASTM E 136; with a flame-spread index of 25 or less when tested according to ASTM E 84.
 - 1. Basis-of-Design Product: Subject to compliance with requirements, provide James Hardie, HardiPanel vented and non-vented soffit, Select Cedarmill pattern, pre-finished, see Section 074600 for detailed specifications or approved equal.

2.4 MISCELLANEOUS MATERIALS

- A. Fasteners for Exterior Finish Carpentry: Provide nails or screws, in sufficient length to penetrate not less than 1-1/2 inches (38 mm) into wood substrate.
 - 1. For face-fastening siding, provide ringed-shank siding nails or hot-dip galvanized-steel siding nails.
 - 2. For applications not otherwise indicated, provide hot-dip galvanized-steel fasteners. For fastening to wood, use ribbed bugle-head screws of sufficient length to penetrate a minimum of 1 inch (25 mm) into substrate.
 - 3. For fastening to metal, use ribbed bugle-head screws of sufficient length to penetrate a minimum of 1/4 inch (6 mm), or three screw-threads, into substrate.
 - 4. For fastening fiber cement, use hot-dip galvanized fasteners.
- B. Flashing: Comply with requirements in Division 07 Section "Sheet Metal Flashing and Trim" for flashing materials installed in exterior finish carpentry.
 - 1. Horizontal Joint Flashing for Panel Siding: Preformed, aluminum, Z-shaped flashing.
- C. Sealants: Latex, complying with ASTM C 834 Type OP, Grade NF and with applicable requirements in Division 07 Section "Joint Sealants," recommended by sealant manufacturer and manufacturer of substrates for intended application.
 - 1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. BASF Building Systems; Sonolac.
 - b. Bostik, Inc.; Chem-Calk 600.
 - c. Pecora Corporation; AC-20+.
 - d. Schnee-Morehead, Inc., an ITW company; SM 8200.
 - e. Tremco Incorporated; Tremflex 834.

2.5 FABRICATION

- A. Back out or kerf backs of standing and running trim wider than 5 inches (125 mm), except members with ends exposed in finished work.
- B. Ease edges of lumber less than 1 inch (25 mm) in nominal thickness to 1/16-inch (1.5-mm) radius and edges of lumber 1 inch (25 mm) or more in nominal thickness to 1/8-inch (3-mm) radius.

PART 3 – EXECUTION

3.1 EXAMINATION

- A. Examine substrates, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance.
- B. Examine finish carpentry materials before installation. Reject materials that are wet, moisture damaged, and mold damaged.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

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

3.3 INSTALLATION, GENERAL

- A. Do not use materials that are unsound, warped, improperly treated or finished, inadequately seasoned, or too small to fabricate with proper jointing arrangements.
 - 1. Do not use manufactured units with defective surfaces, sizes, or patterns.
- B. Install exterior finish carpentry level, plumb, true, and aligned with adjacent materials. Use concealed shims where necessary for alignment.
 - 1. Scribe and cut exterior finish carpentry to fit adjoining work. Refinish and seal cuts as recommended by manufacturer.
 - 2. Install to tolerance of 1/8 inch in 96 inches (3 mm in 2438 mm) for level and plumb. Install adjoining exterior finish carpentry with 1/32-inch (0.8-mm) maximum offset for flush installation and 1/16-inch (1.5-mm) maximum offset for reveal installation.
 - 3. Install stairs with no more than 3/16-inch (4.7-mm) variation between adjacent treads and risers and with no more than 3/8-inch (9.5-mm) variation between largest and smallest

treads and risers within each flight.

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

3.4 STANDING AND RUNNING TRIM INSTALLATION

- A. Install trim with minimum number of joints practical, using full-length pieces from maximum lengths of lumber available. Do not use pieces less than 24 inches (610 mm) long except where necessary.
 1. Use scarf joints for end-to-end joints.
 2. Stagger end joints in adjacent and related members.
- B. Fit exterior joints to exclude water. Cope at returns and miter at corners to produce tight-fitting joints with full-surface contact throughout length of joint. Plane backs of casings to provide uniform thickness across joints, where necessary for alignment.
- C. Where face fastening is unavoidable, countersink fasteners, fill surface flush, and sand unless otherwise indicated.

3.5 SIDING INSTALLATION

- A. Install siding to comply with manufacturer's written instructions and warranty requirements.
- B. Horizontal Siding: Apply starter strip along bottom edge of sheathing or sill. Install first course of siding with lower edge at least 1/8 inch (3 mm) below starter strip and subsequent courses lapped 1 inch (25 mm) over course below. Nail at each stud. Do not allow nails to penetrate more than one thickness of siding.
 1. Leave 1/8-inch (3-mm) gap at trim and corners unless otherwise recommended by manufacturer, and apply sealant.
 2. Butt joints only over framing or blocking, nailing top and bottom on each side and staggering joints in subsequent courses.
 3. Install prefabricated outside corners as recommended by manufacturer of siding materials.
- C. Flashing: Install metal flashing as indicated on Drawings and as recommended by siding manufacturer.

3.6 ADJUSTING

- A. Replace exterior finish carpentry that is damaged or does not comply with requirements. Exterior finish carpentry may be repaired or refinished if work complies with requirements and

shows no evidence of repair or refinishing. Adjust joinery for uniform appearance.

3.7 CLEANING

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

3.8 PROTECTION

- A. Protect installed products from damage from weather and other causes during construction.
- B. Remove and replace finish carpentry materials that are wet, moisture damaged, and mold damaged.
 - 1. Indications that materials are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
 - 2. Indications that materials are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination discoloration.

END OF SECTION 064013

NOT FOR BIDDING PURPOSES

SECTION 074646 – FIBER-CEMENT SIDING

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Fiber cement lap siding, panels, trim, and accessories; James Hardie HZ10 Engineered for Climate Siding, James Hardie HZ5 Engineered for Climate Siding, Hardie Architectural Panels, Hardie Artisan Lap, and Hardie Artisan Lap with Lock Joint.
- B. Factory-finished fiber cement lap siding, panels, trim, and accessories; James Hardie HZ10 Engineered for Climate Siding, James Hardie HZ5 Engineered for Climate Siding.

1.2 RELATED SECTIONS

- A. Section 06 10 00 - Rough Carpentry.

1.3 REFERENCES

- A. ASTM D3359 - Standard Test Method for Measuring Adhesion by Tape Test, Tool, and Tape.
- B. ASTM E136 - Standard Test Method for Behavior of Materials in a Vertical Tube Furnace at 750 degrees C.

1.4 SUBMITTALS

- A. Submit under provisions of Section 01 33 00 – Submittal Procedures.
- B. Product Data: Manufacturer's data sheets on each product to be used, including:
 - 1. Preparation instructions and recommendations.
 - 2. Storage and handling requirements and recommendations.
 - 3. Installation methods.
- C. Shop Drawings: Provide detailed drawings of atypical non-standard applications of cementitious siding materials which are outside the scope of the standard details and specifications provided by the manufacturer.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: Minimum of 2 years' experience with installation of similar products.
- B. Mock-Up: Provide a mock-up for evaluation of surface preparation techniques and application workmanship.

1. Finish areas designated by Architect.
2. Do not proceed with remaining work until workmanship, color, and sheen are approved by Architect.
3. Remodel mock-up area as required to produce acceptable work.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Store products in manufacturer's unopened packaging until ready for installation.
- B. Store siding on edge or lay flat on a smooth level surface. Protect edges and corners from chipping. Store sheets under cover and keep dry prior to installing.
- C. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.

1.7 PROJECT CONDITIONS

- A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside the manufacturer's absolute limits.

1.8 WARRANTY

- A. Product Warranty: Limited, non-pro-rated product warranty.
 1. Hardie Architectural Panels for 30 years or approved equal.
- B. Finish Warranty: Limited product warranty against manufacturing finish defects.
- C. Workmanship Warranty: Application limited warranty for 2 years.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Manufacturer: James Hardie Building Products, Inc., which is located at: 303 E. Wacker Dr.; Chicago, IL 60601 ; Toll Free Tel: 877-236-7526; Email: request info (info@jameshardie.com); Web: <https://www.jameshardiepros.com> | <https://www.jameshardie.com>
- B. Substitutions: Approved Equal.
- C. Requests for approval of equal substitutions will be considered in accordance with the provisions of Section 01 60 00 - Product Requirements.

2.2 SIDING AND TRIM

1. Fiber-cement siding - complies with ASTM C 1186 Type A Grade II.
 2. Fiber-cement siding - complies with ASTM E 136 as a noncombustible material.
 3. Fiber-cement Siding - complies with ASTM E 84 Flame. Spread Index: 0. Smoke Developed Index: 5.
 4. ICC-ES evaluation report ESR-2290.
 5. Intertek Product Listing.
 6. CAL-FIRE, Fire Engineering Division Building Materials Listing - Wildland Urban Interface (WUI) Listed Product.
 7. Manufacturer's Technical Data Sheet.
- B. Lap Siding: Hardie Artisan HZ10 and HZ5 lap siding as manufactured by James Hardie Building Products, Inc.
1. Type: Smooth 5-1/4 inches (133 mm) with 4 inches (102 mm) exposure.
 2. Type: Smooth 7-1/4 inches (184 mm) with 6 inches (152 mm) exposure.
 3. Type: Smooth 8-1/4 inches (210 mm) with 7 inches (178 mm) exposure.
 4. Type: Texture 5-1/4 inches (133 mm) with 4 inches (102 mm) exposure.
 5. Type: Texture 7-1/4 inches (184 mm) with 6 inches (152 mm) exposure.
 6. Type: Texture 8-1/4 inches (210 mm) with 7 inches (178 mm) exposure.
- C. Lap Siding: Hardie Artisan HZ10 and HZ5 lap siding with Lock Joint System as manufactured by James Hardie Building Products, Inc.
1. Type: V-Groove 8-1/4 inches (210 mm) with 7 inches (178 mm) exposure.
 2. Type: Shiplap 10-1/4 inches (260 mm) with 9 inches (229 mm) exposure.
 3. Type: Square Channel 10-1/4 inches (260 mm) with 9 inches (229 mm) exposure.
- D. Hardie Architectural Panels as manufactured by James Hardie Building Products, Inc. A non-combustible fiber-cement panel.
1. Product Composition: Grade II, Type A, fiber-cement sheets as defined by ASTM C1186. manufactured by the Hatschek process and cured by high pressure steam autoclaving.
 2. Intertek Product Listing.

3. Code Compliance:

- a. International Building Code (IBC):
 - 1. Section 1404.10: 2009, 2012 and 2015.
 - 2. Section 1403.10: 2018 and 2021.

2.3 Trim Accessories:

- a. J Trim: Aluminum extrusion to be used as a trim at abutments; soffits, masonry, etc. Not recommended for windows and doors.
- b. 2-pc. J Trim: Aluminum extrusion to be used as a trim at abutments; soffits, masonry, windows, etc.
- c. Low-Profile Inside Corner Trim: Aluminum extrusion to be used for inside corners.
- d. Inside Corner Trim: Aluminum extrusion to be used for inside corners.
- e. Low Profile 45 degrees Inside Corner Trim: Aluminum extrusion to be used for bay windows.
- f. Low-Profile Inside Corner Transition Trim: Aluminum Extrusion to be used for transitions at inside corners.
- g. Low-Profile Outside Corner Trim: Aluminum extrusion to be used for outside corners.
- h. Low-Profile Outside Corner Transition Trim: Aluminum Extrusion to be used for transitions at outside corners.
- i. Low Profile 45 degrees Outside Corner Trim: Aluminum extrusion to be used for bay windows.
- j. Vertical Y Trim: Aluminum extrusion to be used along vertical butt joints. For horizontal panel orientations only.
- k. Vertical H Trim: Aluminum extrusion to be used along vertical butt joints. For horizontal panel orientations only.
- l. Low-Profile Vertical Transition Trim: Aluminum Extrusion to be used for transitions at mid-wall.
- m. Low Profile Horizontal Z Flashing Trim: Aluminum extrusion to be used along horizontal control joints.
- n. Horizontal Z Flashing Trim: Aluminum extrusion to be used along horizontal control joints.
- o. Base Trim: Aluminum extrusion to be used as a base edge solution.
- p. Raised Reveal Base Trim: Aluminum extrusion to be used as a base edge solution.

- q. Base Trim: Aluminum extrusion to be used as a base edge solution.
- r. Hardie Trim Boards: Fiber cement trim for corners and windows. Can be mounted horizontally or vertically.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Do not begin installation until the substrates have been properly prepared.
- B. If framing preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.
- C. Nominal 2 inch by 4 inch (51 mm by 102 mm) wood framing selected for minimal shrinkage and complying with local building codes, including the use of water-resistive barriers or vapor barriers where required. Minimum 1-1/2 inches (38 mm) face and straight, true, of uniform dimensions and properly aligned.
 - 1. Install water-resistive barriers and claddings to dry surfaces.
 - 2. Repair any punctures or tears in the water-resistive barrier prior to the installation of the siding.
 - 3. Protect siding from other trades.
- D. Minimum 20 gauge 3-5/8 inch (92 mm) C-Stud 16 inches maximum on center or 16 gauge 3-5/8 inches (92 mm) C-Stud 24 inches (610 mm) maximum on center metal framing complying with local building codes, including the use of water-resistive barriers and/or vapor barriers where required. Minimum 1-1/2 inches (38 mm) face and straight, true, of uniform dimensions and properly aligned.
 - 1. Install water-resistive barriers and claddings to dry surfaces.
 - 2. Repair any punctures or tears in the water-resistive barrier prior to the installation of the siding.
 - 3. Protect siding from other trades.

3.2 PREPARATION

- A. Clean surfaces thoroughly prior to installation.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
- C. Install a water-resistive barrier is required in accordance with local building code requirements.

- D. The water-resistive barrier must be appropriately installed with penetration and junction flashing in accordance with local building code requirements.
- E. Install Engineered for Climate Hardie Weather Barrier in accordance with local building code requirements.
- F. Use Hardie Weather Barrier Seam Tape and joint and laps.
- G. Install and Hardie Weather Barrier flashing, Hardie Weather Barrier Flex Flashing.

3.3 INSTALLATION - HARDIE ARCHITECTURAL PANELS

- A. Install materials in strict accordance with manufacturer's installation instructions.
- B. Install over braced wood. See General Fastening Requirements. Irregularities in framing and sheathing can mirror through the finished application. Correct irregularities before installing siding.
- C. A water-resistive barrier (WRB) is required in accordance with local building code requirements. The water-resistive barrier must be appropriately installed with penetration and junction flashing in accordance with local building code requirements. James Hardie will assume no responsibility for water infiltration. James Hardie does manufacture Hardie Weather Barrier, a non-woven non-perforated housewrap, which complies with building code requirements.
- D. When installing horizontally, a WRB with min. 90 percent drainage efficiency shall be used.
- E. Adjacent finished grade must slope away from the building in accordance with local building codes - typically a minimum of 6 inches (152 mm). in the first 10 ft (3.048 mm).
- F. Do not use Hardie Architectural Panels in Fascia or Trim applications.
- G. Do not install that product remains in contact with standing water.
- H. Installed on flat vertical wall applications only.
- I. For larger projects where the span of the wall is significant in length, the designer and/or architect should take into consideration the coefficient of thermal expansion and moisture movement of the product in their design. These values can be found in the Technical Bulletin "Expansion Characteristics of James Hardie Siding Products" at www.jameshardie.com.
- J. James Hardie Building Products provides installation /wind load information for buildings with a maximum mean roof height of 85 feet (25.9 m). For information on installations above 60 feet (18.288 m), please contact JH technical support.
- K. Minimum standard panel design size is 12 x 16 inches (305 x 406 mm). Panels may be notched and cut to size to fit between windows, doors, corners, etc.

3.4 FINISHING

- A. Finish unprimed siding with a minimum one coat high quality, alkali resistant primer and one coat of either, 100 percent acrylic or latex or oil based, exterior grade topcoats or two coats high quality alkali resistant 100 percent acrylic or latex, exterior grade topcoat within 90 days of installation. Follow paint manufacturer's written product recommendation and written application instructions.
- B. Finish factory primed siding with a minimum of one coat of high quality 100 percent acrylic or latex or oil based exterior grade paint within 180 days of installation. Follow paint manufacturer's written product recommendation and written application instructions.

3.5 PROTECTION

- A. Protect installed products until completion of project.
- B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION 074646

NOT FOR BIDDING PURPOSES

SECTION 078400 – PENETRATION FIRESTOPPING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. General Firestopping: For through-penetrations and joints in or between the following fire-resistance rated assemblies, including both blank openings, linear openings, and openings containing penetrating items:
 - 1. Floor-ceiling assemblies.
 - 2. Roof-ceiling assemblies.
 - 3. Walls and partitions.
 - 4. Smoke barriers.
 - 5. Construction enclosing compartmentalized areas.
- B. Fire-Resistive Joint Systems: For linear voids within or between fire-resistance rated floor and roof-ceiling assemblies and walls and partitions, including the following types of joints:
 - 1. Expansion joints and control joints or joints between floor structures.
 - 2. Floor-to-wall joints where a floor structure intersects a wall structure.
 - 3. Head-of-wall joints where a wall or partition intersects a roof or floor-ceiling assembly.
 - 4. Control joints within or between wall structures.
- C. Perimeter Fire Containment Systems: Consisting of a floor with an hourly fire-resistance rating, an exterior wall assembly with no hourly fire-resistance rating, and the fill and forming materials installed between the floor and curtain wall for preventing the spread of fire vertically in buildings.
- D. Firestopping, Smoke, and Acoustical Sealing Telecommunications Data Cabling:
 - 1. Firestopping of Through Penetrations in Fire Rated Assemblies.
 - 2. Smoke and Acoustical Sealing in Non-Rated Assemblies.

1.2 RELATED SECTIONS

- A. Section 03 30 00 - Cast-In-Place Concrete.
- B. Section 04 22 00 - Concrete Unit Masonry.

- C. Section 07 90 00 - Joint Protection.
- D. Section 09 25 23 - Plaster and Gypsum Board.
- E. Section 23 00 00 - HVAC.
- F. Section 23 07 13 - HVAC Insulation.
- G. Section 26 00 00 - Electrical.

1.3 REFERENCES

A. American Society of Testing and Materials (ASTM):

1. ASTM C920 - Standard Specification for Elastomeric Joint Sealants.
2. ASTM C1193 - Standard Guide for Use of Joint Sealants.
3. ASTM D6094 - Standard Guide to Assess the Compostability of Environmentally Degradable Nonwoven Fabrics.
4. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
5. ASTM E90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements.
6. ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Materials.
7. ASTM E814 - Standard Test Method for Fire Tests of Penetration Firestop Systems.
8. ASTM E1725 - Standard Test Methods for Fire Tests of Fire-Resistive Barrier Systems for Electrical System Components.
9. ASTM E1966 - Standard Test Method for Fire-Resistive Joint Systems.
10. ASTM E2174 - Standard Practice for On-Site Inspection of Installed Firestop Systems.
11. ASTM E2307 - Standard Test Method for Determining Fire Resistance of Perimeter Fire Barriers Using Intermediate-Scale, Multi-story Test Apparatus.
12. ASTM E2393 - Standard Practice for On-Site Inspection of Installed Fire Resistive Joint Systems and Perimeter Fire Barriers.
13. ASTM E2837 - Standard Test Method for Determining the Fire Resistance of Continuity Head-of-Wall Joint Systems Installed Between Rated Wall Assemblies and Nonrated Horizontal Assemblies.

B. American National Standards Institute (ANSI):

1. ANSI/TIA-1179-A - The Healthcare Facility Telecommunications Infrastructure Standard.
 2. ANSI/TIA-EIA-569-D - Telecommunications Pathways and Spaces.
- C. FM Global (FM):
1. FM 4991 - Standard for Approval of Firestop Contractors.
- D. International Building Code (IBC).
- E. National Fire Protection Association (NFPA):
1. NFPA 101 - Life Safety Code.
 2. NFPA 70 - National Electrical Code.
- F. Underwriters Laboratories, Inc. (UL):
1. UL 263 - Fire Tests of Building Construction and Materials.
 2. UL 723 - Surface Burning Characteristics of Building Materials.
 3. UL 1479 - Fire Tests of Through Penetration Firestops.
 4. UL 1489 - Standard for Fire Tests of Fire Resistance Pipe Protection Systems Carrying Combustible Liquids.
 5. UL 2079 - Tests for Fire Resistance of Building Joint Systems.
- G. Underwriters Laboratories, Inc. Canada (ULC):
1. CAN/ULC S115 - Standard Method of Fire Tests of Firestops Systems.

1.4 SUBMITTALS

- A. Submit under provisions of Section 01 30 00 - Administrative Requirements.
- B. Product Data: For each type of firestopping product indicated demonstrating compliance with referenced standards and listing numbers of systems in which each product is to be used.
- C. System Drawings: Submit documentation from a qualified third-party testing agency that is applicable to each firestopping system configuration for construction, joint opening width and/or penetrating items.
1. Schedule of UL System Drawings for Fire Rated Construction: Submit schedule of all expected opening locations and sizes, penetrating items, and required listed design numbers to seal openings to maintain fire resistance ratings.

2. UL System Drawings for Fire Rated Construction: Furnish copies of all UL Systems identified in schedule above. Include any engineering recommendations.
- D. Product Certificates: Certificate of conformance signed by manufacturers of firestopping products certifying that products comply with requirements.
- E. Verification Samples: Two representative units of each type, size, pattern, and color.
- F. Shop Drawings: Include details of materials, construction, and finish. Include relationship with adjacent construction.
- G. Installation Instructions: Submit manufacturer's printed installation instructions.

1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with a minimum five years documented experience.
- B. Provide systems that comply with the following requirements and those specified in "Performance Criteria" Article:
 1. Firestopping tests are performed by a qualified, testing and inspection agency. A qualified testing and inspection agency is UL or another agency performing testing and follow-up inspection services for firestop systems acceptable to authorities having jurisdiction.
 2. Products bear classification marking of qualified testing and inspection agency.
- C. Engage an experienced installer who is certified, licensed, FM Approved in accordance with FM 4991, Certified by UL as a Qualified Contractor, or otherwise qualified by the firestopping manufacturer as having been provided the necessary training to install firestop products per specified requirements. A manufacturer's willingness to sell its firestopping products to Contractor or to an installer engaged by Contractor does not in itself confer qualifications on buyer.
- D. Obtain firestop systems for each type of penetration or joint opening or slab-edge configuration and construction condition indicated from a single manufacturer.
- E. Conduct conference at Project site to comply with requirements in Division 1 Section "Project Meetings".

1.6 DELIVERY, STORAGE AND HANDLING

- A. Deliver products to Project site in original, unopened containers or packages with intact and legible manufacturer's labels identifying product and manufacturer, date of manufacture; lot number; shelf life, if applicable; qualified testing and inspection agency's classification marking; and mixing instructions for multi-component materials.

- B. Store and handle materials for firestopping products to prevent their deterioration or damage due to moisture, temperature changes, contaminants, or other causes.

1.7 PROJECT CONDITIONS

- A. Do not install products when ambient or substrate temperatures are outside limitations recommended by manufacturer.
- B. Do not install products when substrates are wet due to rain, frost, condensation, or other causes.
- C. Do not use materials that contain flammable solvents.
- D. Do not install water-based or products that are conductive when wet in contact with energized electrical conductors. Exercise care when energizing penetrants.

1.8 COORDINATION

- A. Coordinate construction of openings and penetrating items to ensure that through-penetration firestop systems are installed according to specified requirements.
- B. Coordinate sizing of sleeves, openings, core-drilled holes or cut openings to accommodate through-penetration firestop systems.
- C. Schedule installation of firestopping after completion of penetrating item installation but prior to covering or concealing of openings.

1.9 WARRANTY

- A. Manufacturer's standard limited warranty unless indicated otherwise.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Manufacturer: Specified Technologies Inc., which is located at: 210 Evans Way; Somerville, NJ 08876; Toll Free Tel: 800-992-1180; Tel: 908-526-8000; Fax: 908-526-9623; Email: request info (sales@stifirestop.com); Web: <http://www.stifirestop.com>

2.2 PERFORMANCE REQUIREMENTS

- A. Firestopping:

- 1. Fire Test Requirements:

- a. Underwriters Laboratories, Inc. (UL):

- 1) UL 1479 - Fire Tests of Through Penetration Firestops.

- 2) UL 263 - Fire Tests of Building Construction and Materials.
 - 3) UL 723 - Surface Burning Characteristics of Building Materials.
 - 4) UL 1489 - Standard for Fire Tests of Fire Resistance Pipe Protection Systems Carrying Combustible Liquids.
 - b. American Society of Testing and Materials (ASTM):
 - 1) ASTM E84 - Surface Burning Characteristics of Building Materials.
 - 2) ASTM E119 - Fire Tests of Building Construction and Materials.
 - 3) ASTM E814 - Fire Tests of Penetration Fire Stops.
 - 4) ASTM E1725 - Standard Test Methods for Fire Tests of Fire-Resistive Barrier Systems for Electrical System Components.
 - 5) ASTM E2174 - Standard Practice for On Site Inspection of Installed Fire Stops.
2. References:
- a. Underwriters Laboratories (UL) - Fire Resistance Directory.
 - 1) Through Penetration Firestop Systems (XHEZ)
 - 2) Joint Systems (XHBM)
 - 3) Perimeter Fire Containment Systems (XHDG)
 - 4) Continuity Head-of-Wall Joint Systems (XHBO)
 - 5) Fill, Void, or Cavity Materials (XHHW)
 - 6) Firestop Devices (XHJI)
 - 7) Forming Materials (XHKU)
 - 8) Wall Opening Protective Materials (CLIV)
 - 9) Fire-Resistant Pipe-Protection Systems (HNKJ)
 - b. Major Building Codes:
 - 1) International Building Code published by ICC.
 - 2) NFPA 101 - Life Safety Code.

- 3) NFPA 70 - National Electrical Code.
 - 4) FM 4991 - Standard for Approval of Firestop Contractors.
 - 5) UL Qualified Firestop Contractor Program.
3. Products that upon curing do not re-emulsify, dissolve, leach, breakdown, or otherwise deteriorate over time from exposure to atmospheric moisture, sweating pipes, ponding water, or other forms of moisture characteristic during and after construction.
 4. When intumescent products are used, provide products that do not contain sodium silicate or any other water soluble intumescent ingredient in the formulation.
 5. Firestop products that do not contain ethylene glycol.
 6. Firestop sealants sufficiently flexible to accommodate motion such as pipe vibration, water hammer, thermal expansion, and other normal building movement without damage to the seal.
 7. Pipe insulation shall not be removed, cut away or otherwise interrupted through wall or floor openings. Provide products appropriately tested for the thickness and type of insulation utilized.
 8. Fire rated pathway devices shall be the preferred product and shall be installed in all locations where frequent cable moves, add-ons and changes will occur. Such devices shall be:
 - a. Capable of retrofit around existing cables
 - b. Designed such that two or more devices can be ganged together
 - c. Maintenance free such that no action is required to activate the smoke and fire sealing mechanism
 9. When mechanical cable pathways are not practical, openings within walls and floors designed to accommodate voice, data and video cabling shall be provided with re-enterable products specifically designed for retrofit.
 10. Fire-resistive joint sealants sufficiently flexible to accommodate movement such as thermal expansion and other normal building movement without damage to the seal.
 11. Fire-resistive joint sealants designed to accommodate a specific range of movement and tested for this purpose in accordance with a cyclic movement test criteria as outlined in Standards, ASTM E1966, or ANSI/ UL 2079.
 12. Penetration firestop systems, fire-resistive joint systems, or perimeter fire barrier systems subjected to an air leakage test conducted in accordance with Standard, ANSI/ UL1479 for penetrations and ANSI/UL2079 for joint systems with published L-Ratings for ambient and elevated temperatures as evidence of the ability of firestop system to restrict the movement of smoke.

13. Penetrants passing through fire-resistance rated floor-ceiling assemblies contained within chase wall assemblies shall be protected with products tested by being fully exposed to the fire outside of the chase wall. Systems within the UL Fire Resistance Directory that meet this criterion are identified with the words "Chase Wall Optional."
14. T-Rating Collar Devices tested in accordance with ASTM E814 or ANSI/UL1479 for metallic pipe penetrations requiring T-Ratings per the applicable building code.
15. Fire-rated grommet for all individual or small grouped cable applications up to 0.53 in. (14 mm).
16. Moisture-curing products where inclement weather or greater than transient water exposure is expected.

B. Fire-Resistive Joint Systems

1. Fire and Cyclic Movement Test Requirements

a. Underwriters Laboratories, Inc. (UL):

- 1) UL 2079, "Tests for Fire Resistance of Building Joint Systems".
- 2) UL 263 - Fire Tests of Building Construction and Materials.
- 3) UL 723 - Surface Burning Characteristics of Building Materials.

b. American Society of Testing and Materials (ASTM):

- 1) ASTM E84 - Surface Burning Characteristics of Building Materials.
- 2) ASTM E119 - Fire Tests of Building Construction and Materials.
- 3) ASTM E1966 - Standard Test Method for Fire-Resistive Joint Systems.
- 4) ASTM E2307 - Standard Test Method for Determining Fire Resistance of Perimeter Fire Barriers Using Intermediate-Scale, Multi-story Test Apparatus.
- 5) ASTM E2174 - Standard Practice for On-Site Inspection of Installed Firestop Systems.
- 6) ASTM E2393 - Standard Practice for On-Site Inspection of Installed Fire Resistive Joint Systems and Perimeter Fire Barriers.
- 7) ASTM E2837 - Standard Test Method for Determining the Fire Resistance of Continuity Head-of-Wall Joint Systems Installed Between Rated Wall Assemblies and Nonrated Horizontal Assemblies.

2. References:

- a. UL Fire Resistance Directory.
 - 1) Joint Systems (XHBN).
 - 2) Perimeter Fire Containment Systems (XHDG).
 - 3) Continuity Head-of-Wall Joint Systems (XHBO).
 - 4) Fill, Void, or Cavity Materials (XHHW).
 - 5) Forming Materials (XHKU).
 - b. Major Building Codes: Including local codes at Project location.
 - 1) International Building Code published by ICC.
 - 2) NFPA 101 - Life Safety Code.
 - 3) NFPA 70 - National Electrical Code.
 - 4) FM 4991 - Standard for Approval of Firestop Contractors.
 - 5) UL Qualified Firestop Contractor Program.
 - c. ASTM C1193 - Standard Guide for Use of Joint Sealants.
3. Performance Requirements:
- a. Products that upon curing, do not re-emulsify, dissolve, leach, breakdown or otherwise deteriorate over time from exposure to atmospheric moisture, ponding water, or other forms of moisture characteristic during and after construction.
 - b. Fire-resistive joint sealants:
 - 1) Sufficiently flexible to accommodate movement such as thermal expansion and other normal building movement without seal damage.
 - 2) To accommodate a specific range of movement and tested for this purpose in accordance with a cyclic movement test criteria as outlined in Standards, ASTM E 1966, ASTM E2837, or UL 2079.
 - c. Fire-resistive joint systems subjected to an air leakage test conducted in accordance with Standard, UL 2079 with published L-Ratings for ambient and elevated temperatures as evidence of the ability of the fire-resistive joint system to restrict the movement of smoke.
 - d. Firestop products that do not contain ethylene glycol.

C. Building Perimeter Firestopping Requirements:

1. General: Fire test investigation must be conducted on the Intermediate-Scale, Multi-Story Test Apparatus (ISMA structure).
2. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
3. ASTM E2307 - Standard Test Method for Determining Fire Resistance of Perimeter Fire Barriers Using Intermediate-Scale, Multi-story Test Apparatus.
4. ASTM E2393 - Standard Practice for On-Site Inspection of Installed Fire Resistive Joint Systems and Perimeter Fire Barriers.
5. UL 723 - Surface Burning Characteristics of Building Materials.
6. References:
 - a. UL Fire Resistance Directory.
 - 1) Perimeter Fire Containment Systems (XHJG)
 - 2) Fill, Void, or Cavity Materials (XHJW)
 - 3) Forming Materials (XHJU)
 - 4) Curtain Wall Insulation (XHJU)
 - b. Major Building Codes, including local codes at Project location.
 - 1) International Building Code published by ICC.
 - 2) NFPA 101 - Life Safety Code.
 - 3) FM 491 - Standard for Approval of Firestop Contractors.
 - 4) UL Qualified Firestop Contractor Program.
7. Performance Requirements:
 - a. Products that upon curing, do not re-emulsify, dissolve, leach, breakdown or otherwise deteriorate over time from exposure to atmospheric moisture, ponding water, or other forms of moisture characteristic during and after construction.
 - b. Sealants sufficiently flexible to accommodate movement such as thermal expansion, inter-story differential building sway and other normal building movement without damage to the seal.
 - c. Perimeter fire containment systems subjected to an air leakage test conducted in accordance with Standard, UL 2079 with published L-Ratings for ambient and elevated

temperatures as evidence of the ability of the fire-resistive joint system to restrict the movement of smoke.

- d. Moisture-curing products where inclement weather or greater than transient water exposure is expected.

D. Firestopping, Smoke, and Acoustical Sealing Telecommunications Data Cabling:

1. References:

- a. ANSI/TIA-1179-A - The Healthcare Facility Telecommunications Infrastructure Standard.
- b. ANSI/TIA-EIA-569-D - Telecommunications Pathways and Spaces,
- c. ASTM E90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements.
- d. ASTM E814 - Standard Test Method for Fire Tests of Penetration Firestop Systems.
- e. ASTM E1725 - Standard Test Methods for Fire Tests of Fire-Resistive Barrier Systems for Electrical System Components.
- f. CAN/ULC S115 - Standard Method of Fire Tests of Firestops Systems.
- g. NFPA 70 - National Electrical Code.
- h. NFPA 101 - Life Safety Code.
- i. UL - Fire Resistance Directory.
- j. UL 1479 - Fire Tests of Through Penetration Firestops.

2. Fire rated cable pathway devices shall be used in fire-rated construction for all low-voltage, video, data and voice cabling, optical fiber raceways and certain high-voltage cabling where frequent cable moves, adds and changes may occur. Pathways required for high voltage cabling will be detailed on the prints. Such devices shall:

- a. Meet the hourly fire-rating of fire rated wall and or floor penetrated.
- b. Be tested for the surrounding construction and cable types involved.
- c. Have UL Systems permitting cable loads from; Zero to 100 percent Visual Fill. This requirement eliminates need for fill-ratio calculations to be made by cable technicians to ensure cable load is within maximum allowed by UL System.
- d. Be "Maintenance-Free," having a corresponding Evaluation Services Report from a Nationally Recognized Third Party Laboratory. Maintenance-Free is defined as; No action

required by cabling technician to open and/or close pathway for cable moves, adds or changes, such as, but not limited to:

- 1) Opening or closing of doors.
 - 2) Spinning rings to open or close fabric liner.
 - 3) Removal and or replacement of any material such as, but not limited to, firestop caulk, putty, pillows, bags, foam muffins, foam, foam plugs, foam blocks, or foam closures of any sort.
 - 4) Evaluation Services Report (ESR) from an accredited Nationally Recognized Third-party Laboratory certifying compliance with this definition of "Maintenance-Free" and all relevant codes and standards.
- e. Pathways shall be engineered such that two or more devices may be ganged together for larger cable capacities.
- f. Pathways shall be engineered to be re-enterable so they can be retrofitted and removed from around existing cables without cutting and re-splicing them.
- g. Affix adhesive wall label immediately adjacent to devices to communicate to future cable technicians, authorities having jurisdiction and others the manufacturer of the device and the corresponding UL System number installed.
3. Non-rated cable pathway devices shall be used in non-fire-rated construction for all low-voltage, video, data and voice cabling, optical fiber raceways and certain high-voltage cabling where frequent cable moves, adds and changes may occur. Pathways required for high voltage cabling will be detailed on the prints. Such devices shall:
- a. Limit the movement of smoke and sound of wall and or floor penetrated.
 - b. Restore the STC Rating of the penetrated assembly.
 - c. Provide L Ratings of greater than 1 CFM when empty and greater than 2.5 cfm at all other loading up to 100 percent.
 - d. Accommodate cable loads from; Zero to 100 percent Visual Fill.
 - e. Not have inner fabric liner that tightens around and compresses cables tightly together encouraging potential cable damage or interference.
 - f. Be "Maintenance-Free," maintenance-free is defined as; No action required by cabling technician to open and/or close pathway for cable moves, adds or changes, such as, but not limited to:
 - 1) Opening or closing of doors.

- 2) Spinning rings to open or close fabric liner.
 - 3) Removal and or replacement of any material such as, but not limited to, firestop caulk, putty, pillows, bags, foam muffins, foam, foam plugs, foam blocks, or foam closures of any sort.
 - 4) Furnish letter from manufacturer certifying compliance with this definition of "Zero-Maintenance."
 - g. Pathways shall be engineered such that two or more devices may be ganged together for larger cable capacities.
 - h. Pathways shall be engineered to be re-enterable so they can be retrofitted and removed from around existing cables without cutting and re-splicing them.
 - i. Affix adhesive wall label immediately adjacent to devices to communicate to future cable technicians, authorities having jurisdiction and others the manufacturer of the device and the corresponding UL System number installed.
4. As an alternate to using a fire-rated or non-rated cable pathway device for a single or tow low voltage cables (up to an aggregate cross sectional area of 0.52 in. (14mm) O.D.) penetrating one or two-hour, gypsum board/stud wall assemblies or non-rated assemblies, either as a through-penetration or as a membrane-penetration, a fire-rated cable grommet may be substituted. The product shall consist of a molded, two-piece, plenum-rated grommet having a foam fire and smoke sealing membrane that conforms to the outside diameter of the individual cable. The grommet product shall be capable of locking into place to secure the cable penetration within the wall assembly. The grommet shall be UL Classified and tested to the requirements of ASTM E814 (UL 1479) and CAN/ULC S115.
5. Where non-mechanical pathways must be utilized, such as sealing (caulking) around single or grouped conduits, provide products that upon curing do no re-emulsify, dissolve, leach, breakdown or otherwise deteriorate over time from exposure to atmospheric moisture, sweating pipes, ponding water, or other forms of moisture characteristic during or after construction. Provide letter from manufacturer certifying compliance with this section.
6. Cable pathway shall replace conduit sleeves in walls and floors, and the following;
- a. When installed individually in floors, devices shall pass through core-drilled or preformed opening utilizing tested floor plates.
 - b. When multiple units are ganged in floors, devices shall be anchored by means of a tested grid.
 - c. When installed individually in walls, devices shall pass through core drilled opening utilizing tested wall plates or integrated flanges.

- d. When multiple units are ganged in walls, devices shall be anchored by means of a tested adjustable gang bracket.
7. Cable tray shall terminate at each barrier and resume on the other side such that cables pass independently through devices. Cable tray shall be properly supported on each side of the barrier.

2.3 GENERAL FIRESTOPPING

- A. Through-penetration firestop systems that are compatible with one another, with the substrates forming openings, and with the items, if any, penetrating through-penetration firestop systems, under conditions of service and application, as demonstrated by through-penetration firestop system manufacturer based on testing and field experience.
 1. Components for each through-penetration firestop system that are needed to install fill materials. Use only components specified by the firestopping manufacturer and approved by the qualified testing agency for the designated fire-resistance-rated systems.
 2. Use only firestopping products that have been tested for specific fire-resistance-rated construction conditions conforming to construction assembly type, penetrating item type or joint opening width and movement capabilities, annular space requirements, and fire-rating involved for each separate instance.
- B. Intumescent Sealants: Single component intumescent latex formulations containing no water soluble intumescent ingredients capable of expanding a minimum 8 times.
 1. Specified Technologies, Inc. SpecSeal Series SSS Intumescent Sealant.
 2. Specified Technologies, Inc. SpecSeal Series LCI Intumescent Sealant.
- C. Endothermic Sealants: Single component latex formulations that upon cure do not re-emulsify during exposure to moisture.
 1. Specified Technologies, Inc. SpecSeal Series LC Endothermic Sealant.
- D. Elastomeric Sealants: Single component latex formulations that upon cure do not re-emulsify during exposure to moisture and accommodate minimum plus or minus 25 percent movement. Products shall be tested for use in construction joints incorporating floors and structural steel elements protected with Spray-applied Fire Resistive Materials when present.
 1. Specified Technologies, Inc. SpecSeal Series AS Elastomeric Spray.
 2. Specified Technologies, Inc. SpecSeal Series ES Elastomeric Sealant.
- E. Latex Sealants: Single component latex formulations that upon cure do not re-emulsify during exposure to moisture. When installed in contact with CPVC piping systems, shall be deemed compatible as determined by the respective CPVC Manufacturer.

1. Specified Technologies, Inc. SpecSeal Series SSS Intumescent Sealant.
 2. Specified Technologies, Inc. SpecSeal Series LCI Intumescent Sealant.
 3. Specified Technologies, Inc. SpecSeal Series LC Endothermic Sealant.
- F. Firestop Devices: Factory-assembled steel collars lined with intumescent material capable of expanding a minimum 30 times sized to fit specific outside diameter of penetrating item.
1. Specified Technologies, Inc. SpecSeal Series SSC Firestop Collars.
 2. Specified Technologies, Inc. SpecSeal Series LCC Firestop Collars.
- G. Fire Rated Cable Pathways: Gangable device modules capable of being retrofitted around existing cables and comprised of steel raceway with intumescent foam pads allowing 0 to 100 percent cable fill and requiring no additional action in the form of plugs, twisting closure, putty, pillow, or sealant to achieve fire and leakage ratings.
1. Specified Technologies Inc. EZ-Path Fire Rated Pathway.
- H. Wall Opening Protective Materials: Intumescent, non-curing pads or inserts for protection of electrical switch and receptacle boxes to reduce horizontal separation to less than 24 inch (610 mm).
1. Specified Technologies, Inc. SpecSeal Series SSP Firestop Putty Pads.
 2. Specified Technologies, Inc. SpecSeal Series EP PowerShield Insert Pads.
- I. Firestop Putty: Intumescent, 100 percent solids, non-hardening, water resistant, butyl rubber based putties containing no solvents or silicone compounds.
1. Specified Technologies, Inc. SpecSeal Series SSP Firestop Putty.
- J. Wrap Strips: Single component intumescent elastomeric strips faced on both sides with a plastic film and capable of expanding a minimum 30 times.
1. Specified Technologies, Inc. SpecSeal Series RED2 Wrap Strip.
 2. Specified Technologies, Inc. SpecSeal Series BLU2 Wrap Strip.
- K. Firestop Pillows: Re-enterable, non-curing, mineral fiber core encapsulated with an intumescent coating on all six sides contained in a flame retardant poly bag.
1. Specified Technologies, Inc. SpecSeal Series SSB Firestop Pillows.
- L. Mortar: Portland cement based dry-mix product formulated for mixing with water at Project site to form a non-shrinking, water-resistant, homogenous mortar.

1. Specified Technologies, Inc. SpecSeal Series SSM Firestop Mortar.
- M. Silicone Sealants: Moisture curing, single component, silicone elastomeric sealant for horizontal surfaces (pourable or nonsag) or vertical surface (nonsag).
1. Specified Technologies, Inc. SpecSeal SIL300 Silicone Firestop Sealant.
 2. Specified Technologies, Inc. SpecSeal SIL300 SL Self-Leveling Silicone Firestop Sealant.
- N. All-Weather Coatings: Moisture curing, single component silicone copolymer elastomeric spray coatings for horizontal surfaces where greater water resistance is required or inclement weather is anticipated. Coating shall meet ASTM D6094 early rain resistance test for full 24 Hour Duration.
1. Specified Technologies, Inc. SpecSeal FT305 Firestop Spray.
- O. Silicone Foam: Multicomponent, silicone-based liquid elastomers, that when mixed, expand and cure in place to produce a flexible, non-shrinking foam.
1. Specified Technologies, Inc. Pensil 200 Silicone Foam.
- P. Composite Sheet: Intumescent material sandwiched between a galvanized steel sheet and steel wire mesh protected with aluminum foil capable of sustaining a minimum 2,500 lbs (1,134 kg) when subjected to load testing.
1. Specified Technologies, Inc. SpecSeal CS Composite Sheet.
- Q. Cast-In-Place Firestop Device: Single component molded firestop device installed on forms prior to concrete placement with totally encapsulated, tamper-proof integral firestop system and smoke sealing gasket.
1. Specified Technologies, Inc. SpecSeal CD Cast-In Firestop Device
- R. Fire-Rated HVAC Retaining Angles: Steel angle system with integral intumescent firestop gasket for use on steel HVAC ducts.
1. Specified Technologies, Inc. SpecSeal FyreFlange Firestop Angles
- S. Firestop Plugs: Re-enterable, foam rubber plug impregnated with intumescent material capable of expanding minimum 10 times with expansion beginning at 350 degrees F (177 degrees C) for use in blank openings and cable sleeves.
1. Specified Technologies, Inc. SpecSeal Series FP Firestop Plug
- T. Fire-Rated T Rating Collar Device: Louvered steel collar system with synthetic aluminized polymer coolant wrap installed on metallic pipes where T Ratings are required by applicable building code requirements.

1. Specified Technologies, Inc. SpecSeal T-Collar Device
- U. Fire-Rated Cable Grommet: Molded two-piece grommet made from plenum grade polymer with a foam inner core for sealing cable penetrations up to 0.53 inches. (14 mm) diameter.
1. Specified Technologies, Inc. EZ-Firestop Grommet (RFG1 or RFG2)
- V. Fire-Rated Closet Flange Gasket: Molded, single-component, intumescent gasket for use beneath a closet flange in floor applications.
1. Specified Technologies, Inc. SpecSeal Series CF34 Closet Flange Firestop Gasket
- W. Protective Wrap: Endothermic Wrap incorporating foil scrim evaluated for protection of cable pathways, liquid fuel lines, as well as in through-penetration and membrane-penetration firestopping. Testing to incorporate protection of Electrical Metallic Tubing (EMT), Rigid Metallic Conduit (RMC), Cable Trays, single and/or multi containment liquid fuel lines. Wrap to have a maximum weight of no greater than 1.4 lbs/ft² and allow for the use of steel tie wire when installed around piping, conduits, and/or cable trays.
1. Specified Technologies, Inc. E-Wrap Endothermic Wrap.
- X. Fire rated cable pathway devices shall be used in fire-rated construction for all low-voltage, video, data and voice cabling, optical fiber raceways and certain high-voltage cabling where frequent cable moves, adds and changes may occur. Pathways required for high voltage cabling will be detailed on the prints. Such devices shall:
1. Meet the hourly fire-rating of fire rated wall and or floor penetrated.
 2. Be tested for the surrounding construction and cable types involved.
 3. Have UL Systems permitting cable loads from; "Zero to 100 percent Visual Fill." This requirement eliminates need for fill-ratio calculations to be made by cable technicians to ensure cable load is within maximum allowed by UL System.
 4. Be "Maintenance-Free," having a corresponding Evaluation Services Report from a Nationally Recognized Third Party Laboratory. Maintenance-Free is defined as; No action required by cabling technician to open and/or close pathway for cable moves, adds or changes, such as, but not limited to:
 - a. Opening or closing of doors.
 - b. Spinning rings to open or close fabric liner.
 - c. Removal and or replacement of any material such as, but not limited to, firestop caulk, putty, pillows, bags, foam muffins, foam, foam plugs, foam blocks, or foam closures of any sort.

- d. Evaluation Services Report (ESR) from an accredited Nationally Recognized Third-party Laboratory certifying compliance with this definition of "Maintenance-Free" and all relevant codes and standards.
 5. Pathways shall be engineered such that two or more devices may be ganged together for larger cable capacities.
 6. Pathways shall be engineered to be re-enterable so they can be retrofitted and removed from around existing cables without cutting and re-splicing them.
 7. Affix adhesive wall label immediately adjacent to devices to communicate to future cable technicians, authorities having jurisdiction and others the manufacturer of the device and the corresponding UL System number installed.
- Y. Non-rated cable pathway devices shall be used in non-fire-rated construction for all low-voltage, video, data and voice cabling, optical fiber raceways and certain high-voltage cabling where frequent cable moves, adds and changes may occur. Pathways required for high voltage cabling will be detailed on the prints. Such devices shall:
1. Limit the movement of smoke and sound of wall and or floor penetrated.
 2. Restore the STC Rating of the penetrated assembly.
 3. Provide L Ratings of greater than 1 cfm when empty and greater than 2.5 cfm at all other loading up to 100 percent.
 4. Accommodate cable loads from; "Zero to 100 percent Visual Fill."
 5. Not have inner fabric liner that tightens around and compresses cables tightly together encouraging potential cable damage or interference.
 6. Be "Maintenance-Free," maintenance-free is defined as; No action required by cabling technician to open and/or close pathway for cable moves, adds or changes, such as, but not limited to:
 - a. Opening or closing of doors.
 - b. Spinning rings to open or close fabric liner.
 - c. Removal and or replacement of any material such as, but not limited to, firestop caulk, putty, pillows, bags, foam muffins, foam, foam plugs, foam blocks, or foam closures of any sort.
 - d. Furnish letter from manufacturer certifying compliance with this definition of "Zero-Maintenance."

7. Pathways shall be engineered such that two or more devices may be ganged together for larger cable capacities.
8. Pathways shall be engineered to be re-enterable so they can be retrofitted and removed from around existing cables without cutting and re-splicing them.
9. Affix adhesive wall label immediately adjacent to devices to communicate to future cable technicians, authorities having jurisdiction and others the manufacturer of the device and the corresponding UL System number installed.

2.4 FIRE-RESISTIVE JOINT SYSTEM PRODUCTS

- A. General: Fire-resistive joint system products that are compatible with one another, with the substrates forming openings, under conditions of service and application, as demonstrated by fire-resistive joint system product manufacturer based on testing and field experience.
 1. Components for each fire-resistive joint system that are needed to install fill materials. Use only components specified by the firestopping manufacturer and approved by the qualified testing agency for the designated fire-resistance-rated systems.
 2. Use only perimeter fire containment system products that have been tested for specific fire-resistance-rated construction to non-rated construction conditions conforming to construction assembly type, linear void width, and fire-rating involved for each separate instance
- B. Elastomeric Sealants: Single component latex formulations that upon cure do not re-emulsify during exposure to moisture and accommodate minimum plus or minus 25 percent movement. Products shall be tested for use in construction joints incorporating floors and structural steel elements protected with Spray-applied Fire Resistive Materials when present.
 1. Specified Technologies, Inc. SpecSeal Series AS Elastomeric Spray
 2. Specified Technologies, Inc. SpecSeal Series ES Elastomeric Sealant
- C. Silicone Sealants: Moisture curing, single component, silicone elastomeric sealant for horizontal surfaces (pourable or nonsag) or vertical surface (nonsag). Sealant shall be suitable for use in interior and exterior joint conditions.
 1. Specified Technologies, Inc. SpecSeal SIL300 Silicone Firestop Sealant
 2. Specified Technologies, Inc. SpecSeal SIL300 SL Self-Leveling Silicone Firestop Sealant'
- D. All-Weather Coatings: Moisture curing, single component silicone copolymer elastomeric spray coatings for horizontal surfaces where greater water resistance is required or inclement weather is anticipated. Coating shall meet ASTM D6094 early rain resistance test for full 24 Hour Duration.
 1. Specified Technologies, Inc. SpecSeal FT305 FastTack Firestop Spray

- E. Joint Gasketing: Intumescent gasketing with pressure sensitive adhesive capable of +/- 100 percent movement and suitable for use in head-of-wall, wall-to-wall, bottom-of-wall, and perimeter fire barrier joints.

1. Specified Technologies, Inc. SpeedFlex TTG Track Top Gasket.

2.5 PERIMETER FIRE-CONTAINMENT SYSTEMS PRODUCTS

- A. General: Perimeter fire containment system products that are compatible with one another, with the substrates forming openings, under conditions of service and application as demonstrated by perimeter fire containment system product manufacturer based on testing and field experience.

1. Components for each perimeter fire containment system that are needed to install fill materials. Use components specified by the firestopping manufacturer and approved by the qualified testing agency for the designated perimeter fire containment systems.
2. Use perimeter fire containment system products that have been tested for specific fire-resistance-rated construction to non-rated construction conditions conforming to construction assembly type, linear void width, and fire-rating involved for each separate instance.

- B. All-Weather Coatings: Moisture curing, single component silicone copolymer elastomeric spray coatings for horizontal surfaces where greater water resistance is required or inclement weather is anticipated. Coating shall meet ASTM D6094 early rain resistance test for full 24 Hour Duration.

1. Specified Technologies, Inc. SpecSeal FT305 FastTack Firestop Spray.

- C. Perimeter Fire Barrier Spray: Single component latex formulation with a solids content of minimum 65 percent and a cured Shore A Hardness equal to or greater than 65.

1. Specified Technologies, Inc. SpecSeal Safing Spray.

- D. Curtain Wall Insulation: Faced or unfaced batts or blankets used for exterior curtain walls with the capacity to contribute to the fire-resistance of the assembly.

1. Thermafiber, LLC. FIRESpan 40 Insulation. PCF: 4.0.

2. Thermafiber, LLC. FIRESpan 90 Insulation. PCF: 8.0.

- E. Safing Insulation: Board or sheet products used as forming materials in slab-edge openings with the capacity to provide a degree of the fire resistance required when used with an appropriate fill material.

1. Thermafiber, LLC. Safing Insulation.

- F. Curtain Wall Insulation Hangers: Steel clip system designed to snap/clip onto aluminum framing members minimizing or eliminating the use of screws or other mechanical fasteners. Clips to

include impaling staple to mechanically fasten curtain wall insulation to clip. Clips shall be available in a range of sizes based on mullion width and insulation thickness.

1. Specified Technologies, Inc. SpecSeal Quick Clip Perimeter Fire Barrier System.

PART 3 EXECUTION

3.1 PREPARATION

- A. Do not begin installation until substrates have been properly constructed and prepared.
 1. Examination of Conditions: Examine areas and conditions under which work is to be performed and identify conditions detrimental to proper or timely completion.
- B. If substrate preparation is the responsibility of another installer, notify Architect in writing of unsatisfactory preparation before proceeding.

3.2 PREPARATION

- A. Surfaces to which firestop materials will be applied shall be free of dirt, grease, oil, scale, laitance, rust, release agents, water repellents, and any other substances that may inhibit optimum adhesion.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
 1. Provide masking and temporary covering to prevent soiling of adjacent surfaces by firestopping materials.

3.3 FIRESTOPPING INSTALLATION

- A. General Requirements: Install through-penetration firestop systems and fire-resistive joint systems in accordance with "Performance Criteria" Article, the conditions of testing and classification as specified in the published design, and in accordance with manufacturer's instructions, approved submittals, and in proper relationship with adjacent construction.
 1. Seal openings or voids made by penetrations to ensure an air and water resistant seal.
 2. Consult with mechanical engineer, project manager, and damper manufacturer prior to installation of through-penetration firestop systems that might hamper the performance of fire dampers as it pertains to duct work.
 3. Protect materials from damage on surfaces subjected to traffic.
 4. Apply a suitable bond-breaker to prevent three-sided adhesion in applications where this condition might occur such as the intersection of a gypsum wallboard/steel stud wall to floor or roof assembly where the joint is backed by a steel ceiling runner or track.

5. Where joint application is exposed to the elements, fire-resistive joint sealant must be approved by manufacturer for use in exterior applications and shall comply with ASTM C920, "Specification for Elastomeric Joint Sealants".

3.4 PERIMETER FIRE CONTAINMENT SYSTEM INSTALLATION

- A. General Requirements: Install perimeter fire containment systems in accordance with "Performance Criteria" Article, conditions of testing and classification as specified in the published design, and in accordance with manufacturer's instructions, approved submittals, and in proper relationship with adjacent construction.
 1. Seal all slab-edge openings to ensure an air and water-resistant seal.
 2. Curtain wall insulation that is an integral component of the perimeter fire containment system shall be installed in accordance with the conditions of testing and classification as specified in the published design and shall comply with thermal insulation requirements as specified in Section 07 21 19 - "Thermal Insulation".
 3. Safing insulation shall be installed with the grain oriented vertically to maintain effective compression between edge of floor assembly and curtain wall.

3.5 FIELD QUALITY CONTROL

- A. Inspections: Owner shall engage a qualified independent inspection agency to inspect through-penetration firestop systems in accordance with ASTM E2174, "Standard Practice for On Site Inspection of Installed Fire Stops" or joint systems in accordance with ASTM E2393, "Standard Practice for On Site Inspection of Installed Fire Resistive Joint Systems and Perimeter Fire Barriers".
- B. Keep areas of work accessible until inspection by authorities having jurisdiction.
- C. Where deficiencies are found, repair or firestopping products so they comply with requirements.
- D. Place system stickers on each side of wall penetrations.
- E. Place a reproduction (photocopy) of the UL System description in a document protector and mount to the wall next to the wall penetration
 1. Highlight the section of the system description that list the allowed cable types.

3.6 ADJUSTING AND CLEANING

- A. Remove equipment, materials, and debris, leaving area in undamaged, clean condition.

END OF SECTION 078400

SECTION 079200 – JOINT SEALANTS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Polyurethane sealants. (LOXON S1) (LOXON H1) (LOXON TX) (LOXON SL1) (LOXON NS2) (LOXON SL2)
- B. Primers for polyurethane sealants. (LOXON Porous Surfaces Primer) (LOXON Quick Dry Primer)
- C. Acrylic latex joint sealants. (950A) (Power House)(Sher-Max)
- D. Silicone joint sealants.
- E. Acoustical joint sealants.

1.2 RELATED SECTIONS

- A. Section 03 30 00 - Cast-in-Place Concrete.
- B. Section 04 20 00 - Unit Masonry.
- C. Section 07 24 00 - Exterior Insulation and Finish Systems.
- D. Section 09 21 16.33 - Gypsum Board Area Separation Wall Assemblies.

1.3 REFERENCES

- A. ASTM International (ASTM):
 - 1. ASTM C510 - Standard Test Method for Staining and Color Change of Single- or Multicomponent Joint Sealants.
 - 2. ASTM C639 - Standard Test Method for Rheological (Flow) Properties of Elastomeric Sealants.
 - 3. ASTM C661 - Standard Test Method for Indentation Hardness of Elastomeric-Type Sealants by Means of a Durometer.
 - 4. ASTM C679 - Standard Test Method for Tack-Free Time of Elastomeric Sealants.
 - 5. ASTM C719 - Standard Test Method for Adhesion and Cohesion of Elastomeric Joint Sealants Under Cyclic Movement (Hockman Cycle).
 - 6. ASTM C793 - Standard Test Method for Effects of Laboratory Accelerated Weathering on Elastomeric Joint Sealants.
 - 7. ASTM C794 - Standard Test Method for Adhesion-in-Peel of Elastomeric Joint Sealants.
 - 8. ASTM C920 - Standard Specification for Elastomeric Joint Sealants.
 - 9. ASTM C1382 - Standard Test Method for Determining Tensile Adhesion Properties of Sealants When Used in Exterior Insulation and Finish Systems (EIFS) Joints.
 - 10. ASTM D412 - Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers - Tension.
 - 11. ASTM D2240 - Standard Test Method for Rubber Property - Durometer Hardness.

- B. Sealant, Waterproofing, and Restoration Institute (SWRI): www.swrionline.org.
 - 1. SWRI Validation Program.

1.4 SUBMITTALS

- A. Submit under provisions of Section 01 30 00 - Administrative Requirements.
- B. Product Data:
 - 1. Manufacturer's data sheets on each product to be used.
 - 2. Preparation instructions and recommendations.
 - 3. Storage and handling requirements and recommendations.
 - 4. Typical installation methods.
- C. Verification Samples: Two representative units of each type, size, pattern and color.
- D. Shop Drawings: Include details of materials, construction and finish. Include relationship with adjacent construction.

1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with a minimum five years documented experience.
- B. Installer Qualifications: Company specializing in performing Work of this section with minimum two years documented experience with projects of similar scope and complexity.
- C. Source Limitations: Provide each type of product from a single manufacturing source to ensure uniformity.

1.6 PRE-INSTALLATION CONFERENCE

- A. Convene a conference approximately two weeks before scheduled commencement of the Work. Attendees shall include Architect, Contractor and trades involved. Agenda shall include schedule, responsibilities, critical path items and approvals.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Store and handle in strict compliance with manufacturer's written instructions and recommendations.
- B. Protect from damage due to weather, excessive temperature, and construction operations.

1.8 PROJECT CONDITIONS

- A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's recommended limits.

1.9 WARRANTY

- A. Manufacturer's standard limited warranty unless indicated otherwise.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Manufacturer: Sherwin-Williams, which is located at: 101 Prospect Ave.; Cleveland, OH 44115; ASD Toll Free Tel: 800-4-SHERWIN (474-3794); Tel: 216-566-2000; Fax: 216-566-1392; Email: specifications@sherwin.com
Web: www.swspecs.com
- B. Substitutions:
- C. Requests for substitutions will be considered in accordance with provisions of Section 01 60 00 - Product Requirements.

2.2 POLYURETHANE JOINT SEALANTS

- A. Basis of Design: LOXON S1; as manufactured and supplied by Sherwin Williams. One component, high performance, moisture cure, non-sag, gun-grade elastomeric polyurethane sealant.
 - 1. Standards Compliance: Meets or exceeds the following.
 - a. ASTM C920, Type S, Grade NS, Class 35, Use: NT, A, M, O, and T.
 - b. TT-S-00230C, Type II, Class A, Non-Sag, One Component.
 - c. CAN/CGSB-19.13-M87.
 - 2. Properties, Uncured:
 - a. Tack free Time per ASTM C679 and TT-S-00230C: Passes.
 - b. Curing Time at 75 Degrees F (23.9 degrees C) and 50 Percent RH: Skins less than 24 hours. Full Cure: Approximately one week.
 - c. Flow, Sag or Slump per TT-S-00230C/ASTM C639: Passes.
 - d. Staining per TT-S-00230C/ASTM C510: Passes.
 - 3. Properties, After Full Cure. At 75 degrees F (23.9 degrees C) and 50 percent RH. The physical properties will remain relatively unchanged over a temperature range of minus 40 to 180 degrees F (minus 40 to 82.2 degrees C).
 - a. Hardness (Shore A) per ASTM D2240/ASTM C661: 27, plus or minus 2.
 - b. Tensile Strength ASTM D412: 350 to 450 psi.
 - c. Percent Elongation ASTM D412: 800 to 900 percent.
 - d. Modulus at 100 percent ASTM D412: 75 to 85 psi.
 - e. Tear Strength ASTM D412: 65 to 75 psi.
 - f. Smoke Development ASTM E84: 5.

- g. Color: As selected by Architect from manufacturer's standard line of not less than 20 colors.
 - h. UV Resistance per ASTM C793: Good.
- 4. Substrates: Cementitious board, masonry, stucco, concrete, wood, vinyl, aluminum, steel, ceramics, clay and concrete roof tiles, and natural stone.
 - 5. Shelf Life: 12 months from date of manufacturer when stored at room temperature.
 - 6. Excellent weatherability when exposed to ultraviolet radiation, atmospheric hydrocarbons and extremes in temperature.
 - 7. Joints accommodate 70 percent total joint movement while not affecting the seal or adhesion bond.
 - 8. Joints properly designed and sealed will extend and compress a total of 70 percent of installation width with no more than 35 percent movement in a single direction.
 - 9. Cured sealant can be painted with emulsion or synthetic enamel paints.
 - 10. Unaffected by contact with water after cure on non-porous substrates.
 - 11. Porous Substrates: Priming is recommended if sealant will be subjected to prolonged periods of immersion.
- B. Basis of Design: LOXON H1; as manufactured and supplied by Sherwin Williams. One component, low modulus, high performance, high movement, fast-curing, non-sag, gun-grade, moisture cure, hybrid sealant.
- 1. Standards Compliance: Meets or exceeds the following.
 - a. ASTM C920, Type S, Grade NS, Class 50, Use: NT, A, M, and O.
 - b. TT-S-00230 C, Type II, Class A, Non-Sag.
 - c. TT-S-001543 A, Type II, Class A, Non-Sag.
 - 2. Properties, Uncured.
 - a. Tack free Time per ASTM C679: 90 minutes.
 - b. Curing Time at 75 Degrees F (23.9 degrees C) and 50 Percent RH: 2 to 7 days depending on bead size. Varies with relative humidity.
 - c. Flow, Sag or Slump per ASTM C639: Passes.
 - d. Staining per ASTM C510: Passes.
 - 3. Properties, After Full Cure. At 75 degrees F (23.9 degrees C) and 50 percent RH. The physical properties will remain relatively unchanged over a temperature range of minus 40 to 180 degrees F (minus 40 to 82.2 degrees C).
 - a. Hardness (Shore A) per ASTM C661: 16, plus or minus 2.
 - b. Tensile Strength per ASTM D412: 140-180 psi (965.3 to 1241 kPa).
 - c. Extrusion Rate ASTM C1183: 93.1 mL/min.
 - d. Weight Loss ASTM C1246: Pass.
 - e. Elongation per ASTM D412: 800-1,000 percent.

- f. Adhesion in Peel per ASTM C794: 35 pli.
- g. Stain and Color Change per ASTM C510: Passes.
- h. Ozone Resistance: Good.
- i. Joint Movement Capability per ASTM C719: Plus or minus 50 percent.
 - 1) Substrate: Primed mortar, unprimed glass, aluminum.
- j. Extension per ASTM C1382: 100 percent.
- k. UV Resistance per ASTM C793: Good.
 - 1. Color: As selected by Architect from manufacturer's standard line of not less than 15 colors.
- 4. Substrates: EIFS, cementitious board, masonry, stucco, concrete, wood, vinyl, aluminum, steel, ceramics, clay and concrete roof tiles, and stone.
- 5. Shelf Life: 15 months from date of manufacturer when stored at room temperature.
- 6. Excellent weatherability when exposed to ultraviolet radiation, atmospheric hydrocarbons and extremes in temperature.
- 7. Joints accommodate 100 percent total joint movement while not affecting the seal or adhesion bond.
- 8. Joints properly designed and sealed will extend and compress a total of 100 percent of installation width with no more than 50 percent movement in a single direction.
- 9. Cured sealant can be painted with emulsion or synthetic enamel paints.
- 10. Unaffected by contact with water after cure on non-porous substrates.
- 11. Porous Substrates: Priming is recommended if sealant will be subjected to sporadic periods of immersion. Not intended for continuous immersion.
- C. Basis of Design: LOXON TX; as manufactured and supplied by Sherwin Williams. One component, high performance, moisture cure, non-sag, gun-grade elastomeric textured polyurethane sealant.
 - 1. Standards Compliance: Meets or exceeds the following.
 - a. ASTM C920, Type S, Grade NS, Class 25, Use: NT, A, M, and O.
 - b. TT-S-00230C, Type II, Class A, Non-Sag, One Component.
 - 2. Properties, Uncured:
 - a. Tack free Time per ASTM C679 and TT-S-00230C: Passes.
 - b. Curing Time at 75 Degrees F (23.9 degrees C) and 50 Percent RH: Skins less than 24 hours. Full Cure: Approximately one week. Cure time varies with relative humidity.
 - 3. Properties, After Full Cure. At 75 degrees F (23.9 degrees C) and 50 percent RH. The physical properties will remain relatively unchanged over a temperature range of minus 40 to 180 degrees F (minus 40 to 82.2 degrees C).
 - a. Hardness (Shore A) per ASTM D2240/ASTM C661: 27, plus or minus 2.
 - b. Tensile Strength per ASTM D412: 215 psi (kPa).

- c. Elongation per ASTM D412: 735 percent.
 - d. Adhesion in Peel per ASTM C794: 22 pli.
 - e. Stain and Color Change per TT-S-00230C/ASTM C510: Passes.
 - f. Ozone Resistance: Good.
 - g. Joint Movement Capability per TT-S-00230C/ASTM C719/ASTM C793: Plus or minus 25 percent.
 - h. UV Resistance per ASTM C793: Good.
- 4. Color: White.
 - 5. Color: Limestone.
 - 6. Color: Stone.
 - 7. Color: Black.
 - 8. Color: Special Bronze.
 - 9. Color: Aluminum Gray.
 - 10. Substrates: Cementitious board, masonry, stucco, concrete, wood, vinyl, aluminum, steel, ceramics, clay and concrete roof tiles, natural stone.
 - 11. Shelf Life: 12 months from date of manufacture when stored at room temperature.
 - 12. Excellent weatherability when exposed to ultraviolet radiation, atmospheric hydrocarbons and extremes in temperature.
 - 13. Joints accommodate 50 percent total joint movement while not affecting the seal or adhesion bond.
 - 14. Joints properly designed and sealed will extend and compress a total of 50 percent of installation width with no more than 25 percent movement in a single direction.
 - 15. Cured sealant can be painted with emulsion or synthetic enamel paints.
 - 16. Unaffected by contact with water after cure on non-porous substrates.
 - 17. Porous Substrates: Priming is recommended if sealant will be subjected to prolonged periods of immersion.
- D. Basis of Design: LOXON SL1; as manufactured and supplied by Sherwin Williams. One component, self-leveling, moisture cure, elastomeric polyurethane sealant.
- 1. Standards Compliance: Meets or exceeds the following.
 - a. ASTM C920, Type S, Grade P, Class 25, Use: NT, A, M, O, and T.
 - b. TT-S-00230C, Type I, Class A.
 - c. CAN/CGSB-19.13-M87.
 - 2. Properties, Uncured:
 - a. Tack free Time per ASTM C679 and TT-S-00230C: Passes; less than 72 hours.
 - b. Curing Time at 75 Degrees F (23.9 degrees C) and 50 Percent RH: Skins less than 24 hours. Full Cure: Approximately one week.

3. Properties, After Full Cure. At 75 degrees F (23.9 degrees C) and 50 percent RH. The physical properties will remain relatively unchanged over a temperature range of minus 40 to 180 degrees F (minus 40 to 82.2 degrees C).
 - a. Hardness (Shore A) per ASTM D2240/ASTM C661: 25, plus or minus 2.
 - b. Tensile Strength per ASTM D412: 300 psi (kPa).
 - c. Elongation per ASTM D412: 800 percent.
 - d. Ozone Resistance: Good.
 - e. Joint Movement Capability per TT-S-00230C/ASTM C719/ASTM C793: Plus or minus 25 percent.
 - f. UV Resistance per ASTM C793: Good.
4. Color: Limestone.
5. Substrates: Concrete and metal.
6. Shelf Life: 12 months from date of manufacturer when stored at room temperature.
7. Excellent weatherability when exposed to ultraviolet radiation, atmospheric hydrocarbons and extremes in temperature.
8. Joints accommodate 50 percent total joint movement while not affecting the seal or adhesion bond.
9. Joints properly designed and sealed will extend and compress a total of 50 percent of installation width with no more than 25 percent movement in a single direction.
10. Cured sealant can be painted with emulsion or synthetic enamel paints.
11. Unaffected by contact with water after cure on non-porous substrates.
12. Porous Substrates: Priming is recommended if sealant will be subjected to prolonged periods of immersion.
- E. Basis of Design: NOXON SL2; as manufactured and supplied by Sherwin Williams. Two component, self-leveling, highly flexible, non-priming, high performance polyurethane sealant that is mixed and poured in place.
 1. Standards Compliance: Meets or exceeds the following.
 - a. ASTM C920, Type M, Grade P, Class 25, Use: T, NT, A, M, O, and I.
 - b. TT-S-00227E, Type I, Class A.
 2. Properties, Uncured:
 - a. Tack free Time per ASTM C679 and TT-S-00230C: Less than 24 hours.
 - b. Curing Time at 70 Degrees F (23.9 degrees C): Skins less than 24 hours. Full Cure: Approximately one week. Cure varies with relative humidity.
 3. Properties, After Full Cure. At 75 degrees F (23.9 degrees C) and 50 percent RH. The physical properties will remain relatively unchanged over a temperature range of minus 40 to 180 degrees F (minus 40 to 82.2 degrees C).
 - a. Hardness (Shore A) per ASTM D2240/ASTM C661: 32, plus or minus 2.

- b. Tensile Strength per ASTM D412: 125 psi (kPa).
 - c. Elongation per ASTM D412: 240 percent.
 - d. Adhesion in Peel per ASTM C794: Passes.
 - e. Staining per ASTM C510 and TT-S-00230C: Passes.
 - f. Ozone Resistance: Good.
 - g. Joint Movement Capability per TT-S-00230C/ASTM C719/ASTM C793: Plus or minus 25 percent.
 - h. UV Resistance per ASTM C793: Good.
- 4. Color: Limestone.
 - 5. Color: Tint Base.
 - 6. Color Pack: Off white.
 - 7. Color Pack: Limestone.
 - 8. Color Pack: Tan.
 - 9. Color Pack: Aluminum gray.
 - 10. Color Pack: Redwood tan.
 - 11. Color Pack: White.
 - 12. Color Pack: Stone.
 - 13. Color Pack: Special bronze.
 - 14. Color Pack: Worldly gray.
 - 15. Color Pack: Cork wedge.
 - 16. Color Pack: Pier.
 - 17. Color Pack: Fire weed.
 - 18. Color Pack: Buff.
 - 19. Color Pack: Lotus pod.
 - 20. Color Pack: Pine nut.
 - 21. Color Pack: Country squire.
 - 22. Color Pack: Sand dollar.
 - 23. Color Pack: Oak barrell.
 - 24. Color Pack: Medium bronze.
 - 25. Color Pack: Black.
 - 26. Substrates: Concrete and metal.
 - 27. Shelf Life: 12 months from date of manufacturer when stored at room temperature.
 - 28. Excellent weatherability when exposed to ultraviolet radiation, atmospheric hydrocarbons and extremes in temperature.

29. Joints accommodate 50 percent total joint movement while not affecting the seal or adhesion bond.
 30. Joints properly designed and sealed will extend and compress a total of 50 percent of installation width with no more than 25 percent movement in a single direction.
 31. Cured sealant can be painted with emulsion or synthetic enamel paints.
 32. Unaffected by contact with water after cure on non-porous substrates.
 33. Porous Substrates: Priming is recommended if sealant will be subjected to prolonged periods of immersion.
- F. Basis of Design: LOXON NS2; as manufactured and supplied by Sherwin Williams. Two-component, non-sag, highly flexible, non-priming, high performance polyurethane sealant. It provides up to 50 percent total joint movement and can be tinted to multiple colors.
1. Standards Compliance: Meets or exceeds the following.
 - a. ASTM C-920, Type M, Grade NS, Class 25, Use: NT, T, A, M, O, and I.
 - b. TT-S-00227E, Type II, Class A.
 2. Volatile Organic Compound (VOC) Content: 0 g/L maximum.
 3. Volatile Organic Emissions (VOE): Not greater than Greenguard Children and Schools Certification emissions levels.
 4. Properties, Uncured:
 - a. Tack free Time per ASTM C679 and TT-S-00230C: Less than 48 hours.
 - b. Curing Time at 75 Degrees F (23.9 degrees C) and 50 Percent RH: Will skin in 3 to 4 hours, Full Cure: Approximately one week. Varies with relative humidity.
 - c. Flow, Sag or Slump per TT-S-00230C/ASTM C639: Passes.
 - d. Staining per TT-S-00230C/ASTM C510: Passes.
 5. Properties, After Full Cure. At 75 degrees F (23.9 degrees C) and 50 percent RH. The physical properties will remain relatively unchanged over a temperature range of minus 40 to 180 degrees F (minus 40 to 82.2 degrees C).
 - a. Hardness (Shore A) per ASTM D2240/ASTM C661: 27, plus or minus 2.
 - b. Tensile Strength per ASTM D412: 160 psi (kPa).
 - c. Elongation per ASTM D412: 280 percent.
 - d. Adhesion in Peel per TT-S-00230C/ASTM C794: Greater than 10.
 - e. Stain and Color Change per TT-S-00230C/ASTM C510: Passes.
 - f. Ozone Resistance: Good.
 - g. Joint Movement Capability per TT-S-00230C/ASTM C719: Plus or minus 25 percent.
 - 1) Substrate: Primed mortar, unprimed glass, aluminum.
 - h. UV Resistance per ASTM C793: Good.
 6. Color: As selected by Architect from manufacturer's standard line of not less than 15 colors.

7. Substrates: Cementitious board, masonry, stucco, concrete, wood, vinyl, aluminum, steel, ceramics, clay and concrete roof tiles and natural stone.
8. Shelf Life: 12 months from date of manufacturer when stored at room temperature.
9. Excellent weatherability when exposed to ultraviolet radiation, atmospheric hydrocarbons and extremes in temperature. Joints designed to accommodate 50 percent total joint movement will not affect the seal or adhesion bond.
10. Joints properly designed and sealed will extend and compress a total of 50 percent of the installation width with no more than 25 percent movement in a single direction.
11. Cured sealant can be painted with emulsion or synthetic enamel paints.
12. Unaffected by contact with water after cure on non-porous substrates.
13. Porous Substrates: Priming is recommended if the sealant will be subjected to prolonged periods of immersion.

2.3 POLYURETHANE JOINT SEALANT PRIMERS

- A. Basis of Design: LOXON Porous Surfaces Primer as manufactured and supplied by Sherwin Williams. A quick-drying solvent-based primer for use with Loxon H1 low modulus hybrid sealant on porous surfaces only.
 1. Promotes improved adhesion to porous substrates requiring a primer.
 2. Flashpoint: 65 degrees F (18 degrees C).
 3. Solids: 26 percent volume.
 4. VOC Content: 789 grams per L.
 5. Drying Time: Approximately 15 minutes at 70 degrees F (21 degrees C) and 50 percent humidity.
 6. Yield: 35 to 40 sq ft per pint. 450 linear ft for 1/2 inch (13 mm) deep joint.
 7. Substrates: Concrete, masonry, and stone.
- B. Basis of Design: LOXON Quick Dry Primer; as manufactured and supplied by Sherwin Williams. A quick-drying solvent-based primer for priming joints and substrates before application of LOXON sealants: S1, TX, H1, SL1, SL2, and NS2.
 1. Promotes improved adhesion to many substrates requiring a primer.
 2. Flashpoint: 65 degrees F (18 degrees C).
 3. Viscosity: 90 cps.
 4. Solids: 35 percent volume.
 5. VOC Content: 584 grams per L less water and exempt solvents.
 6. Drying Time: Approximately 15 minutes at 70 degrees F (21 degrees C) and 50 percent humidity.
 7. Yield: 35 to 40 sq ft per pint. 450 linear ft for 1/2 inch (13 mm) deep joint.
 8. Substrates: Concrete, masonry, metal, and fluorocarbon coatings, on aluminum.

9. Shelf Life: 2 years when properly stored.

2.4 ACRYLIC LATEX JOINT SEALANTS

- A. Basis of Design: 950A Siliconized Acrylic Latex Caulk; as manufactured and supplied by Sherwin Williams. For no/low movement areas, gap filling, paintable.
 1. In accordance with ASTM C834, Type OP and C, Grade NF.
- B. Basis of Design: Power House Siliconized Acrylic Latex Caulk; as manufactured and supplied by Sherwin Williams. For low/medium movement areas, wood trim, interior/exterior, and paintable.
 1. In Accordance With:
 - a. ASTM C834, Type OP and C, Grade NF.
 - b. ASTM C920, Class 12.5.
 2. Volatile Organic Compound (VOC) Content: 35 g/L maximum.
 3. Volatile Organic Emissions (VOE): Not greater than Greenguard Children and Schools Certification emissions levels.
 4. Color: White, paintable.
- C. Basis of Design: Sher-Max Urethanized Elastomeric Sealant; as manufactured and supplied by Sherwin Williams. For high movement areas, crown molding, interior/exterior, paintable.
 1. In Accordance With:
 - a. ASTM C834, Type OP and C, Grade NF.
 - b. ASTM C920, Class 35.

2.5 SILICONE JOINT SEALANTS

- A. Mildew-Resistant, Single-Component, Acid-Curing Silicone Joint Sealant complying with ASTM C920, Type S, Grade NS, Class 25, Use NT as manufactured and supplied by Sherwin Williams.
 1. Basis of Design: White Lightning All Purpose Silicone Sealant.
 - a. Volatile Organic Compound (VOC) Content: 1 g/L maximum.
 - b. Volatile Organic Emissions (VOE): Not greater than Greenguard Children and Schools Certification emissions levels.
 - c. Color: White.
 - d. Color: Clear.

2.6 ACOUSTICAL SEALANTS

- A. Acoustical/Curtainwall Sealant: Single-component, non-hardening, non-sag, paintable synthetic rubber-tested to reduce airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing of similar assemblies according to ASTM E 90.
 1. Basis of Design Product: Sherwin Williams Powerhouse Sealant.

2. Volatile Organic Compound (VOC) Content: 160 g/L maximum.
3. Color: White, paintable.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Do not begin installation until substrates have been properly constructed and prepared.
- B. If substrate preparation is the responsibility of another installer, notify Architect in writing of unsatisfactory preparation before proceeding.

3.2 PREPARATION

- A. Clean surfaces thoroughly prior to installation.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.3 SEALANT APPLICATION

- A. Sealant and Primer Installation Standard: Comply with ASTM C 1193 and manufacturer's written instructions.
- B. Joint Backing: Select joint backing materials recommended by sealant manufacturer as compatible with sealant and adjacent materials. Install backing material at depth required to produce profile of joint sealant allowing optimal sealant movement.
 1. Install joint backing to maintain the following joint ratios:
 - a. Joints up to 1/2 inch (13 mm) wide: 1:1 width to depth ratio.
 - b. Joints greater than 1/2 inch (13 mm) wide: 2:1 width to depth ratio; maximum 1/2 inch (13 mm) joint depth.
 2. Install bond breaker tape over substrates when sealant backings are not used.
- C. Masking: Mask adjacent surfaces to prevent staining or damage by contact with sealant or primer.
- D. Joint Priming: Prime joint substrates when recommended by sealant manufacturer or when indicated by preconstruction testing or experience. Apply recommended primer using sealant manufacturer's recommended application techniques.
- E. Liquid Sealant Application: Install sealants using methods recommended by sealant manufacturer, in depths recommended for application. Apply in continuous operation from bottom to top of joint vertically and horizontally in a single direction. Apply using adequate pressure to fill and seal joint width.
 1. Tool sealants immediately with appropriately shaped tool to force sealants against joint backing and joint substrates, eliminating voids and ensuring full contact.
 2. Install sealant free of air pockets, foreign embedded matter, ridges, and sags.

3. Tool exposed joint surface concave using tooling agents approved by sealant manufacturer for application.
- F. Remove excess sealant using materials and methods approved by sealant manufacturer that will not damage joint substrate materials.
 1. Remove masking tape after tooling joint without disturbing seal.
 2. Remove excess sealant from surfaces while still uncured.
- G. Acoustical Sealant installation: Sound-rated assemblies and as indicated, seal construction at perimeters, behind control joints, and at openings and penetrations on both sides of assemblies with a continuous bead of acoustical sealant. Comply with ASTM C919 and manufacturer's written recommendations.
- H. Installation of Preformed Seals: Install seals immediately after removing protective wrapping. Do not stretch or misshape material. Place seals to provide continuity at ends, turns, and intersections. Apply heat to sealant when recommended by sealant manufacturer's written instructions.

3.4 FIELD QUALITY CONTROL

- A. Field-Adhesion Testing: Perform adhesion tests in accordance with manufacturer's instructions and with ASTM C1193, Method A.
 1. Perform 5 tests for the first 1000 feet (300 m) of joint length for each kind of sealant and joint substrate, and one test for each 1000 feet (300 m) of joint length thereafter or 1 test per each floor per building elevation, minimum.
 2. For sealant applied between dissimilar materials, test both sides of joint.
- B. Remove sealants failing adhesion test, clean substrates, reapply sealants, and re-test. Test adjacent sealants to failed sealants.
- C. Submit report of field adhesion testing to Architect indicating tests, locations, dates, results, and remedial actions taken.

3.5 EXTERIOR JOINT-SEALANT SCHEDULE

- A. Exterior concealed transition joints in air barrier.
 1. Joint Sealant: Single-component neutral-curing low-modulus sealant Loxon H1.
 2. Joint Sealant: Single-component non-sag urethane sealant Loxon S1.
 3. Compatibility: Compatible with air barrier components specified in Division 07 air barrier section.
- B. Exterior construction joints in cast-in-place and tilt-up concrete.
 1. Joint Sealant: Single-component neutral-curing low-modulus sealant Loxon H1.
 2. Joint Sealant: Multi-component neutral-curing non-sag field tintable sealant Loxon NS2.
 3. Joint-Sealant Color: As selected by Architect from manufacturer's standard colors.
 4. Joint-Sealant Color: Approved custom match to substrate sample.

5. Joint-Sealant Color: Multiple colors required to match several conditions.
- C. Exterior movement joints in concrete unit masonry.
 1. Joint Sealant: Single-component neutral-curing low-modulus sealant Loxon H1.
 2. Joint Sealant: Multi-component neutral-curing non-sag field tintable sealant Loxon NS2.
 3. Joint Sealant: Single-component non-sag urethane sealant Loxon S1.
 4. Joint-Sealant Color: As selected by Architect from manufacturer's standard colors.
 5. Joint-Sealant Color: Approved custom match to substrate sample.
- D. Exterior movement joints in brick masonry.
 1. Joint Sealant: Single-component neutral-curing low-modulus sealant Loxon H1.
 2. Joint Sealant: Multi-component neutral-curing non-sag field tintable sealant Loxon NS2.
 3. Joint Sealant: Single-component non-sag urethane sealant Loxon S1.
 4. Joint-Sealant Color:
 - a. Vertical Joints: As selected by Architect from manufacturer's standard colors.
 - b. Vertical Joints: Approved custom match to brick at vertical joints.
 - c. Horizontal Joints: As selected by Architect from manufacturer's full range.
 - d. Horizontal Joints: Approved custom match to mortar at horizontal joints.
- E. Exterior movement joints in stone masonry.
 1. Joint Sealant: Single-component neutral-curing low-modulus sealant Loxon H1.
 2. Joint Sealant: Single-component non-sag urethane sealant Loxon S1.
 3. Joint-Sealant Color: As selected by Architect from manufacturer's standard colors.
 4. Joint-Sealant Color: Approved custom match to mortar.
- F. Exterior joints within exterior insulation finish systems (EIFS).
 1. Joint Sealant: Single-component neutral-curing low-modulus sealant Loxon H1.
 2. Joint-Sealant Color: As selected by Architect from manufacturer's standard colors.
 3. Joint-Sealant Color: Approved custom match to EIFS colors.
- G. Exterior exposed joints in metal panel cladding systems.
 1. Joint Sealant: Single-component neutral-curing low-modulus Loxon H1 sealant.
 2. Joint-Sealant Color: As selected by Architect from manufacturer's standard colors.
 3. Joint-Sealant Color: Approved custom match to substrate sample.
- H. Exterior concealed watertight joints in cladding systems.
 1. Joint Sealant: Single-component neutral-curing low-modulus sealant Loxon H1.
- I. Exterior joints between different materials listed above.
 1. Joint Sealant: Single-component neutral-curing low-modulus sealant Loxon H1.
 2. Joint Sealant: Multi-component neutral-curing non-sag field tintable sealant Loxon NS2.

3. Joint Sealant: Single-component non-sag urethane sealant Loxon S1.
 4. Joint-Sealant Color: As selected by Architect from manufacturer's standard colors.
 5. Joint-Sealant Color: Approved custom match to substrate sample.
 6. Joint-Sealant Color: Multiple colors required to match several conditions.
- J. Exterior perimeter joints at frames of doors, windows, storefront frames, curtain wall frames, and louvers.
1. Joint Sealant: Single-component neutral-curing low-modulus sealant Loxon H1.
 2. Joint Sealant: Multi-component neutral-curing non-sag field tintable sealant Loxon NS2.
 3. Joint Sealant: Single-component non-sag urethane sealant Loxon S1.
 4. Joint-Sealant Color: As selected by Architect from manufacturer's standard colors.
 5. Joint-Sealant Color: Approved custom match to substrate sample.
 6. Joint-Sealant Color: Multiple colors required to match several conditions.
- K. Exterior joints within aluminum storefront framing, curtain walls, and window systems:
1. Joint Sealant: Single-component neutral-curing Loxon H1 sealant.
 2. Joint-Sealant Color: As selected by Architect from manufacturer's standard colors.
- L. Exterior joints within structural glazing, aluminum storefront framing, curtain walls, and window systems:
1. Refer to the appropriate sections in Division 08 for "Glazing Sealants."
 2. Refer to the appropriate sections in Division 08 for "Structural-Sealant-Glazed Curtain Walls".
- M. All other exterior non-traffic joints.
1. Joint Sealant: Single component neutral-curing low-modulus sealant Loxon H1.
 2. Joint Sealant: Multi-component neutral-curing non-sag field tintable sealant Loxon NS2.
 3. Joint Sealant: Single-component non-sag urethane sealant Loxon S1.
 4. Joint-Sealant Color: As selected by Architect from manufacturer's standard colors.
 5. Joint-Sealant Color: Approved custom match to substrate sample.
 6. Joint-Sealant Color: Multiple colors required to match several conditions.
- N. Exterior horizontal traffic and traffic isolation joints: Refer to Division 32 Section "Concrete Paving Joint Sealants"
1. Joint Sealant: Single-component pourable urethane sealant Loxon SL1
 2. Joint Sealant: Multi-component neutral-curing non-sag field tintable sealant Loxon NS2.
 3. Joint-Sealant Color: As selected by Architect from manufacturer's standard colors.

3.6 INTERIOR JOINT-SEALANT SCHEDULE

- A. Interior vertical movement joints in exterior concrete and unit masonry.

1. Joint Sealant: Single-component non-sag urethane sealant, Greenguard certified Loxon H1 and Loxon S1.
2. Joint-Sealant Color: As selected by Architect from manufacturer's full range.
- B. Interior movement joints in interior unit masonry.
 1. Joint Sealant: Single-component non-sag urethane sealant, Greenguard certified Loxon H1 and Loxon S1.
 2. Joint-Sealant Color: As selected by Architect from manufacturer's full range.
- C. Interior perimeter joints of exterior aluminum frames.
 1. Joint Sealant: Single-component non-sag urethane sealant Loxon H1, Greenguard certified.
 2. Joint-Sealant Color: As selected by Architect from manufacturer's full range.
- D. Interior perimeter joints of interior frames.
 1. Joint Sealant: Single-component non-sag urethane sealant, Greenguard certified Loxon H1. Paintable.
 2. Joint Sealant: Siliconized acrylic latex, Greenguard certified Powerhouse Sealant.
 3. Joint-Sealant Color: As selected by Architect from manufacturer's full range.
 4. Joint-Sealant Color: Multiple colors required.
- E. Interior sanitary joints between plumbing fixtures, food preparation fixtures, and casework and adjacent walls, floors, and counters.
 1. Joint Sealant: Mildew-Resistant, Single-Component, nonsag, acid-curing silicone joint sealant, Greenguard certified White Lightning All Purpose Silicone Sealant.
 2. Joint-Sealant Color: As selected by Architect from manufacturer's full range; multiple colors required.
- F. Interior traffic joints in floor and between floor and wall construction.
 1. Joint Sealant: Single-component pourable urethane sealant, Greenguard certified Loxon SL1 and Loxon S1.
 2. Joint-Sealant Color: As selected by Architect from manufacturer's full range.
- G. Interior non-moving joints between interior painted surfaces and adjacent materials.
 1. Joint Sealant: Siliconized acrylic latex, Greenguard certified Powerhouse Sealant.
 2. Joint-Sealant Color: Paintable.
- H. Interior concealed sealants at thresholds and sills.
 1. Joint Sealant: Butyl-rubber-based joint sealant White Lightning Butyl Sealant.
- I. Interior exposed and non-exposed acoustical applications:

END OF SECTION 079200

SECTION 081540 – FIBERGLASS DOORS AND FRAMES

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Work Included:
1. Openings as shown in the schedule, on the plans and bound into these specifications.
 2. The removal of existing doors, frames, glass, etc as noted.
 3. The installation of new opening systems that include aluminum frames, fiberglass doors, fiberglass panels, door hardware as scheduled in the specifications.

1.2 QUALITY ASSURANCE

- A. Manufacturer's Certification
1. Manufacturer is to have a minimum of 5 years experience in the production of pre-hardwared and pre-assembled door systems, using the type of materials specified for this project.
- B. Warranties
1. Wide Stile FRP doors will carry a 25 year limited warranty on doors structural integrity, main frame, and the lamination between face sheets and core.
 2. The ENTIRE SYSTEM (excluding hardware) will be guaranteed for 10 years.
 3. Each door hardware component will carry its own manufactures warranty and should not be confused with the warranty of the FRP door and frame.
- C. TEST REPORTS AND PERFORMANCE REQUIREMENTS
1. Entrance systems must comply with requirements for system performance characteristics as determined by the testing methods that follow:
 2. Two copies of test reports covering the test procedures as listed are to be included with the submittals.
 1. COMPLETE SYSTEM REQUIREMENT TESTS – Complete system units that include door, frame and hardware are to meet the following criteria:

1.3 THERMAL TRANSMITTANCE TESTS:

- A. U-factors expressed in Btu/hr-ft(2)-F – AAMA 1503-98-.072
- B. R-value expressed in hr-ft(2)-F/Btu-ASTM 1503-98- 1.39

1.4 STRUCTURAL PERFORMANCE TESTS

- A. Air infiltration:
 - 1. ASTM E283 @ 1.57 psf (25 mph) – 0.31 cfm/ft (2)
 - 2. ASTM W182 @ 6.24 psf (50 mph) – 0.97 cfm/ft (2)
- B. Water Penetration:
 - 1. ASTM E331 – 15 Min Cycle – NO ENTRY
- C. Uniform Load – ASTM E330 – (+) – 112.5 psf

1.5 STRUCTURAL INTEGRITY TESTS:

- A. Exit Bar Pull Off Test – 7975 lbs. minimum load resistance before exit bar disengages from door
- B. Closer Pull Off – 8000 lbs. minimum load resistance before closer disengages from door

1.6 WINDBORNE DEBRIS RESISTANCE TESTS:

- A. Missile Impact Test – PA201 – 94 – PASSED
- B. Cyclic Wind Pressure Test – PA203 – 94 – 60 PSF
- C. Forced Entry Test – SFBC 3603.2 – 300 lbs. – PASSED

1.7 DOOR LEAF EQUIPMENT TESTS – Door leaf without frame or hardware and with a minimum lite cut out of 12" x 24" is to meet the following criteria:

- A. Concentrated Load Bow Test – 5000 lbs minimum load with no permanent deflection to door leaf.
- B. Torsion Twist Test – @300 lbs. minimum load with no permanent set to door leaf.

1.8 FACE SHEET REQUIREMENT TESTS – FRP material and FRP face sheets with core material are to meet the following criteria:

- A. Center Door Section (face sheet/core/face sheet)
 - 1. Gardner Impact Test – ASTM D5420 – 413.72 in-lb.

1.9 MANUFACTURERS

A. ACCEPTABLE MANUFACTURERS

- 1. VALE DOOR – Collingdale, Pa.

- B. This is a PERFORMANCE SPECIFICATION. There are no Patents, Contractual Agreements, or any other type of restrictions that limit competition with the products described in this Performance Specification. However, it should be noted that the manufacturer listed in this specification would

have to make some modifications to their standard products and new dies and designs may be required to adhere to the demands of this specification.

C. APPROVAL PROCEDURE

1. Submit manufacturer's technical data for each type (STILE CLASSIFICATION) of door. Include all frame & door sections, elevations, and details.
2. Two copies of current test reports are to be included with the submittals.
3. Submit two samples of each door STILE CLASSIFICATION that shows rails, stiles core, joint construction and edge trim.

D. SHOP DRAWINGS

1. Submit SIX sets of shop drawings for the fabrication and installation of the Doors and Frames, and associated components of the work. Included wall elevations and detail sections of every typical composite member. Show frame anchoring, frame repairs to existing frames, glazing details, interior and exterior wall repairs and any other component or accessory required to complete each door opening
2. Include details of main frame corner joint construction on doors, Stile and Rail size, Core material, Vision lite moldings, Louvers and Factory Finishing Specifications.
3. Details of HARDWARE REINFORCING Material, Size & Thickness, Locations on both door(s) and frame and Method of attachment.

1.10 PRODUCT DELIVERY, STORAGE AND HANDLING

A. IDENTIFICATION

1. Each door, frame and any additional components will be tagged with a mark or number which correlates with the designation system used for shop drawings.

B. PROTECTION

1. All material will be protected during transit and storage from soiling and deterioration.

PART 2 - DOORS, FRAMES AND PANELS

2.1 DOOR SYSTEM CLASSIFICATIONS:

A. VALE DOOR SOLUTIONS V600

2.2 MATERIALS

A. ALUMINUM MEMBERS

1. Doors, frames, miscellaneous components, and entrance systems accessories are to be from the same manufacturer. Splitting the source for these items will not be permitted.

2. Provide alloy and temper as recommended for resistance to corrosion and color control. Aluminum member references are ASTM B 221 for extrusions and ASTM B 209 for sheets.

2.3 ALUMINUM FRAMES

- A. STANDARD CLOSED BACK FRAMES shall be of extruded aluminum 6063-T5 alloy and a wall thickness of .125".
 1. VERTICAL MEMBERS – All vertical frame jambs and mullions will be full height of opening.
 2. SECTIONS - Tube sections will be 2" x 8" with joints connected by use of reinforcing clips and machine screws.
 3. Finish is 313, or as selected by the architect.
 4. All exposed screws must be stainless steel with spanner heads.
 5. CLOSED BACK FRAMES are 2" X 8" X .125" tubing (or equal)

2.4 FIBERGLASS PANELS

- A. ALUMINUM EDGED FIBERGLASS (FRP) PANELS
 1. CONSTRUCTION - Panels will be constructed of two sheets of .120 fiberglass sheets bonded to 3/4" core material.
 - a. Panel thickness will be 1". An aluminum frame surrounds the perimeter of the panel, and measures 1" x 1" x 1/8" with 1/8" wall thickness.
 2. WOOD EDGED PANELS WILL NOT BE ACCEPTED.
- B. Review record documents of existing construction provided by Owner. Owner does not guarantee that existing conditions are same as those indicated in record documents.
- C. CORE material will be 24-psi density polystyrene with a FLAME SPREAD rating of no more than 25.
 1. CORE MATERIAL MUST HAVE A PROVEN RECORD FOR USE IN PANEL FABRICATION – WITHOUT DELAMINATING
 2. URETHANE CORES will not be accepted
- D. FRP face sheets will be .120 minimum thickness with a pebble like surface.
- E. COLOR will be selected from Vale color chart.
- F. Provide U.V. Protection equal to "Kal-Lite" premium greenhouse "Resin-Acrylic" modified as a U.V. Inhibitor.
- G. PANELS are by Vale model VC90 (OR EQUAL)

2.5 EXTRA HEAVY DUTY FIBERGLASS WIDE STILE (FRP) DOORS

- A. **STRUCTURAL MAIN FRAME** – Doors have an aluminum main frame constructed from extruded aluminum 6063 – T6 alloy. Doors are 1 ¾” thick. Main frame tube is to be a single extruded unit measuring 1 ½” x 5 ¾” (O.D.) on both side stiles and 6” (O.D.) Top and Bottom rails. Spliced extrusions that are joined together to measure 6” will not be accepted.
- B. **MAIN FRAME WALL THICKNESS**
1. Side Stiles - Minimum 3/16” thick hinge edge wall
 2. Top and Bottom Rails - Minimum 1/8” thick outside edge wall (tie rod spline built into tube)
 3. All Rails and Stiles - Minimum 1/8” thick face walls
 4. All Rails and Stiles - Minimum 1/8” thick inside edge wall
- C. **MAIN FRAME JOINERY**– Assembly for the meeting joints of the Rails and Stiles on the main frame are to be MORTISE & TENON on all four joints. Secured with: 2 Tie Rods in Head Rail and 1 Tie Rod in Bottom Rail.
1. **WELDED JOINTS WILL NOT BE ACCEPTED**
- D. **FACE SHEETS** – Face sheets will be fiberglass reinforced polyester. .120” thick and have A pebble-like embossed finish. Face sheet color to be selected from Vale’s color chart.
1. FRP face sheets are MR84 high impact FRP MATERIAL that has been tested by ASTM D5420 Gardner Impact Test rating no lower than 413.72 in-lb (or equal).
- E. **CORE MATERIAL** – will be 25 psi density polystyrene with a flame spread rating of no more than 25.
- F. **INTER-LOC EDGE TRIM** – All aluminum trim is completely removable. All parts of the door are REPLACEMENTABLE and REPAIRABLE in the field. No fastening devices are exposed on the Stile Edge Trims.
1. **SNAP-ON OR SCREW-ON STILE TRIM WILL NOT BE ACCEPTED.**
 2. Edge Trim finish is 313, or as selected by architect.
- G. **WEATHER STRIPPING** – Center stiles of pairs will have pile weather-stripping .500 backing width, .5” pile height.
- H. **HARDWARE REINFORCING** – CLOSER reinforcing to be ¼” aluminum inserted into head rail.
1. Other surface applied hardware is reinforced with the standard mainframe tube wall thickness of 1/8” . Reinforcing for mortise and concealed hardware is to be done per template requirements.

END OF SECTION 081540

SECTION 092900 – GYPSUM BOARD

PART 1 GENERAL

1.01 SUMMARY

- A. Section Includes: Fiberglass-mat faced, mold- and moisture-resistant gypsum board.
- B. Related Sections:
 - 1. Section 06 10 00 Rough Carpentry.

1.02 REFERENCES

- A. ASTM International (ASTM):
 - 1. ASTM C473 Standard Test Methods for Physical Testing of Gypsum Panel Products.
 - 2. ASTM C518 Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus.
 - 3. ASTM C630 Standard Specification for Water-Resistant Gypsum Backing Board.
 - 4. ASTM C840 Standard Specification for Application and Finishing of Gypsum Board.
 - 5. ASTM C1396 Standard Specification for Gypsum Board.
 - 6. ASTM C1658 Standard Specification for Glass Mat Gypsum Panels.
 - 7. ASTM D3273 Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber.
 - 8. ASTM D6329 Standard Guide for Developing Methodology for Evaluating the Ability of Indoor Materials to Support Microbial Growth Using Static Environmental Chambers.
 - 9. ASTM E84 Standard Test Method for Surface Burning Characteristics of Building Materials.
- B. Gypsum Association (GA):
 - 1. GA-214 Recommended Levels of Gypsum Board Finish.
 - 2. GA-216 Application and Finishing of Gypsum Panel Products.

1.03 SUBMITTALS

- A. Product Data: Manufacturer's specifications and installation instructions for each product specified.

1.04 QUALITY ASSURANCE

- A. Regulatory Requirements: Provide products that comply with the following limits for surface burning characteristics when tested per ASTM E84:
 - 1. Flame spread: 0.
 - 2. Smoke developed: 0.
- B. Provide products that are GREENGUARD Indoor Air Quality Certified and GREENGUARD Children & Schools Certified for low emissions of volatile organic compounds (VOCs) by GREENGUARD Environmental Institute.

1.05 WARRANTY

- A. Provide products that offer twelve months of coverage against in-place exposure damage (delamination, deterioration and decay).
- B. Manufacturer's Warranty: Three years against manufacturing defects.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Georgia-Pacific Gypsum LLC:
 - 1. Fiberglass-Mat Faced Gypsum Board: DensArmor Plus Interior Panel.
 - 2. Fire-Rated Fiberglass-Mat Faced Gypsum Board: DensArmor Plus Fireguard.

2.02 MATERIALS

- A. 5/8 Inch Fire-Rated Fiberglass-Mat Faced Gypsum Board:
 - 1. Thickness: 5/8 inch.
 - 2. Width: 4 feet.
 - 3. Length: 8 feet.
 - 4. Weight: 2.5 pounds per square foot.
 - 5. Edges: Tapered.
 - 6. Surfacing: Coated fiberglass mat on face, back, and long edges.

7. Flexural Strength, Parallel (ASTM C473, ASTM C1658): Not less than 100 lbf.
8. Flexural Strength, Perpendicular (ASTM C473, ASTM C1658): Not less than 140 lbf.
9. R-Value (ASTM C518): Not less than 0.67.
10. Nail Pull Resistance (ASTM C473, ASTM C1658): Not less than 90 lbf.
11. Humidified Deflection (ASTM C473, ASTM C1658): Not more than 1/8 inch.
12. Hardness, Core, Edges, and Ends (ASTM C473, ASTM C1396): Not less than 15.
13. Water Absorption (ASTM C630, ASTM C1396, ASTM C1658): Less than 5 percent of weight.
14. Mold Resistance (ASTM D3273): 10, in a test as manufactured.
15. Microbial Resistance (ASTM D6329): Will not support microbial growth.
16. Acceptable Products:
 - a. 5/8 inch DensArmor Plus Fireguard, Georgia-Pacific Gypsum.
 - b. 5/8 inch DensArmor Plus Fireguard C, Georgia-Pacific Gypsum.
 - c.

PART 3 EXECUTION

3.01 INSTALLATION

- A. General: In accordance with GA-216, ASTM C840 and manufacturer's recommendations.
 1. Manufacturer's Recommendations:
 - a. Current "Product Catalog", Georgia-Pacific Gypsum.

3.02 APPLICATION

- A. Primer and Paint Application:
 1. Use high solids primer with at least 40% volume solids.
 2. Apply primer to a dry film thickness of 1.7 to 1.8 mils dry to ensure uniform coverage and appearance.
 3. Apply finish coats of paint per the paint manufacturer's label instructions.

3.03 PROTECTION

- A. Protect gypsum board installations from damage and deterioration until

END OF SECTION 092900

NOT FOR BIDDING PURPOSES

SECTION 099000 – INTERIOR, EXTERIOR AND HIGH PERFORMANCE PAINTS AND COATINGS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Interior paint and coating commercial systems including surface preparation.
- B. Interior high-performance paint and coatings systems including surface preparation.
- C. Exterior high-performance paint and coatings systems including surface preparation.
- D. Exterior paint and coating systems including surface preparation.

1.2 RELATED SECTIONS

- A. Section 03 30 00 - Cast-in-Place Concrete.
- B. Section 04 20 00 - Unit Masonry: Concrete Masonry Units (CMU) and brick.
- C. Section 06 20 00 - Finish Carpentry.
- D. Section 06 40 00 - Architectural Woodwork.

1.3 REFERENCES

- A. Steel Structures Painting Council (SSPC):
 - 1. SSPC-SP 1 - Solvent Cleaning.
 - 2. SSPC-SP 2 - Hand Tool Cleaning.
 - 3. SSPC-SP 3 - Power Tool Cleaning.
 - 4. SSPC-SP5/NACE No. 1, White Metal Blast Cleaning.
 - 5. SSPC-SP6/NACE No. 3, Commercial Blast Cleaning.
 - 6. SSPC-SP7/NACE No. 4, Brush-Off Blast Cleaning.
 - 7. SSPC-SP10/NACE No. 2, Near-White Blast Cleaning.
 - 8. SSPC-SP11, Power Tool Cleaning to Bare Metal.
 - 9. SSPC-SP12/NACE No. 5, Surface Preparation and Cleaning of Metals by Waterjetting Prior to Recoating.
 - 10. SSPC-SP 13 / NACE No. 6 Surface Preparation for Concrete.
- B. Material Safety Data Sheets / Environmental Data Sheets: Per manufacturer's MSDS/EDS for specific VOCs (calculated per 40 CFR 59.406). VOCs may vary by base and sheen.

1.4 SUBMITTALS

- A. Submit under provisions of Section 01 30 00 - Administrative Requirements.
- B. Product Data: For each paint system indicated, including.
 - 1. Product characteristics.
 - 2. Surface preparation instructions and recommendations.
 - 3. Primer requirements and finish specification.
 - 4. Storage and handling requirements and recommendations.
 - 5. Application methods.
 - 6. Cautions for storage, handling and installation.
- C. Selection Samples: Submit a complete set of color chips that represent the full range of manufacturer's products, colors, and sheens available.
- D. Verification Samples: For each finished product specified, submit samples that represent the actual product, color, and sheen.
- E. Coating Maintenance Manual: Upon conclusion of project, the Contractor or paint manufacturer/supplier shall furnish a coating maintenance manual, such as Sherwin-Williams, "Custodian Project Color and Product Information" report or equal. Manual shall include an Area Summary with finish schedule, Area Detail designating where each product/color/finish was used, product data pages, Material Safety Data Sheets, care and cleaning instructions, touch-up procedures, and color samples of each color and finish used.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: A firm or individual experienced in applying paints and coatings similar in material, design, and extent to those indicated for this Project, whose work has resulted in applications with a record of successful in-service performance.
- B. Paint exposed surfaces. If a color of finish, or a surface is not specifically mentioned, Architect will select from standard products, colors, and sheens available.
- C. Do not paint prefinished items, concealed surfaces, finished metal surfaces, operating parts, and labels unless indicated.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Delivery: Deliver manufacturer's unopened containers to the work site. Packaging shall bear the manufacturer's name, label, and the following list of information.
 - 1. Product name, and type (description).
 - 2. Application and use instructions.
 - 3. Surface preparation.
 - 4. VOC content.
 - 5. Environmental handling.
 - 6. Batch date.

7. Color number.

- B. Storage: Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.
- C. Store materials in an area that is within the acceptable temperature range, per manufacturer's instructions. Protect from freezing.
- D. Handling: Maintain a clean, dry storage area, to prevent contamination or damage to the coatings.

1.7 PROJECT CONDITIONS

- A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's recommended limits.

1.8 EXTRA MATERIALS

- A. Furnish extra paint materials from the same production run as the materials applied and, in the quantities, described below. Package with protective covering for storage and identify with labels describing contents. Deliver extra materials to Owner.
- B. Furnish Owner with an additional one percent of each material and color, but not less than 1 gal (3.8 l) or 1 case, as appropriate.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Manufacturer: Sherwin-Williams, which is located at: 101 Prospect Ave.; Cleveland, OH 44115; ASD Toll Free Tel: 800-524-5979; Tel: 216-566-2000; Fax: 440-826-1989; Email: requestinfospecifications@sherwin.com; Web:www.swspeccs.com.
- B. Substitutions: Approved Equal.
- C. Requests for substitutions will be considered in accordance with the provisions of Section 01 60 00 - Product Requirements.

2.2 APPLICATIONS/SCOPE

- A. Interior Paint and Coating Commercial Systems:
 - 1. Concrete: Poured, precast, tilt-up, cast-in-place, cement board, plaster.
 - 2. Concrete: Non-vehicular floors.
 - 3. Drywall: Drywall board, Gypsum board.
- B. High Performance Interior Paint and Coating Systems:
 - 1. Concrete: Poured, precast, tilt-up, cast-in-place, cement board, plaster.

2. Concrete: Exposed ceilings.
 3. Masonry: Concrete masonry units, including split-face, scored, and smooth block.
 4. Wood: Walls, ceilings, doors, trim and similar items.
 5. Drywall: Drywall board, Gypsum board.
- C. High Performance Exterior Paint and Coating Systems:
1. Concrete: Cementitious siding, flexboard, transite, and shingles; non-roof.
 2. Masonry: Concrete masonry units, cinder, or concrete block.
 3. Wood: Siding, trim, shutters, sash, and miscellaneous hardboard.
- D. Exterior Paint and Coating Systems:
1. Concrete: Cementitious siding, flexboard, transite, and shingles; non-roof.
 2. Masonry: Concrete masonry units, cinder, or concrete block.
 3. Concrete: Non-vehicular concrete floors, patios, porches, steps, and platforms.
 4. Wood: Siding, trim, shutters, sash, and miscellaneous hardboard.
 5. Architectural PVC, plastic, fiberglass.
 6. Drywall: Gypsum board, and exterior drywall.

2.3 PAINT MATERIALS - GENERAL

- A. Paints and Coatings:
1. Unless otherwise indicated, provide factory-mixed coatings. When required, mix coatings to correct consistency in accordance with manufacturer's instructions before application. Do not reduce, thin, or dilute coatings or add materials to coatings unless such procedure is specifically described in manufacturer's product instructions.
 2. For opaque finishes, tint each coat including primer coat and intermediate coats, one-half shade lighter than succeeding coat, with final finish coat as base color. Or follow manufacturer's product instructions for optimal color conformance.
- B. Primers: Where the manufacturer offers options on primers for a particular substrate, use a primer categorized as "best" by the manufacturer.
- C. Coating Application Accessories: Provide all primers, sealers, cleaning agents, cleaning cloths, sanding materials, and clean-up materials required, per manufacturer's specifications.
- D. Color: Refer to Finish Schedule for paint colors, and as selected.

2.4 INTERIOR PAINT AND COATING SYSTEMS

- A. Concrete: Walls and Ceilings, Poured Concrete, Precast Concrete, Unglazed Brick, Cement Board, Tilt-Up, Cast-In-Place including Plaster Walls and Ceilings.
1. Latex Systems:
 - a. Semi-Gloss Finish High Performance:

- 1) 1st Coat: S-W ProMar 200 Zero VOC Latex Primer B28W02600
 - 2) 2nd Coat: S-W ProMar 200 Zero VOC Interior Latex Semi-Gloss
 - 3) 3rd Coat: S-W ProMar 200 Zero VOC Interior Latex Semi-Gloss
2. Epoxy Systems; Eggshell:
 - a. Eggshell:
 - 1) 1st Coat: S-W ProMar 200 Zero VOC Latex Primer B28W02600
 - 2) 2nd Coat: S-W Pro Industrial Pre-Catalyzed Epoxy Eggshell 113.01
 - 3) 3rd Coat: S-W Pro Industrial Pre-Catalyzed Epoxy Eggshell 113.01
- B. Masonry; CMU: - Concrete, Split Face, Scored, Smooth, High Density, Low Density, Fluted.
1. Latex Systems:
 - a. Semi-Gloss Finish High Performance:
 - 1) 1st Coat: S-W ProMar 200 Zero VOC Latex Primer B28W02600
 - 2) 2nd Coat: S-W ProMar 200 Zero VOC Interior Latex Semi-Gloss
 - 3) 3rd Coat: S-W ProMar 200 Zero VOC Interior Latex Semi-Gloss
 2. Epoxy Systems; Waterbased:
 - a. Eggshell:
 - 1) 1st Coat: S-W ProMar 200 Zero VOC Latex Primer B28W02600
 - 2) 2nd Coat: S-W Pro Industrial Pre-Catalyzed Epoxy Eggshell 113.01
 - 3) 3rd Coat: S-W Pro Industrial Pre-Catalyzed Epoxy Eggshell 113.01
 3. Epoxy Systems; Glazing:
 - a. Benjamin Moore or Equal Epoxy Semi-Gloss Finish IG4010S9F-2K
- C. Drywall: Walls, Ceilings, Gypsum Board, and similar items.
1. Latex Systems:
 - a. Semi-Gloss Finish High Performance:
 - 1) 1st Coat: S-W ProMar 200 Zero VOC Latex Primer B28W02600
 - 2) 2nd Coat: S-W ProMar 200 Zero VOC Interior Latex Semi-Gloss
 - 3) 3rd Coat: S-W ProMar 200 Zero VOC Interior Latex Semi-Gloss
 2. Epoxy Systems; Eggshell:
 - a. Eggshell:
 - 1) 1st Coat: S-W ProMar 200 Zero VOC Latex Primer B28W02600
 - 2) 2nd Coat: S-W Pro Industrial Pre-Catalyzed Epoxy Eggshell 113.01

3) 3rd Coat: S-W Pro Industrial Pre-Catalyzed Epoxy Eggshell 113.01

D. Concrete: Floors, non-vehicular.

1. Epoxy Systems:

a. Gloss Finish:

- 1) 1st Coat: S-W ArmorSeal 33 Epoxy Primer Sealer
- 2) 2nd Coat: S-W ArmorSeal 1000 HS 2 Part Epoxy Clear
- 3) 3rd Coat: S-W ArmorSeal 1000 HS 2 Part Epoxy Clear

2.5 EXTERIOR PAINT AND COATING SYSTEMS

A. Concrete: Cementitious Siding, Flexboard, Transite Board, Non-Roof Shingles, Common Brick, Stucco, Tilt-up, Precast, and Poured-in-place Cement.

1. Latex Systems:

a. Semi-Gloss Finish:

- 1) 1st Coat: S-W A-100 Exterior Latex Gloss, A6-100 Series
- 2) 2nd Coat: S-W A-100 Exterior Latex Gloss, A6-100 Series

B. Masonry: Concrete Masonry Units (CMU), Cinder or Concrete Block.

1. Latex Systems:

a. Semi-Gloss Finish:

- 1) 1st Coat: S-W A-100 Exterior Latex Gloss, A6-100 Series
- 2) 2nd Coat: S-W A-100 Exterior Latex Gloss, A6-100 Series

C. Wood: Siding, Trim, Shutters, Sashes, and Hardboard-Bare/Primed.

1. Latex Systems:

a. Semi-Gloss Finish:

- 1) 1st Coat: S-W A-100 Exterior Latex Gloss, A6-100 Series
- 2) 2nd Coat: S-W A-100 Exterior Latex Gloss, A6-100 Series

D. Architectural PVC, Plastic, and Fiberglass:

1. Latex Systems:

a. Semi-Gloss Finish:

- 1) 1st Coat: S-W A-100 Exterior Latex Gloss, A6-100 Series
- 2) 2nd Coat: S-W A-100 Exterior Latex Gloss, A6-100 Series

PART 3 EXECUTION

3.1 EXAMINATION

- A. Do not begin installation until the substrates have been properly prepared; notify Architect of unsatisfactory conditions before proceeding. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.
- B. Proceed with work only after conditions have been corrected and approved by all parties, otherwise application of coatings will be considered as an acceptance of surface conditions.
- C. Previously Painted Surfaces: Verify that existing painted surfaces do not contain lead based paints, notify Architect immediately if lead based paints are encountered.

3.2 SURFACE PREPARATION

- A. General: Surfaces shall be dry and in sound condition. Remove oil, dust, dirt, loose rust, peeling paint, or other contamination to ensure good adhesion.
 - 1. Prior to attempting to remove mildew, it is recommended to test any cleaner on a small, inconspicuous area prior to use. Bleach and bleaching type cleaners may damage or discolor existing paint films. Bleach alternative cleaning solutions are advised.
 - 2. Remove mildew before painting by washing with a solution of 1 part liquid household bleach and 3 parts of warm water. Apply solution and scrub the mildewed area. Allow solution to remain on the surface for 10 minutes. Rinse thoroughly with clean water and allow the surface to dry before painting. Wear protective glasses or goggles, waterproof gloves, and protective clothing. Quickly wash off any of the mixture that comes in contact with your skin. Do not add detergents or ammonia to the bleach/water solution.
 - 3. Remove items including but not limited to thermostats, electrical outlets, switch covers and similar items prior to painting. After completing painting operations in each space or area, reinstall items removed using workers skilled in the trades involved.
 - 4. No exterior painting should be done immediately after a rain, during foggy weather, when rain is predicted, or when the temperature is below 50 degrees F (10 degrees C), unless products are designed specifically for these conditions. On large expanses of metal siding, the air, surface, and material temperatures must be 50 degrees F (10 degrees F) or higher to use low temperature products.
- B. Aluminum: Remove all oil, grease, dirt, oxide, and other foreign material by cleaning per SSPC-SP1, Solvent Cleaning.
- C. Block (Cinder and Concrete): Remove all loose mortar and foreign material. Surface must be free of laitance, concrete dust, dirt, form release agents, moisture curing membranes, loose cement, and hardeners. Concrete and mortar must be cured at least 30 days at 75 degrees F (24 degrees C). The pH of the surface should be between 6 and 9 unless the products are designed to be used in high pH environments. On tilt-up and poured-in-place concrete, commercial detergents and abrasive blasting may be necessary to prepare the surface. Fill bug holes, air pockets, and other voids with a cement patching compound.
- D. Concrete, SSPC-SP13 or NACE 6: This standard gives requirements for surface preparation of concrete by mechanical, chemical, or thermal methods prior to the application of bonded protective coating or lining systems. The requirements of this standard are applicable to all types of cementitious surfaces including cast-in-place concrete floors and walls, precast slabs, masonry walls, and shotcrete surfaces. An acceptable prepared concrete surface should be free of

contaminants, laitance, loosely adhering concrete, and dust, and should provide a sound, uniform substrate suitable for the application of protective coating or lining systems.

- E. Cement Composition Siding/Panels: Remove all surface contamination by washing with an appropriate cleaner, rinse thoroughly and allow to dry. Existing peeled or checked paint should be scraped and sanded to a sound surface. Pressure clean, if needed, with a minimum of 2100 psi pressure to remove all dirt, dust, grease, oil, loose particles, laitance, foreign material, and peeling or defective coatings. Allow the surface to dry thoroughly. The pH of the surface should be between 6 and 9 unless the products are designed to be used in high pH environments.
- F. Copper and Stainless Steel: Remove all oil, grease, dirt, oxide, and other foreign material by cleaning per SSPC-SP 2, Hand Tool Cleaning.
- G. Exterior Composition Board (Hardboard): Some composition boards may exude a waxy material that must be removed with a solvent prior to coating. Whether factory primed or unprimed, exterior composition board siding (hardboard) must be cleaned thoroughly and primed with an alkyd primer.
- H. Drywall - Exterior: Must be clean and dry. All nail heads must be set and spackled. Joints must be taped and covered with a joint compound. Spackled nail heads and tape joints must be sanded smooth, and all dust removed prior to painting. Exterior surfaces must be spackled with exterior grade compounds.
- I. Drywall - Interior: Must be clean and dry. All nail heads must be set and spackled. Joints must be taped and covered with a joint compound. Spackled nail heads and tape joints must be sanded smooth, and all dust removed prior to painting.
- J. Galvanized Metal: Clean per SSPC-SP1 using detergent and water or a degreasing cleaner to remove greases and oils. Apply to a test area, priming as required. Allow the coating to dry at least one week before testing. If adhesion is poor, Brush Blast per SSPC-SP16 is necessary to remove these treatments.
- K. Plaster: Must be allowed to dry thoroughly for at least 30 days before painting unless the products are designed to be used in high pH environments. Room must be ventilated while drying; in cold, damp weather, rooms must be heated. Damaged areas must be repaired with appropriate patching material. Bare plaster must be cured and hard. Textured, soft, porous, or powdery plaster should be treated with a solution of 1 pint household vinegar to 1 gallon of water. Repeat until the surface is hard, rinse with clear water and allow to dry.
- L. Steel: Structural, Plate, And Similar Items: Should be cleaned by one or more of the surface preparations described below. These methods are used throughout the world for describing methods for cleaning structural steel. Visual standards are available through the Society of Protective Coatings. A brief description of these standards together with numbers by which they can be specified follow.
 - 1. Solvent Cleaning, SSPC-SP1: Solvent cleaning is a method for removing all visible oil, grease, soil, drawing and cutting compounds, and other soluble contaminants. Solvent cleaning does not remove rust or mill scale. Change rags and cleaning solution frequently so that deposits of oil and grease are not spread over additional areas in the cleaning process. Be sure to allow adequate ventilation.
 - 2. Hand Tool Cleaning, SSPC-SP2: Hand Tool Cleaning removes all loose mill scale, loose rust, and other detrimental foreign matter. It is not intended that adherent mill scale, rust, and paint

- be removed by this process. Beforehand tool cleaning, remove visible oil, grease, soluble welding residues, and salts by the methods outlined in SSPC-SP1.
3. Power Tool Cleaning, SSPC-SP3: Power Tool Cleaning removes all loose mill scale, loose rust, and other detrimental foreign matter. It is not intended that adherent mill scale, rust, and paint be removed by this process. Before power tool cleaning, remove visible oil, grease, soluble welding residues, and salts by the methods outlined in SSPC-SP1.
 4. White Metal Blast Cleaning, SSPC-SP5 or NACE 1: A White Metal Blast Cleaned surface, when viewed without magnification, shall be free of all visible oil, grease, dirt, dust, mill scale, rust, paint, oxides, corrosion products, and other foreign matter. Before blast cleaning, visible deposits of oil or grease shall be removed by any of the methods specified in SSPC-SP1 or other agreed upon methods.
 5. Commercial Blast Cleaning, SSPC-SP6 or NACE 3: A Commercial Blast Cleaned surface, when viewed without magnification, shall be free of all visible oil, grease, dirt, dust, mill scale, rust, paint, oxides, corrosion products, and other foreign matter, except for staining. Staining shall be limited to no more than 33 percent of each square inch of surface area and may consist of light shadows, slight streaks, or minor discoloration caused by stains of rust, stains of mill scale, or stains of previously applied paint. Before blast cleaning, visible deposits of oil or grease shall be removed by any of the methods specified in SSPC-SP1 or other agreed upon methods.
 6. Brush-Off Blast Cleaning, SSPC-SP7 or NACE 4: A Brush-Off Blast Cleaned surface, when viewed without magnification, shall be free of all visible oil, grease, dirt, dust, loose mill scale, loose rust, and loose paint. Tightly adherent mill scale, rust, and paint may remain on the surface. Before blast cleaning, visible deposits of oil or grease shall be removed by any of the methods specified in SSPC-SP1 or other agreed upon methods.
 7. Power Tool Cleaning to Bare Metal, SSPC-SP11: Metallic surfaces that are prepared according to this specification, when viewed without magnification, shall be free of all visible oil, grease, dirt, dust, mill scale, rust, paint, oxide corrosion products, and other foreign matter. Slight residues of rust and paint may be left in the lower portions of pits if the original surface is pitted. Prior to power tool surface preparation, remove visible deposits of oil or grease by any of the methods specified in SSPC-SP1, Solvent Cleaning, or other agreed upon methods.
 8. Near-White Blast Cleaning, SSPC-SP10 or NACE 2: A Near White Blast Cleaned surface, when viewed without magnification, shall be free of all visible oil, grease, dirt, dust, mill scale, rust, paint, oxides, corrosion products, and other foreign matter, except for staining. Staining shall be limited to no more than 5 percent of each square inch of surface area and may consist of light shadows, slight streaks, or minor discoloration caused by stains of rust, stains of mill scale, or stains of previously applied paint. Before blast cleaning, visible deposits of oil or grease shall be removed by any of the methods specified in SSPC-SP1 or other agreed upon methods.
 9. High- and Ultra-High Pressure Water Jetting for Steel and Other Hard Materials: SSPC-SP12 or NACE 5: This standard provides requirements for the use of high- and ultra-high pressure water jetting to achieve various degrees of surface cleanliness. This standard is limited in scope to the use of water only without the addition of solid particles in the stream.

10. Water Blasting, SSPC-SP12/NACE No. 5: Removal of oil grease dirt, loose rust, loose mill scale, and loose paint by water at pressures of 2,000 to 2,500 psi at a flow of 4 to 14 gallons per minute.
- M. Vinyl Siding, Architectural Plastics, EIFS and Fiberglass: Clean vinyl siding thoroughly by scrubbing with a warm, soapy water solution. Rinse thoroughly. Do not paint vinyl siding with any color darker than the original color unless the paint system features Sherwin-Williams VinylSafe technology. Painting with darker colors that are not Sherwin-Williams VinylSafe may cause siding to warp. Follow all painting guidelines of the vinyl manufacturer when painting. Only paint properly installed vinyl siding. Deviating from the manufacturer's painting guidelines may cause the warranty to be voided.
- N. Stucco: Must be clean and free of any loose stucco. If recommended procedures for applying stucco are followed, and normal drying conditions prevail, the surface may be painted in 30 days. The pH of the surface should be between 6 and 9 unless the products are designed to be used in high pH environments such as Loxon.
- O. Wood: Must be clean and dry. Prime and paint as soon as possible. Knots and pitch streaks must be scraped, sanded, and spot primed before a full priming coat is applied. Patch all nail holes and imperfections with a wood filler or putty and sand smooth.

3.3 INSTALLATION

- A. Apply all coatings and materials with the manufacturer's specifications in mind. Mix and thin coatings according to manufacturer's recommendations.
- B. Do not apply it to wet or damp surfaces. Wait at least 30 days before applying to new concrete or masonry. Or follow manufacturer's procedures to apply appropriate coatings prior to 30 days. Test new concrete for moisture content. Wait until wood is fully dry after rain or morning fog or dew.
- C. Apply coatings using methods recommended by manufacturer.
- D. Uniformly apply coatings without runs, drips, or sags, without brush marks, and with consistent sheen.
- E. Apply coatings at spreading rate required to achieve the manufacturers recommended dry film thickness.
- F. Regardless of the number of coats specified, apply as many coats as necessary for complete hide, and uniform appearance.
- G. Inspection: The coated surface must be inspected and approved by the Architect just prior to the application of each coat.

3.4 PROTECTION

- A. Protect finished coatings from damage until completion of project.

END OF SECTION 099000

SECTION 099600 – HIGH PERFORMANCE FLOOR COATINGS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. ARMORSEAL 1K Water-Based Urethane Floor Enamel.

1.2 REFERENCES

- A. ASTM International (ASTM):
 1. ASTM D523 - Standard Test Method for Specular Gloss.
 2. ASTM D1640 - Standard Test Methods for Drying, Curing, or Film Formation of Organic Coatings.
 3. ASTM D2369 - Standard Test Method for Volatile Content of Coatings.
 4. ASTM D3828 - Standard Test Methods for Flash Point by Small Scale Closed Cup Tester.
 5. ASTM D3960 - Standard Practice for Determining Volatile Organic Compound (VOC) Content of Paints and Related Coatings.

1.3 SUBMITTALS

- A. Submit under provisions of Section 01 30 00 - Administrative Requirements.
- B. Product Data:
 1. Manufacturer's data sheets on each product to be used.
 2. Preparation instructions and recommendations.
 3. Storage and handling requirements and recommendations.
 4. Typical installation methods.
- C. Verification Samples: Two representative units of each type, size, pattern, and color.
- D. Shop Drawings: Include details of materials, construction, and finish. Include relationship with adjacent construction.

1.4 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with a minimum of five years documented experience.
- B. Installer Qualifications: Company specializing in performing Work of this section with minimum two years documented experience with projects of similar scope and complexity.
- C. Source Limitations: Provide each type of product from a single manufacturing source to ensure uniformity.

1.5 PRE-INSTALLATION CONFERENCE

- A. Convene a conference approximately two weeks before scheduled commencement of the Work. Attendees shall include Architect, Contractor and trades involved. Agenda shall include schedule, responsibilities, critical path items and approvals.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Store and handle in strict compliance with manufacturer's written instructions and recommendations.
- B. Protect from damage due to weather, excessive temperature, and construction operations.

1.7 PROJECT CONDITIONS

- A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's recommended limits.

1.8 WARRANTY

- A. Manufacturer's standard limited warranty unless indicated otherwise.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Manufacturer: Sherwin-Williams, which is located at: 101 Prospect Ave.; Cleveland, OH 44115; Toll Free Tel: 800-4-SHERWIN (474-3794); Tel: 216-566-2000; Fax: 216-566-1392; Email: request info (specifications@sherwin.com); Web: http://www.sherwin-williams.com/pro/services/architects_designers | <https://www.uniflexroof.com>
- B. Substitutions: Approved equal.
- C. Requests for substitutions will be considered in accordance with the provisions of Section 01 60 00.

2.2 ARMORSEAL 1K WATER-BASED URETHANE FLOOR ENAMEL

- A. ARMORSEAL 1K Water Based Urethane Floor Enamel. A high performance, one component polyester water based urethane, formulated specifically for industrial floor applications. Provides outstanding abrasion resistance, good chemical resistance, with excellent color and gloss retention.
 - 1. Luster: Gloss.
 - 2. Color: Clear.
 - 3. Color: Tinted.

B. Product Properties:

1. Dry Time and Cure: At 4 mils wet 77 degrees F (25 degrees C). Relative Humidity: 50 percent
 - a. To Touch: 45 minutes.
 - b. Foot Traffic: 8 hours.
 - c. Heavy Traffic: 18 hours.
 - d. To Recoat (self):
 - 1) Minimum: 6 hours.
 - 2) Maximum: 30 days.
 - e. To Cure: 14 days.
2. Coverage: Approx. 204 to 408 sq ft per gallon (5 to 10 sq m per Liter) Clear.
3. Coverage: Approx. 136 to 272 sq ft per gallon (3.3 to 6.6 sq m per Liter) Colors.
4. Cleanup and Reducer: Water.
5. Storage: Store at room temperature. Keep container tightly closed.
6. Chemical resistant.
7. Impact and abrasion resistant.
8. Performance comparable to two component WB urethane.
9. Resistant to "hot tire" pick-up.
10. May exhibit "tire tracking."

C. Physical Properties:

1. Resin Type: One component polyester water based urethane.
2. Density: 8.7 lbs per gal (1.04 kg per L). Clear.
3. Density: 9.7 lbs per gal (1.16 kg per L). Tinted.

D. Product Characteristics:

1. Color: Wide range of colors possible.
2. Volume Solids:
 - a. Clear: 27 to 31 percent.
 - b. Color: 32 to 36 percent. May vary by color.
3. Weight Solids:
 - a. Clear: 31.5 percent. Plus or minus 2 percent.
 - b. Color: 41 percent. Plus or minus 2 percent.
4. VOC (EPA Method 24): Less than 2.8 lbs/gal (340 g/L).

E. Performance Characteristics:

1. Abrasion Resistance per ASTM D4060, CS10 wheel, 1000 cycles, 1 kg load: 145 mg loss.
2. Adhesion per ASTM D4541: 350 psi, 100 percent Concrete Failure.

3. Direct Impact Resistance (topcoat only) per ASTM D2794: 160 in. lb.
4. Dry Heat Resistance (topcoat only) per ASTM D2485: 150 degrees F (66 degrees C), intermittent 250 degrees F (121 degrees C).
5. Flexibility per ASTM D522, 180 degree bend, 1/4 inch (6 mm) mandrel: Passes.
6. Hot Tire Pick-up, ITM at 140 degrees F (60 degrees C): Passes.
7. Pencil Hardness (topcoat only) ASTM D3363: 2H.
8. Reverse Impact Resistance (topcoat only) per ASTM D2794: 100 in-lbs.
9. Scrub Resistance ASTM 141-6192, 10,000 cycles: TBD.
10. Slip Resistance, Floors per ASTM C1028: 0.60 minimum.
11. Static Coefficient of Friction: Pass dry with and without SharkGrip Additive; Pass wet with SharkGrip Additive.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Do not begin installation until substrates have been properly constructed and prepared.
- B. If substrate preparation is the responsibility of another installer, notify Architect in writing of unsatisfactory preparation before proceeding.

3.2 PREPARATION

- A. All floors need to be prepared to MFMA standards (<https://www.maplefloor.org/en/sanding-athletic-maple-floor-resurfacing/>).

3.3 APPLICATION - OIL BASED SYSTEM

- A. Paint: Armorseal 1K Water-Based Urethane Floor Enamel.
 1. Abrade before applying paint.
 2. Apply lines, logos, etc. in accordance with label directions.
 3. Abrade all painted areas.
 4. Apply a 2nd coat of color.

3.4 SEALER APPLICATION - WATER BASED SYSTEM

- A. Paint: Armorseal 1K Water-Based Urethane Floor Enamel.
 1. Abrade before applying paint.
 2. Apply lines, logos, etc. in accordance with label directions.
 3. Abrade all painted areas.

4. Apply a 2nd coat of color.

3.5 FIELD QUALITY CONTROL

- A. Field Inspection: Coordinate field inspection in accordance with appropriate sections in Division 01.

3.6 CLEANING AND PROTECTION

- A. Clean products in accordance with the manufacturers recommendations.

END OF SECTION 099600

NOT FOR BIDDING PURPOSES

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. Scope:

1. The Pool Contractor shall visit the pool site and carefully examine the existing conditions, observing the site access, site constraints, soils, study the geotechnical report, the Pool structural drawings, and verify it for adequacy of pool site preparation.
2. The Pool Contractor shall construct the pool structures, furnish and installed the systems for filtration, re-circulation, disinfection, with trims and finishes for the outdoor pool at this facility.
3. During construction and completion of soils work, the General Contractor shall retain the services of a Geotechnical Firm as specified in the "Allowance" section of the Contract Documents to verify and supply a "Letter of Certification" that the soils work is in compliance with the requirements for this work and reciting cautions to be observed while constructing the pool structure, and work adjacent to the pool structure. It is the responsibility of the Pool Contractor to coordinate with the Geotechnical Firm and follow their instructions and recommendations. Special attention should be given to the drawings and specifications of the Pool Structural drawings for this project.
4. The Pool Contractor shall be responsible for the proper maintenance of soils conditions at all times. Soil conditions must be maintained as specified by Geotechnical Firm.
5. The Pool structures are to be cast-in-place concrete floors and cast-in-place, dry-gun gunite or shotcrete wall structures installed by the Pool Contractor. The pool shell shall be constructed against temporary form work. The soils work below and adjacent to the pool structures, shall meet the requirements of the Geotechnical Firm and shall meet the additional requirements of the specifications and the Pool Structural Drawings.
6. During construction and completion of the pool shell, the contractor must maintain proper site drainage of ground water until the pool has been filled with water to a level of -3'-0" from finish grade. The pool structure is not designed to resist buoyancy forces and hydrostatic pressures. If addition water must be removed for pool maintenance, the contractor ensure that the ground water is below the lowest part of the pool shell using the pool site well and ensure the underdrain pump station is properly function. The contractor with continue to carefully monitor the ground water until the pool has been refilled with water.
7. The specifications on the pool structural drawings must be adhered to precisely.

B. The Contractor shall:

1. Precisely layout pool as shown on pool layout drawings.
2. Install pool under drain system as depicted on project plans and ensure the system is working properly.

3. Perform all required hand trimming of excavation.
4. Furnish and install all and any engineered fill required to the subgrade for the Pool structures and decks.
5. Protect site from flooding and divert water from rainfall/storm events away from pool excavation during construction process.
6. Provide and install all required forms for pool and provide for moisture loss protection of exposed soils during construction.
7. Provide and install specified reinforcing steel per the structural drawings, and provide 3rd party inspection of reinforcing prior to concrete work. Results of that inspection to be provided to the EOR.
8. The Pool Contractor job superintendent shall be responsible to assure that only a certified gunite or shotcrete nozzleman place the gunite or shotcrete. Also, the job superintendent shall be knowledgeable of the specified soils and material (concrete, gunite or shotcrete & grout) requirements, the specified ASTM and ACl requirements, including testing.
9. Provide Operation and Maintenance Manuals and wall operating charts at the end of the project.
10. Provide "Certificate of Survey" to owner stating conformity to the required pool depths and dimensions.
11. Provide start-up supervision and instruction (Owner designates persons to be trained upon completion of pool work). Contractor must arrange for video production of training. The Pool Operation & Maintenance Manual shall be the basis for the start-up and instruction, and provide notice to the Engineer, Owner, and Owner's Representative 15 days prior to start-up.
12. Provide first 30 days of pool startup chemicals, including chlorine stabilizer.
13. Properly dispose of all trash and debris after construction.
14. Contractor must provide any and all work necessary to provide complete, functional, first class swimming pool installation.

1.3 INTENT OF PLANS AND SPECIFICATIONS

- A. The intent of this work is to provide a high quality, cost-effective, long life, and easy to maintain aquatic facility. The "bid" for this work, shall reflect that the plans and specifications are intended to furnish Owner with complete, operational, and functional facilities and systems of the "best accepted practice" of commercial swimming pool construction. All materials and equipment not specifically noted shall be selected and furnished suitable for intended duty, appearance, operation, and long life. No change orders will be granted at a cost to the owner for anything required to complete the project as outlined above.

1.4 SUBMITTALS

- A. The Contractor shall, within 45 days of notification of selection for the award of a contract for this work, submit the following information to the Engineer:
 1. A description of the work to be performed by the Pool Contractor with its own forces.
 2. The product names and the suppliers of all principal items or systems of materials and equipment proposed for the work.
 3. A list of names of the Subcontractors or other persons or entities (including those who are to furnish materials or equipment fabricated to a special design) proposed for this work.
 4. A detailed "schedule of values" for all pool work.
 5. A detailed calendar schedule of work for all phases of the entire project.
 6. The Contractor will be required to establish, to the satisfaction of the Engineer, and the Owner, the reliability of all materials and equipment and responsibility of the suppliers,

persons, subcontractors, or entities proposed to furnish and perform work described in the Bidding Documents.

7. Standard Submittals and Catalog Sheets: (Submit at one time a complete package, not individually)
 - a. Pool structural reinforcing steel shop drawings, the Pool structural concrete design mixes (cast-in-place, dry-gun, shotcrete, grout) (review structural specifications on pool drawings).
 - b. All pump specifications with pump curves.
 - c. Stainless steel recirculation system shop drawings.
 - d. Filter and face piping shop drawings.
 - e. Filter tank and pump pit shop drawings.
 - f. Catalog sheets of all other pool equipment items.
 - g. Pool piping shop drawings.
 - h. Certification of Compliance for filters, piping, and valving.
 - i. Play feature anchor shop drawings with catalog sheets, and specifications. Feature foundations must be designed by a licensed professional engineer.
 - j. Complete slide specifications and drawings. Slide foundations must be designed by a licensed professional engineer.
8. The Contractor shall, during the course of construction, collect and compile a complete catalog of all equipment furnished and installed on the project. This catalog shall include operation and maintenance instructions, part lists, shop drawings, and descriptive literature and guarantee or warranty information as furnished by the equipment manufacturers. All guarantees shall be filled out in the Owner's name and registered with the manufacture. Owner's portion shall be put in the catalog. All literature shall be submitted in accordance with the General Conditions. Large drawings shall be folded and bound in envelopes and bound in the catalog. The Contractor shall save all literature and instructions shipped with the equipment for inclusion in the catalog. A copy of all shop drawings submitted to the Engineer and approved will be retained for the Owners catalog.
9. Operation and Maintenance Manual:
 - a. The Contractor shall furnish four (4) copies of the Operation & Maintenance Manual to the Engineer. Upon review by the Engineer, the Contractor shall complete, rewrite, and or reissue as required, incorporating suggested modifications and inclusions. It is the responsibility of the Contractor, not the responsibility of the Architect, to write or extensively modify the Operation, & Maintenance Manual. The Operation & Maintenance Manual must be well written, logical, and easily understood by any and all pool operators. The Operation & Maintenance Manual must provide step-by-step procedures for complete operation and maintenance of all facility elements. The O&M should include at a minimum the following:
 1. Seasonal startup procedures
 2. Daily startup procedures
 3. Daily shut down procedures
 4. Seasonal shut down and winterization procedures
 5. Daily maintenance procedures
 6. Weekly maintenance procedures.
 7. Manufacturers individual manuals incorporated in the O&M manual.
 8. Backwashing procedure
 - b. The Operation & Maintenance Manual shall bear an Index of Contents. This index sheet shall also be provided with space to allow for the date of owner instruction and signature of the person instructed for each item of content in the Operation & Maintenance Manual. The sign-off list shall be sent to the

Architect for record and distribution. This manual shall be the basis of start-up instruction.

- c. The Contractor shall furnish and install in the equipment room one (1) framed with plexiglass wall chart, including a schematic of each pool system, valve and pool equipment, recirculation rates, pool volume, and a valve operation schedule. The wall chart shall be submitted to the Architect for review and approval.
10. Submit to the Owner samples of all exposed materials for selection and approval of color and texture.
11. Submit to the Owner samples of all shades structure fabric material and colors for subsequent selection.
12. Submit to the Owner color selection charts for all slides, water play equipment, etc.
13. All deck tile markings.

1.5 WORKMANSHIP

- A. The workmanship requirements of Division 1 of the specifications is the same for all pool work, except where special requirements are noted in this section.

1.6 QUALITY OF MATERIALS.

- A. Special attention is directed to the materials, products, and equipment described in this section of the specifications which establish a standard of the required function, dimension, appearance, service, useful life and quality as pre-determined by Owner, staff, and consultants. Pay special attention to the stainless steel gutter, filters, pumps, and chemical control systems.
- B. Where manufacturer's names are listed for a particular item of equipment or material without the phrase "or approved equal" the Contractor's bid shall be based on those items only. Substitutions may be considered after the low bidder is selected, if such substitutes are deemed at that time to be in the best interest of the Owner.
- C. Where references are made to ADA, EPA, OSHA, National Sanitary Foundation, NEC, NSPI, ASTM, ASME, Federal Specifications, American Society for Testing, & Materials, American Standards Association, American Institute of Steel Construction, Steel Institute, and similar institutions, organizations and standards, it shall be construed to mean the current specifications and designations as amended as of the date of the "plans" for this work. This requirement also shall include all federal, state and local codes.
- D. All construction must adhere to swimming pool criteria and regulations as established by State Department of Health, and the City.

1.7 WARRANTIES

- A. A manufacturer's ten (10) year or more non-prorated warranty for the swimming pool filter tanks, the stainless steel recirculation system, and five (5) year non-prorated warranty for the pool water analyzer programmers shall apply. (Furnish warranty with shop drawing submittals).
- B. The Contractor shall furnish written, two (2) year warranty of "non-leak" for the Pool structures, all buried piping, and the Diamond Brite and tile finishes. All other warranties shall be as specified herein and in Division 1.
- C. Contractor shall in coordination with the Pool Contractor, provide all Owner instructions and pool related documents.
- D. Contractor shall outline with bid documents any variance from the warranties specified herein and the warranties actually to be furnished.
- E. The Pool Contractor shall assist owner in first-year winterization and second season start-up (two man days required)

- F. The Contractor shall also warranty all work as specified in General Conditions and Supplemental Conditions.

PART 2 – PRODUCTS

2.1 POOL STRUCTURES.

- A. Excavation - The pool structures work shall include all labor, material, and equipment to complete the excavation, all concrete work (reinforced or otherwise), and all labor, material and equipment for other work as specified under this section.
- B. Steel – Refer to Pool Structural Plan
- C. Concrete – Refer to Pool Structural Plans
- D. Subgrade - Refer to Pool Structural Plans and Geotechnical Report
- E. Underdrain - Refer to Pool Structural Plans and Pool Plumbing Plans

2.2 RECIRCULATION SYSTEM - STAINLESS STEEL GUTTER

- A. It is the intent of these specifications that gutter flow and water surface cleaning be maintained under all conditions of normal operation and that no water be discharged to waste except when cleaning the filter or emptying the pool.
- B. A continuous flow, open channel gutter and filtered water supply line, according to the details shown on the plans, shall be installed as shown on plans, and attached to the pool per manufacturer's guidelines. All gutters shall be 304 stainless.
- C. The filtered water return tube shall be fitted with properly sized nylon inlet jet nozzles, not over 36 inches on center around the entire pool perimeter, except where inlet shall be expressly deleted and racing lane end walls (and paired between lanes), stairways or ladders. These inlet jets shall be installed so as to provide a stream of filtered sanitized water on a fixed 45° angle directed toward the bottom of the pool. The inlet openings shall not be larger than 3/8" diameter, and the manufacturer must space all openings and hydraulically model the entire pool area so the system shall deliver an even flow from all perimeter jets, producing an "equalized water distribution system". The perimeter distribution system shall be designed by the manufacturer to provide a uniform and equal pressure at each inlet. The manufacturer shall furnish with shop drawings, inlet locations with sizing calculations for orifice size and provide additional inlets to allow for changes of orifices and pipe sizes and runs to balance flows as indicated during start up.
- D. The gutter side of the return tube shall be fitted with removable jet flow nozzles to provide a constant stream of filtered, sanitized water in the gutter to prevent any unhealthy, stagnation or dirt build up in the gutter should the water level fall below a level which permits its entrance into the gutter channel. Jet flow nozzles should be installed at each integral weir location and at intermittent locations (not shown on the plans). Jet nozzles must be provided in adequate numbers to assure proper movement of water within any gutter sections. All areas of the gutter shall be assessable for inspection and cleaning with easy removal of plates at step locations.
- E. Converters (piping connections to the stainless steel gutter system) shall be installed in the gutter perimeter as shown on the plans and/or at locations to provide proper water circulation to and from the filters. It is the manufacturer's responsibility to ensure proper hydraulic flow balance with all equipment integrally to ensure proper water cleanliness at all times. Pool Designer must be informed of any suggested changes to ensure proper water circulation using the manufacturer's systems. Piping, as shown, shall connect the converters to the filter. Materials shall be as shown on the drawings. The overflow converters shall be provided with removable trash grates, and return converters as required.
- F. The face of the return tube shall have, flush with the surface, cup anchors for the racing lane float lines and safety lines as shown on the plans.

- G. There shall be factory installed in the back side of the return tube, 2 inch removable plug of CPB, with/internal hex socket. These plugs shall be removed to flush the pressure tube when required.
- H. Filler metal shall be used on all weld joints, whether the sections butt together or not; so as to result in uniform appearing raised welds at each joint. Raised welds shall not be ground. After the weld is cooled, a second pass may be made with the arc puddling and smoothing the original weld if required. The welder shall be factory (gutter manufacture) certified for this work by letter at time of shop drawing submittal.
- I. The components of the gutter system shall be fabricated from low carbon content, anti-magnetic stainless steel. The filtered water supply tube which forms the lip of the gutter section shall be fabricated from 12 gauge low carbon type 304 stainless steel with a similar or approved alternate to a #3 polished (100 mesh abrasive) finish. The 1 1/2" by 1 1/3" by 3/16" angle anchors, and all stiffener brackets shall be type 304 stainless steel. The gutter channel sections, shall be manufactured from 14 gauge type 304 stainless steel with a finish similar or approved alternate to # 3 polished (100 mesh abrasive) finish. 304 stainless steel shall have not less than 0.046 carbon content. The horizontal surfaces shall be sandblasted to provide a "nonslip" stepping surface.
- J. The stainless steel gutter system as specified above, shall be as manufactured by Paddock Pool Equipment Company, or approved alternate when conforming to the above specification and pool plan details.

2.3 POOL FILTER

- A. The Pool filter must be high rate sand filter type. Filter models: Shall be as shown on plans or approved alternate when conforming to the specification and pool plan details. Approved manufacturer is Paddock, Neptune Benson, and Aqua Revival. For consideration of an alternate, Contractor must submit request with all detailed design information to Engineer at least 15 days prior to bid.
- B. Pool filter must meet all warranty requirements specified in the Contract Documents.
- C. Minimum filtration rates for the pool filtration and recirculation system are specified on the pool plans.

2.2 POOL PUMP AND MOTOR

HORIZONTAL CLOSE COUPLED END SUCTION CENTRIFUGAL PUMP(S)

- A. GENERAL
 - 1. DESCRIPTION: The Contractor shall furnish materials, equipment and labor to furnish and install the pumping system(s) as indicated on the contract drawings and as herein specified.
 - 2. INSTALLATION The Contractor shall insure that the pump(s) and motor(s) are properly installed with no pipe strain transmitted to the pump casing and with the back pullout function of the pump preserved.
- B. GENERAL PUMP DESCRIPTION: The pump(s) shall be a centrifugal horizontal close-coupled end suction type and shall be certified by the National Sanitation Foundation (NSF) and bear the NSF50 certification Paco, Aurora, Marlow, or Griswold may be considered as substitutions providing they meet all aspects of this specification. Any cost associated with the use of a substitution, including installation and engineering changes shall be borne by the installing contractor.
- 1. MATERIALS OF CONSTRUCTION
 - a. Casing.....Cast Iron (ASTM A48)
 - b. Impeller.....Bronze (ASTM B584)(Max zinc content 5%)

- c. Shaft.....Steel (AISI C1045)
- d. Case Wear Ring.....Bronze (ASTM B62)
- e. Shaft Sleeve.....Bronze (ASTM B62)
- 2. MECHANICAL SEAL: Shaft sealing shall be accomplished by means of a mechanical seal with a ceramic seat, carbon washer, Buna-N elastomers, and stainless steel metal parts.
- 3. SHAFT SLEEVE: The pump shaft shall be fitted with a shaft sleeve to minimize shaft wear. The sleeve shall be sealed to the impeller hub by an O-ring, and shall be positively driven by a pin to the keyway

C. BEP (Best Efficiency Point):

- 1. To allow for changing conditions and pump wear the selected pump(s) Maximum flow must be not be less than 125% of BEP flow as demonstrated on the published pump curve at full diameter.

D. COATING

- 1. All wetted surfaces of the pump(s) shall be sandblasted to a white metal surface and coated with fusion bonded epoxy as manufactured by 3M Corp or approved equal. (ScotchKote 134). This shall include the bronze impeller. The coating shall be approved and listed by the National Sanitation Foundation for the purpose intended.

E. MOTOR

- 1. The motor(s) shall be a NEMA-JM configuration TEFC enclosed and supplied in accordance with the latest NEMA Standards. Motors exceeding the horsepower identified in these specifications shall not be allowed. Motor shall be EPACT High Eff. (premium Eff, EPACT high Eff., standard Eff.) with the minimum required efficiency percentage as noted on the following chart for the motor type specified. Each motor shall have a sufficient horsepower rating to operate the pump at any point on the pump's head-capacity curve without overloading the nameplate horsepower rating of the motor, regardless of service factor. The motor shall have a service factor of at least 1.15. The service factor is reserved for variations in voltage and frequency. The motor shall be inverter duty rated and labeled accordingly.

2. MINIMUM REQUIRED MOTOR EFFICIENCY

HP	RPM	Standard	Eff	Epact High Eff Premium Eff
1	1800	75.5	82.5	85.5
	1200	80.0	80.0	82.5
1 1/2	1800	77.0	84.0	86.5
	1200	85.5	85.5	87.5
2	1800	78.5	84.0	86.5
	1200	86.5	86.5	88.5
3	1800	82.5	87.5	89.5
	1200	87.5	87.5	89.6
5	1800	82.5	87.5	89.5
	1200	87.5	87.5	89.6
7 1/2	1800	84.0	89.5	91.7
	1200	89.5	89.5	91.0
10	1800	84.0	89.5	91.7
	1200	89.5	89.5	91.3
15	1800	87.5	91.0	92.4
	1200	90.2	90.2	91.7
20	1800	87.5	91.0	93.0

	1200	90.2	90.2	91.7
25	1800	89.5	92.4	93.6
	1200	91.7	91.7	93.0
30	1800	89.5	92.4	93.6
	1200	91.7	91.7	93.0
40	1800	91.0	93.0	94.1
	1200	93.0	93.0	94.1
50	1800	91.7	93.0	94.5
	1200	93.0	93.0	94.1
60	1800	93.6	93.6	95.0
	1200	93.4	93.6	94.5

2.3 PUMP BELLOWS

- A. Flexible braided hose shall consist of corrugated tube with braided wire to prevent elongation due to pressure thrust. Flexible braided stainless steel hose shall be manufactured using type 304 stainless steel braid and hose with one raised-face fixed and one floating steel plate flange. Grooved ends may be used in sizes 2" through 12" (50mm through 300mm). Welding is not acceptable. Sizes 2-1/2" (63mm) and smaller may have threaded male nipples. Flexible braided hose 4" (100mm) or smaller, with copper sweat ends, may have stainless steel hose and braid for gas service or bronze hose and braid for water service.

2.4 POOL STRAINER

- A. Strainers shall be stainless steel or fiberglass by Neptune Benson, Mermade, or Paddock Pool Equipment Company. For consideration of an alternate, Contractor must submit request with all detailed design information to Engineer at least 7 days prior to bid.
1. Stainless steel:
 - a. There shall be supplied stainless steel, custom fabricated pump strainers with quick lever acting, removable cover with stainless steel basket which shall be perforated and its open area shall exceed four (4) times the pipe area. The water shall flow downward through the basket. A 4 inch diameter vacuum gauge shall be installed on the strainer inlet to monitor the pump influent. A 3/4 inch bottom tapping shall be provided for a 3/4 inch hose bib winterization drain cock and a side stainless steel connection at 45° angle for vacuum connection.
 2. Fiberglass:
 - a. Strainer body shall be entirely constructed of high strength vinylester fiberglass not less than 1/4" in thickness. All exterior surfaces shall be impregnated with special UV stabilizers. Connections shall be of typical construction with 1" thick fixed flanges. Flanged connections shall be ANSI standard dimensions.
 - b. Strainer body shall include one (1) 3/4" F.P.T. drain connection and (1) 1/4" F.P.T. gauge connection (on the influent side). Unit shall include securing assemblies to permit easy opening and closing of strainer lid without the use of tools. Strainers with Influent connections 4" and smaller shall have four (4) securing assemblies. Strainers with Influent connections 5"-8" shall have six (6) securing assemblies. Strainers with Influent connections 10"-16" shall have eight (8) securing assemblies.
 - c. Provide one (1) stainless steel basket and one (1) additional to serve as a spare. Basket shall be Type 304 stainless frame and mesh with 5/32" perforations and not less than 62% open area. Open area of basket shall be no less than 4 times greater than the influent connection. Strainer basket shall have a welded intermediate baffle to reduce cleaning frequency. Basket handle shall be 1/8" in

thickness. Strainer basket shall have a 20-25 mil electrostatic applied powder coat finish including clear coat.

- d. Strainer lid shall be 1" thick transparent acrylic machined to eliminate sharp edges and house securing assemblies. Lid shall be grooved to house rubber gasket. Lid shall be seated with a 1/8" thick, full faced 40 durometer neoprene rubber gasket. Strainer lids on units with 10" connections and larger shall include a stainless steel cross brace.
- e. Strainers with influent connections up to 8" shall be pressure tested to 50psi. Strainers with influent connections 10" and up shall be pressure tested to 30 psi, as manufactured by Neptune-Benson.

2.5 PIPE SUPPORTS & HANGERS

- A. Pipe support brackets shall be installed by the Pool Contractor to adequately support the pool piping lines. The brackets type shall be as shown on the plan detail. The piping shall be securely clamped to these brackets with non-corrosive components. Quantity and spacing will be per manufactures guidelines based on pipe sizing.

2.6 CHEMICAL TUBING AND CONDUIT

- A. All polyethylene tubing used in conjunction with the chemical feed equipment shall conform to ASTM D635. All tubing shall be supported and installed in PVC 3/4" inch conduit with 6 inch radius (or greater) sweep bends to facilitate installation of the tubing. EMT conduit shall not be used.

2.7 CHEMICAL SYSTEMS

- A. Contractor shall provide all chemical systems shown on plans. All necessary equipment for chemical distribution as shown on plans must be included in Contractor's bid. All chemical systems must be provided complete and operational for the Aquatic Facility.
- B. Contractor must follow all applicable regulatory standards during construction of chemical systems.
- C. Proper labeling of all chemicals and chemical storage areas must be completed by Contractor.
- D. All required chemical handling and safety equipment must be provided by Contractor including eye wash station.
- E. Contractor shall supply professional test kit, Lumiso Pooltest Expert by Palintest USA.
- F. The Contractor shall furnish at time of startup Personnel Protection Equipment as shown on the plans.
- G. The Contractor shall furnish and install chemical safety signage:
 - 1. Equipment room door exterior sign stating: "DANGER POOL EQUIPMENT ROOM" and appropriate signage for chemical storage.
 - 2. Chlorine, and acid handling safety signs with instructions placed on the equipment room interior wall.
 - 3. Emergency phone numbers.
 - 4. Chemical equipment room doors must have appropriate hazard placards as approved by local fire marshal.

2.8 CHLORINE CHEMICAL FEEDERS

- A. General Description:
 - 1. The pump shall be a double head adjustable output pump.
 - 2. Have a 3-point roller design in anti-siphon protection
 - 3. Pump head requires no valves, allows for easy maintenance.

4. Self-priming against maximum working pressure, foot valve not required.
5. Pump does not lose prime or vapor lock
6. Pumps off-gassing solutions and can run dry
7. Output volume is not affected by back pressure
8. Certified ANSI/NSF STD 50.
9. The pump shall run at 44rpm and be capable of pumping 8.5to170gpd up to 25 psi max. Basis of design: Stenner Class Series 170DM5 - Model 170JL5A3T

B. Accessories (required for each pump):

1. Wall brackets.
2. Suction and feed tubing - 3/8 inch outside diameter low density linear polyethylene.
3. Feed indicator
4. Threadless injector fitting for 3/8 inch tubing with stainless steel band clamp.
5. Pump tube - Ten extra tubes required for each pump.
4. Drum safety wand suction tube straightener assembly for 3/8 inch suction tubing. Assembly includes PVC tube and 2 inch buttress thread bung. Two assemblies required.
5. Spill containment units must be supplied for each active acid drum in the system as shown on plans.
6. Vapor shield

2.9 ACID CHEMICAL FEEDERS

A. General Description:

1. The pump shall be a double head adjustable output pump.
2. Have a 3-point roller design in anti-siphon protection
3. Pump head requires no valves, allows for easy maintenance.
4. Self-priming against maximum working pressure, foot valve not required.
5. Pump does not lose prime or vapor lock
6. Pumps off-gassing solutions and can run dry
7. Output volume is not affected by back pressure
8. Certified ANSI/NSF STD 50.
9. The pump shall run at 44rpm and be capable of pumping 8.5to170gpd up to 25 psi max. Basis of design: Stenner Class Series 170DM5 - Model 170JL5A3T

B. Accessories (required for each pump):

1. Wall brackets.
2. Suction and feed tubing - 3/8 inch outside diameter low density linear polyethylene.
3. Feed indicator
4. Threadless injector fitting for 3/8 inch tubing with stainless steel band clamp.
5. Pump tube - Ten extra tubes required for each pump.
4. Drum safety wand suction tube straightener assembly for 3/8 inch suction tubing. Assembly includes PVC tube and 2 inch buttress thread bung. Two assemblies required.
5. Spill containment units must be supplied for each active acid drum in the system as shown on plans.
6. Vapor shield
7. Acid fume separator

2.10 CHEMICAL STORAGE TANKS

- A. Chemical tanks must be molded double wall tanks / dual containment tanks designed for use with pool chemicals. Tanks must comply with 40CFR-264.193 capacity requirements. Tanks will come standard with a vented manway. See plans for tank size requirements.

B. Basis of Design: Chem-tainer Industries Double wall tanks.

2.11 UV CHAMBERS

- A. UV Chambers shall be chambers rated for a UV dose of 40MJ/CM2 and have the following characteristics:
1. UV system shall have a MET of equivalent (ELT, CSA, OR UL) listing.
 2. UV System shall be a complete package to include: 316L Sch. 10 stainless steel chamber, control system located in a NEMA 12 rated panel, medium pressure bulbs, designed to emit wavelengths within the UVC electromagnetic spectrum, strainer basket, and automatic wiper system.
 3. Chamber shall be rated for 690 kPa
 4. Chamber shall have temperature control system
 5. Chamber shall have ANSI flanges and all ports or vents shall be threaded NPT.
 6. Chamber shall have sacrificial anode attached to the chamber.
 7. Manufacturer to warranty ultraviolet chamber and control panel for a period of 5 years excluding lamps, quartz and seals. Medium pressure Ultraviolet bulbs shall be warranted for a period of 8,000 hours. Intermittently operated lamps (> 1 on/off cycles per day) will be replaced free of charge should failure occur prior to 4,000 hours and replacement will be prorated between 4,000 and 8,000 hours.
 8. Power cabinet in NEMA 4 enclosure.
 9. Basis of Design: Neptune Benson ETS Wafer series UV Chambers
- B. See plans for chamber sizes.
- C. Provide in-line strainer for UV Chamber

2.12 GAS DETECTORS

- A. Gas detector is designed to be connected to a dedicated, renewable toxic gas sensor, which is programmed for a specific type of gas in parts-per-million (ppm). The detector will also have the following features:
1. Plug & play sensor sets the transmitter gas & measurement range
 2. Dual-level user-adjustable alarm relays
 3. 4-20mA analog output (Active)
 4. Built-in horn & visual alarm LEDs
 5. Electronics continuously check sensor & systems status
 6. Low-cost, long-life renewable sensor
 7. Quick, easy sensor calibration
 8. Optional remote cable for monitoring up to 30 feet from the transmitter
 9. Connects to PLC or SCADA controller
 10. UL, CUL, and CE Approvals
 11. 24V DC Power supply included
- B. Basis of Design (Chlorine Room): PureAire Universal Fixed Gas Detector, Chlorine, 10ppm
- C. Basis of Design (pH Room): PureAire Universal Fixed Gas Detector, Hydrochloric Acid, 0-15ppm

2.13 LIFEGUARD CHAIRS

- A. Type 1: Lifeguard chair shall have the following
1. 34" x 34" deck, non-slip, ultra-violet stabilized, structural fiberglass T-Bar.
 2. Protective side railings
 3. ANSI/APSP-16 approved
 4. Seat post is 3" O.D. x .109"
 5. 360 degree swivel, closed cell, UV protected, foam padded seat

6. Two 6" diameter wheels provided for easy transport
7. Hook for rescue tube
8. Umbrella holder
9. Basis of Design: Spectrum Aquatics Model 20211 Torrey II 36"

2.14 ADA POOL LIFT

- A. Aqua Creek Products Scout Excel Pool Lift, Model F-SCTXL with anchor F-808SA and spare battery for lift or equal.

2.15 WATER FEATURES

- A. Water Features will be as shown on plans. Water features will manufactured by one of the following:
 1. Aquatix (Basis of design)
 2. Splashtacular
 3. Vortex International
 4. Water Play
 5. Water Odessey
 6. Water Play
- B. Quantities and models shown on drawings.

2.16 POOL PIPING

- A. Buried pool piping for pressure lines of slides and piping that crossed under the pool shall be PVC schedule 80 and schedule 80 fittings. Exposed piping up to slide must be painted with epoxy paint recommended for PVC application to match color selected for slide steel. All other buried pool piping shall be PVC schedule 40 pipe and schedule 40 fittings. PVC shall conform to ASTM 02729. Mechanical/expansion joints shall be used at the pool structure, foundations/grade beams, and when connecting to pool equipment to allow for thermal expansion and soil movement. All piping shall be NSF or AWWA listed for use. All flange fittings shall use 1/8 inch full face rubber gaskets. Mechanical joints at all structures and all equipment are required. Link Seal fitting to be used for all pipe transition from concrete structures.
- B. The perforated PVC schedule 40 underdrain piping shall be wrapped with a filter fabric. The underdrain pipe shall flow by gravity to storm manhole as shown on plans.
- C. The Pool Contractor shall provide piping shop drawings for winterization low point drains and valving for all piping.
- D. All piping must easily drain by gravity during winterization. Provide air fitting to allow water to be blown out and winterization valves at expose low points.

2.17 POOL VALVES

- A. Butterfly Valves: Butterfly valves shall be PVC body with PVC disc and EPDM seat & seals. The liner shall be full seat design fully molded around the body where as only the Disc and Seat are wetted parts and feature raised convex rings on the face and be utilized as the mating flange gaskets. Valves shall accept flat faced flanges in accordance with ANSI B16.5 bolt pattern for 150 lb flanges. Valve stem shall be Stainless Steel, be non-wetted, and have engagement over the full length of the disc. The valve lever handle (sizes 1-1/2" – 8") shall be Blue in color and have a molded provision for a padlock. Valves sizes 1-1/2" – 12" shall feature a molded ISO bolt pattern for accessory and Plasgear™ Gear-operator

mounting. Butterfly valves are intended for chlorinated water, swimming pool, and fresh water applications only. Basis of Design: Asahi Pool-Pro Butterfly Valves.

- B. Ball Valves: Ball valves sized 1/2" – 6" shall be of True-Union design with 2-way blocking capability. PTFE seats shall have elastomeric backing cushions to provide smooth even stem torque and to compensate for wear. Valves shall feature molded ISO mounting top flange for actuation installation and Panel Mount feature on bottom of valve for securing in-line. The handle shall double as the spanner wrench for maintenance and carrier adjustment. Basis of Design: Asahi Type 21/21A True Union Ball Valve.
- C. Stem Extensions: Stem extensions where required will be provided by valve manufacturer.
- D. Check Valves (Ball): Ball Check valves shall be PVC, CPVC, PP or PVDF body with EPDM, FKM or PTFE seals. Valves shall be of solid thermoplastic construction, and be designed with an elastomeric uniseat/seal for tight shut-off under pressure. Sizes 1/2" – 2" shall be true union, and sizes 3" & 4" shall be single union. Basis of Design: Asahi True Union Ball Check Valve and Single Union Ball Check Valve.
- E. Check Valve (Wafer): Wafer Check Valves shall be of solid thermoplastic construction, having no metal to media contact. Valves shall incorporate a single disc design suitable for either horizontal or vertical installations. Valves shall be wafer style conforming to ASME/ANSI B16.1 face to face for 150 lb flanges. Valve face to face dimensions shall conform to ISO 5752 short pattern face to face dimension. Valves shall be round body design with all O-ring seals of either EPDM or FKM and accept as an option a SWP-B ETFE coated spring for use in vertical applications. PVC shall conform to ASTM D1784 Cell classification 12454. Valves shall be rated to 150 psi (3" – 8") and 85 PSI (10" & 12"). Basis of Design: Asahi Wafer Check Valves.
- F. See pool valve schedule on drawings. All valves required are not shown. Valving for proper operation and maintenance is required as used in standard practice.

2.18 MAIN DRAINS / COVERS / HYDROSTATIC RELIEF VALVES

- A. Main drains sumps shall be:
 - 1. Sump must be VGB compliant.
 - 2. Type 304L stainless steel material
 - 3. ANSI/APSP-16 approved.
 - 4. NSF listed.
 - 5. Basis of Design: Paddock Pool Equipment Company Model #2424ESMD0FC and Model #2448ESMD-FC or approved equal
- B. Main drain cover shall be:
 - 1. The cover shall be VGB compliant and shall be stamped as such.
 - 2. Type 304L stainless steel material
 - 3. ANSI/APSP-16 approved.
 - 4. NSF listed.
 - 5. Cover to be flat type cover.
 - 6. Basis of Design: Paddock Pool Equipment Company Model #2424ESMD0FC and Model #2448ESMD-FC or approved equal
- C. Hydrostatic relief valves shall be:
 - 1. 2.5in MIP
 - 2. Spring-loaded
 - 3. ABS plastic body with stainless steel spring
 - 4. Comply with provisions of ASME/ANSI A112.19.8 2007.
 - 5. Provide 12in threaded ABS collection tube for valve.

2.19 FLOW METER

- A. The electromagnetic insertion flow sensor shall generate an electrical signal proportional flow velocity from a range of 0.15-33 feet per second. The output signals shall be optional 4-20 mA analog, or digital S3L / open-collector pulse with maximum pull-up voltage of 30 vdc, and a maximum current sink of 50 mA.
- B. The sensor shall operate with a power input of 5 – 26.4 VDC, with a maximum current draw of 15 mA.
 1. The microprocessor-based sensor shall include Empty Pipe Detection, LED-assisted troubleshooting, and Bi-Directional span.
 2. The sensor shall utilize an Installation Fitting that is factory set to control proper flow sensor insertion depth and orientate sensor to be parallel with fluid flow.
 3. The sensor shall not create a pressure drop of >1 psi at any flow rate.
 4. With a fully developed flow profile the sensor output shall be linear to $\pm 1\%$ of full range, with a repeatability of $\pm 0.5\%$ of full range, and supplied with a certificate traceable to N.I.S.T.
 5. Three optional sensor lengths shall allow the flow sensor to install into pipes from 0.5 to 36 inches.
 6. The sensor body shall be 316L Polypropylene with stainless steel electrodes and grounding ring: PVDF/316LSS.
 7. The flow sensor shall be equipped with dual o-ring seals. The elastomeric seals shall be FPM-Viton® (standard) with optional EPDM or FFPM-Kalrez®.
 8. Basis of Design: Georg Fischer Signet 2551 Magmeter Flow Sensor or approved equal

2.20 AUTOMATIC WATER LEVEL CONTROL

- A. Water make up controller must have the following:
 1. Housing must be a watertight NEMA 4X UL 94 5V UL flammability rated polycarbonate enclosure
 2. Controller must have a user friendly menu driven operating system. It must utilize a 5 switch user interface, four directional arrows and enter key with a short audible click with each key press. An easy to read LCD display must power down after a 15 minute period of no key entries.
 3. The controller must have a fifteen second rolling slosh filter with 0.1-second sample for fluid detection.
 4. Sensing must be controlled automatically within ± 4 mm of nominal water level.
 5. The solenoid valve must be a 2", 1 solid state relay output at 24VAC, 1.85A. Auxiliary shall be a mechanical relay output C, NO, and NC contacts at terminal block.
 6. Water level controller will have tri-sensing configuration.
 7. Basis of Design:
 - a. Lap Pool: AquatiControl ELC-810-TS-ST-300, tri-sensing for surge tank with 300ft of cord and 2" solenoid valve or approved equal
 - b. Wading Pool: AquatiControl ELC-810-TS-DW-300, tri-sensing for surge tank with 300ft of cord and 1" solenoid valve or approved equal

2.21 BOUY LINES AND ACCESSORIES

- A. Rope Float: 5" x 9" Rope float for $\frac{3}{4}$ " rope. Made of Polyethylene and treated with chlorine inhibitors and ultraviolet stabilizers. Color: Blue and White
- B. Rope: $\frac{3}{4}$ " Polyethylene Rope. 3 strand twisted. Color: Blue and White
- C. Rope Hook: $\frac{3}{4}$ " Chrome plated brass hook with hardware.
- D. Floor Cup Anchor: 4" S.S. Cup anchor with eyelet and bonding screw.

2.22 POOL LADDERS

- A. Pool Ladders will have the following features:

1. Rails: The ladder shall be fabricated of 1.90" O.D. x .109" wall thickness 304L stainless steel. Each rail shall have three bends that are to be wrinkle free. Provided with two (2) rubber bumpers.
2. Steps: Treads shall be provided as shown on plans. They shall be 19.66in wide x 5.00in deep with a non-slip top surface, and shall be made of high density plastic. Hardware included.
3. Anchors: The ladder shall be supported by two (2) 4" bronze wedge anchors and two (2) stainless steel keyhole escutcheons.
4. Basis of Design: Spectrum Aquatics Heavy Duty Ladder 1.90" Model 36178-36 or approved equal

2.23 RING BUOYS

- A. Ring buoys shall be USCG approved with the following features:
- a. Size: 24"
 - b. Color: Orange
 - c. Equipped with straps.
 - d. Provide aluminum mounting bracket.
 - e. Provide 1/4" Polypropylene heaving line with foot float, 60ft in length.
 - f. Basis of Design: Jim-Bouy GO-24 or approved equal

2.24 AIR RELIEF VALVE

- A. Air relief valve shall be stainless steel rated at 1 to 50 psi clean water air release valve, 1/8in inlet size.
1. Operating pressure: 3.5 psi to 50 psi
 2. Max. vent capacity: .5 scfm at 3.5 psi to 6.4 scfm at 50psi
- B. Basis of design: Armstrong AV-11 Air Vent or approved equal.

2.25 COMPOUND GAUGE

- A. Compound gauge shall be dual-scale pressure and vacuum gauge with 304 stainless steel case, 2.5inch dial diameter, 1/4inch NPT bottom, liquid filled. Range from 30 Hg to 60 psi
- B. Basis of Design: Wiki Type 213.53 Model 9767010 or approved equal

2.26 PRESSURE GAUGE

- A. Pressure gauge shall be pressure gauge with 304 stainless steel case, 2.5inch dial diameter, 1/4inch NPT bottom, liquid filled. Range from 0 to 60 psi
- B. Basis of Design: Wiki Type 213.53 Model 9796053 or approved equal

2.27 POOL FINISHES AND MARKINGS

- A. Pool Walls and floor:
1. The interior pool plaster finish to be exposed quartz aggregates fortified with white Portland cement installed strictly per manufacturer's guidelines. Color to be white. (Final color to be chosen by owner.)
 2. Installed strictly per manufacturer's guidelines.
 3. Basis of Design: SGM Diamond Brite, Color Aqua Quartz or approved equal
- B. Deck depth markings

1. 6" tile deck inserts with 4" black letters and numerals on white ceramic tile, skid-resistant depth and safety markings. All tiles shall be set in and grouted with pure white Portland cement. The Contractor shall accurately verify that all depth markings are appropriately located to meet regulatory requirements before placement. See drawings for additional details.
 2. Basis of Design: Inlays, Inc, 6" Ceramic tiles with 4" lettering, or approved alternate.
- C. Deck safety signage
1. Place in deck ceramic tile "No Dive", "Deep Water" & Max. Depth" tile safety markings in decks adjacent to pool. Verify current regulations on exact wording prior to ordering and installing markers. See drawings for additional details.
 2. Basis of Design: Inlays, Inc, 6" Ceramic tiles with 4" lettering, or approved alternate.
- D. Stair, & Change of Slope Safety Stripe
1. Tile shall be Black / Ebony D311. 1"x1". Non-slip. All tiles shall set in and grouted with Portland cement per manufacturer's recommendation.
 2. Basis of Design: Dal-Tile Keystones collection or approved alternate.
- E. Water Line Tile – Wading Pool
1. Tile shall be Navy D189. 6"x6". All tiles shall set in and grouted with Portland cement per manufacturer's recommendation.
 2. Basis of Design: Dal-Tile Keystones collection or approved alternate.
- F. Control Joints
1. Below water joints: Control joints below water shall be furnished and installed by the Pool Contractor only. All services shall be applied only in most favorable weather conditions.
 2. The Pool Contractor shall use a Thiodaulk Sealant, 2 part polysulfate, meeting all of the specifications of the manufacturer for swimming pool installation, and a companion primer shall be used on clean surfaces only in as manufactured by Sika, product Sika-Flex #412, or approved alternate.
 3. The Pool Contractor shall verify current dates on all product packages and sandblasting all joints before applying primers.
 4. Pool Contractor shall install 3" strip of ceramic tile along both edges of pool joints for the entire length of the joint. Tile shall closely match pool finish.

2.28 CHEMICAL CONTROLLERS

- A. The water chemistry control system shall provide continuous monitoring and control of sanitizers, oxidizers, pH, ORP, Total Alkalinity, free chlorine, total chlorine, combined chlorine, temperature, system flow rate, total dissolved solids (TDS), turbidity, chemical inventory levels, surge tank and backwash holding tank water levels, system pressures, strainer vacuum and water chemistry balance calculations. The controller shall feature a programmable Fireman Cycle feature, which automatically turns off the Heater, UV and Ozone/Auxiliary systems prior to shutting off the recirculation pump. The controller shall abort VFD turn downs upon declining water chemistry, and increase the circulation rate to satisfy minimum flow requirements of a heater, UV and/or ozone system. All high-voltage wiring shall be performed in a separate NEMA 4X enclosure that precludes access to the controller electronics. The control system shall optionally provide automatic control of the filtration system including backwash operation. Remote access shall be provided through EZConnect, without the need for port forwarding or a VPN. Installation of the system shall be per the manufacturer's specification and no exceptions shall be allowed. A factory trained/authorized representative shall provide training to the owner.

- B. Controller supplier to provide remote monitoring software for a desktop client capable of remote access over a local Ethernet connection, without internet connection. Software shall be installed on a local Windows based computer provided by the owner.
 - 1. The software shall display the following inputs for each pool:
 - a. pH Level
 - b. ORP (mV)
 - c. Temperature (C deg)
 - d. Flow Rate (LPM)
 - e. Conductivity (mhos/cm)
 - f. CL/Br (ppm)
- C. The software shall be capable of the following outputs for each pool:
 - a. pH Control
 - b. Chlorine control
 - c. Heater control
 - d. UV Control
- D. Controller software shall also have the following features:
 - a. Readings, set points, and alarms that are easily monitored
 - b. Alarm / Status messages
 - c. Relay status, with feed mode
 - d. Emergency Off capability.
 - e. Mechanical tab for other parameters
 - f. Allow settings to be modified from operator's console.
- E. Basis of Design: BECS Technology BECSYS5 chemical controller Model BECSys5-OL1GPMXOXPWN or approved equal

2.29 SUMP PUMPS

- A. Sump shall be a submersible dewatering pump with following features:
 - 1. Non-clogging vortex impeller.
 - 2. Durable cast construction. Cast iron switch case, motor and pump housing, base and impeller. No sheet metal parts to rust or corrode. All cast iron class 25-30 25000# tensile strength.
 - 3. Stainless steel screws, bolts, float rod, handle, guard and arm and seal assembly
 - 4. Shaft Seal - Carbon & ceramic rotary face seal, with stainless steel wetted parts.
 - 5. Maximum temperature for sewage or dewatering 130°F (54°C).
 - 6. All models pass 2 inch spherical solids.
 - 7. Backwash tank, pump pit, and slide pump pit: Automatic with float operated, submersible (NEMA 6) mechanical switch.
 - 8. Pool Underdrain Manhole and Pool Drain Manhole: Manual operation. On/off control via Sump pump duplex controller.
 - 9. Balance Tank: Manual operation. On/Off controlled with tethered float switches.
 - 10. Corrosion resistant powder coated epoxy finish.
 - 11. Voltage: 115V & 200V
 - 12. Basis of Design:
 - a. Pump Pit: Zoeller Sump Pump Model M292, .5HP 115V, Auto with integral float switch or approved equal
 - b. Manhole: Zoeller Sump Pump Model N292, .5HP 115V, Manual with tethered float switches or approved equal
- B. Duplex Control Panel shall be an electrical alternator that is used on a Duplex pump application where automatic alternation of the pumps is desired for added protection. With one pump operating to handle normal flow, a second pump becomes operational in the event the water level continues to rise. The built-in alarm system, a standard feature, can be connected to sound when the second pump becomes operational.

1. Hand-Off-Auto Toggle Switch for each pump
2. Green pump run pilot light for each pump
3. Alarm test and silence switches
4. Red Alarm Beacon included with Nema 4X enclosure
5. Auxiliary Dry Contact
6. High Water Alarm
7. On Single Phase - Circuit breaker for each pump
8. Magnetic starter for each pump
9. Alternating mechanism
10. Numbered terminal strip for connecting pumps and variable level float switches
11. Nema 4X - Watertight enclosures available
12. Integral auxiliary terminal board connections (dry contact) for remote alarm devices
13. 3 variable level float switch control operation
14. Three 20' float switches included with single phase panels
15. 2 Year Warranty
16. The use of off-the-shelf components provide for relative easy field maintenance and repair
17. Rated for use with 115/200/230v pumps and an Amp range of 15 to 20 amps.
18. Basis of Design: Zoeller Electrical Alternator Control Panel Item#: 10-0045 or approved equal

2.30 FLAP VALVE

- A. Flap valves will have the following features:
1. Flap valve shall have cast iron body and cover.
 2. The seat and disc ring shall be bronze, and the hinge pin and cotter pins shall be stainless steel.
 3. The valve shall be constructed with a 10-degree offset from vertical to ensure positive closure.
 4. The flange shall be drilled using an ANSI 125# template.
 5. All iron parts shall be coated in TNEMEC 2-part epoxy with 3-4 mils dry film thickness to prevent rusting or corrosion or approved equal

2.31 DIVERSION VALVE

- A. Float operated modulating valve shall be designed for submerged service in a vertical configuration.
- B. The housing body shall be fabricated using Sch. 80 PVC pipe with Sch. 80 PVC van stone flanges. The internal wafer shall be 12 gauge T304L material and positioned with 1/8" clearance around the perimeter. The body shall also incorporate an interior stop plate constructed of PVC to define the allowable range of arm motion. Close fitting Delrin bushings shall be included on the shaft penetrations of the body to provide a seal against water loss and air entrance.
- C. The valve shaft shall be T304L material 1" in diameter. Float arms shall securely fasten to shaft using T316SS nuts with washers to provide adjustability. Arms shall be 1/2" (12mm) diameter all thread rod T316SS with length as required
- D. Ball floats shall be constructed of T304L stainless steel and be 7" in diameter with internal weighting. Floats shall also be adjustable using T316SS nuts with washers as previously described. Provide two (2) float arms as shown on the drawings.

2.36 FRP LADDERS

A. Performance Requirements

1. Ladder and cage systems shall meet the requirements set forth in OSHA 1910.23 and 1926.1053, local building codes and industry standards as applicable.
2. Basis of design: Strongwell SAFRAIL Fiberglass Ladder Systems or approved equal

B. Materials

1. The side rails and cage straps shall be fiberglass reinforced pultruded polyester with OSHA safety yellow pigment. As an option, an industrial grade polyurethane yellow coating may be applied to the finished ladder and cage. Other colors are available as an option.
2. The side rails shall be 2" (51mm) or 2.375" (60mm) square tube with a wall thickness of .156" (4mm) or greater. The rungs shall be pultruded 1.25" (31.75mm) diameter FRP fluted tube.
3. Cage hoops shall be manufactured by the open mold hand lay up process with a width of 3" (76mm) and thickness of 1/4" (6.4mm) minimum at the top and bottom and 2" (51mm) x 1/4" (6mm) at the intermediate hoops. The cage shall be interconnected with 2" (51mm) x 3/16" (5mm) pultruded straps spaced 9" (230mm) on center around the hoop.

C. Fabrication Requirements

1. All joints and rungs shall be riveted. The hoops shall be attached to the rails in a manner which provides hand clearance throughout the length of the ladder.
2. Ladders shall be shop assembled, and as an option may be pre-drilled and prepared for field attachments of standoffs.
3. The ladder cages shall be shipped assembled or as an option may be shipped unassembled for field assembly using rivets or bolts.

D. Workmanship

1. If required, all cut or machined edges, holes and abrasions shall be sealed with a resin compatible with the resin matrix used in the structural shape.

E. Installation

1. All FRP ladder sections shall be installed as shown on the approved shop drawings.

2.37 FRP HANDRAILS

A. Design

1. The FRP standard railing system, including connections, shall be designed to meet the configuration and loading requirements of OSHA 1910.29 and IBC with a minimum 2.0 factor of safety.
2. Guardrail height is 42" (1067mm) from the top of walkway to the top of the guardrail.
3. Guardrail installation method shall be as indicated on plans.
4. Basis of Design: Strongwell SAFRAIL Fiberglass railing system or approved equal

B. Material

1. The rails and posts shall be (select as appropriate):
 - a. 2" x 2" x .156" (51mm x 51mm x 4mm) square tube
2. The pultruded parts shall be made with a fire retardant resin that achieves a flame spread rating of 25 or less in accordance with ASTM test method E84, flammability characteristics of UL 94 V0 and meet the self-extinguishing requirement of ASTM D635. The resin matrix shall be polyester and shall contain a UV inhibitor. The color shall be yellow.

C. Fabrication of Standard Railing System

1. The fiberglass standard railing system shall be fabricated into finished sections by fabricating and joining together the pultruded square tube using glass-reinforced thermoset components; epoxy bonded and connected as shown in the fabrication details. Railing sections shall be fabricated to the size shown on the approved fabrication drawings and shall be piece marked with a water proof tag.
2. The fiberglass standard railing system shall be fabricated into finished sections by fabricating and joining together the pultruded square tube using molded ABS components; epoxy bonded and connected as shown in the fabrication details. Railing sections shall be fabricated to the size shown on the approved fabrication drawings and shall be piece marked with a water proof tag.

D. For Side Mount

1. Post shall be constructed with a pultruded bottom plug. Length shall be sufficient to extend a minimum of 1" (25mm) beyond the uppermost bolt hole to prevent crushing of post tubing. Bolt holes shall provide clearance of 1/16" (1.6mm) for 1/2" (12.7mm) diameter bolts/studs. On square tubes, holes shall be on longitudinal center line of post, 1" (25mm) from bottom of post (minimum) and not less than 3" (76mm) apart on center. Posts shall be fastened with stainless steel anchor bolts or studs, 1/2" (12.7mm) diameter.
2. Post locations shall be no greater than 18" (450mm), nor less than 9" (230mm) from horizontal or vertical change in handrail direction. For square tubes, post centers shall be no greater than 72" (1830mm) apart on any straight run or rail, or 48" (1220mm) apart on any inclined rail section.

E. Other Attachment Methods

1. Base mount, embedded and removable are also types of mounting procedures for railing pending design and approval by the Design Engineer.

F. Installation of Handrail Sections

1. The fabricated railing sections shall be supplied complete with fittings by the FRP manufacturer. The components used to join fabricated sections together may be shipped loose, to be epoxied and riveted, if required, together, if required in the field by the contractor.
2. The fabricated handrail sections shall be installed as shown on the approved shop drawings. The handrail sections shall be accurately located, erected plumb and level. The sections shall be fastened to the structure as shown on the approved shop drawings.

2.38 UNIVERSAL DOUBLE SAFETY GATE

- A. Universal double safety gate will have the following features:
 - 1. Universal hinge design with left or right hand swing.
 - 2. Automatic gate closure via gravity.
 - 3. Withstand 400lbs impact test at ambient.
 - 4. Molded parts made from UV-resistant polyurethane.
 - 5. Color: safety yellow
 - 6. Open swing of 112 degrees with a maximum rise of 14"
 - 7. Design for attachment to square tube
- B. Basis of Design: Intrepid Industries, Universal Double Bar Safety Gate Model UDFG-37

2.39 MANHOLE STEPS

- A. Manhole steps shall have the following features:
 - 1. Epoxy coated ½"ASTM A615 Gr 60 steel
 - 2. Mechanical lock for concrete applications
 - 3. High Impact Copolymer Polypropylene which has been proven non-corrosive in sewer environments. Conforms to an ASTM D-4101 specific number
 - 4. Contoured to fit the hand for comfort and a Sure Grip.
 - 5. Sturdy Tread Design with Side Molded Slip-Resistant Wings.
 - 6. Step Size: 13 ¾"x6"
- B. Basis of Design: American Step Company, Model ML-43 or approved equal.

2.40 SAFETY BOARD

- A. Contractor shall provide and install custom made safety board containing Personal protection equipment, first aid kit, MSDS sheets for chemical, and fire extinguisher.
- B. Safety board to be installed in chemical room.
- C. See pool drawings for additional details.

2.41 MANHOLE ACCESS HATCH

- A. Sanitary Manhole: Access hatch will have lift assistance for one-hand door operation and automatic hold-open arm that locks cover in the open position and constructed with corrosion resistant materials. Additional the access hatch will have the following features:
 - 1. Aluminum cover and extruded aluminum frame
 - 2. Cover designed with fillable pan for field installation of concrete material
 - 3. Hinges and latch will be constructed from 316 stainless steel.
 - 4. Lift Assistance: Compression spring operators enclosed in telescopic tubes. Automatic hold-open arm with grip handle release
 - 5. Finish: Mill Finish aluminum with a bituminous coating applied to the exterior of the frame.
 - 6. Basis-of-Design Manufacturer: Bilco Type TER Floor Access Door or approved equal.
- B. Storm Manhole: Access hatch will have lift assistance for one-hand door operation and automatic hold-open arm that locks cover in the open position and constructed with corrosion resistant materials. Additional the access hatch will have the following features:
 - 1. Aluminum cover and extruded aluminum frame
 - 2. Hinges and latch will be constructed from 316 stainless steel.
 - 3. Lift Assistance: Compression spring operators enclosed in telescopic tubes. Automatic hold-open arm with grip handle release
 - 4. Finish: Mill Finish aluminum with a bituminous coating applied to the exterior of the frame.
 - 5. Basis-of-Design Manufacturer: Bilco Type K Angle Fram Access Door or approved equal.

2.42 EMERGENCY SHOWER / EYEWASH STATION

- A. Emergency Shower / Eyewash station will have the following features:
1. Shower head and Eyewash bowl: 10" (254mm) diameter yellow impact-resistant plastic or 10-3/4" (273mm) corrosion resistant stainless steel.
 2. Shower Valve: Chrome-plated brass 1" IPS stay-open ball valve. Operated by stainless steel pull rod with triangular handle. S19-310FSS is all stainless steel.
 3. Standard Sprayhead Assembly: Chrome-plated brass sprayhead with twin, soft flow, eyewash heads and protective sprayhead covers. The integral flow control assures safe, steady flow under varying water supply conditions from 30–90 PSI. S19-310FSS is all stainless steel.
 4. Eyewash Valve: Chrome-plated 1/2" IPS stay-open ball valve. Hand operated by a large, highly visible safety yellow PVC push handle. S19-310FSS is all stainless steel.
 5. Pipe and Fittings: 1-1/4" galvanized steel protected with BRADTEGSM safety yellow coating or approved equal. S19-310FSS is all stainless steel.
 6. Water Supply: 1-1/4" IPS.
 7. Complies with American National Standard Z358.1-2004.
 8. Universal Identification Sign and Inspection Tag Included.
 9. One-Year Warranty
 10. Provide emergency thermostatic mixing valve.
- B. Basis of Design: Bradley Combination Drench Shower / Eyewash Unit Model S19-310 and Bradley Emergency Fixture Thermostatic Mixing Valves S19-2100 or approved equal.

PART 3 – EXECUTIONS**3.1 GENERAL**

- A. Refer to all site and site preparation specifications within this document and on the structural plans. Request geotechnical testing if conditions and materials are not acceptable or there is a doubt of suitability for pool work. Start of this work indicates acceptance of the soils and substrate as acceptable and satisfactory.

3.2 POOL STRUCTURE

- A. Any annotations and drawings of the swimming pool structural plan sheets, must be followed exactly. In case of contradiction between structural plan sheets and specifications in other parts of these documents, the structural plan sheets shall govern.
- B. The Pool Contractor shall place permanent batter boards located around the perimeter of the pool structure. The Pool Contractor shall verify that the batter boards placement represents the exact location and elevation of the pool structure in this work. Machine and hand excavate as required. Correct any geophysical problems caused by this work.
- C. The Contractor shall place a clean crushed rock base to provide proper subdrainage below the pool floor structure. The Contractor shall place in this rock base a pool structure dewatering/under drain piping system. The system shall be piped and installed per applicable drawings and specifications. The Contractor shall not use this dewatering system during construction. The piping shall be clean at all times.
- D. Any minor voids which may occur due to over excavation or from cave-in, etc., shall be filled with lean mixture of gunite or shotcrete or concrete before any reinforcing steel is placed. The Pool Contractor shall notify the Engineer where any minor deformations in the excavation caused by cave-ins, subsurface water conditions, or earth of adequate bearing capacity have occurred. These irregularities shall be repaired as required and filled with

- bank run gravel, crushed rock, or a lean mixture of gunite or shotcrete as directed by the Engineer.
- E. The Pool Contractor shall verify the under drain system was installed within the clean drainage fill base below the pool floor as shown on the Pool drawings. The pool under drain system shall consist of a 4 inch diameter perforated PVC, schedule 40 pipe installed around the perimeter of the pool area with a collection header adjacent to the main pool drain at the deepest portion of the pool. A geotextile filter fabric shall be installed between the LVC soils or subgrade soils and the drainage fill to encapsulate the drainage fill material.
- F. The Pool Contractor shall construct a header completely around the pool, to form a bond beam at the top of the pool wall, which is monolithic portion of the pool shell, formed to the dimensions as specified in the structural drawings. A taught cutting wire shall be anchored to the header to assist verification of the dimensional integrity of the gunite or shotcrete structure during construction and to assist in constructing a straight wall. A 1/2" plus, 0" minus tolerance will be allowed in the straightness of the vertical pool walls at the time of placement of C.I.P., Gunite or shotcrete. All structural walls have a minimum thickness as noted on the wall reinforcing schedule. Hand of placement or mortar to true up walls will not be permitted. Before Gunite or shotcrete has set, the walls shall be within the dimensional requirements of the structure. Standard race course lengths must be maintained in areas applicable.
- G. The Pool Contractor shall place, before commencing the Gunite, shotcrete, or C.I.P. work, all special pool fittings and gutter anchorages that are required to be embedded in concrete or C.I.P., Gunite or shotcrete and shall be responsible for positioning in accordance with the drawings.
- H. The wall and floor reinforcing steel shall be securely wired together and shall be lapped not less than 40 diameters or 2 feet minimum, whichever is greater, and placed in a workmanlike manner. The Engineer shall inspect this work before concrete or Gunite or shotcrete work.
- I. The Engineer shall be notified after concrete design mixes are approved and 14 days prior to the placement of concrete or Gunite or shotcrete. The Pool Contractor shall furnish radius templates of the principal radii of the structure and demonstrate the proper wall thicknesses are being provided within the cutting lines. The Engineer shall approve or disapprove the work prior to the concrete or Gunite, shotcrete, or C.I.P. placement. The main drain piping shall be tested during this inspection and during concrete placement.
- J. The pool structural concrete design requires the placement of the poured floor before C.I.P., Gunite or shotcrete of the walls.
- K. Concrete mixes for poured in place and C.I.P., Gunite or shotcrete shall be as shown on structural drawings and specifications.
- L. Gunite sand shall consist of clean, hard, sharp particles and the moisture content per structural plans. Gunite proportions shall be per structural plans, mixed dry in a batch mixing machine for a period of not less than one minute after materials have been added. Hydration shall occur at the nozzle of the cement gun using just enough water so that no slump shall occur in the Gunite. Surfaces upon which the Gunite or shotcrete is to be apply shall be shot at right angles to the surface, starting at the bottom in continuing upward. Concrete shall be built up in layers of thickness that will not slump, allowing sufficient time between the placing of layers for initial set to take place. All loose, fine aggregates or rebound shall be removed from the surface the Gunite or shotcrete before placing succeeding layers to avoid sand pockets, and whenever possible, the first layer shall entirely cover the reinforcing steel in order to secure it in the proper position. Any sand pockets which may occur shall be immediately cut out and filled with Gunite or shotcrete.
- M. The design mixes shall be submitted to the Engineer 14 days before placement. All ACI cold and hot weather concrete work recommended practices apply to pool structure and grout placement. All concrete, gunite, and shotcrete work shall be wet cured.

- N. The pool concrete floor and C.I.P., Gunitite or shotcrete walls shall be finished at time of placement to a smooth steel troweled finish. Walls and floor shall be of uniform, flat plane, with smooth radius, and without perceptible contour variations.
- O. The stainless steel gutter system is grouted in the place using a non-expansive grout and shall be continuously supervised, wet-burlap-cured with vapor barrier covering not less than three days after placement.
- P. Only experienced forming, gunmen, and nozzle men shall be employed, and satisfactory written evidence of five years of such experience shall be furnished to the Engineer prior to commencing Gunitite or shotcrete work. It is the intent of this specification that the dry-gun of Gunitite or shotcrete will be employed for the pool well construction.
- Q. The Gunitite or shotcrete surface shall be placed in a workmanship like manner to achieve a true flat plane and smooth radius surfaces for finish application, without patching, plastering, or surface grinding. Shoddy workmanship or improper care will require work to be removed and replaced properly.
- R. At no point in any pool structure shall the water depth be less than specified. Depth tolerance of minus 0 inches or plus 1 inch shall be maintained.
- S. The Pool Contractor shall upon completion of pool construction and prior to filling with water, obtain a Certificate of Survey by a state licensed surveyor specifying actual length, width, diagonals, depths, and vertical dimensions of all swimming pool areas including diving area.

3.3 RECIRCULATION SYSTEM

- A. The entire open channel gutter section shall be anchored to the pool structure, thus forming a continuous parameter section as shown on the plans.
- B. Filler metal shall be used on all weld joints, whether the sections butt together are not, so as to result in uniform appearing raised welds in each joint. Raised welds shall not be ground. After the weld is cooled, a second pass may be made with the arc puddling and smoothing the original weld if required.
- C. All welds shall be smooth and neat with no sharp edges.
- D. The stainless steel gutter components shall be cleaned and polished as required to present a substantially uniform finish. Each weld seam, as completed, after cooling to approximately 300 degrees, shall be vigorously brushed with a stainless steel brush. Blending of all surfaces should be done with a Scotch Brite Flat Wheel or equal. Areas requiring blending, which are inaccessible with the power wheel, shall be hand blended with a 3M Scotch Brite Pad. The strength of the raised the weld shall not be reduced by grinding. After all stainless steel welding, brushing, blending and testing, the welds on the stainless steel components must be cleaned as contained in the directions for the stainless steel gutter system installation by the manufacturer. Observe all applicable safety precautions. The finished surfaces shall appear bright and shiny without stains or discolor.
- E. All installation is to be performed by a welder with at least five years experience in field welding stainless steel recirculation systems. The Pool Contractor shall submit the installer's experience, factory certified, in writing to the Engineer's office for approval prior to ordering the recirculation system. All work to be performed in accordance with the manufacturer's technical bulletins. The welder shall submit a sample for standard and quality to be used.
- F. At the discretion of the Engineer, the Pool Contractor shall drill and tap up to 10 locations in the stainless steel system. Tappings shall be for 1/8 inch NPT stainless steel plugs. All chips and tailings from this procedure shall be provided to the Engineer for metallurgical testing to verify the composition of the stainless steel. Carbon content shall not exceed 0.046.

3.4 POOL PIPING/MAIN DRAIN

- A. The Pool Contractor shall furnish and install the piping systems as shown on the pool plan drawings. The elevations and piping slopes shall be carefully controlled to avoid air entrapment and provide winterization drainage, with valving, to all lines.
- B. All buried pool piping for pool recirculation system shall be schedule 40 pipe and schedule 40 fittings and schedule 80 pipe and schedule 80 fittings under pool slab. Mechanical joints shall be used at the pool structure, foundations/grade beams, and when connecting to pool equipment. All piping shall be NSF and AWWA listed for use. All flange fittings shall use 1/8 inch full face rubber gaskets. Link Seal shall be used when pipe is penetrating concrete structures, and stainless steel forming niches are not used.
- C. The pool's main drain line also flows by gravity to a manhole as a winterization drain. The main drain line is a solid PVC pipe and does not connect to the soil dewatering perforated line beneath the pool. The above piping provides for the rainfall removal from within the pool structure and subsurface water beneath the pool structure is removed by dewatering lines.
- D. All pool piping shall be placed with 6 inch bedding and 6 inch cover of clean 1/4-3/8 rock. All trench work and backfill shall comply with specifications. Thrust blocks shall be used at elbows over 30°.
- E. Pool piping shall have mechanical joints at all structures and all rigid equipment. Piping shall be free-floating in sleeves at all floor slabs, pool decks, foundations, grade beams, etc. Vacuum cleaning piping shall be of "reamed" pipe ends with sanitary "Ys" and sweep bends, 12 inch minimum radius.
- F. The Pool Contractor shall before placing any pipe furnish the Engineer a piping shop drawing with the elevation of the flow line of all piping, determining the elevations of low points, high points, and clearance between crossing piping.
- G. All piping below structures, concrete decks, or sidewalks, etc., shall be pressure tested to 15 psi for 6 hours prior to and during placement of concrete. Piping shall be observed, photographed, and recorded by the Contractor's Superintendent as to date and time of day at beginning and end of pressure tests. Any pressure loss shall be immediately communicated to the Engineer. All piping must pass pressure testing before proceeding with construction.
- H. All main drain niches over 8 inches shall be prefabricated stainless steel. All frames for main drain shall be white in color with white grading/cores.
- I. Cast iron fittings shall be baked epoxy lined and used only where called for in these specifications or on the pool plans. Steel or black iron shall not be used.
- J. Pool valves shall be installed as shown on the pool valve schedule on the pool plans and as specified. Pool Contractor shall install additional valves as required to meet the intent of the design.

3.5 AUTOMATIC CHEMICAL CONTROL

- A. The Pool Contractor shall furnish and install complete automatic chemical control systems consisting of control cabinets, sensors, and accessories to continuously monitor the free active chlorine sanitizer, PPM, O. R. P., temperatures, and pH levels in the water of the pool.
- B. The automatic chemical feed systems manufacturer shall guarantee in writing that the systems are installed and operating in accordance with written instructions given and accepted by the Owner and that all systems will perform in complete accordance with the specifications.
- C. The Pool Contractor shall furnish and install all chemical feed equipment according to the codes, regulations, and manufacturer's instructions governing the installation of this equipment and usage.
- D. The Pool Contractor shall utilize as required sodium bisulfate, bicarbonate of soda, muriatic acid, sodium hypochlorite, calcium chloride, and chlorine as specified. These chemicals shall be supplied by the Pool Contractor for use during start up in any additional chemicals

that may be required are to be provided. Purchase of the start up supply and one month supply of chemicals shall be by Pool Contractor and must be coordinated with the Owner.

3.6 POOL DECK ACCESSORIES

- A. The Pool Contractor shall assemble and install all the swimming pool deck equipment and accessories. All shall be installed and finished in accordance with the manufacturer's instructions, coordinated with other trades, and as shown on plans and specifications.
- B. Assemble and install all safety equipment and lifeguard chairs.
- C. The Pool Contractor shall install and verify function of all swimming pool safety and lifesaving equipment.

3.7 POOL FINISHES

- A. The swimming pools shall not be interior finished until all deck work, all mechanical installations, all general, electrical, and mechanical work on the project has been completed and the area around the pool has been swept and thoroughly cleaned. All pool lines and water service lines shall be flushed clean before any pool finishing is started. All pool chemicals and test equipment must be on hand for start up.
- B. Interior surfaces of the pools shall be thoroughly cleaned of dust, oil, paint, and other foreign materials before application of any surface coatings.
- C. The Pool Contractor shall apply Paint or Diamond Brite finish pool surfaces according to the manufacturer's recommendations. A manufacturer's representative must visit site prior to application and instruct Pool Contractor's personnel prior to work.
- D. Concrete walls and floors shall be at least 21 days old before finishing. Do not apply to damp surfaces. Protect from blowing debris. Any work with debris and final finish shall be refinished.
- E. Depth markers – The depth markers shall be provided and installed flush in the pool deck according to the plan and details shown on the drawings. Numerals shall be set in and grouted with pure white Portland cement. Wet cure all depth markers immediately after placement for a period of not less than five days.
- F. All pool perimeters shall have adjacent to the stainless steel gutter system, depth and safety markings. These tile depth markers shall be immediately after placement for a period of not less than five days. These tile depth markers shall be installed such that water will not pour. Poorly placed markers shall be removed and replaced. Tiles shall be set in a bed of pure white Portland cement grout. No lime or other additives will be approved.
- G. Pressure sensitive depth markers shall be installed on the vertical stainless steel face of the return line. Utilize heat applied depth markers of material designed for such service. These shall be placed to correlate with the deck depth markers.

3.8 POOL PIPING FINISHES

- A. The Pool Contractor is responsible to verify the current color code requirements and for the pool piping to have proper paint finishes on all materials and equipment. Pool Contractor shall properly repair any factory finishes which have been damaged.

3.9 POOL START UP PROCEDURE

- A. All pool equipment shall be checked to be sure it is properly connected and ready for start up, and the pool interior finish has been properly hydrated. Notify Engineer as soon as start up training can be started.

- B. Verify with all subcontractors involved with the start up procedure are available prior to scheduling start up.
- C. Verify that all pool systems have been thoroughly cleaned and are ready for start up.
- D. Begin filling of swimming pool using manual fill valve.
- E. Follow manufacturer's guidelines and recommendations in starting pool filter, recirculation, and heating systems. Follow manufacturer's guidelines and recommendations in start up of chemical and automatic control systems. The Pool Contractor shall determine when the pool equipment is functioning normally and the water is being automatically controlled and chemical operational balance is being achieved. Thereafter, notify appropriate contractors to start and calibrate heating systems. Notify the Engineer. Request all applicable regulatory inspections.
- F. After complete start up of all swimming pool systems, contact the Engineer to schedule training sessions of the Owner. The Pool Contractor shall conduct all training sessions and coordinate training personnel from various manufacturers participating in training sessions. It is the responsibility of a Pool Contractor to provide sufficient operation and maintenance training of the Owners personnel. Engineer may, at his sole discretion, require additional and/or more specific training if deemed necessary.

END OF SECTION

NOT FOR BIDDING PURPOSES

**SECTION 220523
GENERAL-DUTY VALVES FOR PLUMBING PIPING**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Ball valves.
- B. Butterfly valves.
- C. Check valves.
- D. Gate valves.
- E. Lubricated plug valves.

1.02 RELATED REQUIREMENTS

1.03 ABBREVIATIONS AND ACRONYMS

- A. CWP: Cold working pressure.
- B. EPDM: Ethylene propylene copolymer rubber.
- C. NBR: Acrylonitrile-butadiene, Buna-N, or nitrile rubber.
- D. NRS: Non-rising stem.
- E. OS&Y: Outside screw and yoke.
- F. PTFE: Polytetrafluoroethylene.
- G. RS: Rising stem.
- H. TFE: Tetrafluoroethylene.
- I. WOG: Water, oil, and gas.

1.04 REFERENCE STANDARDS

- A. ASME B1.20.1 - Pipe Threads, General Purpose, Inch.
- B. ASME B16.1 - Gray Iron Pipe Flanges and Flanged Fittings: Classes 25, 125, and 250.
- C. ASME B16.5 - Pipe Flanges and Flanged Fittings: NPS 1/2 through NPS 24 Metric/Inch Standard.
- D. ASME B16.18 - Cast Copper Alloy Solder Joint Pressure Fittings.
- E. ASTM A48/A48M - Standard Specification for Gray Iron Castings.
- F. ASTM A126 - Standard Specification for Gray Iron Castings for Valves, Flanges, and Pipe Fittings.
- G. ASTM A536 - Standard Specification for Ductile Iron Castings.
- H. ASTM B62 - Standard Specification for Composition Bronze or Ounce Metal Castings.
- I. AWWA C606 - Grooved and Shouldered Joints.
- J. MSS SP-67 - Butterfly Valves.
- K. MSS SP-70 - Gray Iron Gate Valves, Flanged and Threaded Ends.
- L. MSS SP-71 - Gray Iron Swing Check Valves, Flanged and Threaded Ends.
- M. MSS SP-72 - Ball Valves with Flanged or Butt-Welding Ends for General Service.
- N. MSS SP-78 - Gray Iron Plug Valves, Flanged and Threaded Ends.
- O. MSS SP-80 - Bronze Gate, Globe, Angle, and Check Valves.

- P. MSS SP-110 - Ball Valves Threaded, Socket-Welding, Solder Joint, Grooved and Flared Ends.
- Q. NSF 61 - Drinking Water System Components - Health Effects.
- R. NSF 372 - Drinking Water System Components - Lead Content.

1.05 SUBMITTALS

- A. See Section 013000 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide data on valves including manufacturers catalog information. Submit performance ratings, rough-in details, weights, support requirements, and piping connections.
- C. Warranty: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.
- D. Operation and Maintenance Data: Include manufacturer's descriptive literature, operating instructions, maintenance and repair data, and parts listings.
- E. Maintenance Materials: Furnish Owner with one wrench for every five plug valves, in each size of square plug valve head.
 - 1. See Section 016000 - Product Requirements for additional provisions.

1.06 QUALITY ASSURANCE

- A. Manufacturer:
 - 1. Obtain valves for each valve type from single manufacturer.
 - 2. Company must specialize in manufacturing products specified in this section, with not less than three years of documented experience.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Prepare valves for shipping as follows:
 - 1. Minimize exposure of operable surfaces by setting plug and ball valves to open position.
 - 2. Protect valve parts exposed to piped medium against rust and corrosion.
 - 3. Protect valve piping connections such as grooves, weld ends, threads, and flange faces.
 - 4. Adjust gate valves to the closed position to avoid clattering.
 - 5. Secure check valves in either the closed position or open position.
- B. Use the following precautions during storage:
 - 1. Maintain valve end protection and protect flanges and specialties from dirt.
 - a. Provide temporary inlet and outlet caps.
 - b. Maintain caps in place until installation.
 - 2. Store valves in shipping containers and maintain in place until installation.
 - a. Store valves indoors in dry environment.
 - b. Store valves off the ground in watertight enclosures when indoor storage is not an option.

1.08 EXERCISE THE FOLLOWING PRECAUTIONS FOR HANDLING:

- A. Avoid the use of operating handles or stems as rigging or lifting points.

PART 2 PRODUCTS

2.01 APPLICATIONS

- A. Listed pipe sizes shown using nominal pipe sizes (NPS) and nominal diameter (DN).
- B. Provide the following valves for the applications if not indicated on drawings:
 - 1. Shutoff: Ball, gate or plug.
 - 2. Throttling: Provide ball or butterfly.
 - 3. Swing Check (Pump Outlet):

- a. 2 inch (50 mm, DN) and Smaller: Bronze swing check valves with bronze or nonmetallic disc.
- C. Substitutions of valves with higher CWP classes or WSP ratings for same valve types are permitted when specified CWP ratings or WSP classes are not available.
- D. Required Valve End Connections for Non-Wafer Types:
 - 1. Steel Pipe:
 - a. 2 inch (50 mm, DN) and Smaller: Threaded ends.
 - 2. Copper Tube:
 - a. 2 inch (50 mm, DN) and Smaller: Threaded ends except where solder-joint valve-end option is indicated in valve schedules below.
- E. Domestic, Hot and Cold Water Valves:
 - 1. 2 inch (50 mm, DN) and Smaller:
 - a. Bronze and Brass: Provide with solder-joint ends.
 - b. Ball: One piece, full port, brass with brass trim.
 - c. Bronze Swing Check: Class 125, bronze disc.
 - d. Bronze Gate: Class 125, NRS.
 - 2. 2-1/2 inch (65 mm, DN) and Larger:
 - a. Iron, 2-1/2 inch (65 mm, DN) to 4 inch (100 mm, DN): Provide with threaded ends.
 - b. Iron Ball: Class 150.
 - c. Iron Single-Flange Butterfly: 200 CWP, EPDM seat, aluminum-bronze disc.
 - d. Iron Grooved-End Butterfly: 175 CWP.
 - e. Iron Swing Check: Class 125, metal seats.
 - f. Iron Gate: Class 125, NRS.
- F. Sanitary Waste Water Valves:
 - 1. 2 inch (50 mm, DN) and Smaller:
 - a. Bronze and Brass: Provide with solder-joint.
 - b. Ball: One piece, full port, brass with brass trim.
 - c. Bronze Swing Check: Class 125, bronze disc.
 - d. Bronze Gate: Class 125, NRS.
 - 2. 2-1/2 inch (65 mm, DN) and Larger:
 - a. Iron, 2-1/2 inch (65 mm, DN) to 4 inch (100 mm, DN): Provide with threaded ends.
 - b. Iron Ball: Class 150.
 - c. Iron Swing Check: Class 125, metal seats.
 - d. Iron Gate: Class 125, NRS.
 - e. Lubricated Plug: Class 125, regular gland.

2.02 GENERAL REQUIREMENTS

- A. Valve Pressure and Temperature Ratings: No less than rating indicated; as required for system pressures and temperatures.
- B. Valve Sizes: Match upstream piping unless otherwise indicated.
- C. Valve Actuator Types:
 - 1. Handwheel: Valves other than quarter-turn types.
 - 2. Hand Lever: Quarter-turn valves 6 inch (150 mm, DN) and smaller except plug valves.
 - 3. Wrench: Plug valves with square heads.
- D. Insulated Piping Valves: With 2 inch (50 mm, DN) stem extensions and the following features:
 - 1. Gate Valves: Rising stem.

2. Ball Valves: Extended operating handle of non-thermal-conductive material, and protective sleeve that allows operation of valve without breaking the vapor seal or disturbing insulation.
3. Butterfly Valves: Extended neck.
- E. Valve-End Connections:
 1. Threaded End Valves: ASME B1.20.1.
 2. Flanges on Iron Valves: ASME B16.1 for flanges on iron valves.
 3. Pipe Flanges and Flanged Fittings 1/2 inch (15 mm, DN) through 24 inch (600 mm, DN): ASME B16.5.
 4. Solder Joint Connections: ASME B16.18.
 5. Grooved End Connections: AWWA C606.
- F. General ASME Compliance:
- G. Potable Water Use:
 1. Certified: Approved for use in compliance with NSF 61 and NSF 372.
 2. Lead-Free Certified: Wetted surface material includes less than 0.25 percent lead content.

2.03 BRASS, BALL VALVES

- A. One Piece, Full Port with Brass Trim and Push-to-fit or Threaded Connections:
 1. Comply with MSS SP-110.
 2. CWP Rating: 200 psi (1379 kPa).
 3. Body: Forged brass.
 4. Seats: PTFE.
 5. Stem: Brass.
 6. Ball: Chrome-plated brass.
 7. Operator: Handle.
- B. Two Piece, Full Port with Brass Trim and Female Thread, Male thread, or Solder Connections:
 1. Comply with MSS SP-110.
 2. WSP Rating: 150 psi (1035 kPa).
 3. WOG Rating: 600 psi (4140 kPa).
 4. Body: Forged brass.
 5. Seats: PTFE.
 6. Ball: Chrome-plated brass.
 7. Operator: Lockable handle and memory stop.
- C. Two Piece, Full Port with Press Connections:
 1. WOG Rating: 250 psi (1724 kPa).
 2. Body: Forged brass.
 3. Seats: EPDM.
 4. Ball: Chrome-plated brass.
 5. Blow-out Proof Stem: Forged brass.
 6. Operator: Provide lockable handle.
 7. Maximum Service Temperature: 250 degrees F (121.1 degrees C).

2.04 IRON, BALL VALVES

- A. Class 125, Full Port, Stainless Steel Trim:
 1. Comply with MSS SP-72.
 2. CWP Rating: 200 psi (1380 kPa).
 3. Body: ASTM A536 Grade 65-45-12, ductile iron.

4. End Connections: Flanged.
5. Seats: PTFE.
6. Operator: Lever with locking handle.

2.05 IRON, SINGLE FLANGE BUTTERFLY VALVES

- A. Wafer Style:
 1. Class 125, or Class 150 flanges.
 2. Comply with MSS SP-67, Type I.
 3. Wafer Style, Service Pressure Ratings:
 - a. 150 psi (1034 kPa) for sizes 14 to 24 inch (350 to 600 mm, DN).
 4. Body Material: ASTM A126, cast iron or ASTM A536, ductile iron.
 5. Stem: One or two-piece stainless steel.
 6. Seat: EPDM.
 7. Disc: Aluminum-bronze.
 8. Finish: Epoxy coated.
 9. Operator: Gear operator with handwheel over direct-mount actuator base.

2.06 IRON, GROOVED-END BUTTERFLY VALVES

- A. CWP Rating: 175 psi (1200 kPa).
 1. Comply with MSS SP-67, Type I.
 2. Body: Coated ductile iron.
 3. Stem: Two-piece stainless steel.
 4. Disc: Coated ductile iron.
 5. Disc Seal: EPDM.

2.07 BRONZE, SWING CHECK VALVES

- A. General:
 1. Fabricate from dezincification resistant material.
 2. Copper alloys containing more than 15 percent zinc are not permitted.
- B. Class 125:
 1. Pressure and Temperature Rating: MSS SP-80, Type 3.
 2. Design: Y-pattern, horizontal or vertical flow.
 3. WOG Rating: 200 psi (1380 kPa).
 4. Body: Bronze, ASTM B62.
 5. End Connections: Threaded.
 6. Disc: Bronze.

2.08 IRON, HORIZONTAL SWING CHECK VALVES

- A. Class 125:
 1. Pressure and Temperature Rating: MSS SP-71, Type I.
 2. Design: T-body style for clear or full waterways.
 3. WOG Rating: 200 psi (1380 kPa).
 4. Body: ASTM A126, gray cast iron with bolted bonnet.
 5. End Connections: Flanged.
 6. Trim: Composition.
 7. Seat Ring and Disc Holder: Bronze.
 8. Disc: PTFE.
 9. Gasket: Asbestos free.

2.09 BRONZE, GATE VALVES

- A. General:
 - 1. Fabricate from dezincification resistant material.
 - 2. Copper alloys containing more than 15 percent zinc are not permitted.
- B. Rising Stem or OS&Y:
 - 1. Pressure-Temperature Range: MSS SP-80, Type I.
 - 2. Body: ASTM B62, bronze with integral seat and screw-in bonnet.
 - 3. End Connections: Threaded or solder.
 - 4. Stem: Bronze.
 - 5. Disc: Solid wedge; bronze.
 - 6. Packing: Asbestos free.
 - 7. Handwheel Operator: Malleable iron.
- C. Non-Rising Stem or NRS
 - 1. Pressure-Temperature Range: MSS SP-80, Type I.
 - 2. Class 125:
 - 3. Class 150: CWP Rating; 300 psi (2070 kPa).
 - 4. Body: ASTM B62, bronze with integral seat and screw-in bonnet.
 - 5. Ends Connections: Threaded or solder.
 - 6. Stem: Bronze.
 - 7. Disc: Solid wedge; bronze.
 - 8. Packing: Asbestos free.
 - 9. Handwheel Operator: Malleable iron.

2.10 IRON, GATE VALVES

- A. Bolted Bonnet: OS&Y; Rising Stem:
 - 1. Pressure and Temperature Rating: MSS SP-70, Type I.
 - 2. Class 125: WOG Rating; 200 psi (1380 kPa).
 - 3. Body: ASTM A126, gray iron with bolted bonnet.
 - 4. End Connections: Flanged.
 - 5. Trim: Bronze.
 - 6. Disc: Solid wedge.
 - 7. Packing and Gasket: Asbestos free.

2.11 LUBRICATED PLUG VALVES

- A. Regular Gland with Flanged Ends:
 - 1. Comply with MSS SP-78, Type II.
 - 2. Body: ASTM A48/A48M or ASTM A126, cast iron with lubrication sealing system.
 - 3. Pattern: Regular or short.
 - 4. Plug: Cast iron or bronze with sealant groove.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Discard all packing materials and verify that valve interior, including threads and flanges are completely clean without signs of damage or degradation that could result in leakage.
- B. Verify valve parts to be fully operational in all positions from closed to fully open.
- C. Confirm gasket material to be suitable for the service, to be of correct size, and without defects that could compromise effectiveness.

- D. Should valve is determined to be defective, replace with new valve.

3.02 INSTALLATION

- A. Provide unions or flanges with valves to facilitate equipment removal and maintenance while maintaining system operation and full accessibility for servicing.
- B. Provide separate valve support as required and locate valve with stem at or above center of piping, maintaining unimpeded stem movement.
- C. Install check valves where necessary to maintain direction of flow as follows:
 - 1. Lift Check: Install with stem plumb and vertical.
 - 2. Swing Check: Install horizontal maintaining hinge pin level.

END OF SECTION

NOT FOR BIDDING PURPOSES

SECTION 220529
HANGERS AND SUPPORTS FOR PLUMBING PIPING AND EQUIPMENT

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Strut systems for pipe or equipment support.
- B. Beam clamps.
- C. Pipe hangers.
- D. Pipe supports, guides, shields, and saddles.
- E. Anchors and fasteners.

1.02 RELATED REQUIREMENTS

- A. Section 033000 - Cast-in-Place Concrete: Concrete equipment pads
- B. Section 055000 - Metal Fabrications.

1.03 REFERENCE STANDARDS

- A. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
- B. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
- C. ASTM A181/A181M - Standard Specification for Carbon Steel Forgings, for General-Purpose Piping.
- D. ASTM A36/A36M - Standard Specification for Carbon Structural Steel.
- E. ASTM A47/A47M - Standard Specification for Ferritic Malleable Iron Castings.
- F. ASTM A283/A283M - Standard Specification for Low and Intermediate Tensile Strength Carbon Steel Plates.
- G. ASTM A395/A395M - Standard Specification for Ferritic Ductile Iron Pressure-Retaining Castings for Use at Elevated Temperatures.
- H. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
- I. ASTM A1011/A1011M - Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength.
- J. ASTM B633 - Standard Specification for Electrodeposited Coatings of Zinc on Iron and Steel.
- K. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
- L. ASTM E96/E96M - Standard Test Methods for Gravimetric Determination of Water Vapor Transmission Rate of Materials.
- M. FM (AG) - FM Approval Guide.
- N. MSS SP-58 - Pipe Hangers and Supports - Materials, Design, Manufacture, Selection, Application, and Installation.
- O. UL (DIR) - Online Certifications Directory.
- P. UL 723 - Standard for Test for Surface Burning Characteristics of Building Materials.

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
 - 1. Coordinate sizes and arrangement of supports and bases with the actual equipment and components to be installed.
 - 2. Coordinate the work with other trades to provide additional framing and materials required for installation.
 - 3. Coordinate compatibility of support and attachment components with mounting surfaces at the installed locations.
 - 4. Coordinate the arrangement of supports with ductwork, piping, equipment and other potential conflicts installed under other sections or by others.
 - 5. Notify Architect of any conflicts with or deviations from Contract Documents. Obtain direction before proceeding with work.
- B. Sequencing:
 - 1. Do not install products on or provide attachment to concrete surfaces until concrete has fully cured in accordance with Section 033000.

1.05 SUBMITTALS

- A. See Section 013000 - Administrative Requirements for submittal procedures.
- B. Shop Drawings: Include details for fabricated hangers and supports where materials or methods other than those indicated are proposed for substitution.
 - 1. Application of protective inserts, saddles, and shields at pipe hangers for each type of insulation and hanger.

1.06 QUALITY ASSURANCE

- A. Comply with applicable building codes.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Receive, inspect, handle, and store products in accordance with manufacturer's instructions.

PART 2 PRODUCTS

2.01 GENERAL REQUIREMENTS

- A. Provide required hardware to hang or support piping, equipment, or fixtures with related accessories as necessary to complete installation of plumbing work.
- B. Provide hardware products listed, classified, and labeled as suitable for intended purpose.
- C. Materials for Metal Fabricated Supports: Comply with Section 055000.
 - 1. Zinc-Plated Steel: Electroplated in accordance with ASTM B633 unless stated otherwise.
 - 2. Galvanized Steel: Hot-dip galvanized in accordance with ASTM A123/A123M or ASTM A153/A153M unless stated otherwise.
- D. Corrosion Resistance: Use corrosion-resistant metal-based materials fully compatible with exposed piping materials and suitable for the environment where installed.
 - 1. Outdoor, Damp, or Wet-Indoor Locations: Use galvanized steel, stainless steel, or approved equivalent unless otherwise indicated.

2.02 STRUT SYSTEMS FOR PIPE OR EQUIPMENT SUPPORT

- A. Strut Channels:
 - 1. ASTM A653/A653M galvanized steel bracket with clamps for surface mounting of piping or plumbing equipment support.

2. Channel or Bracket Kits: Include rods, brackets, end-fixed fittings, covers, clips, and other related hardware required to complete sectional trapeze section for piping or other support.
- B. Hanger Rods:
 1. Threaded zinc-plated steel unless otherwise indicated.
 2. Minimum Size, Unless Otherwise Indicated or Required:
 - a. Piping up to 1 inch (25 mm, DN): 1/4 inch (6 mm, DN) diameter.
 - b. Piping larger than 1 inch (25 mm, DN): 3/8 inch (10 mm, DN) diameter.
- C. Channel Nuts:
 1. Provide carbon steel channel nut with epoxy copper or zinc finish and long, regular, or short spring as indicated on drawings.
- D. Cable Hanging System Kits:
 1. Provide cable-wire in bulk or pre-cut lengths with respective cable hangers as required to hold minimum weight of 120 lb (54.4 kg).

2.03 BEAM CLAMPS

- A. MSS SP-58 types 19 through 23, 25 or 27 through 30 based on required load.
- B. Provide clamps with hardened steel cup-point set screws and lock-nuts for anchoring in place.
- C. Material: ASTM A395/A395M ductile iron, ASTM A36/A36M carbon steel, ASTM A47/A47M malleable iron, ASTM A181/A181M forged steel, or ASTM A283/A283M steel.

2.04 PIPE HANGERS

- A. Band Hangers, Adjustable:
 1. MSS SP-58 type 7 or 9, zinc-plated ASTM A1011/A1011M steel or ASTM A653/A653M carbon steel.
- B. J-Hangers, Adjustable:
 1. MSS SP-58 type 5, zinc-plated ASTM A1011/A1011M steel or ASTM A653/A653M carbon steel.
- C. Swivel Ring Hangers, Adjustable:
 1. MSS SP-58 type 10, epoxy-painted, zinc-colored.
 2. Material: ASTM A395/A395M ductile iron, ASTM A36/A36M carbon steel, ASTM A47/A47M malleable iron, ASTM A181/A181M forged steel, or ASTM A283/A283M steel.
 3. FM (AG) and UL (DIR) listed for specific pipe size runs and loads.
- D. Clevis Hangers, Adjustable:
 1. Copper Tube: MSS SP-58 type 1, epoxy-plated copper.
 2. Light-Duty: MSS SP-58 type 1, zinc-colored, epoxy plated.
 3. Standard-Duty: MSS SP-58 type 1, zinc-colored, epoxy plated.
 4. UL (DIR) listed: Pipe sizes 2-1/2 to 8 inch (65 to 200 mm, DN).
- E. Nonmetallic Pipe Hangers:
 1. CPVC fabricated, snap-action hanger for pendant or sidewall applications.

2.05 PIPE CLAMPS

- A. Riser Clamps:
 1. For insulated pipe runs, provide two bolt-type clamps designed for installation under insulation.

2. MSS SP-58 type 1 or 8, carbon steel or steel with epoxy plated, plain, stainless steel, or zinc plated finish.
3. UL (DIR) listed: Pipe sizes 1/2 to 8 inch (15 to 200 mm, DN).
- B. Extension Split Pipe Clamp:
 1. MSS SP-58 type 12, hinged split ring and yoke roller hanger with epoxy copper or plain finish.
 2. Material: ASTM A47/A47M malleable iron or ASTM A36/A36M carbon steel.
 3. Provide hanger rod and nuts of the same type and material for a given pipe run.
 4. Provide coated or plated hangers to isolate steel hangers from dissimilar metal tube or pipe.
- C. Strut Clamps:
 1. Pipe Clamp: Two-piece rigid, universal, or outer diameter type, carbon steel with epoxy copper or zinc finish.

2.06 PIPE SUPPORTS, GUIDES, SHIELDS, AND SADDLES

- A. Dielectric Barriers: Provide between metallic supports and metallic piping and associated items of dissimilar type; acceptable dielectric barriers include rubber or plastic sheets or coatings attached securely to pipe or item.
- B. Stanchions:
 1. Material: Malleable iron, ASTM A47/A47M, or carbon steel, ASTM A36/A36M.
 2. Provide coated or plated saddles to isolate steel hangers from dissimilar metal tube or pipe.
- C. U-Bolts:
 1. MSS SP-58 type 24, carbon steel U-bolt for pipe support or anchoring.
- D. Intermediate Anchors and Pipe Alignment Guides:
 1. Pipe Sizes 6 inch (150 mm, DN) and Smaller: Minimum clearance of 0.16 inch (4 mm).
 2. Pipe Size 8 inch (200 mm, DN): 0.625 inch (16 mm) U-bolt with double nuts providing minimum clearance of 0.28 inch (7 mm).
 3. Pipe Size 10 inch (250 mm, DN): 0.75 inch (19 mm) U-bolt.
 4. Pipe Sizes 12 to 16 inch (300 to 400 mm, DN): 0.875 inch (24 mm) U-bolt.
 5. Pipe Sizes 18 to 30 inches (450 to 750 mm, DN): 1 inch (25 mm) U-bolt.
 6. Use pipe clamps with oversize pipe sleeve that provides clearance around pipe.
- E. Pipe Alignment Guides:
 1. Pipe Sizes 8 inch (200 mm, DN) and Smaller: Spider or sleeve type.
 2. Pipe Sizes 10 inch (250 mm, DN) and Larger: Roller type.
- F. Pipe Shields for Insulated Piping:
 1. MSS SP-58 type 40, ASTM A1011/A1011M steel or ASTM A653/A653M carbon steel.
 2. General Construction and Requirements:
 - a. Surface Burning Characteristics: Comply with ASTM E84 or UL 723.
 - b. Shields Material: UV-resistant polypropylene with glass fill.
 - c. Maximum Insulated Pipe Outer Diameter: 12-5/8 inch (321 mm).
 - d. Service Temperature: Minus 40 to 178 degrees F (Minus 40 to 81 degrees C).
 - e. Pipe shields to be provided at hanger, support, and guide locations on pipe requiring insulation or additional support.
- G. Pipe Supports:

1. Material: ASTM A395/A395M ductile iron, ASTM A36/A36M carbon steel, ASTM A47/A47M malleable iron, ASTM A181/A181M forged steel, or ASTM A283/A283M steel.
2. Liquid Temperatures Up to 122 degrees F (50 degrees C):
 - a. Overhead Support: MSS SP-58 types 1, 3 through 12 clamps.
 - b. Support From Below: MSS SP-58 types 35 through 38.
- H. Pipe Supports, Thermal Insulated:
 1. General Requirements:
 - a. Insulated pipe supports to be provided at hanger, support, and guide locations on pipe requiring insulation or additional support.
 - b. Surface Burning Characteristics: Flame spread index/smoke developed index of 5/30, maximum, when tested in accordance with ASTM E84 or UL 23.
 - c. Provide pipe supports for 1/2 to 30 inch (15 to 750 mm, DN) iron pipes.
 - d. Insulation inserts to consist of rigid phenolic foam insulation surrounded by 360 degree, PVC jacketing.
 2. PVC Jacket:
 - a. Pipe insulation protection shields to be provided with ball bearing hinge and locking seam.
 - b. Moisture Vapor Transmission: 0.0071 perm inch (0.0092 ng/Pa s m), when tested in accordance with ASTM E96/E96M.
 - c. Minimum Thickness: 60 mil, 0.06 inch (1.524 mm).

2.07 ANCHORS AND FASTENERS

- A. Unless otherwise indicated and where not otherwise restricted, use the anchor and fastener types indicated for the specified applications.
- B. Concrete: Use preset concrete inserts, expansion anchors, or screw anchors.
- C. Solid or Grout-Filled Masonry: Use expansion anchors or screw anchors.
- D. Wood: Use wood screws.
- E. Plastic and lead anchors are not permitted.
- F. Preset Concrete Inserts, Continuous metal strut channel and spot inserts specifically designed to be cast in concrete ceilings, walls, and floors.
 1. Channel Material: Use galvanized steel.
 2. Manufacturer: Same as manufacturer of metal strut channel framing system.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that field measurements are as indicated.
- B. Verify that mounting surfaces are ready to receive support and attachment components.
- C. Verify that conditions are satisfactory for installation prior to starting work.

3.02 INSTALLATION

- A. Install products in accordance with manufacturer's instructions.
- B. Provide independent support from building structure. Do not provide support from piping, ductwork, conduit, or other systems.
- C. Unless specifically indicated or approved by Architect, do not provide support from suspended ceiling support system or ceiling grid.
- D. Unless specifically indicated or approved by Architect, do not provide support from roof deck.

- E. Do not penetrate or otherwise notch or cut structural members without approval of Structural Engineer.
- F. Provide thermal insulated pipe supports complete with hangers and accessories. Install thermal insulated pipe supports during the installation of the piping system.
- G. Equipment Support and Attachment:
 - 1. Use metal fabricated supports or supports assembled from metal channel (strut) to support equipment as required.
 - 2. Use metal channel (strut) secured to studs to support equipment surface-mounted on hollow stud walls when wall strength is not sufficient to resist pull-out.
 - 3. Use metal channel (strut) to support surface-mounted equipment in wet or damp locations to provide space between equipment and mounting surface.
 - 4. Securely fasten floor-mounted equipment. Do not install equipment such that it relies on its own weight for support.
- H. Preset Concrete Inserts: Use manufacturer-provided closure strips to inhibit concrete seepage during concrete pour.
- I. Secure fasteners according to manufacturer's recommended torque settings.
- J. Remove temporary supports.

END OF SECTION

NOT FOR BIDDING PURPOSES

SECTION 220553
IDENTIFICATION FOR PLUMBING PIPING AND EQUIPMENT

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Nameplates.
- B. Tags.
- C. Stencils.
- D. Pipe markers.

1.02 RELATED REQUIREMENTS

- A. Section 099123 - Interior Painting: Identification painting.

1.03 REFERENCE STANDARDS

- A. ASME A13.1 - Scheme for the Identification of Piping Systems.
- B. ASTM D709 - Standard Specification for Laminated Thermosetting Materials.

1.04 SUBMITTALS

- A. See Section 013000 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide manufacturers catalog literature for each product required.
- C. Manufacturer's Installation Instructions: Indicate special procedures, and installation.

PART 2 PRODUCTS

2.01 PLUMBING COMPONENT IDENTIFICATION GUIDELINE

- A. Nameplates:
 - 1. Heat exchangers, water heaters, and other heat transfer products.
 - 2. Control panels, transducers, and other related control equipment products.
 - 3. Pumps, tanks, filters, water treatment devices, and other plumbing equipment products.
- B. Tags:
 - 1. Piping: 3/4 inch (20 mm) diameter and smaller.
 - 2. Instrumentation, relays, gauges, and other related control equipment products.
- C. Stencil:
 - 1. Piping: 3/4 inch (20 mm) diameter and higher.
 - 2. Heat exchangers, water heaters, and other heat transfer products.
 - 3. Pumps, tanks, filters, water treatment devices, and other fluid managing products.
- D. Pipe Markers: 3/4 inch (20 mm) diameter and higher.

2.02 NAMEPLATES

- A. Description: Laminated piece with up to three lines of text.
 - 1. Letter Color: White.
 - 2. Letter Height: 1/4 inch (6 mm).
 - 3. Background Color: Black.
 - 4. Nameplate Height: 3/4 inch (19 mm).
 - 5. Nameplate Material:
 - a. Flexible: Vinyl with adhesive backing per ASTM D709.
 - b. Metal: Brass with center-side holes for screw fastening.

2.03 TAGS

- A. Flexible: Vinyl with engraved black letters on light contrasting background color with up to three lines of text. Minimum tag size 1-1/2 inch (40 mm) in diameter.
- B. Metal: Brass, 19 gauge 1-1/2 inch (40 mm) in diameter with smooth edges, blank, smooth edges, and corrosion-resistant ball chain. Up to three lines of text.
- C. Piping: 3/4 inch (20 mm) diameter and smaller. Include corrosion resistant chain. Identify service, flow direction, and pressure.

2.04 STENCILS

- A. Pipe: Stencil size required per external insulated or uninsulated pipe diameter.
 - 1. 3/4 to 1-1/4 inch (20 to 30 mm) Range: 1/2 inch (15 mm) text over 9 inch (200 mm) long background.
 - 2. 1-1/2 to 2 inch (40 to 50 mm) Range: 3/4 inch (20 mm) text over 8 inch (200 mm) long background.
 - 3. 2-1/2 to 6 inch (65 to 150 mm) Range: 1-1/4 inch (30 mm) text over 12 inch (300 mm) long background.
- B. Equipment: Use 2-1/2 inch (65 mm) text using Owner defined scheme.
- C. Background Paint: Semi-gloss enamel in compliance with Section 099123.
- D. Stencil Paint: As specified in Section 099123, semi-gloss enamel, colors complying with ASME A13.1.
- E. Fluid Service Identification Scheme, ASME A13.1:
 - 1. Combustible Fluids: White text on brown background.
 - 2. Flammable and Oxidizing Fluids: Black text on yellow background.
 - 3. Toxic and Corrosive Fluids: Black text on orange background.
 - 4. Water; Potable, Cooling, Boiler Feed and Other: White text on green background.

2.05 PIPE MARKERS

- A. Comply with ASME A13.1.
- B. Flexible Marker: Factory fabricated, semi-rigid, preformed to fit around pipe or pipe covering; minimum information indicating flow direction arrow and identification of fluid conveyed.
- C. Flexible Tape Marker: Flexible, vinyl film tape with pressure-sensitive adhesive backing and printed markings.
- D. Identification Scheme, ASME A13.1:
 - 1. Primary: External Pipe Diameter, Uninsulated or Insulated.
 - a. 3/4 to 1-1/4 inches (19 to 32 mm): Use 8 inch (203 mm) field-length with 1/2 inch (13 mm) text height.
 - b. 1-1/2 to 2 inches (38 to 51 mm): Use 8 inch (203 mm) field-length with 3/4 inch (19 mm) text height.
 - c. 2-1/2 to 6 inches (64 to 152 mm): Use 12 inch (305 mm) field-length with 1-1/4 inch (32 mm) text height.
 - 2. Secondary: Color scheme per fluid service.
 - a. Water; Potable, Cooling, Boiler Feed, and Other: White text on green background.
 - 3. Tertiary: Other Details.
 - a. Directional flow arrow.

PART 3 EXECUTION

3.01 PREPARATION

- A. Degrease and clean surfaces to receive identification products.
- B. Prepare surfaces for stencil painting, see Section 099123.

3.02 INSTALLATION

- A. Install flexible nameplates with corrosive-resistant mechanical fasteners, or adhesive. Apply with sufficient adhesive to ensure permanent adhesion and seal with clear lacquer.
- B. Install tags in clear view and align with axis of piping
- C. Apply stencil painted identification in compliance with Section 099123 requirements. Identify unit with assigned id-number and area being served using pipe marking rules.
- D. Install plastic pipe markers in accordance with manufacturer's instructions.
- E. Apply ASME A13.1 Pipe Marking Rules:
 - 1. Place pipe marker adjacent to changes in direction.
 - 2. Place pipe marker adjacent each valve port and flange end.
 - 3. Place pipe marker at both sides of floor and wall penetrations.
 - 4. Place pipe marker every 25 to 50 feet (7.6 to 15.2 m) interval of straight run.

END OF SECTION

NOT FOR BIDDING PURPOSES

**SECTION 221005
PLUMBING PIPING**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Sanitary waste piping, buried within 5 feet (1500 mm) of building.
- B. Sanitary waste piping, above grade.
- C. Chemical-resistant sanitary waste piping.
- D. Domestic water piping, buried within 5 feet (1500 mm) of building.
- E. Domestic water piping, above grade.
- F. Pipe flanges, unions, and couplings.
- G. Pipe sleeve-seal systems.

1.02 RELATED REQUIREMENTS

1.03 REFERENCE STANDARDS

- A. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
- B. NSF 61 - Drinking Water System Components - Health Effects.
- C. NSF 372 - Drinking Water System Components - Lead Content.
- D. UL 723 - Standard for Test for Surface Burning Characteristics of Building Materials.

1.04 SUBMITTALS

- A. See Section 013000 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide data on pipe materials, pipe fittings, valves, and accessories. Provide manufacturers catalog information. Indicate valve data and ratings.

1.05 QUALITY ASSURANCE

- A. Perform work in accordance with applicable codes.
- B. Valves: Manufacturer's name and pressure rating marked on valve body.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Accept valves on site in shipping containers with labeling in place. Inspect for damage.
- B. Provide temporary protective coating on cast iron and steel valves.
- C. Provide temporary end caps and closures on piping and fittings. Maintain in place until installation.
- D. Protect piping systems from entry of foreign materials by temporary covers, completing sections of the work, and isolating parts of completed system.

1.07 FIELD CONDITIONS

- A. Do not install underground piping when bedding is wet or frozen.

PART 2 PRODUCTS

2.01 GENERAL REQUIREMENTS

- A. Potable Water Supply Systems: Provide piping, pipe fittings, and solder and flux (if used), that comply with NSF 61 and NSF 372 for maximum lead content; label pipe and fittings.
- B. Plenum-Installed Acid Waste Piping: Flame-spread index equal or below 25 and smoke-spread index equal or below 50 according to ASTM E84 or UL 723 tests.

2.02 SANITARY WASTE PIPING, BURIED WITHIN 5 FEET (1500 MM) OF BUILDING
END OF SECTION

NOT FOR BIDDING PURPOSES

**SECTION 221006
PLUMBING PIPING SPECIALTIES**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Drains.
- B. Cleanouts.
- C. Floor drain trap seals.

1.02 RELATED REQUIREMENTS

1.03 REFERENCE STANDARDS

- A. NSF 61 - Drinking Water System Components - Health Effects.
- B. NSF 372 - Drinking Water System Components - Lead Content

1.04 SUBMITTALS

- A. See Section 013000 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide component sizes, rough-in requirements, service sizes, and finishes.

1.05 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with not less than three years documented experience.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Accept specialties on site in original factory packaging. Inspect for damage.

PART 2 PRODUCTS

2.01 GENERAL REQUIREMENTS

- A. Specialties in Potable Water Supply Systems: Provide products that comply with NSF 61 and NSF 372 for maximum lead content.

2.02 DRAINS

- A. Manufacturers:
 - 1. Josam Company; _____: www.josam.com/#sle.
 - 2. MIFAB, Inc; _____: www.mifab.com/#sle.
 - 3. Zurn Industries, LLC; _____: www.zurn.com/#sle.
- B. Floor Drains:(See Drawings)
 - 1. Manufacturers:
 - a. Jay R. Smith Manufacturing Company; _____: www.jrsmith.com/#sle.
 - b. MIFAB, Inc; FS1100-C Series: www.mifab.com/#sle.

2.03 CLEANOUTS

- A. Manufacturers:
 - 1. Josam Company; _____: www.josam.com/#sle.
 - 2. MIFAB, Inc; C1100-R: www.mifab.com/#sle.
 - 3. Zurn Industries, LLC; _____: www.zurn.com/#sle.
- B. Cleanouts at Interior Finished Floor Areas (CO-3):
 - 1. Lacquered cast iron body with anchor flange, reversible clamping collar, threaded top assembly, and round gasketed scored cover in service areas and round gasketed depressed cover to accept floor finish in finished floor areas.

- C. Cleanouts at Interior Finished Wall Areas (CO-4):
 - 1. Line type with lacquered cast iron body and round epoxy coated gasketed cover, and round stainless steel access cover secured with machine screw.

2.04 FLOOR DRAIN TRAP SEALS

- A. Manufacturers:
 - 1. Green Drains; GD4: www.greendrains.com/#sle.
 - 2. MIFAB, Inc; MI-GARD: www.mifab.com/#sle.
- B. Description: Push-fit EPDM or silicone fitting with a one-way membrane.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Extend cleanouts to finished floor or wall surface. Lubricate threaded cleanout plugs with mixture of graphite and linseed oil. Ensure clearance at cleanout for rodding of drainage system.
- C. Install floor cleanouts at elevation to accommodate finished floor.

END OF SECTION

NOT FOR BIDDING PURPOSES

**SECTION 221429
SUMP PUMPS**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Submersible sump pumps. (See Pool Vendor Drawings)
- B. Sump basins and pits. (See Pool Vendor Drawings)

PART 2 PRODUCTS

END OF SECTION

NOT FOR BIDDING PURPOSES

**SECTION 224500
EMERGENCY PLUMBING FIXTURES**

PART 2 PRODUCTS

1.01 EMERGENCY-FIXTURE WATER-TEMPERING VALVES

- A. Valve Assembly: Thermostatic mixing (blending) type made of lead-free cast brass body with integral built-in cold water bypass (fail safe), color marked dual-scale outlet temperature gauge, integral inlet check valve, integral inlet strainer, locking-type regulator, and mounting bracket.

END OF SECTION

NOT FOR BIDDING PURPOSES

**SECTION 230513
COMMON MOTOR REQUIREMENTS FOR HVAC EQUIPMENT**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. General construction and requirements.
- B. Applications.
- C. Single phase electric motors.

1.02 RELATED REQUIREMENTS

- A. Section 260583 - Wiring Connections: Electrical characteristics and wiring connections.
- B. Section 262913 - Enclosed Controllers.

1.03 REFERENCE STANDARDS

- A. NEMA MG 1 - Motors and Generators.
- B. NFPA 70 - National Electrical Code.

1.04 SUBMITTALS

- A. See Section 013000 - Administrative Requirements for submittal procedures.
- B. Manufacturer's Installation Instructions: Indicate setting, mechanical connections, lubrication, and wiring instructions.
- C. Operation Data: Include instructions for safe operating procedures.
- D. Maintenance Data: Include assembly drawings, bearing data including replacement sizes, and lubrication instructions.

1.05 QUALITY ASSURANCE

- A. Comply with NFPA 70.
- B. Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories Inc. as suitable for the purpose specified and indicated.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Protect motors stored on site from weather and moisture by maintaining factory covers and suitable weather-proof covering. For extended outdoor storage, remove motors from equipment and store separately.

PART 2 PRODUCTS

2.01 MANUFACTURERS

2.02 GENERAL CONSTRUCTION AND REQUIREMENTS

- A. Electrical Service: Refer to Section 260583 for required electrical characteristics.
- B. Electrical Service:
 - 1. Motors 1/2 HP and Smaller: 115 volts, single phase, 60 Hz.
- C. Construction:
 - 1. Open drip-proof type except where specifically noted otherwise.
 - 2. Design for continuous operation in 104 degrees F (40 degrees C) environment.
 - 3. Design for temperature rise in accordance with NEMA MG 1 limits for insulation class, service factor, and motor enclosure type.

- D. Explosion-Proof Motors: UL approved and labelled for hazard classification, with over temperature protection.
- E. Visible Nameplate: Indicating motor horsepower, voltage, phase, cycles, RPM, full load amps, locked rotor amps, frame size, manufacturer's name and model number, service factor, power factor, efficiency.
- F. Wiring Terminations:
 - 1. Provide terminal lugs to match branch circuit conductor quantities, sizes, and materials indicated. Enclose terminal lugs in terminal box sized to NFPA 70, threaded for conduit.
 - 2. For fractional horsepower motors where connection is made directly, provide threaded conduit connection in end frame.

2.03 APPLICATIONS

- A. Single phase motors for shaft mounted fans or blowers: Permanent split capacitor type.
- B. Single phase motors for fans, pumps, blowers, and air compressors: Capacitor start type.
- C. Single phase motors for fans, blowers, and pumps: Capacitor start, capacitor run type.
- D. Motors located in exterior locations, wet air streams downstream of sprayed coil dehumidifiers, draw through cooling towers, air cooled condensers, humidifiers, direct drive axial fans, roll filters, explosion proof environments, and dust collection systems: Totally enclosed type.

2.04 SINGLE PHASE POWER - PERMANENT-SPLIT CAPACITOR MOTORS

- A. Starting Torque: Exceeding one fourth of full load torque.
- B. Starting Current: Up to six times full load current.
- C. Multiple Speed: Through tapped windings.
- D. Open Drip-proof or Enclosed Air Over Enclosure: Class A (50 degrees C temperature rise) insulation, minimum 1.0 Service Factor, prelubricated sleeve or ball bearings, automatic reset overload protector.

2.05 SINGLE PHASE POWER - CAPACITOR START MOTORS

- A. Starting Torque: Three times full load torque.
- B. Starting Current: Less than five times full load current.
- C. Pull-up Torque: Up to 350 percent of full load torque.
- D. Breakdown Torque: Approximately 250 percent of full load torque.
- E. Motors: Capacitor in series with starting winding; provide capacitor-start/capacitor-run motors with two capacitors in parallel with run capacitor remaining in circuit at operating speeds.
- F. Drip-proof Enclosure: Class A (50 degrees C temperature rise) insulation, NEMA Service Factor, prelubricated sleeve bearings.
- G. Enclosed Motors: Class A (50 degrees C temperature rise) insulation, 1.0 Service Factor, prelubricated ball bearings.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Install securely on firm foundation. Mount ball bearing motors with shaft in any position.
- C. Check line voltage and phase and ensure agreement with nameplate.

3.02 SCHEDULE

A. NEMA Open Motor Service Factors.

1. 1/6-1/3 hp:
 - a. 3600 rpm: 1.35.
 - b. 1800 rpm: 1.35.
 - c. 1200 rpm: 1.35.
 - d. 900 rpm: 1.35.
2. 1/2 hp:
 - a. 3600 rpm: 1.25.
 - b. 1800 rpm: 1.25.
 - c. 1200 rpm: 1.25.
 - d. 900 rpm: 1.15.
3. 3/4 hp:
 - a. 3600 rpm: 1.25.
 - b. 1800 rpm: 1.25.
 - c. 1200 rpm: 1.15.
 - d. 900 rpm: 1.15.
4. 1 hp:
 - a. 3600 rpm: 1.25.
 - b. 1800 rpm: 1.15.
 - c. 1200 rpm: 1.15.
 - d. 900 rpm: 1.15.
5. 1.5-150 hp:
 - a. 3600 rpm: 1.15.
 - b. 1800 rpm: 1.15.
 - c. 1200 rpm: 1.15.
 - d. 900 rpm: 1.15.

END OF SECTION

NOT FOR BIDDING PURPOSES

**SECTION 230553
IDENTIFICATION FOR HVAC PIPING AND EQUIPMENT**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Nameplates.
- B. Tags.
- C. Adhesive-backed duct markers.
- D. Stencils.

1.02 RELATED REQUIREMENTS

- A. Section 099123 - Interior Painting: Identification painting.

1.03 REFERENCE STANDARDS

- A. ASME A13.1 - Scheme for the Identification of Piping Systems.
- B. ASTM D709 - Standard Specification for Laminated Thermosetting Materials.

1.04 SUBMITTALS

- A. See Section 013000 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide manufacturers catalog literature for each product required.
- C. Manufacturer's Installation Instructions: Indicate special procedures, and installation.

PART 2 PRODUCTS

2.01 IDENTIFICATION APPLICATIONS

- A. Control Panels: Nameplates.
- B. Ductwork: Nameplates.
- C. Small-sized Equipment: Tags.
- D. Tanks: Nameplates.
- E. Thermostats: Nameplates.

2.02 NAMEPLATES

- A. Manufacturers:
 - 1. Advanced Graphic Engraving, LLC; _____: www.advancedgraphicengraving.com/#sle.
 - 2. Brimar Industries, Inc; _____: www.pipemarker.com/#sle.
 - 3. Seton Identification Products, a Tricor Direct Company; _____: www.seton.com/#sle.
- B. Letter Color: White.
- C. Letter Height: 1/4 inch (6 mm).
- D. Background Color: Black.
- E. Plastic: Comply with ASTM D709.

2.03 TAGS

- A. Manufacturers:
 - 1. Advanced Graphic Engraving; _____: www.advancedgraphicengraving.com/#sle.
 - 2. Brimar Industries, Inc; _____: www.pipemarker.com/#sle.
 - 3. Seton Identification Products, a Tricor Company; _____: www.seton.com/#sle.

- B. Plastic Tags: Laminated three-layer plastic with engraved black letters on light contrasting background color. Tag size minimum 1-1/2 inch (40 mm) diameter.

2.04 ADHESIVE-BACKED DUCT MARKERS

- A. Manufacturers:
 - 1. Brimar Industries, Inc; _____: www.pipemarker.com/#sle.
 - 2. Craftmark Pipe Markers; _____: www.craftmarkid.com/#sle.
- B. Material: High gloss acrylic adhesive-backed vinyl film 0.0032 inch (0.76 mm); printed with UV and chemical resistant inks.
- C. Style: Individual Label.
- D. Color: Yellow/Black.

2.05 STENCILS

- A. Manufacturers:
 - 1. Craftmark Pipe Markers; _____: www.craftmarkid.com/#sle.
 - 2. Seton Identification Products, a Tricor Company; _____: www.seton.com/#sle.
- B. Stencils: With clean cut symbols and letters of following size:
 - 1. Ductwork and Equipment: 2-1/2 inch (65 mm) high letters.
- C. Stencil Paint: As specified in Section 099123, semi-gloss enamel, colors complying with ASME A13.1.

PART 3 EXECUTION

3.01 PREPARATION

- A. Degrease and clean surfaces to remove adhesive for identification materials.
- B. Prepare surfaces in accordance with Section 099123 for stencil painting.

3.02 INSTALLATION

- A. Install nameplates with corrosion-resistant mechanical fasteners, or adhesive. Apply with sufficient adhesive to ensure permanent adhesion and seal with clear lacquer.
- B. Install tags with corrosion resistant chain.
- C. Apply stencil painting in accordance with Section 099123.
- D. Install ductwork with plastic nameplates. Identify with air handling unit identification number and area served. Locate identification at air handling unit, at each side of penetration of structure or enclosure, and at each obstruction.

END OF SECTION

**SECTION 230593
TESTING, ADJUSTING, AND BALANCING FOR HVAC**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Testing, adjustment, and balancing of air systems.
- B. Measurement of final operating condition of HVAC systems.

1.02 RELATED REQUIREMENTS

- A. Section 012100 - Allowances: Inspection and testing allowances.
- B. Section 014000 - Quality Requirements: Employment of testing agency and payment for services.
- C. Section 019113 - General Commissioning Requirements: Commissioning requirements that apply to all types of work.
- D. Section 230800 - Commissioning of HVAC.

1.03 PRICE AND PAYMENT PROCEDURES

- A. Cash Allowance: See Section 012100 for additional requirements.
- B. Allowance includes testing, adjusting, and balancing of mechanical systems.

1.04 REFERENCE STANDARDS

- A. AABC (NSTSB) - AABC National Standards for Total System Balance, 7th Edition.
- B. ASHRAE Std 111 - Measurement, Testing, Adjusting, and Balancing of Building HVAC Systems.
- C. SMACNA (TAB) - HVAC Systems Testing, Adjusting and Balancing.

1.05 SUBMITTALS

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. TAB Plan: Submit a written plan indicating the testing, adjusting, and balancing standard to be followed and the specific approach for each system and component.
 - 1. Submit to Architect.
 - 2. Submit six weeks prior to starting the testing, adjusting, and balancing work.
 - 3. Include at least the following in the plan:
 - a. List of all air flow, water flow, sound level, system capacity and efficiency measurements to be performed and a description of specific test procedures, parameters, formulas to be used.
 - b. Copy of field checkout sheets and logs to be used, listing each piece of equipment to be tested, adjusted and balanced with the data cells to be gathered for each.
 - c. Discussion of what notations and markings will be made on the duct and piping drawings during the process.
 - d. Final test report forms to be used.
 - e. Detailed step-by-step procedures for TAB work for each system and issue, including:
 - 1) Terminal flow calibration (for each terminal type).
 - 2) Diffuser proportioning.
 - 3) Branch/submain proportioning.
 - 4) Total flow calculations.
 - 5) Rechecking.
 - 6) Diversity issues.

-
- f. Details of how TOTAL flow will be determined; for example:
 - 1) Air: Sum of terminal flows via control system calibrated readings or via hood readings of all terminals, supply (SA) and return air (RA) pitot traverse, SA or RA flow stations.
 - 2) Water: Pump curves, circuit setter, flow station, ultrasonic, etc.
 - g. Specific procedures that will ensure that both air and water side are operating at the lowest possible pressures and methods to verify this.
 - h. Confirmation of understanding of the outside air ventilation criteria under all conditions.
 - i. Procedures for formal deficiency reports, including scope, frequency and distribution.
- C. Control System Coordination Reports: Communicate in writing to the controls installer all setpoint and parameter changes made or problems and discrepancies identified during TAB that affect, or could affect, the control system setup and operation
- D. Final Report: Indicate deficiencies in systems that would prevent proper testing, adjusting, and balancing of systems and equipment to achieve specified performance.
- 1. Revise TAB plan to reflect actual procedures and submit as part of final report.
 - 2. Submit draft copies of report for review prior to final acceptance of Project. Provide final copies for Architect and for inclusion in operating and maintenance manuals.
 - 3. Provide reports in soft cover, letter size, 3-ring binder manuals, complete with index page and indexing tabs, with cover identification at front and side. Include set of reduced drawings with air outlets and equipment identified to correspond with data sheets, and indicating thermostat locations.
 - 4. Include actual instrument list, with manufacturer name, serial number, and date of calibration.
 - 5. Form of Test Reports: Where the TAB standard being followed recommends a report format use that; otherwise, follow ASHRAE Std 111.
 - 6. Units of Measure: Report data in I-P (inch-pound) units only.
 - 7. Include the following on the title page of each report:
 - a. Name of Testing, Adjusting, and Balancing Agency.
 - b. Address of Testing, Adjusting, and Balancing Agency.
 - c. Telephone number of Testing, Adjusting, and Balancing Agency.
 - d. Project name.
 - e. Project location.
 - f. Project Architect.
 - g. Project Engineer.
 - h. Project Contractor.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 GENERAL REQUIREMENTS

- A. Perform total system balance in accordance with one of the following:
 - 1. AABC (NSTSB), AABC National Standards for Total System Balance.
 - 2. ASHRAE Std 111, Practices for Measurement, Testing, Adjusting and Balancing of Building Heating, Ventilation, Air-Conditioning, and Refrigeration Systems.
 - 3. SMACNA (TAB).
- B. Begin work after completion of systems to be tested, adjusted, or balanced and complete work prior to Substantial Completion of the project.
- C. TAB Agency Qualifications:

1. Company specializing in the testing, adjusting, and balancing of systems specified in this section.
2. Having minimum of three years documented experience.
3. Certified by one of the following:
 - a. AABC, Associated Air Balance Council: www.aabc.com/#sle; upon completion submit AABC National Performance Guaranty.
 - b. TABB, The Testing, Adjusting, and Balancing Bureau of National Energy Management Institute: www.tabbcertified.org/#sle.

D. TAB Supervisor and Technician Qualifications: Certified by same organization as TAB agency.

3.02 EXAMINATION

- A. Verify that systems are complete and operable before commencing work. Ensure the following conditions:
 1. Systems are started and operating in a safe and normal condition.
 2. Temperature control systems are installed complete and operable.
 3. Proper thermal overload protection is in place for electrical equipment.
 4. Duct systems are clean of debris.
 5. Fans are rotating correctly.
 6. Air outlets are installed and connected.
 7. Duct system leakage is minimized.
- B. Submit field reports. Report defects and deficiencies that will or could prevent proper system balance.
- C. Beginning of work means acceptance of existing conditions.

3.03 PREPARATION

- A. Hold a pre-balancing meeting at least one week prior to starting TAB work.
- B. Provide instruments required for testing, adjusting, and balancing operations. Make instruments available to Architect to facilitate spot checks during testing.
- C. Provide additional balancing devices as required.

3.04 ADJUSTMENT TOLERANCES

- A. Air Handling Systems: Adjust to within plus or minus 5 percent of design for supply systems and plus or minus 10 percent of design for return and exhaust systems.
- B. Air Outlets and Inlets: Adjust total to within plus 10 percent and minus 5 percent of design to space. Adjust outlets and inlets in space to within plus or minus 10 percent of design.

3.05 RECORDING AND ADJUSTING

- A. Ensure recorded data represents actual measured or observed conditions.
- B. Permanently mark settings of valves, dampers, and other adjustment devices allowing settings to be restored. Set and lock memory stops.
- C. Mark on drawings the locations where traverse and other critical measurements were taken and cross reference the location in the final report.
- D. After adjustment, take measurements to verify balance has not been disrupted or that such disruption has been rectified.
- E. Leave systems in proper working order, replacing belt guards, closing access doors, closing doors to electrical switch boxes, and restoring thermostats to specified settings.

3.06 AIR SYSTEM PROCEDURE

- A. Adjust air handling and distribution systems to provide required or design supply, return, and exhaust air quantities at site altitude.
- B. Make air quantity measurements in ducts by Pitot tube traverse of entire cross sectional area of duct.
- C. Measure air quantities at air inlets and outlets.
- D. Use volume control devices to regulate air quantities only to extend that adjustments do not create objectionable air motion or sound levels. Effect volume control by duct internal devices such as dampers and splitters.
- E. Vary total system air quantities by adjustment of fan speeds. Provide drive changes required. Vary branch air quantities by damper regulation.
- F. Adjust outside air automatic dampers, outside air, return air, and exhaust dampers for design conditions.

3.07 SCOPE

- A. Test, adjust, and balance the following:
 - 1. Fans.
 - 2. Air Filters.
 - 3. Air Inlets and Outlets.

END OF SECTION

**SECTION 230800
COMMISSIONING OF HVAC**

PART 1 GENERAL

1.01 SUMMARY

- A. See Section 019113 - General Commissioning Requirements for overall objectives; comply with the requirements of Section 019113.
- B. This section covers the Contractor's responsibilities for commissioning; each subcontractor or installer responsible for the installation of a particular system or equipment item to be commissioned is responsible for the commissioning activities relating to that system or equipment item.
- C. The Commissioning Authority (CA) directs and coordinates all commissioning activities and provides Prefunctional Checklists and Functional Test Procedures for Contractor's use.
- D. The entire HVAC system is to be commissioned, including commissioning activities for the following specific items:
 - 1. Control system.
 - 2. Major and minor equipment items.
 - 3. Ductwork and accessories.
 - 4. Other equipment and systems explicitly identified elsewhere in Contract Documents as requiring commissioning.
- E. The Prefunctional Checklist and Functional Test requirements specified in this section are in addition to, not a substitute for, inspection or testing specified in other sections.

1.02 RELATED REQUIREMENTS

1.03 SUBMITTALS

- A. Updated Submittals: Keep the Commissioning Authority informed of all changes to control system documentation made during programming and setup; revise and resubmit when substantial changes are made.
- B. Startup Reports, Prefunctional Checklists, and Trend Logs: Submit for approval of Commissioning Authority.
- C. HVAC Control System O&M Manual Requirements. In addition to documentation specified elsewhere, compile and organize at minimum the following data on the control system:
 - 1. Specific step-by-step instructions on how to perform and apply all functions, features, modes, etc. mentioned in the controls training sections of this specification and other features of this system. Provide an index and clear table of contents. Include the detailed technical manual for programming and customizing control loops and algorithms.
 - 2. Full as-built set of control drawings.
 - 3. Full as-built sequence of operations for each piece of equipment.
 - 4. Full points list; in addition to the information on the original points list submittal, include a listing of all rooms with the following information for each room:
 - a. Floor.
 - b. Room number.
 - c. Room name.
 - d. Air handler unit ID.
 - e. Reference drawing number.
 - f. Air terminal unit tag ID.
 - g. Heating and/or cooling valve tag ID.
 - h. Minimum air flow rate.

- i. Maximum air flow rate.
5. Full print out of all schedules and set points after testing and acceptance of the system.
6. Full as-built print out of software program.
7. Electronic copy on disk of the entire program for this facility.
8. Marking of all system sensors and thermostats on the as-built floor plan and HVAC drawings with their control system designations.
9. Maintenance instructions, including sensor calibration requirements and methods by sensor type, etc.
10. Control equipment component submittals, parts lists, etc.
11. Warranty requirements.
12. Copies of all checkout tests and calibrations performed by the Contractor (not commissioning tests).
13. Organize and subdivide the manual with permanently labeled tabs for each of the following data in the given order:
 - a. Sequences of operation.
 - b. Control drawings.
 - c. Points lists.
 - d. Controller and/or module data.
 - e. Thermostats and timers.
 - f. Sensors and DP switches.
 - g. Valves and valve actuators.
 - h. Dampers and damper actuators.
 - i. Program setups (software program printouts).
- D. Project Record Documents: See Section 017800 for additional requirements.
 1. Submit updated version of control system documentation, for inclusion with operation and maintenance data.
 2. Show actual locations of all static and differential pressure sensors (air, water and building pressure) and air-flow stations on project record drawings.
- E. Draft Training Plan: In addition to requirements specified in Section 017900, include:
 1. Follow the recommendations of ASHRAE Guideline 1.1.
 2. Control system manufacturer's recommended training.
 3. Demonstration and instruction on function and overrides of any local packaged controls not controlled by the HVAC control system.
- F. Training Manuals: See Section 017900 for additional requirements.
 1. Provide three extra copies of the controls training manuals in a separate manual from the O&M manuals.

PART 2 PRODUCTS

2.01 TEST EQUIPMENT

- A. Provide all standard testing equipment required to perform startup and initial checkout and required functional performance testing; unless otherwise noted such testing equipment will NOT become the property of Owner.
- B. Equipment-Specific Tools: Where special testing equipment, tools and instruments are specific to a piece of equipment, are only available from the vendor, and are required in order to accomplish startup or Functional Testing, provide such equipment, tools, and instruments as part of the work at no extra cost to Owner; such equipment, tools, and instruments are to become the property of Owner.

PART 3 EXECUTION

3.01 PREPARATION

- A. Cooperate with the Commissioning Authority in development of the Prefunctional Checklists and Functional Test Procedures.
- B. Furnish additional information requested by the Commissioning Authority.
- C. Prepare a preliminary schedule for HVAC pipe and duct system testing, flushing and cleaning, equipment start-up and testing, adjusting, and balancing start and completion for use by the Commissioning Authority; update the schedule as appropriate.
- D. Notify the Commissioning Authority when pipe and duct system testing, flushing, cleaning, startup of each piece of equipment and testing, adjusting, and balancing will occur; when commissioning activities not yet performed or not yet scheduled will delay construction notify ahead of time and be proactive in seeing that the Commissioning Authority has the scheduling information needed to efficiently execute the commissioning process.
- E. Put all HVAC equipment and systems into operation and continue operation during each working day of testing, adjusting, and balancing and commissioning, as required.
- F. Provide test holes in ducts and plenums where directed to allow air measurements and air balancing; close with an approved plug.
- G. Provide temperature and pressure taps in accordance with Contract Documents.

3.02 INSPECTING AND TESTING - GENERAL

- A. Submit startup plans, startup reports, and Prefunctional Checklists for each item of equipment or other assembly to be commissioned.
- B. Perform the Functional Tests directed by the Commissioning Authority for each item of equipment or other assembly to be commissioned.
- C. Provide two-way radios for use during the testing.
- D. Valve/Damper Stroke Setup and Check:
 - 1. For all valve/damper actuator positions checked, verify the actual position against the control system readout.
 - 2. Set pump/fan to normal operating mode.
 - 3. Command valve/damper closed; visually verify that valve/damper is closed and adjust output zero signal as required.
 - 4. Command valve/damper open; verify position is full open and adjust output signal as required.
 - 5. Command valve/damper to a few intermediate positions.
 - 6. If actual valve/damper position does not reasonably correspond, replace actuator or add pilot positioner (for pneumatics).
- E. Isolation Valve or System Valve Leak Check: For valves not by coils.
 - 1. With full pressure in the system, command valve closed.
 - 2. Use an ultra-sonic flow meter to detect flow or leakage.
- F. Deficiencies: Correct deficiencies and re-inspect or re-test, as applicable, at no extra cost to Owner.

3.03 TAB COORDINATION

- A. TAB: Testing, adjusting, and balancing of HVAC.
- B. Coordinate commissioning schedule with TAB schedule.

- C. Review the TAB plan to determine the capabilities of the control system toward completing TAB.
- D. Provide all necessary unique instruments and instruct the TAB technicians in their use; such as handheld control system interface for setting terminal unit boxes, etc.
- E. Have all required Prefunctional Checklists, calibrations, startup and component Functional Tests of the system completed and approved by the Commissioning Authority prior to starting TAB.
- F. Provide a qualified control system technician to operate the controls to assist the TAB technicians or provide sufficient training for the TAB technicians to operate the system without assistance.

3.04 CONTROL SYSTEM FUNCTIONAL TESTING

- A. Prefunctional Checklists for control system components will require a signed and dated certification that all system programming is complete as required to accomplish the requirements of Contract Documents and the detailed Sequences of Operation documentation submittal.
- B. Do not start Functional Testing until all controlled components have themselves been successfully Functionally Tested in accordance with Contract Documents.
- C. Using a skilled technician who is familiar with this building, execute the Functional Testing of the control system as required by the Commissioning Authority.
- D. Functional Testing of the control system constitutes demonstration and trend logging of control points monitored by the control system.
 - 1. The scope of trend logging is partially specified; trend log up to 50 percent more points than specified at no extra cost to Owner.
 - 2. Perform all trend logging specified in Prefunctional Checklists and Functional Test procedures.
- E. Functionally Test integral or stand-alone controls in conjunction with the Functional Tests of the equipment they are attached to, including any interlocks with other equipment or systems; further testing during control system Functional Test is not required unless specifically indicated below.
- F. Demonstrate the following to the Commissioning Authority during testing of controlled equipment; coordinate with commissioning of equipment.
 - 1. Setpoint changing features and functions.
 - 2. Sensor calibrations.
- G. Demonstrate to the Commissioning Authority:
 - 1. That all specified functions and features are set up, debugged and fully operable.
 - 2. That scheduling features are fully functional and setup, including holidays.
 - 3. That all graphic screens and value readouts are completed.
 - 4. Correct date and time setting in central computer.
 - 5. That field panels read the same time as the central computer; sample 10 percent of field panels; if any of those fail, sample another 10 percent; if any of those fail test all remaining units at no extra cost to Owner.
 - 6. Functionality of field panels using local operator keypads and local ports (plug-ins) using portable computer/keypad; demonstrate 100 percent of panels and 10 percent of ports; if any ports fail, sample another 10 percent; if any of those fail, test all remaining units at no extra cost to Owner.
 - 7. Power failure and battery backup and power-up restart functions.

8. Global commands features.
 9. Security and access codes.
 10. Occupant over-rides (manual, telephone, key, keypad, etc.).
 11. O&M schedules and alarms.
 12. Occupancy sensors and controls.
 13. All control strategies and sequences not tested during controlled equipment testing.
- H. If the control system, integral control components, or related equipment do not respond to changing conditions and parameters appropriately as expected, as specified and according to acceptable operating practice, under any of the conditions, sequences, or modes tested, correct all systems, equipment, components, and software required at no additional cost to Owner.

3.05 OPERATION AND MAINTENANCE MANUALS

- A. See Section 017800 for additional requirements.
- B. Add design intent documentation furnished by Architect to manuals prior to submission to Owner.
- C. Submit manuals related to items that were commissioned to Commissioning Authority for review; make changes recommended by Commissioning Authority.
- D. Commissioning Authority will add commissioning records to manuals after submission to Owner.

3.06 DEMONSTRATION AND TRAINING

- A. See Section 017900 for additional requirements.
- B. Demonstrate operation and maintenance of HVAC system to Owner' personnel; if during any demonstration, the system fails to perform in accordance with the information included in the O&M manual, stop demonstration, repair or adjust, and repeat demonstration. Demonstrations may be combined with training sessions if appropriate.
- C. These demonstrations are in addition to, and not a substitute for, Prefunctional Checklists and demonstrations to the Commissioning Authority during Functional Testing.
- D. Provide classroom and hands-on training of Owner's designated personnel on operation and maintenance of the HVAC system, control system, and all equipment items indicated to be commissioned. Provide the following minimum durations of training:
- E. TAB Review: Instruct Owner's personnel for minimum ____ hours, after completion of TAB, on the following:
 1. Review final TAB report, explaining the layout and meanings of each data type.
 2. Discuss any outstanding deficient items in control, ducting or design that may affect the proper delivery of air or water.
 3. Identify and discuss any terminal units, duct runs, diffusers, coils, fans and pumps that are close to or are not meeting their design capacity.
 4. Discuss any temporary settings and steps to finalize them for any areas that are not finished.
 5. Other salient information that may be useful for facility operations, relative to TAB.
- F. HVAC Control System Training: Perform training in at least three phases:
 1. Phase 1 - Basic Control System: Provide minimum of ____ hours of actual training on the control system itself. Upon completion of training, each attendee, using appropriate documentation, should be able to perform elementary operations and describe general hardware architecture and functionality of the system.
 - a. This training may be held on-site or at the manufacturer's facility.

- b. If held off-site, the training may occur prior to final completion of the system installation.
 - c. For off-site training, Contractor shall pay expenses of up to two attendees.
- 2. Phase 2 - Integrating with HVAC Systems: Provide minimum of ____ hours of on-site, hands-on training after completion of Functional Testing. Include instruction on:
 - a. The specific hardware configuration of installed systems in this facility and specific instruction for operating the installed system, including interfaces with other systems, if any.
 - b. Security levels, alarms, system start-up, shut-down, power outage and restart routines, changing setpoints and alarms and other typical changed parameters, overrides, freeze protection, manual operation of equipment, optional control strategies that can be considered, energy savings strategies and set points that if changed will adversely affect energy consumption, energy accounting, procedures for obtaining vendor assistance, etc.
 - c. Trend logging and monitoring features (values, change of state, totalization, etc.), including setting up, executing, downloading, viewing both tabular and graphically and printing trends; provide practice in setting up trend logging and monitoring during training session.
 - d. Every display screen, allowing time for questions.
 - e. Point database entry and modifications.
- 3. Phase 3 - Post-Occupancy: Six months after occupancy conduct minimum of ____ hours of training. Tailor training session to questions and topics solicited beforehand from Owner. Also be prepared to address topics brought up and answer questions concerning operation of the system.
- G. Provide the services of manufacturer representatives to assist instructors where necessary.
- H. Provide the services of the HVAC controls instructor at other training sessions, when requested, to discuss the interaction of the controls system as it relates to the equipment being discussed.

END OF SECTION

**SECTION 230913
INSTRUMENTATION AND CONTROL DEVICES FOR HVAC**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Control panels.
- B. Dampers.
- C. Damper Operators:
 - 1. Electric operators.
 - 2. Inlet vane operators.
- D. Wall-, Surface-, and Duct-Mounted Sensors:
 - 1. Temperature sensors.
 - 2. IAQ (indoor air quality) sensors.
- E. Thermostats:
 - 1. Electric thermostats.
 - 2. Room-mount thermostat accessories.

1.02 RELATED REQUIREMENTS

- A. Section 253513 - Integrated Automation Actuators and Operators.
- B. Section 260583 - Wiring Connections: Electrical characteristics and wiring connections.
- C. Section 262726 - Wiring Devices: Elevation of exposed components.

1.03 REFERENCE STANDARDS

- A. ASHRAE Std 135 - A Data Communication Protocol for Building Automation and Control Networks.
- B. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum).
- C. NEMA DC 3 - Residential Controls - Electrical Wall-Mounted Room Thermostats.

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Preinstallation Meeting: Conduct a preinstallation meeting one week before starting work of this section; require attendance by all affected installers.

1.05 SUBMITTALS

- A. See Section 013000 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide description and engineering data for each control system component. Include sizing as requested. Provide data for each system component and software module.

1.06 QUALITY ASSURANCE

- A. Designer Qualifications: Design system under direct supervision of a Professional Engineer experienced in design of this work and licensed in the State in which the Project is located.
- B. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum three years documented experience.
- C. Installer Qualifications: Company specializing in performing the work of this section with minimum _____ years experience approved by manufacturer.

1.07 WARRANTY

- A. See Section 017800 - Closeout Submittals for additional warranty requirements.

PART 2 PRODUCTS

2.01 EQUIPMENT - GENERAL

- A. Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories Inc., as suitable for the purpose specified and indicated.

2.02 CONTROL PANELS

- A. Unitized cabinet type for each system under automatic control with relays and controls mounted in cabinet and temperature indicators, pressure gauges, pilot lights, push buttons and switches flush on cabinet panel face.
- B. NEMA 250, general purpose utility enclosures with enameled finished face panel.

2.03 DAMPERS

- A. See Section 233300 for dampers and this section for actuators and operators.

2.04 DAMPER OPERATORS

- A. General:
 - 1. Provide actuators with torque capacity sized for minimum of 20 percent greater than maximum design stream velocity and hold tight seal against maximum system pressures.
 - 2. Provide spring return for two position control and for fail safe operation.
 - 3. Provide sufficient number of operators to achieve unrestricted movement throughout damper range.
 - 4. Provide one operator for maximum 36 sq ft (3.34 sq m) damper section.
 - 5. See Section 253513 for field-mount damper actuators and operators.
- B. Electric Operators:
 - 1. Manufacturers:
 - a. Honeywell International, Inc; _____: buildingcontrols.honeywell.com/#sle.
 - b. Johnson Controls International, PLC; _____: www.johnsoncontrols.com/#sle.
 - 2. Spring return, adjustable stroke motor having oil immersed gear train, with auxiliary end switch.
- C. Inlet Vane Operators:
 - 1. High pressure with pilot positioners and sufficient force to move vanes when fan is started with vanes in closed position. Return vane operator to closed position on fan shutdown.

2.05 WALL-, SURFACE-, AND DUCT-MOUNT SENSORS

- A. Temperature Sensors:
 - 1. Manufacturers:
 - a. Dwyer Instruments Inc; _____: www.dwyer-inst.com/#sle.
 - b. Johnson Controls International, PLC; _____: www.johnsoncontrols.com/#sle.
 - 2. Use thermistor or RTD type temperature sensing elements with characteristics resistant to moisture, vibration, and other conditions consistent with the application without affecting accuracy and life expectancy.
 - 3. Construct RTD of nickel or platinum with base resistance of 1000 ohms at 70 degrees F (26 degrees C).
 - 4. 100 ohm platinum RTD is acceptable if used with project DDC controllers.
 - 5. Temperature Sensing Device: Compatible with project DDC controllers.
 - 6. Performance Characteristics:
 - a. Wire Resistance:

- 1) Use appropriate wire size to limit temperature offset due to wire resistance to 1.0 degree F (0.56 degrees C) or use temperature transmitter when offset is greater than 1.0 degree F (0.56 degrees C) due to wire resistance.
 - 2) Compensate for wire resistance in software input definition when feature is available in the DDC controller.
 - b. Room Sensors: Locking cover matching the pneumatic thermostats used.
 - c. Outside Air Sensors: Watertight inlet fitting shielded from direct rays of the sun.
 - d. Room Temperature Sensors:
 - 1) Construct for surface or wall box mounting.
- B. IAQ (Indoor Air Quality) Sensors:
1. Manufacturers:
 - a. Automated Logic, a company of Carrier Global Corporation, _____: www.automatedlogic.com/#sle.
 - b. Honeywell International, Inc; _____: buildingcontrols.honeywell.com/#sle.
 2. Form Factor: Surface mounted, desk mounted, or single gang electrical-box-mounted module made of high-impact plastic or other resilient material.
 3. Temperature Sensor:
 - a. Solid-state, integrated circuit type, 32 to 122 deg F (0 to 50 deg C) range.
 - b. Accuracy: Plus/minus two percent within 0.1 deg resolution.
 4. CO2 (Carbon Dioxide) Monitoring Sensor:
 - a. Non-dispersive infrared (NDIR) type, 0 to 100 %RH range.
 - b. Accuracy: Plus/minus 30 ppm within three percent of measured value.
 5. VOC (Volatile Organic Compounds) Monitoring Sensor:
 - a. Solid state type, 0 to 1,000 ppm (parts per billion) scaled from 0 to 100% range.
 - b. Accuracy: Plus/minus 15 percent of measured value.
 6. BAS, SCADA, or other Integrated Automation Link: ASHRAE Std 135 BACnet MS/TP.

2.06 THERMOSTATS

- A. Electric Thermostats:
1. Manufacturers:
 - a. Honeywell International, Inc; _____: buildingcontrols.honeywell.com/#sle.
 - b. Johnson Controls International, PLC; _____: www.johnsoncontrols.com/#sle.
 2. Type: NEMA DC 3, 24 volts, with setback/setup temperature control.
 3. Service: Cooling only.
 4. Covers: Locking with set point adjustment, with thermometer.
- B. Room-Mounted Thermostat Accessories:
1. Thermostat Covers: Brushed aluminum.
 2. Insulating Bases: For thermostats located on exterior walls.
 3. Thermostat Guards: Metal mounted on separate base.
 4. Adjusting Key: As required for device.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify existing conditions before starting work.
- B. Verify that systems are ready to receive work.
- C. Sequence work to ensure installation of components is complementary to installation of similar components in other systems.

- D. Coordinate installation of system components with installation of mechanical systems equipment such as air handling units and air terminal units.

3.02 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Check and verify location of thermostats with plans and room details before installation. Locate 60 inches (1500 mm) above floor. Align with lighting switches and humidistats; see Section 262726.
- C. Provide conduit and electrical wiring in accordance with Section 260583. Electrical material and installation shall be in accordance with appropriate requirements of Division 26.

3.03 MAINTENANCE

- A. Provide service and maintenance of control system for one year from Date of Substantial Completion.
- B. Provide complete service of controls systems, including call backs, and submit written report of each service call.
- C. In addition to normal service calls, make minimum of _____ complete normal inspections of approximately _____ hours duration to inspect, calibrate, and adjust controls.

END OF SECTION

NOT FOR BIDDING PURPOSES

**SECTION 233100
HVAC DUCTS AND CASINGS**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Metal ducts.
- B. Ducts for laboratory and industrial-grade applications.

1.02 RELATED REQUIREMENTS

- A. Section 230130.51 - HVAC Air-Distribution System Cleaning: Post install duct cleaning.
- B. Section 233319 - Duct Silencers.

1.03 REFERENCE STANDARDS

- A. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
- B. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar.
- C. ASTM B209/B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
- D. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
- E. NFPA 90A - Standard for the Installation of Air-Conditioning and Ventilating Systems.
- F. SMACNA (DCS) - HVAC Duct Construction Standards Metal and Flexible.
- G. SMACNA (LEAK) - HVAC Air Duct Leakage Test Manual.

1.04 SUBMITTALS

- A. See Section 013000 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide data for duct materials.
- C. Shop Drawings: Indicate duct fitting types, gauges, sizes, welds, and configuration.
- D. Test Reports: Indicate pressure tests performed. Include date, section tested, test pressure, and leakage rate per appropriate seal class, following SMACNA (LEAK).

1.05 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum three years of documented experience, and approved by manufacturer.
- B. Installer Qualifications: Company specializing in performing the type of work specified in this section, with minimum three years of documented experience.

1.06 FIELD CONDITIONS

- A. Do not install duct sealants when temperatures are less than those recommended by sealant manufacturers.
- B. Maintain temperatures within acceptable range during and after installation of duct sealants.

1.07 WARRANTY

- A. See Section 017800 - Closeout Submittals for additional warranty requirements.

PART 2 PRODUCTS

2.01 GENERAL REQUIREMENTS

- A. Provide UL Class 1 ductwork, fittings, hangers, supports, and appurtenances in accordance with NFPA 90A and SMACNA (DCS) guidelines unless stated otherwise.
- B. Provide metal duct unless otherwise indicated.
- C.
- D. Duct Shape and Material in accordance with Allowed Static Pressure Range:
 - 1. Rectangular: Plus or minus 1/2 in-wc (125 Pa) of galvanized steel.
- E. Duct Sealing and Leakage in accordance with Static Pressure Class:
 - 1. Duct Pressure Class and Material for Common Mechanical Ventilation Applications:
 - a. Supply Air: 1/2 in-wc (125 Pa) pressure class, galvanized steel.
 - b. Return and Relief Air: 1/2 in-wc (125 Pa) pressure class, galvanized steel.
 - c. General Exhaust Air: 1/2 in-wc (125 Pa) pressure class, galvanized steel.
 - 2. Low Pressure Service: From 2 in-wc (500 Pa) to 3 in-wc (750 Pa):
 - a. Seal: Class B, apply sealing of transverse joints and longitudinal seams.
 - b. Leakage:
 - 1) Rectangular: Class 12 or 12 cfm/100 sq ft (340 Lpm/9.3 sq m).
 - 2) Round: Class 6 or 6 cfm/100 sq ft (170 Lpm/9.3 sq m).
- F. Duct Fabrication Requirements:
 - 1. Duct and Fitting Fabrication and Support: SMACNA (DCS) including specifics for continuously welded round and oval duct fittings.
 - 2. Use reinforced and sealed sheet-metal materials at recommended gauges for indicated operating pressures or pressure class.
 - 3. Construct tees, bends, and elbows with radius of not less than 1-1/2 times width of duct on centerline. Where not possible and where rectangular elbows must be used, provide airfoil turning vanes of perforated metal with glass fiber insulation.
 - 4. Provide turning vanes of perforated metal with glass fiber insulation when acoustical lining is indicated.
 - 5. Increase duct sizes gradually, not exceeding 15 degrees divergence wherever possible; maximum 30 degrees divergence upstream of equipment and 45 degrees convergence downstream.
 - 6. Provide turning vanes of perforated metal with glass fiber insulation when an acoustical lining is required.
 - 7. Where ducts are connected to exterior wall louvers and duct outlet is smaller than louver frame, provide blank-out panels sealing louver area around duct. Use same material as duct, painted black on exterior side; seal to louver frame and duct.

2.02 METAL DUCTS

- A. Material Requirements:
 - 1. Galvanized Steel: Hot-dipped galvanized steel sheet, ASTM A653/A653M FS Type B, with G60/Z180 coating.
 - 2. Aluminum: ASTM B209/B209M, aluminum sheet, alloy 3003-H14.
 - 3. Stainless Steel: ASTM A666, Type 304.
- B. Metal Duct Coating Requirements:
 - 1. Specialty Coatings for Metal Ducts: Factory- or field-applied in accordance with manufacturer's instructions.
 - a. Application: _____.

2. PVC Coating for Steel Duct: 4 mils (0.1 mm) polyvinyl chloride plastic on both sides.
- C. Rectangular Metal Duct:
 1. Rectangular Double Wall Insulated: Rectangular spiral lock seam duct with galvanized steel outer wall, perforated galvanized steel inner wall; fitting with the solid inner wall.
 - a. Insulation:
 - 1) Thickness: 1 inch (25 mm).
 - 2) Material: Air.
- D. Round Metal Ducts:
 1. Round Single Wall Duct: Round lock seam duct with galvanized steel outer wall.
 2. Round Connection System: Interlocking duct connection system in accordance with SMACNA (DCS).
- E. Connectors, Fittings, Sealants, and Miscellaneous:
 1. Fittings: Manufacture with solid inner wall of perforated galvanized steel.
 2. Joint Sealers and Sealants: Non-hardening, water resistant, mildew and mold resistant.
 - a. Type: Heavy mastic or liquid used alone or with tape, suitable for joint configuration and compatible with substrates, and recommended by manufacturer for pressure class of ducts.
 - b. Surface Burning Characteristics: Flame spread index of zero and smoke developed index of zero, when tested in accordance with ASTM E84.

2.03 DUCTS FOR LABORATORY AND INDUSTRIAL-GRADE APPLICATIONS

- A. Duct Class:
 1. Class 5: Corrosive fumes in light concentrations at a minimum conveying velocity of 1,000 to 2,000 fpm (5 to 10 m/s).
- B. Sectional Shape and Material Requirements:

PART 3 EXECUTION

3.01 INSTALLATION

- A. Install, support, and seal ducts in accordance with SMACNA (DCS).
- B. Duct sizes indicated are precise inside dimensions. For lined ducts, maintain sizes inside lining.
- C. Locate ducts with sufficient space around equipment to allow normal operating and maintenance activities.

3.02 CLEANING

- A. Clean thoroughly each duct system. See Section 230130.51.

END OF SECTION

**SECTION 233300
AIR DUCT ACCESSORIES**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Air turning devices/extractors.
- B. Backdraft dampers - metal.
- C. Backdraft dampers - fabric.
- D. Duct access doors.
- E. Duct test holes.
- F. Flexible duct connectors.
- G. Volume control dampers.

1.02 RELATED REQUIREMENTS

- A. Section 233100 - HVAC Ducts and Casings.

1.03 REFERENCE STANDARDS

- A. NFPA 90A - Standard for the Installation of Air-Conditioning and Ventilating Systems.
- B. SMACNA (DCS) - HVAC Duct Construction Standards Metal and Flexible.

1.04 SUBMITTALS

- A. See Section 013000 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide for shop-fabricated assemblies including volume control dampers, duct access doors, duct test holes, and hardware used. Include electrical characteristics and connection requirements.

1.05 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum three years of documented experience.
- B. Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories Inc. as suitable for the purpose specified and indicated.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Protect dampers from damage to operating linkages and blades.

PART 2 PRODUCTS

2.01 AIR TURNING DEVICES/EXTRACTORS

- A. Manufacturers:
 - 1. Elgen Manufacturing Company, Inc; _____: www.elgenmfg.com/#sle.
 - 2. Krueger-HVAC, Division of Air System Components; _____: www.krueger-hvac.com/#sle.
 - 3. Ruskin Company; _____: www.ruskin.com/#sle.
 - 4. Titus HVAC, a brand of Johnson Controls; _____: www.titus-hvac.com/#sle.
- B. Multi-blade device with blades aligned in short dimension; steel construction; with individually adjustable blades, mounting straps.

2.02 BACKDRAFT DAMPERS - METAL

- A. Manufacturers:

1. Louvers & Dampers, Inc, a brand of Mestek, Inc; _____: www.louvers-dampers.com/#sle.
 2. Nailor Industries, Inc; _____: www.nailor.com/#sle.
 3. Pottorff; _____: www.pottorff.com/#sle.
 4. Ruskin Company; _____: www.ruskin.com/#sle.
 5. United Enertech; _____: www.unitedenertech.com/#sle.
- B. Gravity Backdraft Dampers, Size 18 by 18 inches (450 by 450 mm) or Smaller, Furnished with Air Moving Equipment: Air moving equipment manufacturer's standard construction.

2.03 BACKDRAFT DAMPERS - FABRIC

- A. Fabric Backdraft Dampers: Factory-fabricated.
1. Blades: Neoprene coated fabric material.
 2. Birdscreen: 1/2 inch (12 mm) nominal mesh of galvanized steel or aluminum.
 3. Maximum Velocity: 1000 fpm (5 mps) face velocity.

2.04 DUCT ACCESS DOORS

- A. Manufacturers:
1. Elgen Manufacturing Company, Inc; _____: www.elgenmfg.com/#sle.
 2. Lloyd Industries, Inc; _____: www.firedamper.com/#sle.
 3. Nailor Industries, Inc; _____: www.nailor.com/#sle.
 4. Ruskin Company; _____: www.ruskin.com/#sle.
- B. Fabrication: Rigid and close fitting of galvanized steel with sealing gaskets and quick-fastening locking devices. For insulated ducts, install minimum 1-inch (25 mm) thick insulation with sheet metal cover.
1. Less Than 12 inches (300 mm) Square: Secure with sash locks.
 2. Up to 18 inches (450 mm) Square: Provide two hinges and two sash locks.

2.05 DUCT TEST HOLES

- A. Temporary Test Holes: Cut or drill in ducts as required. Cap with neat patches, neoprene plugs, threaded plugs or threaded or twist-on metal caps.

2.06 FLEXIBLE DUCT CONNECTORS

- A. Manufacturers:
1. Ductmate Industries, Inc, a DMI Company; _____: www.ductmate.com/#sle.
 2. Elgen Manufacturing Company, Inc; _____: www.elgenmfg.com/#sle.
- B. Fabricate in accordance with SMACNA (DCS) and as indicated.
- C. Flexible Duct Connections: Fabric crimped into metal edging strip.
1. Fabric: UL listed fire-retardant neoprene coated woven glass fiber fabric to NFPA 90A, minimum density 30 oz/sq yd (1.0 kg/sq m).
 - a. Net Fabric Width: Approximately 2 inches (50 mm) wide.
 2. Metal: 3 inches (75 mm) wide, 24 gauge, 0.0239 inch (0.61 mm) thick galvanized steel.
- D. Leaded Vinyl Sheet: Minimum 0.55 inch (14 mm) thick, 0.87 lbs per sq ft (4.2 kg/sq m), 10 dB attenuation in 10 to 10,000 Hz range.
- E. Maximum Installed Length: 14 inch (356 mm).

2.07 VOLUME CONTROL DAMPERS

- A. Manufacturers:
1. Elgen Manufacturing Company, Inc; _____: www.elgenmfg.com/#sle.
 2. Nailor Industries, Inc; _____: www.nailor.com/#sle.

3. Pottorff; _____: www.pottorff.com/#sle.
 4. Ruskin Company; _____: www.ruskin.com/#sle.
 5. United Enertech; _____: www.unitedenertech.com/#sle.
- B. Fabricate in accordance with SMACNA (DCS) and as indicated.
- C. Splitter Dampers:
1. Material: Same gauge as duct to 24 inches (600 mm) size in either direction, and two gauges heavier for sizes over 24 inches (600 mm).
 2. Blade: Fabricate of single thickness sheet metal to streamline shape, secured with continuous hinge or rod.
 3. Operator: Minimum 1/4 inch (6 mm) diameter rod in self aligning, universal joint action, flanged bushing with set screw.
- D. Single Blade Dampers:
1. Fabricate for duct sizes up to 6 by 30 inch (150 by 760 mm).
 2. Blade: 24 gauge, 0.0239 inch (0.61 mm), minimum.
- E. Multi-Blade Damper: Fabricate consisting of opposed blades with maximum blade sizes 8 by 72 inches (200 by 1825 mm). Assemble center- and edge-crimped blades in prime-coated or galvanized-channel frame with suitable hardware.
1. Blade: 18 gauge, 0.0478 inch (1.21 mm), minimum.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Install accessories in accordance with manufacturer's instructions, NFPA 90A, and follow SMACNA (DCS). See Section 233100 for duct construction and pressure class.
- B. Provide backdraft dampers on exhaust fans or exhaust ducts nearest to outside and where indicated.
- C. Provide duct test holes where indicated and required for testing and balancing purposes.
- D. At fans and motorized equipment associated with ducts, provide flexible duct connections immediately adjacent to the equipment.
- E. At equipment supported by vibration isolators, provide flexible duct connections immediately adjacent to the equipment.
- F. Provide balancing dampers at points on supply, return, and exhaust systems where branches are taken from larger ducts as required for air balancing. Install minimum two duct widths from duct take-off.
- G. Use splitter dampers only where indicated.

END OF SECTION

**SECTION 233423
HVAC POWER VENTILATORS**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Inline centrifugal fans and blowers.

1.02 RELATED REQUIREMENTS

- A. Section 233100 - HVAC Ducts and Casings.
- B. Section 233300 - Air Duct Accessories: Backdraft dampers.

1.03 REFERENCE STANDARDS

- A. AMCA (DIR) - (Directory of) Products Licensed Under AMCA International Certified Ratings Program.
- B. AMCA 99 - Standards Handbook.
- C. AMCA 204 - Balance Quality and Vibration Levels for Fans.
- D. AMCA 210 - Laboratory Methods of Testing Fans for Certified Aerodynamic Performance Rating.
- E. AMCA 300 - Reverberation Room Methods of Sound Testing of Fans.
- F. AMCA 301 - Methods for Calculating Fan Sound Ratings from Laboratory Test Data.

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Preinstallation Meeting: Conduct a preinstallation meeting one week prior to the start of the work of this section; require attendance by all affected installers.

1.05 SUBMITTALS

- A. See Section 013000 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide data on fans and accessories, including fan curves with specified operating point plotted power, rpm, sound power levels at rated capacity, and electrical characteristics and connection requirements.
- C. Manufacturer's Instructions: Indicate installation instructions.
- D. Maintenance Data: Include instructions for lubrication, motor and drive replacement, spare parts list, and wiring diagrams.

1.06 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum three years of documented experience.

1.07 FIELD CONDITIONS

- A. Request Owner permission to use permanent ventilator(s) for ventilation during construction.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Greenheck Fan Corporation; _____: www.greenheck.com/#sle.
- B. Loren Cook Company; _____: www.lorencook.com/#sle.
- C. PennBarry, Division of Air System Components; _____: www.pennbarry.com/#sle.

2.02 POWER VENTILATORS - GENERAL

- A. Static and Dynamically Balanced: Comply with AMCA 204.
- B. Performance Ratings: Comply with AMCA 210, bearing certified rating seal.
- C. Sound Ratings: Comply with AMCA 301, tested to AMCA 300, bearing certified sound ratings seal.
- D. Fabrication: Comply with AMCA 99.
- E. Electrical Components: Listed and classified by Underwriters Laboratories Inc. as suitable for the purpose specified and indicated.

2.03 INLINE CENTRIFUGAL FANS AND BLOWERS

- A. Manufacturers:
 - 1. Greenheck Fan Corporation; _____: www.greenheck.com/#sle
 - 2. Loren Cook Company; _____: www.lorencook.com/#sle
 - 3. PennBarry, Division of Air System Components; _____: www.pennbarry.com/#sle.
- B. Centrifugal Fan Unit: V-belt or direct driven, with galvanized steel housing lined with acoustic insulation, resiliently-mounted motor, gravity backdraft damper in discharge.
- C. Sheaves: Cast iron or steel, dynamically balanced, bored to fit shafts and keyed; variable and adjustable pitch motor sheaves selected so required rpm gets reached with sheaves set at mid-position; fan shaft with self-aligning prelubricated ball bearings.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Hung In-line Fans:
 - 1. Install flexible connections between fan and ductwork; see Section 233300. Ensure metal bands of connectors are parallel with minimum 1 inch (25 mm) flex between ductwork and fan while running.
- C. Provide sheaves required for final air balance.
- D. Install backdraft dampers on inlet to roof and wall exhausters.
- E. Provide backdraft dampers on outlet from cabinet and ceiling exhausters fans and as indicated.

END OF SECTION

**SECTION 233700
AIR OUTLETS AND INLETS**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Registers/grilles:
 - 1. Ceiling-mounted, exhaust and return register/grilles.
 - 2. Wall-mounted, exhaust and return register/grilles.
- B. Duct-mounted supply and return registers/louvers.
- C. Louvers:

1.02 RELATED REQUIREMENTS

- A. Section 099123 - Interior Painting: Painting of ducts visible behind outlets and inlets.
- B. Section 265100 - Interior Lighting: Air handling light troffers.

1.03 SUBMITTALS

- A. See Section 013000 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide data for equipment required for this project. Review outlets and inlets as to size, finish, and type of mounting prior to submission. Submit schedule of outlets and inlets showing type, size, location, application, and noise level.

1.04 QUALITY ASSURANCE

- A. Test and rate air outlet and inlet performance in accordance with ASHRAE Std 70.
- B. Test and rate louver performance in accordance with AMCA 500-L.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Krueger-HVAC; _____: www.krueger-hvac.com/#sle.
- B. Metalaire, a brand of Metal Industries Inc; _____: www.metalaire.com/#sle.
- C. Price Industries; _____: www.priceindustries.com/#sle.
- D. Titus, a brand of Air Distribution Technologies; _____: www.titus-hvac.com/#sle.

2.02 CEILING EXHAUST AND RETURN REGISTERS/GRILLES

- A. Type: Streamlined blades, 3/4 inch (19 mm) minimum depth, 3/4 inch (19 mm) maximum spacing, with blades set at 45 degrees, vertical face.
- B. Frame: 1-1/4 inch (32 mm) margin with countersunk screw mounting.
- C. Fabrication: Steel with 20 gauge, 0.0359 inch (0.91 mm) minimum frames and 22 gauge, 0.0299 inch (0.76 mm) minimum blades, steel and aluminum with 20 gauge, 0.0359 inch (0.91 mm) minimum frame, or aluminum extrusions, with factory baked enamel finish.
- D. Fabrication: Stainless steel with 20 gauge, 0.0359 inch (0.91 mm) minimum frames and 22 gauge, 0.0299 inch (0.76 mm) minimum blades, steel and aluminum with 20 gauge, 0.0359 inch (0.91 mm) minimum frame.
- E. Color: To be selected by Architect from manufacturer's standard range.
- F. Damper: Integral, gang-operated, opposed blade type with removable key operator, operable from face where not individually connected to exhaust fans.

2.03 WALL EXHAUST AND RETURN REGISTERS/GRILLES

- A. Type: Streamlined blades, 3/4 inch (19 mm) minimum depth, 3/4 inch (19 mm) maximum spacing, with spring or other device to set blades, vertical face.
- B. Frame: 1-1/4 inch (32 mm) margin with countersunk screw mounting.
- C. Fabrication: Steel frames and blades, with factory baked enamel finish.
- D. Color: To be selected by Architect from manufacturer's standard range.
- E. Damper: Integral, gang-operated, opposed blade type with removable key operator, operable from face.

2.04 LOUVERS

- A. Manufacturers:
 - 1. Ruskin Company; _____: www.ruskin.com/#sle.
- B. Type: 4 inch (100 mm) deep frame with blades on 45 degree slope with center baffle and return bend, heavy channel frame, 1/2 inch (13 mm) square mesh screen over intake or exhaust end.
- C. Fabrication: 16 gauge, 0.0598 inch (1.52 mm) thick galvanized steel thick galvanized steel welded assembly, with factory prime coat finish.
- D. Color: As indicated on the drawings.
- E. Mounting: Furnish with interior flat flange for installation.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Check location of outlets and inlets and make necessary adjustments in position to comply with architectural features, symmetry, and lighting arrangement.
- C. Provide balancing dampers on duct take-off to diffusers and grilles and registers, despite whether dampers are specified as part of diffuser, or grille and register assembly.
- D. Paint ductwork visible behind air outlets and inlets matte black, see Section 099123.

3.02 CLOSEOUT ACTIVITIES

- A. Demonstrate operational system to Owner's representative.
- B. Instruct Owner's representative to maintain system and use occupant controls or interfaces, as required.

3.03 PROTECTION

- A. Protect installed products until completion of project.
- B. Replace, repair, or touch-up damaged products before Substantial Completion.

END OF SECTION

**SECTION 260519
LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Single conductor building wire.
- B. Metal-clad cable.
- C. Wiring connectors.
- D. Electrical tape.
- E. Oxide inhibiting compound.
- F. Wire pulling lubricant.
- G. Cable ties.
- H. Firestop sleeves.

1.02 RELATED REQUIREMENTS

- A. Section 260526 - Grounding and Bonding for Electrical Systems: Additional requirements for grounding conductors and grounding connectors.

1.03 SUBMITTALS

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide manufacturer's standard catalog pages and data sheets for conductors and cables, including detailed information on materials, construction, ratings, listings, and available sizes, configurations, and stranding.

1.04 QUALITY ASSURANCE

- A. Comply with requirements of NFPA 70.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Receive, inspect, handle, and store conductors and cables in accordance with manufacturer's instructions.

PART 2 PRODUCTS

2.01 CONDUCTOR AND CABLE APPLICATIONS

- A. Do not use conductors and cables for applications other than as permitted by NFPA 70 and product listing.
- B. Provide single conductor building wire installed in suitable raceway unless otherwise indicated, permitted, or required.
- C. Metal-clad cable is permitted only as follows:
 - 1. Where not otherwise restricted, may be used:
 - a. Where concealed above accessible ceilings for final connections from junction boxes to luminaires.
 - 1) Maximum Length: 6 feet (1.8 m).
 - b. Where concealed in hollow stud walls and above accessible ceilings for branch circuits up to 20 A.
 - 2. In addition to other applicable restrictions, may not be used:
 - a. Where exposed to damage.
 - b. For damp, wet, or corrosive locations, unless provided with a PVC jacket listed as suitable for those locations.

2.02 CONDUCTOR AND CABLE GENERAL REQUIREMENTS

- A. Provide products that comply with requirements of NFPA 70.
- B. Provide products listed, classified, and labeled as suitable for the purpose intended.
- C. Unless specifically indicated to be excluded, provide all required conduit, boxes, wiring, connectors, etc. as required for a complete operating system.
- D. Comply with NEMA WC 70.
- E. Thermoplastic-Insulated Conductors and Cables: Listed and labeled as complying with UL 83.
- F. Thermoset-Insulated Conductors and Cables: Listed and labeled as complying with UL 44.
- G. Conductors for Grounding and Bonding: Also comply with Section 260529.
- H. Conductors and Cables Installed Where Exposed to Direct Rays of Sun: Listed and labeled as sunlight resistant.
- I. Conductor Material:
 - 1. Provide copper conductors only. Aluminum conductors are not acceptable for this project. Conductor sizes indicated are based on copper.
 - 2. Copper Conductors: Soft drawn annealed, 98 percent conductivity, uncoated copper conductors complying with ASTM B3, ASTM B8, or ASTM B787/B787M unless otherwise indicated.
- J. Minimum Conductor Size: 12 AWG.
- K. Conductor Color Coding:
 - 1. Color code conductors as indicated unless otherwise required by the authority having jurisdiction. Maintain consistent color coding throughout project.
 - 2. Color Coding Method: Integrally colored insulation.
 - a. Conductors size 4 AWG and larger may have black insulation color coded using vinyl color coding electrical tape.
 - 3. Color Code:
 - a. 480Y/277 V, 3 Phase, 4 Wire System:
 - 1) Phase A: Brown.
 - 2) Phase B: Orange.
 - 3) Phase C: Yellow.
 - 4) Neutral/Grounded: Gray.
 - b. 208Y/120 V, 3 Phase, 4 Wire System:
 - 1) Phase A: Black.
 - 2) Phase B: Red.
 - 3) Phase C: Blue.
 - 4) Neutral/Grounded: White.
 - c. Equipment Ground, All Systems: Green.

2.03 SINGLE CONDUCTOR BUILDING WIRE

- A. Manufacturers:
 - 1. Copper Building Wire:
 - a. Cerro Wire LLC: www.cerrowire.com/#sle.
 - b. Encore Wire Corporation: www.encorewire.com/#sle.
 - c. General Cable Technologies Corporation: www.generalcable.com/#sle.
 - d. Service Wire Co: www.servicewire.com/#sle.
 - e. Southwire Company: www.southwire.com/#sle.

- B. Description: Single conductor insulated wire.
- C. Conductor Stranding:
 - 1. Feeders and Branch Circuits:
 - a. Size 10 AWG and Smaller: Solid.
 - b. Size 8 AWG and Larger: Stranded.
- D. Insulation Voltage Rating: 600 V.
- E. Insulation:
 - 1. Copper Building Wire: Type THHN/THWN-2, except as indicated below.
 - a. Size 4 AWG and Larger: Type XHHW-2.
 - b. Installed Underground: Type XHHW-2.

2.04 METAL-CLAD CABLE

- A. Manufacturers:
 - 1. AFC Cable Systems Inc: www.afcweb.com/#sle.
 - 2. Encore Wire Corporation: www.encorewire.com/#sle.
 - 3. Service Wire Co: www.servicewire.com/#sle.
 - 4. Southwire Company: www.southwire.com/#sle.
- B. Description: NFPA 70, Type MC cable listed and labeled as complying with UL 1569, and listed for use in classified firestop systems to be used.
- C. Conductor Stranding:
 - 1. Size 10 AWG and Smaller: Solid.
 - 2. Size 8 AWG and Larger: Stranded.
- D. Insulation Voltage Rating: 600 V.
- E. Insulation: Type THHN/THWN or THHN/THWN-2.
- F. Grounding: Full-size integral equipment grounding conductor.
- G. Armor: Steel, interlocked tape.
- H. Provide PVC jacket applied over cable armor.

2.05 WIRING CONNECTORS

- A. Description: Wiring connectors appropriate for the application, suitable for use with the conductors to be connected, and listed as complying with UL 486A-486B or UL 486C as applicable.
- B. Connectors for Grounding and Bonding: Comply with Section 260526.
- C. Wiring Connectors for Splices and Taps:
 - 1. Copper Conductors Size 8 AWG and Smaller: Use twist-on insulated spring connectors.
 - 2. Copper Conductors Size 6 AWG and Larger: Use mechanical connectors or compression connectors.
- D. Wiring Connectors for Terminations:
 - 1. Provide terminal lugs for connecting conductors to equipment furnished with terminations designed for terminal lugs.
 - 2. Where over-sized conductors are larger than the equipment terminations can accommodate, provide connectors suitable for reducing to appropriate size, but not less than required for the rating of the overcurrent protective device.
 - 3. Copper Conductors Size 8 AWG and Larger: Use mechanical connectors or compression connectors where connectors are required.

4. Stranded Conductors Size 10 AWG and Smaller: Use crimped terminals for connections to terminal screws.
- E. Twist-on Insulated Spring Connectors: Rated 600 V, 221 degrees F (105 degrees C) for standard applications and 302 degrees F (150 degrees C) for high temperature applications; pre-filled with sealant and listed as complying with UL 486D for damp and wet locations.
 1. Manufacturers:
 - a. 3M: www.3m.com/#sle.
 - b. Ideal Industries, Inc: www.idealindustries.com/#sle.
 - c. NSI Industries LLC: www.nsiindustries.com/#sle.
- F. Mechanical Connectors: Provide bolted type or set-screw type.
- G. Compression Connectors: Provide circumferential type or hex type crimp configuration.
- H. Crimped Terminals: Nylon-insulated, with insulation grip and terminal configuration suitable for connection to be made.

2.06 ACCESSORIES

- A. Electrical Tape:
 1. Vinyl Color Coding Electrical Tape: Integrally colored to match color code indicated; listed as complying with UL 510; minimum thickness of 7 mil (0.18 mm); resistant to abrasion, corrosion, and sunlight; suitable for continuous temperature environment up to 221 degrees F (105 degrees C).
 2. Vinyl Insulating Electrical Tape: Complying with ASTM D3005 and listed as complying with UL 510; minimum thickness of 7 mil (0.18 mm); resistant to abrasion, corrosion, and sunlight; conformable for application down to 0 degrees F (-18 degrees C) and suitable for continuous temperature environment up to 221 degrees F (105 degrees C).
- B. Oxide Inhibiting Compound: Listed; suitable for use with the conductors or cables to be installed.
- C. Wire Pulling Lubricant:
 1. Listed and labeled as complying with UL 267.
 2. Suitable for use with conductors/cables and associated insulation/jackets to be installed.
 3. Suitable for use at installation temperature.
- D. Cable Ties: Material and tensile strength rating suitable for application.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that interior of building has been protected from weather.
- B. Verify that work likely to damage wire and cable has been completed.
- C. Verify that raceways, boxes, and equipment enclosures are installed and are properly sized to accommodate conductors and cables in accordance with NFPA 70.
- D. Verify that field measurements are as indicated.
- E. Verify that conditions are satisfactory for installation prior to starting work.

3.02 INSTALLATION

- A. Circuiting Requirements:
 1. When circuit destination is indicated without specific routing, determine exact routing required.
 2. Arrange circuiting to minimize splices.

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3. Circuiting Adjustments: Unless otherwise indicated, when branch circuits are indicated as separate, combining them together in a single raceway is not permitted.
 - B. Install products in accordance with manufacturer's instructions.
 - C. Perform work in accordance with NECA 1 (general workmanship).
 - D. Install metal-clad cable (Type MC) in accordance with NECA 120.
 - E. Installation in Raceway:
 1. Tape ends of conductors and cables to prevent infiltration of moisture and other contaminants.
 2. Pull all conductors and cables together into raceway at same time.
 3. Do not damage conductors and cables or exceed manufacturer's recommended maximum pulling tension and sidewall pressure.
 4. Use suitable wire pulling lubricant where necessary, except when lubricant is not recommended by the manufacturer.
 - F. Exposed Cable Installation (only where specifically permitted):
 1. Route cables parallel or perpendicular to building structural members and surfaces.
 2. Protect cables from physical damage.
 - G. Paralleled Conductors: Install conductors of the same length and terminate in the same manner.
 - H. Secure and support conductors and cables in accordance with NFPA 70 using suitable supports and methods approved by the authority having jurisdiction. Provide independent support from building structure. Do not provide support from raceways, piping, ductwork, or other systems.
 - I. Terminate cables using suitable fittings.
 1. Metal-Clad Cable (Type MC):
 - a. Use listed fittings.
 - b. Cut cable armor only using specialized tools to prevent damaging conductors or insulation. Do not use hacksaw or wire cutters to cut armor.
 - J. Install conductors with a minimum of 12 inches (300 mm) of slack at each outlet.
 - K. Neatly train and bundle conductors inside boxes, wireways, panelboards and other equipment enclosures.
 - L. Group or otherwise identify neutral/grounded conductors with associated ungrounded conductors inside enclosures in accordance with NFPA 70.
 - M. Make wiring connections using specified wiring connectors.
 1. Make splices and taps only in accessible boxes. Do not pull splices into raceways or make splices in conduit bodies or wiring gutters.
 2. Remove appropriate amount of conductor insulation for making connections without cutting, nicking or damaging conductors.
 3. Do not remove conductor strands to facilitate insertion into connector.
 4. Clean contact surfaces on conductors and connectors to suitable remove corrosion, oxides, and other contaminants. Do not use wire brush on plated connector surfaces.
 5. Mechanical Connectors: Secure connections according to manufacturer's recommended torque settings.
 6. Compression Connectors: Secure connections using manufacturer's recommended tools and dies.

- N. Insulate splices and taps that are made with uninsulated connectors using methods suitable for the application, with insulation and mechanical strength at least equivalent to unspliced conductors.
- O. Insulate ends of spare conductors using vinyl insulating electrical tape.
- P. Field-Applied Color Coding: Where vinyl color coding electrical tape is used in lieu of integrally colored insulation as permitted in Part 2 under "Color Coding", apply half overlapping turns of tape at each termination and at each location conductors are accessible.
- Q. Unless specifically indicated to be excluded, provide final connections to all equipment and devices, including those furnished by others, as required for a complete operating system.

END OF SECTION

NOT FOR BIDDING PURPOSES

SECTION 260526
GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Grounding and bonding requirements.
- B. Conductors for grounding and bonding.
- C. Connectors for grounding and bonding.

1.02 RELATED REQUIREMENTS

- A. Section 260519 - Low-Voltage Electrical Power Conductors and Cables. Additional requirements for conductors for grounding and bonding, including conductor color coding.
- B. Section 260553 - Identification for Electrical Systems: Identification products and requirements.

1.03 SUBMITTALS

- A. See Section 013000 - Administrative Requirements for submittals procedures.

1.04 QUALITY ASSURANCE

- A. Comply with requirements of NFPA 70.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Receive, inspect, handle, and store products in accordance with manufacturer's instructions.

PART 2 PRODUCTS

2.01 GROUNDING AND BONDING REQUIREMENTS

- A. Existing Work: Where existing grounding and bonding system components are indicated to be reused, they may be reused only where they are free from corrosion, integrity and continuity are verified, and where acceptable to the authority having jurisdiction.
- B. Do not use products for applications other than as permitted by NFPA 70 and product listing.
- C. Unless specifically indicated to be excluded, provide all required components, conductors, connectors, conduit, boxes, fittings, supports, accessories, etc. as necessary for a complete grounding and bonding system.
- D. Where conductor size is not indicated, size to comply with NFPA 70 but not less than applicable minimum size requirements specified.
- E. Bonding and Equipment Grounding:
 - 1. Provide bonding for equipment grounding conductors, equipment ground busses, metallic equipment enclosures, metallic raceways and boxes, device grounding terminals, and other normally non-current-carrying conductive materials enclosing electrical conductors/equipment or likely to become energized as indicated and in accordance with NFPA 70.
 - 2. Provide insulated equipment grounding conductor in each feeder and branch circuit raceway. Do not use raceways as sole equipment grounding conductor.
 - 3. Where circuit conductor sizes are increased for voltage drop, increase size of equipment grounding conductor proportionally in accordance with NFPA 70.
 - 4. Unless otherwise indicated, connect wiring device grounding terminal to branch circuit equipment grounding conductor and to outlet box with bonding jumper.
 - 5. Terminate branch circuit equipment grounding conductors on solidly bonded equipment ground bus only. Do not terminate on neutral (grounded) or isolated/insulated ground bus.

6. Provide bonding jumper across expansion or expansion/deflection fittings provided to accommodate conduit movement.

2.02 GROUNDING AND BONDING COMPONENTS

- A. General Requirements:
 1. Provide products listed, classified, and labeled as suitable for the purpose intended.
 2. Provide products listed and labeled as complying with UL 467 where applicable.
- B. Conductors for Grounding and Bonding, in Addition to Requirements of Section 260526:
 1. Use insulated copper conductors unless otherwise indicated.
 - a. Exceptions:
 - 1) Use bare copper conductors where installed underground in direct contact with earth.
 - 2) Use bare copper conductors where directly encased in concrete (not in raceway).
- C. Connectors for Grounding and Bonding:
 1. Description: Connectors appropriate for the application and suitable for the conductors and items to be connected; listed and labeled as complying with UL 467.
 2. Unless otherwise indicated, use exothermic welded connections for underground, concealed and other inaccessible connections.
 3. Unless otherwise indicated, use mechanical connectors, compression connectors, or exothermic welded connections for accessible connections.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that work likely to damage grounding and bonding system components has been completed.
- B. Verify that field measurements are as indicated.
- C. Verify that conditions are satisfactory for installation prior to starting work.

3.02 INSTALLATION

- A. Install products in accordance with manufacturer's instructions.
- B. Perform work in accordance with NECA 1 (general workmanship).
- C. Make grounding and bonding connections using specified connectors.
 1. Remove appropriate amount of conductor insulation for making connections without cutting, nicking or damaging conductors. Do not remove conductor strands to facilitate insertion into connector.
 2. Remove nonconductive paint, enamel, or similar coating at threads, contact points, and contact surfaces.
 3. Exothermic Welds: Make connections using molds and weld material suitable for the items to be connected in accordance with manufacturer's recommendations.
 4. Mechanical Connectors: Secure connections according to manufacturer's recommended torque settings.
 5. Compression Connectors: Secure connections using manufacturer's recommended tools and dies.
- D. Identify grounding and bonding system components in accordance with Section 260553.

END OF SECTION

**SECTION 260529
HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Support and attachment requirements and components for equipment, conduit, cable, boxes, and other electrical work.

1.02 RELATED REQUIREMENTS

- A. Section 033000 - Cast-in-Place Concrete: Concrete equipment pads.
- B. Section 260533.13 - Conduit for Electrical Systems: Additional support and attachment requirements for conduits.

1.03 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
 - 1. Coordinate sizes and arrangement of supports and bases with actual equipment and components to be installed.
 - 2. Coordinate work to provide additional framing and materials required for installation.
 - 3. Coordinate compatibility of support and attachment components with mounting surfaces at installed locations.
 - 4. Coordinate arrangement of supports with ductwork, piping, equipment and other potential conflicts.
 - 5. Notify Owner's representative/Engineer of conflicts with or deviations from Contract Documents. Obtain direction before proceeding with work.
- B. Sequencing:
 - 1. Do not install products on or provide attachment to concrete surfaces until concrete has cured; see Section 033000.

1.04 SUBMITTALS

- A. See Section 013000 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide manufacturer's standard catalog pages and data sheets for channel/strut framing systems, nonpenetrating rooftop supports, and post-installed concrete/masonry anchors.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Receive, inspect, handle, and store products in accordance with manufacturer's instructions.

PART 2 PRODUCTS

2.01 SUPPORT AND ATTACHMENT COMPONENTS

- A. General Requirements:
 - 1. Comply with the following. Where requirements differ, comply with most stringent.
 - a. NFPA 70.
 - b. Requirements of authorities having jurisdiction.
 - 2. Provide required hangers, supports, anchors, fasteners, fittings, accessories, and hardware as necessary for complete installation of electrical work.
 - 3. Provide products listed, classified, and labeled as suitable for purpose intended, where applicable.

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4. Where support and attachment component types and sizes are not indicated, select in accordance with manufacturer's application criteria as required for load to be supported. Include consideration for vibration, equipment operation, and shock loads where applicable.
 5. Do not use products for applications other than as permitted by NFPA 70 and product listing.
 6. Steel Components: Use corrosion-resistant materials suitable for environment where installed.
 - a. Galvanized Steel: Hot-dip galvanized after fabrication in accordance with ASTM A123/A123M or ASTM A153/A153M.
 - B. Conduit and Cable Supports: Straps and clamps suitable for conduit or cable to be supported.
 1. Conduit Straps: One-hole or two-hole type; match material and finish of conduit system being supported..
 2. Conduit Clamps: Bolted type unless otherwise indicated.
 - C. Outlet Box Supports: Hangers and brackets suitable for boxes to be supported.
 - D. Metal Channel/Strut Framing Systems:
 1. Description: Factory-fabricated, continuous-slot, metal channel/strut and associated fittings, accessories, and hardware required for field assembly of supports.
 2. Comply with MFMA-4.
 3. Channel Material:
 - a. Indoor Dry Locations: Use zinc-plated steel or galvanized steel.
 - b. Outdoor and Damp or Wet Indoor Locations: Use galvanized steel.
 - E. Hanger Rods: Threaded, zinc-plated steel unless otherwise indicated. Galvanized steel for outdoor or indoor damp, wet and corrosive environments.
 1. Minimum Size, Unless Otherwise Indicated or Required:
 - a. Equipment Supports: 1/2-inch (13 mm) diameter.
 - b. Single Conduit up to 1-inch (27 mm) Trade Size: 1/4-inch (6 mm) diameter.
 - c. Single Conduit larger than 1-inch (27 mm) Trade Size: 3/8-inch (10 mm) diameter.
 - d. Trapeze Support for Multiple Conduits: 3/8-inch (10 mm) diameter.
 - e. Outlet Boxes: 1/4-inch (6 mm) diameter.
 - f. Luminaires: 1/4-inch (6 mm) diameter.
 - F. Anchors and Fasteners:
 1. Unless otherwise indicated and where not otherwise restricted, use anchor and fastener types indicated for specified applications.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that field measurements are as indicated.
- B. Verify that mounting surfaces are ready to receive support and attachment components.
- C. Verify that conditions are satisfactory for installation prior to starting work.

3.02 INSTALLATION

- A. Install products in accordance with manufacturer's instructions.
- B. Install hangers and supports in accordance with NECA 1.
- C. Provide independent support from building structure. Do not provide support from piping, ductwork, or other systems.
- D. Do not provide sole support from suspended ceiling support system or ceiling grid.

- E. Do not penetrate or otherwise notch or cut structural members without approval of Structural Engineer.
- F. Equipment Support and Attachment:
 - 1. Use metal, fabricated supports or supports assembled from metal channel/strut to support equipment as required.
 - 2. Use metal channel/strut secured to studs to support equipment surface mounted on hollow stud walls when wall strength is not sufficient to resist pull-out.
 - 3. Use metal channel/strut to support surface-mounted equipment in wet or damp locations to provide space between equipment and mounting surface.
 - 4. Securely fasten floor-mounted equipment. Do not install equipment such that it relies on its own weight for support.
- G. Secure fasteners in accordance with manufacturer's recommended torque settings.
- H. Remove temporary supports.

3.03 FIELD QUALITY CONTROL

- A. Inspect support and attachment components for damage and defects.
- B. Repair cuts and abrasions in galvanized finishes using zinc-rich paint recommended by manufacturer. Replace components that exhibit signs of corrosion.
- C. Correct deficiencies and replace damaged or defective support and attachment components.

END OF SECTION

**SECTION 260533.13
CONDUIT FOR ELECTRICAL SYSTEMS**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Galvanized steel rigid metal conduit (RMC).
- B. Galvanized steel intermediate metal conduit (IMC).
- C. PVC-coated galvanized steel rigid metal conduit (RMC).
- D. Liquidtight flexible metal conduit (LFMC).
- E. Electrical metallic tubing (EMT).
- F. Rigid polyvinyl chloride (PVC) conduit.

1.02 RELATED REQUIREMENTS

- A. Section 260519 - Low-Voltage Electrical Power Conductors and Cables: Cable assemblies consisting of conductors protected by integral metal armor.
- B. Section 260526 - Grounding and Bonding for Electrical Systems.
- C. Section 260529 - Hangers and Supports for Electrical Systems.
- D. Section 260533.16 - Boxes for Electrical Systems.
- E. Section 260553 - Identification for Electrical Systems: Identification products and requirements.
- F. Section 312316.13 - Trenching: Excavating, bedding, and backfilling.

1.03 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
 - 1. Coordinate minimum sizes of conduits with actual type and quantity of conductors to be installed, including adjustments for conductor sizes increased for voltage drop.
 - 2. Coordinate arrangement of conduits with structural members, ductwork, piping, equipment, and other potential conflicts.
 - 3. Verify exact conduit termination locations required for boxes, enclosures, and equipment.
 - 4. Coordinate work to provide roof penetrations that preserve integrity of roofing system and do not void roof warranty.
 - 5. Notify owner/engineer of conflicts with or deviations from Contract Documents. Obtain direction before proceeding with work.

1.04 SUBMITTALS

- A. See Section 013000 - Administrative Requirements for submittals procedures.
- B. Product Data: Provide manufacturer's standard catalog pages and data sheets for conduits and fittings.

1.05 QUALITY ASSURANCE

- A. Product Listing Organization Qualifications: Organization recognized by OSHA as Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Receive, inspect, handle, and store conduit and fittings in accordance with manufacturer's instructions.

PART 2 PRODUCTS

2.01 CONDUIT APPLICATIONS

- A. Do not use conduit and associated fittings for applications other than as permitted by NFPA 70, manufacturer's instructions, and product listing.
- B. Unless otherwise indicated and where not otherwise restricted, use conduit types indicated for specified applications. Where more than one listed application applies, comply with most restrictive requirements. Where conduit type for particular application is not specified, use galvanized steel rigid metal conduit.
- C. Underground:
 - 1. Under Slab on Grade: Use rigid PVC conduit.
 - 2. Exterior, Direct-Buried: Use rigid PVC conduit.
 - 3. Where rigid polyvinyl chloride (PVC) conduit is provided, transition to galvanized steel rigid metal conduit (RMC) where emerging from underground. Where emerging from underground into the pool equipment room or any chemical storage room, transition to PVC-coated galvanized rigid metal conduit (RMC).
- D. Concealed Above Ceilings: Use galvanized steel rigid metal conduit (RMC), galvanized steel intermediate metal conduit (IMC), or galvanized steel electrical metallic tubing (EMT).
- E. Interior, Damp, Wet or Corrosive Locations: Use PVC-coated galvanized steel rigid metal conduit (RMC).
- F. Interior Dry Locations: Use galvanized steel electrical metallic tubing (EMT).
- G. Corrosive Locations Above Ground: Use PVC-coated galvanized steel rigid metal conduit (RMC).
 - 1. Corrosive locations include, but are not limited to:
 - a. Swimming pools and associated equipment areas.
 - b. Chemical storage areas.
- H. Flexible Connections to Luminaires Above Accessible Ceilings: Use flexible metal conduit (FMC).
 - 1. Maximum Length: 6 feet (1.8 m).
- I. Flexible Connections to Vibrating Equipment:
 - 1. Dry Locations: Use flexible metal conduit (FMC).
 - 2. Damp, Wet, or Corrosive Locations: Use liquidtight flexible metal conduit (LFMC).
 - 3. Maximum Length: 6 feet (1.8 m) unless otherwise indicated.
 - 4. Vibrating equipment includes, but is not limited to:
 - a. Motors.
- J. Fished in Existing Walls, Where Necessary: Use flexible metal conduit (FMC).

2.02 CONDUIT - GENERAL REQUIREMENTS

- A. Comply with NFPA 70.
- B. Existing Work: Where existing conduits are indicated to be reused, they may be reused only where they comply with specified requirements, are free from corrosion, and integrity is verified by pulling mandrel through them.
- C. Provide conduit, fittings, supports, and accessories required for complete raceway system.
- D. Provide products listed, classified, and labeled as suitable for purpose intended.
- E. Minimum Conduit Size, Unless Otherwise Indicated:
 - 1. Branch Circuits: 3/4-inch (21 mm) trade size.

- F. Where conduit size is not indicated, size to comply with NFPA 70 but not less than applicable minimum size requirements specified.

2.03 GALVANIZED STEEL RIGID METAL CONDUIT (RMC)

- A. Manufacturers:
1. Allied Tube & Conduit, a division of Atkore International: www.alliedeg.com/#sle.
 2. Western Tube, a division of Zekelman Industries: www.westerntube.com/#sle.
 3. Wheatland Tube, a division of Zekelman Industries: www.wheatland.com/#sle.
- B. Description: NFPA 70, Type RMC galvanized steel rigid metal conduit complying with ANSI C80.1 and listed and labeled as complying with UL 6.
- C. Fittings:
1. Nonhazardous Locations: Use fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B or UL 6.
 2. Material: Use steel or malleable iron.
 3. Connectors and Couplings: Use threaded type fittings only. Threadless fittings, including set screw and compression/gland types, are not permitted.

2.04 GALVANIZED STEEL INTERMEDIATE METAL CONDUIT (IMC)

- A. Description: NFPA 70, Type IMC galvanized steel intermediate metal conduit complying with ANSI C80.6 and listed and labeled as complying with UL 1242.
- B. Fittings:
1. Nonhazardous Locations: Use fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B or UL 1242.
 2. Material: Use steel or malleable iron.
 3. Connectors and Couplings: Use threaded type fittings only. Threadless fittings, including set screw and compression/gland types, are not permitted.

2.05 PVC-COATED GALVANIZED STEEL RIGID METAL CONDUIT (RMC)

- A. Description: NFPA 70, Type RMC galvanized steel rigid metal conduit with external polyvinyl chloride (PVC) coating complying with NEMA RN 1 and listed and labeled as complying with UL 6.
- B. Exterior Coating: Polyvinyl chloride (PVC), nominal thickness of 40 mil, 0.040 inch (1.02 mm).
- C. PVC-Coated Boxes and Fittings:
1. Manufacturer: Same as manufacturer of PVC-coated conduit to be installed.
 2. Nonhazardous Locations: Use boxes and fittings listed and labeled as complying with UL 514A, UL 514B, or UL 6.
 3. Material: Use steel or malleable iron.
 4. Exterior Coating: Polyvinyl chloride (PVC), minimum thickness of 40 mil, 0.040 inch (1.02 mm).
- D. PVC-Coated Supports: Furnish with exterior coating of polyvinyl chloride (PVC), minimum thickness of 15 mil, 0.015 inch (0.38 mm).

2.06 FLEXIBLE METAL CONDUIT (FMC)

- A. Description: NFPA 70, Type FMC standard-wall steel flexible metal conduit listed and labeled as complying with UL 1, and listed for use in classified firestop systems.
- B. Fittings:
1. Description: Fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B.

2. Material: Use steel or malleable iron.

2.07 LIQUIDTIGHT FLEXIBLE METAL CONDUIT (LFMC)

- A. Description: NFPA 70, Type LFMC polyvinyl chloride (PVC) jacketed steel flexible metal conduit listed and labeled as complying with UL 360.
- B. Fittings:
 1. Description: Fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B.
 2. Material: Use steel or malleable iron.

2.08 ELECTRICAL METALLIC TUBING (EMT)

- A. Manufacturers:
 1. Allied Tube & Conduit, a division of Atkore International: www.alliedeg.com/#sle.
 2. Western Tube, a division of Zekelman Industries: www.westerntube.com/#sle.
 3. Wheatland Tube, a division of Zekelman Industries: www.wheatland.com/#sle.
- B. Description: NFPA 70, Type EMT galvanized steel electrical metallic tubing complying with ANSI C80.3 and listed and labeled as complying with UL 797.
- C. Fittings:
 1. Description: Fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B.
 2. Material: Use steel or malleable iron.
 3. Connectors and Couplings: Use compression/gland or set-screw type.
 - a. Do not use indenter type connectors and couplings.

2.09 RIGID POLYVINYL CHLORIDE (PVC) CONDUIT

- A. Manufacturers:
 1. ABB; Carlon: www.carlon.com/#sle.
 2. Allied Tube & Conduit (a division of Atkore International): www.alliedeg.com/#sle.
 3. Cantex Inc: www.cantexinc.com/#sle.
- B. Description: NFPA 70, Type PVC rigid polyvinyl chloride conduit complying with NEMA TC 2 and listed and labeled as complying with UL 651; Schedule 40 unless otherwise indicated, Schedule 80 where subject to physical damage; rated for use with conductors rated 90 degrees C.
- C. Fittings:
 1. Manufacturer: Same as manufacturer of conduit to be connected.
 2. Description: Fittings complying with NEMA TC 3 and listed and labeled as complying with UL 651; material to match conduit.

2.10 REINFORCED THERMOSETTING RESIN CONDUIT (RTRC)

- A. Description: NFPA 70, Type RTRC reinforced thermosetting resin conduit complying with NEMA TC 14 (SERIES).
- B. Supports: As recommended by manufacturer.
- C. Fittings: Same type and manufacturer as conduit to be connected.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that field measurements are as indicated.
- B. Verify that mounting surfaces are ready to receive conduits.

- C. Verify that conditions are satisfactory for installation prior to starting work.

3.02 INSTALLATION

- A. Install products in accordance with manufacturer's instructions.
- B. Install conduit in accordance with NECA 1.
- C. Galvanized Steel Rigid Metal Conduit (RMC): Install in accordance with NECA 101.
- D. Intermediate Metal Conduit (IMC): Install in accordance with NECA 101.
- E. PVC-Coated Galvanized Steel Rigid Metal Conduit (RMC): Install using only tools approved by manufacturer.
- F. Rigid Polyvinyl Chloride (PVC) Conduit: Install in accordance with NECA 112.
- G. Conduit Support:
 - 1. Secure and support conduits in accordance with NFPA 70 using suitable supports and methods approved by authorities having jurisdiction; see Section 260529.
 - 2. Provide independent support from building structure. Do not provide support from piping, ductwork, or other systems.
 - 3. Installation Above Suspended Ceilings: Do not provide support from ceiling support system. Do not provide support from ceiling grid or allow conduits to lay on ceiling tiles.
 - 4. Use conduit strap to support single surface-mounted conduit.
 - a. Use clamp back spacer with conduit strap for damp and wet locations to provide space between conduit and mounting surface.
 - 5. Use metal channel/strut with accessory conduit clamps to support multiple parallel surface-mounted conduits.
 - 6. Use conduit clamp to support single conduit from beam clamp or threaded rod.
 - 7. Use trapeze hangers assembled from threaded rods and metal channel/strut with accessory conduit clamps to support multiple parallel suspended conduits.
- H. Connections and Terminations:
 - 1. Use approved zinc-rich paint or conduit joint compound on field-cut threads of galvanized steel conduits prior to making connections.
 - 2. Where two threaded conduits must be joined and neither can be rotated, use three-piece couplings or split couplings. Do not use running threads.
 - 3. Use suitable adapters where required to transition from one type of conduit to another.
 - 4. Provide drip loops for liquidtight flexible conduit connections to prevent drainage of liquid into connectors.
 - 5. Terminate threaded conduits in boxes and enclosures using threaded hubs or double lock nuts for dry locations and raintight hubs for wet locations.
 - 6. Provide insulating bushings, insulated throats, or listed metal fittings with smooth, rounded edges at conduit terminations to protect conductors.
 - 7. Secure joints and connections to provide mechanical strength and electrical continuity.
- I. Penetrations:
 - 1. Do not penetrate or otherwise notch or cut structural members, including footings and grade beams, without approval of Structural Engineer.
 - 2. Make penetrations perpendicular to surfaces unless otherwise indicated.
 - 3. Provide sleeves for penetrations as indicated or as required to facilitate installation. Set sleeves flush with exposed surfaces unless otherwise indicated or required.
 - 4. Conceal bends for conduit risers emerging above ground.
 - 5. Where conduits penetrate waterproof membrane, seal as required to maintain integrity of membrane.

6. Make penetrations for roof-mounted equipment within associated equipment openings and curbs where possible to minimize roofing system penetrations. Where penetrations are necessary, seal as indicated or as required to preserve integrity of roofing system and maintain roof warranty.
- J. Underground Installation:
 1. Provide trenching and backfilling; see Section 312316.13.
 2. Minimum Cover, Unless Otherwise Indicated or Required:
 - a. Underground, Exterior: 18 inches (460 mm).
 - b. Under Slab on Grade: 12 inches (300 mm) to bottom of slab.
- K. Conduit Movement Provisions: Where conduits are subject to movement provide expansion and expansion/deflection fittings to prevent damage to enclosed conductors or connected equipment. This includes, but is not limited to:
 1. Where conduits cross structural joints intended for expansion, contraction, or deflection.
 2. Where calculated in accordance with NFPA 70 for rigid polyvinyl chloride (PVC) conduit installed above ground to compensate for thermal expansion and contraction.
 3. Where conduits are subject to earth movement by settlement or frost.
- L. Conduit Sealing:
 1. Use foam conduit sealant to prevent entry of moisture and gases. This includes, but is not limited to:
 - a. Where conduits enter building from outside.
 - b. Where service conduits enter building from underground distribution system.
 - c. Where conduits enter building from underground.
 - d. Where conduits may transport moisture to contact live parts.
 2. Where conduits cross barriers between areas of potential substantial temperature differential, use foam conduit sealant at accessible point near penetration to prevent condensation. This includes, but is not limited to:
 - a. Where conduits pass from outdoors into conditioned interior spaces.
 - b. Where conduits pass from unconditioned interior spaces into conditioned interior spaces.
- M. Provide grounding and bonding; see Section 260526.

3.03 FIELD QUALITY CONTROL

- A. Repair cuts and abrasions in galvanized finishes using zinc-rich paint recommended by manufacturer. Replace components that exhibit signs of corrosion.
- B. Where coating of PVC-coated galvanized steel rigid metal conduit (RMC) contains cuts or abrasions, repair in accordance with manufacturer's instructions.
- C. Correct deficiencies and replace damaged or defective conduits.

END OF SECTION

**SECTION 260533.16
BOXES FOR ELECTRICAL SYSTEMS**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Outlet and device boxes up to 100 cubic inches (1,650 cu cm), including those used as junction and pull boxes.

1.02 RELATED REQUIREMENTS

- A. Section 260529 - Hangers and Supports for Electrical Systems.
- B. Section 260533.13 - Conduit for Electrical Systems:
 - 1. Conduit bodies and other fittings.
 - 2. Additional requirements for locating boxes to limit conduit length and/or number of bends between pulling points.
- C. Section 262726 - Wiring Devices:
 - 1. Wall plates.
 - 2. Additional requirements for locating boxes for wiring devices.

1.03 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
 - 1. Coordinate the work with other trades to avoid placement of ductwork, piping, equipment, or other potential obstructions within the dedicated equipment spaces and working clearances for electrical equipment required by NFPA 70.
 - 2. Coordinate arrangement of electrical equipment with the dimensions and clearance requirements of the actual equipment to be installed.
 - 3. Coordinate minimum sizes of boxes with the actual installed arrangement of conductors, clamps, support fittings, and devices, calculated according to NFPA 70.
 - 4. Coordinate minimum sizes of pull boxes with the actual installed arrangement of connected conduits, calculated according to NFPA 70.
 - 5. Coordinate the work with other trades to provide walls suitable for installation of flush-mounted boxes where indicated.
 - 6. Notify Owner's Representative/Engineer of any conflicts with or deviations from Contract Documents. Obtain direction before proceeding with work.

1.04 SUBMITTALS

- A. Product Data: Provide manufacturer's standard catalog pages and data sheets for outlet and device boxes, junction and pull boxes, and cabinets and enclosures.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Receive, inspect, handle, and store products in accordance with manufacturer's instructions.

PART 2 PRODUCTS

2.01 BOXES

- A. General Requirements:
 - 1. Do not use boxes and associated accessories for applications other than as permitted by NFPA 70 and product listing.
 - 2. Provide all boxes, fittings, supports, and accessories required for a complete raceway system and to accommodate devices and equipment to be installed.
 - 3. Provide products listed, classified, and labeled as suitable for the purpose intended.

4. Where box size is not indicated, size to comply with NFPA 70 but not less than applicable minimum size requirements specified.
5. Provide grounding terminals within boxes where equipment grounding conductors terminate.
- B. Outlet and Device Boxes Up to 100 cubic inches (1,650 cu cm), Including Those Used as Junction and Pull Boxes:
 1. Use galvanized steel for dry and non-corrosive locations unless otherwise indicated or required and matching conduit system.
 2. Use cast iron boxes or cast aluminum boxes for damp or wet locations unless otherwise indicated or required; furnish with compatible weatherproof gasketed covers.
 3. Use cast iron boxes or cast aluminum boxes where exposed galvanized steel rigid metal conduit or exposed intermediate metal conduit (IMC) is used.
 4. Use PVC coated steel outlet boxes for corrosive environments where PVC coated rigid metal steel conduit is used.
 5. Use nonmetallic boxes where exposed rigid PVC conduit is used.
 6. Use suitable concrete type boxes where flush-mounted in concrete.
 7. Use suitable masonry type boxes where flush-mounted in masonry walls.
 8. Use raised covers suitable for the type of wall construction and device configuration where required.
 9. Use shallow boxes where required by the type of wall construction.
 10. Do not use "through-wall" boxes designed for access from both sides of wall.
 11. Sheet-Steel Boxes: Comply with NEMA OS 1, and list and label as complying with UL 514A.
 12. Cast Metal Boxes: Comply with NEMA FB 1, and list and label as complying with UL 514A; furnish with threaded hubs.
 13. Nonmetallic Boxes: Comply with NEMA OS 2, and list and label as complying with UL 514C.
 14. Boxes for Supporting Luminaires and Ceiling Fans: Listed as suitable for the type and weight of load to be supported; furnished with fixture stud to accommodate mounting of luminaire where required.
 15. Boxes for Ganged Devices: Use multigang boxes of single-piece construction. Do not use field-connected gangable boxes unless specifically indicated or permitted.
 16. Minimum Box Size, Unless Otherwise Indicated:
 - a. Wiring Devices (Other Than Communications Systems Outlets): 4 inch square by 1-1/2 inch deep (100 by 38 mm) trade size.
 - b. Ceiling Outlets: 4 inch octagonal or square by 1-1/2 inch deep (100 by 38 mm) trade size.
 17. Wall Plates: Comply with Section 262726.
 18. Manufacturers:
 - a. Cooper Crouse-Hinds, a division of Eaton Corporation: www.cooperindustries.com/#sle.
 - b. Hubbell Incorporated; Bell Products: www.hubbell-rtb.com/#sle.
 - c. Hubbell Incorporated; RACO Products: www.hubbell-rtb.com/#sle.
 - d. Thomas & Betts Corporation: www.tnb.com/#sle.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that field measurements are as indicated.
- B. Verify that mounting surfaces are ready to receive boxes.

- C. Verify that conditions are satisfactory for installation prior to starting work.

3.02 INSTALLATION

- A. Install products in accordance with manufacturer's instructions.
- B. Install boxes in accordance with NECA 1 (general workmanship) and, where applicable, NECA 130, including mounting heights specified in those standards where mounting heights are not indicated.
- C. Arrange equipment to provide minimum clearances in accordance with manufacturer's instructions and NFPA 70.
- D. Unless otherwise indicated, provide separate boxes for line voltage and low voltage systems.
- E. Unless otherwise indicated, boxes shall be surface-mounted where exposed conduits are indicated or provided.
- F. Box Locations:
 - 1. Locate boxes to be accessible.
 - 2. Locate boxes as required for devices installed under other sections or by others.
 - a. Switches, Receptacles, and Other Wiring Devices: Comply with Section 262726.
 - 3. Unless otherwise indicated, where multiple outlet boxes are installed at the same location at different mounting heights, install along a common vertical center line.
- G. Box Supports:
 - 1. Secure and support boxes in accordance with NFPA 70 and Section 260529 using suitable supports and methods approved by the authority having jurisdiction.
 - 2. Provide independent support from building structure except for cast metal boxes (other than boxes used for fixture support) supported by threaded conduit connections in accordance with NFPA 70. Do not provide support from piping, ductwork, or other systems.
- H. Install boxes plumb and level.
- I. Install boxes as required to preserve insulation integrity, where applicable.
- J. Install permanent barrier between ganged wiring devices when voltage between adjacent devices exceeds 300 V.
- K. Close unused box openings.
- L. Install blank wall plates on junction boxes and on outlet boxes with no devices or equipment installed or designated for future use.
- M. Provide grounding and bonding in accordance with Section 260526.

3.03 CLEANING

- A. Clean interior of boxes to remove dirt, debris, plaster and other foreign material prior to installation of wire or devices.

END OF SECTION

SECTION 260553
IDENTIFICATION FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Electrical identification requirements.
- B. Identification nameplates and labels.
- C. Wire and cable markers.
- D. Voltage markers.
- E. Warning signs and labels.

1.02 RELATED REQUIREMENTS

- A. Section 260519 - Low-Voltage Electrical Power Conductors and Cables: Color coding for power conductors and cables 600 V and less; vinyl color coding electrical tape.

PART 2 PRODUCTS

2.01 IDENTIFICATION REQUIREMENTS

- A. Identification for Equipment:
 - 1. Use identification nameplate to identify each piece of electrical distribution and control equipment and associated sections, compartments, and components.
 - a. Panelboards:
 - 1) Identify ampere rating.
 - 2) Identify voltage and phase.
 - 3) Use typewritten circuit directory to identify load(s) served for panelboards. Identify spares and spaces.
- B. Identification for Conductors and Cables:
 - 1. Color Coding for Power Conductors 600 V and Less: Comply with Section 260519.

2.02 IDENTIFICATION NAMEPLATES AND LABELS

- A. Identification Nameplates:
 - 1. Materials:
 - a. Indoor Clean, Dry Locations: Use plastic nameplates.
 - b. Outdoor Locations: Use plastic, stainless steel, or aluminum nameplates suitable for exterior use.
 - 2. Plastic Nameplates: Two-layer or three-layer laminated acrylic or electrically non-conductive phenolic with beveled edges; minimum thickness of 1/16 inch (1.6 mm); engraved text.
 - 3. Stainless Steel Nameplates: Minimum thickness of 1/32 inch (0.8 mm); engraved or laser-etched text.
 - 4. Aluminum Nameplates: Anodized; minimum thickness of 1/32 inch (0.8 mm); engraved or laser-etched text.
 - 5. Mounting Holes for Mechanical Fasteners: Two, centered on sides for sizes up to 1 inch (25 mm) high; Four, located at corners for larger sizes.
- B. Identification Labels:
 - 1. Materials: Use self-adhesive laminated plastic labels; UV, chemical, water, heat, and abrasion resistant.
 - 2. Text: Use factory pre-printed or machine-printed text. Do not use handwritten text unless otherwise indicated.

- C. Format for Equipment Identification:
 - 1. Minimum Size: 1 inch (25 mm) by 2.5 inches (64 mm).
 - 2. Text: All capitalized unless otherwise indicated.
 - 3. Minimum Text Height:
 - a. System Designation: 1 inch (25 mm).
 - b. Equipment Designation: 1/2 inch (13 mm).
 - 4. Color:
 - a. Normal Power System: White text on black background.
- D. Format for Receptacle Identification:
 - 1. Minimum Size: 3/8 inch (10 mm) by 1.5 inches (38 mm).
 - 2. Legend: Power source and circuit number or other designation indicated.
 - 3. Text: All capitalized unless otherwise indicated.
 - 4. Color: Black text on clear background.

2.03 WARNING SIGNS AND LABELS

- A. Comply with ANSI Z535.2 or ANSI Z535.4 as applicable.
- B. Warning Labels:
 - 1. Materials: Use factory pre-printed or machine printed self-adhesive polyester or self-adhesive vinyl labels; UV, chemical, water, heat, and abrasion resistant; produced using materials recognized to UL 969.
 - 2. Machine-Printed Labels: Use thermal transfer process printing machines and accessories recommended by label manufacturer.
 - 3. Minimum Size: 2 by 4 inches (51 mm by 102 mm) unless otherwise indicated.

PART 3 EXECUTION

3.01 PREPARATION

- A. Clean surfaces to receive adhesive products according to manufacturer's instructions.

3.02 INSTALLATION

- A. Install products in accordance with manufacturer's instructions.
- B. Install identification products to be plainly visible for examination, adjustment, servicing, and maintenance. Unless otherwise indicated, locate products as follows:
 - 1. Surface-Mounted Equipment: Enclosure front.
 - 2. Elevated Equipment: Legible from the floor or working platform.
 - 3. Conductors and Cables: Legible from the point of access.
- C. Install identification products centered, level, and parallel with lines of item being identified.
- D. Secure nameplates to exterior surfaces of enclosures using stainless steel screws and to interior surfaces using self-adhesive backing or epoxy cement.
- E. Install self-adhesive labels and markers to achieve maximum adhesion, with no bubbles or wrinkles and edges properly sealed.

END OF SECTION

SECTION 262726
WIRING DEVICES

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Wall switches.
- B. Receptacles.
- C. Wall plates and covers.

1.02 RELATED REQUIREMENTS

- A. Section 260533.16 - Boxes for Electrical Systems.

1.03 SUBMITTALS

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide manufacturer's catalog information showing dimensions, colors, and configurations.

PART 2 PRODUCTS

2.01 WIRING DEVICES - GENERAL REQUIREMENTS

- A. Provide wiring devices suitable for intended use with ratings adequate for load served.
- B. Wiring Device Applications:
 - 1. Receptacles Installed Outdoors or in Damp or Wet Locations: Use weather-resistant GFCI receptacles with weatherproof covers.
 - 2. Provide GFCI protection per NFPA 70 and as indicated on plan.
- C. Wiring Device Finishes:
 - 1. Provide wiring device finishes as described below, unless otherwise indicated.
 - 2. Wiring Devices Installed in Unfinished Spaces: Gray with wall plate matching outletbox material and/or associated conduit system associated with the installation.

2.02 WALL SWITCHES

- A. Manufacturers:
 - 1. Hubbell Incorporated: www.hubbell.com/#sle.
 - 2. Leviton Manufacturing Company, Inc: www.leviton.com/#sle.
 - 3. Pass & Seymour, a brand of Legrand North America, Inc: www.legrand.us/#sle.
- B. Wall Switches - General Requirements: AC only, general-use snap switches with silver alloy contacts, complying with NEMA WD 1 and NEMA WD 6, and listed as complying with UL 20 and where applicable, FS W-S-896; types as indicated on the drawings.
 - 1. Wiring Provisions: Terminal screws for side wiring with separate ground terminal screw.
- C. Standard Wall Switches: Industrial specification grade, 20 A, 120/277 V with standard toggle type switch actuator and maintained contacts; single pole single throw, double pole single throw, three way, or four way as indicated on the drawings.

2.03 RECEPTACLES

- A. Manufacturers:
 - 1. Hubbell Incorporated: www.hubbell.com/#sle.
 - 2. Leviton Manufacturing Company, Inc: www.leviton.com/#sle.
 - 3. Lutron Electronics Company, Inc; Designer Style: www.lutron.com/#sle.
 - 4. Pass & Seymour, a brand of Legrand North America, Inc: www.legrand.us/#sle.

- B. Receptacles - General Requirements: Self-grounding, complying with NEMA WD 1 and NEMA WD 6, and listed as complying with UL 498, and where applicable, FS W-C-596; types as indicated on the drawings.
 - 1. Wiring Provisions: Terminal screws for side wiring with separate ground terminal screw.
 - 2. NEMA configurations specified are according to NEMA WD 6.
- C. Convenience Receptacles:
 - 1. Weather Resistant Convenience Receptacles: Industrial specification grade, 20A, 125V, NEMA 5-20R, listed and labeled as weather resistant type complying with UL 498 Supplement SD suitable for installation in damp or wet locations; single or duplex as indicated on the drawings.
- D. GFCI Receptacles:
 - 1. GFCI Receptacles - General Requirements: Self-testing, with feed-through protection and light to indicate ground fault tripped condition and loss of protection; listed as complying with UL 943, class A.
 - a. Provide test and reset buttons of same color as device.
 - 2. Standard GFCI Receptacles: Industrial specification grade, duplex, 20A, 125V, NEMA 5-20R, rectangular decorator style.
 - 3. Weather Resistant GFCI Receptacles: Industrial specification grade, duplex, 20A, 125V, NEMA 5-20R, rectangular decorator style, listed and labeled as weather resistant type complying with UL 498 Supplement SD suitable for installation in damp or wet locations.

2.04 DEVICE PLATES AND COVERS

- A. Manufacturers:
 - 1. Hubbell Incorporated: www.hubbell-wiring.com/#sle.
 - 2. Leviton Manufacturing Company, Inc: www.leviton.com/#sle.
 - 3. Lutron Electronics Company, Inc: www.lutron.com/#sle.
 - 4. Pass & Seymour, a brand of Legrand North America, Inc: www.legrand.us/#sle.
- B. Device Plates: Comply with UL 514D.
 - 1. Configuration: One piece cover as required for quantity and types of corresponding wiring devices.
 - 2. Size: Standard.
 - 3. Screws: Metal with slotted heads finished to match wall plate finish.
- C. Galvanized Steel Wall Plates: Rounded corners and edges, with corrosion resistant screws. Provide where galvanized steel outlet boxes and conduit systems are used.
- D. PVC Coated Steel Wall Plates: Rounded corners and edges, with corrosion resistant screws. Provide where PVC coated steel outlet boxes and conduit systems are used.
- E. Weatherproof Receptacle Covers for Damp Locations: Gasketed, clear thermoplastic, hinged cover and corrosion-resistant screws; listed as suitable for use in wet locations with cover closed.
- F. Weatherproof Receptacle Covers for Wet Locations: Gasketed, clear thermoplastic, hinged cover and corrosion-resistant screws; listed as suitable for use in wet locations while in use with attachment plugs connected and identified as extra-duty type.
- G. Weatherproof Switch Covers for Wet Locations: Gasketed, metallic, with externally operable actuating means and corrosion-resistant screws; listed as suitable for use in wet locations.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Perform work in accordance with NECA 1 (general workmanship) and, where applicable, NECA 130, including mounting heights specified in those standards unless otherwise indicated.
- B. Coordinate locations of outlet boxes provided under Section 260533.16 as required for installation of wiring devices provided under this section.
 - 1. Mounting Heights: Unless otherwise indicated, as follows:
 - a. Wall Switches: 48 inches (1200 mm) above finished floor.
 - b. Receptacles: 18 inches (450 mm) above finished floor.
 - 2. Orient outlet boxes for vertical installation of wiring devices unless otherwise indicated.
- C. Install wiring devices in accordance with manufacturer's instructions.
- D. Install permanent barrier between ganged wiring devices when voltage between adjacent devices exceeds 300 V.
- E. Where required, connect wiring devices using pigtails not less than 6 inches (150 mm) long. Do not connect more than one conductor to wiring device terminals.
- F. Connect wiring devices by wrapping conductor clockwise 3/4 turn around screw terminal and tightening to proper torque specified by the manufacturer. Where present, do not use push-in pressure terminals that do not rely on screw-actuated binding.
- G. Unless otherwise indicated, connect wiring device grounding terminal to branch circuit equipment grounding conductor and to outlet box with bonding jumper.
- H. Unless otherwise indicated, GFCI receptacles may be connected to provide feed-through protection to downstream devices. Label such devices to indicate they are protected by upstream GFCI protection.
- I. Install wiring devices plumb and level with mounting yoke held rigidly in place.
- J. Install wall switches with OFF position down.
- K. Install blank wall plates on junction boxes and on outlet boxes with no wiring devices installed or designated for future use.

END OF SECTION

SECTION 262816.16
ENCLOSED SWITCHES

PART 1 GENERAL

1.01 RELATED REQUIREMENTS

- A. Section 260526 - Grounding and Bonding for Electrical Systems.
- B. Section 260529 - Hangers and Supports for Electrical Systems.

1.02 SUBMITTALS

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide manufacturer's standard catalog pages and data sheets for enclosed switches and other installed components and accessories.

1.03 QUALITY ASSURANCE

- A. Comply with requirements of NFPA 70.

1.04 DELIVERY, STORAGE, AND HANDLING

- A. Store in a clean, dry space. Maintain factory wrapping.
- B. Handle carefully in accordance with manufacturer's written instructions to avoid damage to enclosed switch internal components, enclosure and finish.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. ABB: www.electrification.us.abb.com/#sle
- B. Eaton Corporation: www.eaton.com/#sle.
- C. Schneider Electric: www.se.com/#sle.
- D. Siemens Industry, Inc: www.new.siemens.com/#sle.

2.02 ENCLOSED SAFETY SWITCHES

- A. Description: Quick make, quick-break enclosed safety switches listed and labeled as complying with UL 98; heavy duty; ratings, configurations, and features as indicated on the drawings.
- B. Provide products listed, classified, and labeled as suitable for the purpose intended.
- C. Unless otherwise indicated, provide products suitable for continuous operation under the following service conditions:
 - 1. Altitude: Less than 6,600 feet (2,000 m).
 - 2. Ambient Temperature: Between -22 degrees F (-30 degrees C) and 104 degrees F (40 degrees C).
- D. Horsepower Rating: Suitable for connected load.
- E. Voltage Rating: Suitable for system voltage.
- F. Short Circuit Current Rating: Suitable for short circuit rating.
- G. Provide with switch blade contact position that is visible when the cover is close.
- H. Conductor Terminations: Suitable for use with the conductors to be installed.
- I. Provide solidly bonded equipment ground bus in each enclosed safety switch, with a suitable lug for terminating each equipment grounding conductor.
- J. Enclosures: Comply with NEMA 250, and list and label as complying with UL 50 and UL 50E.

1. Environment Type per NEMA 250: Unless otherwise indicated, as specified for the following installation locations:
 - a. Indoor Clean, Dry Locations: Type 1.
 - b. Outdoor Locations: Type 3R.
 - c. Interior Damp, Wet or Corrosive Locations: Type 4X 304 Stainless Steel
 2. Finish for Painted Steel Enclosures: Manufacturer's standard, factory applied grey unless otherwise indicated.
- K. Provide safety interlock to prevent opening the cover with the switch in the ON position with capability of overriding interlock for testing purposes.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Install products in accordance with manufacturer's instructions.
- B. Perform work in accordance with NECA 1 (general workmanship).
- C. Arrange equipment to provide minimum clearances in accordance with manufacturer's instructions and NFPA 70.
- D. Provide required support and attachment in accordance with Section 260529.
- E. Install enclosed switches plumb.
- F. Except where indicated to be mounted adjacent to the equipment they supply, mount enclosed switches such that the highest position of the operating handle does not exceed 78 inches (2000 mm) above the floor or working platform.
- G. Provide grounding and bonding in accordance with Section 260526.

3.02 ADJUSTING

- A. Adjust tightness of mechanical and electrical connections to manufacturer's recommended torque settings.

3.03 CLEANING

- A. Clean dirt and debris from switch enclosures and components according to manufacturer's instructions.
- B. Repair scratched or marred exterior surfaces to match original factory finish.

END OF SECTION

SECTION 265100
INTERIOR LIGHTING

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Interior luminaires.
- B. Emergency lighting units.
- C. Exit signs.

1.02 RELATED REQUIREMENTS

- A. Section 260529 - Hangers and Supports for Electrical Systems.
- B. Section 260533.16 - Boxes for Electrical Systems.

1.03 SUBMITTALS

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings:
 - 1. Indicate dimensions and components for each luminaire that is not a standard product of the manufacturer.
- C. Product Data: Provide manufacturer's standard catalog pages and data sheets including detailed information on luminaire construction, dimensions, ratings, finishes, mounting requirements, listings, service conditions, photometric performance, installed accessories, and ceiling compatibility; include model number nomenclature clearly marked with all proposed features.
 - 1. LED Luminaires:
 - a. Include estimated useful life, calculated based on IES LM-80 test data.

1.04 QUALITY ASSURANCE

- A. Comply with requirements of NFPA 70.
- B. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

1.05 DELIVERY, STORAGE, AND PROTECTION

- A. Receive, handle, and store products according to NECA/IESNA 500 (commercial lighting), NECA/IESNA 502 (industrial lighting), and manufacturer's written instructions.
- B. Keep products in original manufacturer's packaging and protect from damage until ready for installation.

1.06 WARRANTY

- A. See Section 017800 - Closeout Submittals, for additional warranty requirements.

PART 2 PRODUCTS

2.01 LUMINAIRE TYPES

- A. Furnish products as indicated in luminaire schedule included on the drawings.

2.02 LUMINAIRES

- A. Manufacturers: As indicated in luminaire schedule included on the drawings.
- B. Provide products that comply with requirements of NFPA 70.
- C. Provide products that are listed and labeled as complying with UL 1598, where applicable.

- D. Provide products listed, classified, and labeled as suitable for the purpose intended.
- E. Unless specifically indicated to be excluded, provide all required conduit, boxes, wiring, connectors, hardware, supports, trims, accessories, etc. as necessary for a complete operating system.
- F. LED Luminaires:
 - 1. Components: UL 8750 recognized or listed as applicable.
 - 2. Tested in accordance with IES LM-79 and IES LM-80.
 - 3. LED Estimated Useful Life: Minimum of 50,000 hours at 70 percent lumen maintenance, calculated based on IES LM-80 test data.

2.03 EMERGENCY LIGHTING UNITS

- A. Manufacturers: As indicated in luminaire schedule included on the drawings.
- B. Description: Emergency lighting units complying with NFPA 101 and all applicable state and local codes, and listed and labeled as complying with UL 924.
- C. Operation: Upon interruption of normal power source or brownout condition exceeding 20 percent voltage drop from nominal, solid-state control automatically switches connected lamps to integral battery power for minimum of 90 minutes of rated emergency illumination, and automatically recharges battery upon restoration of normal power source.
- D. Battery:
 - 1. Sealed maintenance-free lead calcium unless otherwise indicated.
 - 2. Size battery to supply all connected lamps, including emergency remote heads where indicated.
- E. Diagnostics: Provide power status indicator light and accessible integral test switch to manually activate emergency operation.
- F. Provide low-voltage disconnect to prevent battery damage from deep discharge.

2.04 EXIT SIGNS

- A. Description: Exit signs complying with NFPA 101 and applicable state and local codes, and listed and labeled as complying with UL 924.
 - 1. Number of Faces: Single- or double-face as indicated or as required for installed location.
 - 2. Directional Arrows: As indicated or as required for installed location.
- B. Powered Exit Signs: Internally illuminated with LEDs unless otherwise indicated.
 - 1. Manufacturers: As indicated in luminaire schedule included on the drawings.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that field measurements are as indicated.
- B. Verify that outlet boxes are installed in proper locations and at proper mounting heights and are properly sized to accommodate conductors in accordance with NFPA 70.
- C. Verify that suitable support frames are installed where required.
- D. Verify that branch circuit wiring installation is completed, tested, and ready for connection to luminaires.
- E. Verify that conditions are satisfactory for installation prior to starting work.

3.02 PREPARATION

- A. Provide extension rings to bring outlet boxes flush with finished surface.

- B. Clean dirt, debris, plaster, and other foreign materials from outlet boxes.

3.03 INSTALLATION

- A. Coordinate locations of outlet boxes provided under Section 260533.16 as required for installation of luminaires provided under this section.
- B. Install products in accordance with manufacturer's instructions.
- C. Install luminaires securely, in a neat and workmanlike manner, as specified in NECA 500 (commercial lighting) and NECA 502 (industrial lighting).
- D. Provide required support and attachment in accordance with Section 260529.
- E. Install luminaires plumb and square and aligned with building lines and with adjacent luminaires.
- F. Install accessories furnished with each luminaire.
- G. Bond products and metal accessories to branch circuit equipment grounding conductor.
- H. Emergency Lighting Units:
 - 1. Unless otherwise indicated, connect unit to unswitched power from same circuit feeding normal lighting in same room or area. Bypass local switches, contactors, or other lighting controls.
- I. Exit Signs:
 - 1. Unless otherwise indicated, connect unit to unswitched power from same circuit feeding normal lighting in same room or area. Bypass local switches, contactors, or other lighting controls.

3.04 FIELD QUALITY CONTROL

- A. See Section 014000 - Quality Requirements, for additional requirements.
- B. Inspect each product for damage and defects.
- C. Operate each luminaire after installation and connection to verify proper operation.
- D. Test self-powered exit signs, emergency lighting units, and fluorescent emergency power supply units to verify proper operation upon loss of normal power supply.
- E. Correct wiring deficiencies and repair or replace damaged or defective products. Repair or replace excessively noisy ballasts as determined by Architect.

3.05 CLEANING

- A. Clean surfaces according to manufacturer's instructions to remove dirt, fingerprints, paint, or other foreign material and restore finishes to match original factory finish.

END OF SECTION

SECTION 311000

SITE CLEARING

PART 1. GENERAL

1.01 DESCRIPTION

- A. Work consists of all labor, materials, equipment and services necessary for and incidental to the execution of SITE CLEARING as indicated on the Drawings and specified herein.
- B. Include:
 - 1. Layout and staking for limit of disturbance.
 - 2. Clearing, grubbing and removing of unneeded materials, existing structures, debris, bituminous and concrete paving and curb, tree, shrub and vegetation removal and disposal.
- C. Demolition work as specified herein, is not intended to be performed as a wrecking operation but as preparatory work relative to the performance of the various construction operation of the Project.
- D. Items involved in the demolition and/or excavation, such as foundations, sidewalks and curbs, shall not be classified as rock.

1.02 RELATED WORK IN OTHER SECTIONS

- A. SECTION 311000, EARTHWORK
- B. SECTION 315000, EXCAVATION SUPPORT SYSTEMS
- C. SECTION 312500, SEDIMENT AND EROSION CONTROL

1.03 PROJECT CONDITIONS

Accept the site in the condition in which it exists at the date of award of the Contract.

1.04 HISTORIC AND SCIENTIFIC FINDS

- A. All articles of historical or scientific value, including coins, bottles, utensils, tools, fossils and articles of antiquity which may be encountered or uncovered during process of the Work shall become the property of DNREC.
- B. Report such findings to the Architect immediately for determination of method of removal and final disposition.

PART 2. PRODUCTS

As required to complete the Work.

PART 3. EXECUTION

3.01 PREPARATION

- A. Contact "Miss Utility" (Phone number is 811) for location of utilities prior to beginning the Work.
- B. Protection: Exercise care during demolition work to confine demolition operations to the areas indicated on the Drawings.

1. The physical means and methods used for protection are at the Contractor's option. However, the Contractor shall be responsible and restitution work of whatever nature at no expense to DNREC.
 2. Protect the existing structures, walls and associated infrastructure from damage during demolition and construction activities. All damage shall be replaced or repair at the Contractor's expense, to the satisfaction of DNREC.
 3. If public safety is endangered during the progress of the demolition work, provide adequate protective measures to protect pedestrian and vehicular traffic.
 4. Signs, signals, and barricades used shall conform to State and local requirements.
- C. Provide protection of lawn and plant material as required throughout construction.
1. Protect existing lawn, trees and shrubs to remain from damage from construction operations.
 2. Existing plant material and lawn destroyed or damaged by construction operations shall be replaced by the Contractor at no cost to DNREC, and as approved by DREC's Representative.
- D. Layout limits of clearing with stakes and obtain approval of staked limits from DNREC's Representative prior to clearing.
- E. Prevent equipment from entering areas which are not designated to be cleared or disturbed.
- F. Use of Explosives: The use of explosives will not be permitted.

3.02**MATERIAL TO BE DISPOSED OF**

- A. All material resulting from demolition and clearing and not identified to be salvaged, shall become the property of the Contractor and shall be legally disposed of off-site.
- B. Disposal shall be performed as promptly as possible and not left until the final clean up. Burning of debris on the site will not be permitted.

3.03**CLEARING AND GRUBBING**

- A. Clearing shall consist of the removal of trees, weeds, vines, rubbish and debris, bituminous and concrete paving, curb and miscellaneous items shown on the Drawings.
- B. Grubbing shall consist of the removal of all stumps, root mats, foundations or other buried items and debris which interfere with the Work. Such removal shall be carried to a depth of not less than one (1) foot below subgrades.
- C. Backfill to level of subgrade in the area of demolished items in accordance with Section 312000, EARTHWORK.

PART 4. MEASUREMENT AND PAYMENT

No measurement for payment of these items of work will be made since their cost shall be included in the lump sum price bid.

-END OF SECTION-

SECTION 312000

EARTHWORK

PART 1. GENERAL

1.01 DESCRIPTION

- A. Work consists of all labor, materials equipment and services necessary for and incidental to the execution and completion of EARTHWORK, as indicated on the Drawings and specified herein.
- B. Include:
 - 1. Layout and staking.
 - 2. Excavation, trenching, and rough grading.
 - 3. Establishing subgrades, leveling and proof rolling.
 - 4. Filling, backfilling and compaction.

1.02 RELATED WORK IN OTHER SECTIONS

- A. SECTION 312000, SITE CLEARING
- B. SECTION 312500, SEDIMENT AND EROSION CONTROL

1.03 DEFINITIONS

- A. Excavation Classification: All excavation, except rock as defined in Item B below, shall be unclassified. The Bid price shall include all materials required to be excavated, except for rock, whether wet or dry and regardless of the character of the materials.
- B. Rock Excavation: Natural geologic formations which defy removal by track-mounted equipment as defined below. Additional payment for rock removal and off-site disposal shall be made in accordance with the Contract provisions affecting changes in the Work.
 - 1. Open Excavation and Grading: Rock in excess of the capabilities of a Caterpillar Model No. 953 with 2 cubic yard capacity bucket or equivalent loader.
 - 2. Closed Excavation (i.e.: trenches, pits and footings): Rock in excess of the capabilities of a Caterpillar Model 225C-LC or equivalent power excavator, using a rock bucket (0.8 cubic yard capacity).
 - 3. Minimum Effort: If rock is not removed during the process of normal digging and ripping, then extend the excavation to expose the rock surface within the limit of original excavation. Contact the Department's Representative for further direction.
- C. Earth Excavation: All materials except Item 1.03.D below.
- D. Unsuitable Materials: Debris, man-made or fabricated materials, organic material, and soft, expansive or unstable matter which cannot be field compacted to densities specified. Excessive moisture content shall not classify a material as unsuitable.
- E. Soils Architect or Inspection Agency: An agency and its designated representative who monitor and approve all earthwork operations described herein.

- F. In the case of conflicts, the Contractor shall notify the Architect in writing immediately and request clarification or direction prior to ordering or installing any component of the utility work. Failure to notify the Architect of conflicts will result in immediate rejection of the change order requests by the Architect for materials ordered or work in place.

1.04 REFERENCES AND QUALITY ASSURANCE

- A. Reference Standards:
1. American Association of State Highway and Transportation Officials (A.A.S.H.T.O.).
 2. American Society for Testing and Materials (A.S.T.M.).
 3. Occupational Safety and Health Administration (O.S.H.A.).
- B. Tolerances: As specified herein.
- C. Testing: As specified herein.

1.05 SUBMITTALS

- A. Contact DNREC's Representative, Regulatory Agencies and Soils Architect for notification or Inspection of the Work as follows:
1. Prior to commencement of the Work.
 2. Encounter with unknown utilities.
 3. Subgrades before filing or installation of new construction.
 4. Areas for testing.
- B. List of all equipment to be used for the Work.

1.06 JOB CONDITIONS

- A. Existing Conditions: Accept the site in the condition which it exists at the date of the award of the Contract.
- B. Contact "Miss Utility" (Phone Number is 811) for location of utilities prior to beginning the Work.
- C. Existing Utilities: Locate existing underground utilities in areas of Work. If utilities are to remain, provide adequate means of protection during earthwork operations.
- D. Use of Explosives: The use of explosives will not be permitted.

1.07 PROTECTION

- A. Safety: Provide protective measures necessary for the safety of workmen, the general public and adjacent property. Prevent cave-ins and collapse of walls, structures and slopes, both on and adjacent to the site.
- B. Standards: Comply with regulations of local authorities having jurisdiction, including all applicable Occupational Safety and Health Administration (O.S.H.A.) requirements.
- C. Repair: Include the removal of damaged materials and replacement with new materials (in accordance with the Contract Documents) where such materials are affected by settlement.
- D. Utilities:
Movement of construction machinery and equipment over pipes and utilities during

construction shall be at the Contractor's risk. Perform work adjacent to existing utilities as indicated in accordance with procedures outlined by utility company or Architect. Excavation made with power-driven equipment is not permitted within two feet of known utilities or subsurface construction. For work immediately adjacent to or for excavations exposing a utility or other buried obstruction, excavate by hand. Start hand excavation on each side of the indicated obstruction and continue until the obstruction is uncovered or until clearance for the new grade is assured. Support uncovered lines or other existing work affected by the contract excavation until approval for backfill is granted by the utility company. Report damaged utility lines or subsurface construction immediately to the utility company, DNREC, and City of Cambridge.

PART 2. PRODUCTS**2.01 FILL AND BACKFILL****A. General**

1. Granular materials shall be classified in accordance with A.A.S.H.T.O. guidelines as either A-1 (sand and gravel), A-2 (sand and fines) or A-3 (sand), and the minimum dry unit weight shall not be less than 110 pounds per cubic foot (PCF) maximum dry density as determined by A.S.T.M. D-1557 (Modified Proctor).
2. Fine-grained shall be classified in accordance with A.A.S.H.T.O. guidelines as either A-4 (silt), A-5 (silt), A-6 (clay) or A-7 clay with a minimum dry unit weight not less than 105 pounds per cubic foot (PCF) maximum dry density as determined by A.S.T.M. D-1557 (Modified Proctor).
3. All backfill shall be clean earth material free of all organic materials, mulch or other foreign objects. Only materials which have been approved by the Department's Representative or Soils Architect shall be used for fill and backfill.

B. Minimum Requirements

1. Structures: On-site materials or off-site borrow in accordance with Item 2.01.A.1 (Granular) above, excluding classifications A-2-6 and A-2-7, unless approved otherwise by the Soils Architect.
2. Roads, Service Drives, Parking Areas and Walks: On-site materials or off site borrow in accordance with Item 2.01. A.1 (Granular) or Item 2.01.A.2 (Fine Grained) above, unless approved otherwise by the Soils Architect.
3. Utilities: Backfill shall be made with the earth removed from the trench provided that the materials are in accordance with Item 2.01. A.1 (Granular) or Item 2.01.A.2 (Fine Grained) above. If off-site borrow is required, it shall be in accordance with Item 2.01.A.1 (Granular) or Item 2.01.A.2 (Fine grained) above.
4. Lawns and Unpaved Areas: On-site or off-site borrow in accordance with Item 2.01.A.1 (Granular) or Item 2.01.A.2 (Fine grained) above.

PART 3. EXECUTION**3.01 EXCAVATION**

- A. Excavation consists of removal and disposal of material encountered when establishing required finish grade or subgrade elevations.
- B. Unauthorized Excavations:

1. Unauthorized excavation consists of removal of materials beyond indicated subgrade elevations or dimensions without specific direction of the Soils Architect. Unauthorized excavation, as well as remedial work directed by the Soils Architect, shall be at Contractor's expense.
 2. Under footings, foundation bases, retaining walls, etc., fill unauthorized excavation by extending indicated bottom elevation of footing or base to excavation bottom, without altering required top elevation. Lean concrete fill may be used to bring elevations to proper position when acceptable by the Soils Architect. The cost of this concrete fill shall be at the Contractor's expense.
- C. Additional Excavation: When excavation has reached required subgrade elevations, notify the Department's Representative and Soils Architect who will make an inspection of conditions.
1. If unsuitable materials are encountered at required subgrade elevations, carry excavations deeper and replace excavated materials as directed by the Soils Architect.
 2. Payment for removal of unsuitable material below subgrade and its replacement shall be made in accordance with the Contract provisions affecting changes in the Work.
- D. Stability of Excavations: Slope of excavations to comply with O.S.H.A. and local codes and ordinances having jurisdiction. Shore and brace where sloping is not possible because of space restrictions or stability of materials excavated. Maintain sides and slopes of excavations in safe conditions until completion of backfilling.
- E. Material Storage: Stockpile suitable excavated materials where directed, until required for backfill. Place, grade and shape stockpiles for proper drainage. Protect as necessary.
1. Stockpile soil materials in a manner to maintain moisture content within the specified optimum range.
 2. Locate and retain soil materials form edge of excavations.
 3. Dispose of excess soil material and waste materials as herein specified and as shown on the Drawings.
- F. Excavation for Drainage in Revetment Structures: Conform to elevations and dimensions shown within a tolerance of plus or minus 0.30 foot, and extending sufficient distance from, other construction and for inspection.
1. In excavating for footings and foundations, do not disturb bottom of excavation.
 2. Excavate by hand to final grade just before concrete is placed and trim bottoms to required lines and grades to leave solid base to receive other work.
- G. Excavation for Trenches: Excavate trenches to the uniform width required for the particular item to be installed, sufficiently wide to provide ample working room.
1. Excavate trenches to depth indicated or required. Carry depth of trenches for piping to establish indicated flow lines and invert elevations.
 2. Where rock is encountered, carry excavation 6 inches below required elevation and backfill with a 6 inch layer of crushed stone or gravel prior to installation of pipe. Payment for this effort shall be made in accordance with the Contract provisions affecting changes in the Work.

3. Grade bottoms of trenches as indicated, notching under pipe bells to provide solid bearing for entire barrel of pipe.
 4. Do not backfill trenches until tests and inspection have been made and backfilling is authorized by the Department's Representative or Soils Architect. Use care in backfilling to avoid damage or displacement of pipe systems.
- H. Excavation for Stone and Bituminous Pavements: Cut surface under pavements to comply with cross-section, elevations and grades as shown on the Drawings. Where rock is encountered, carry excavation 12 inches below subgrade and backfill with suitable materials approved by the Soils Architect.
- I. Cold Weather Protection: Protect bottom of excavations against freezing when atmospheric temperature is less than 35 degrees. F. (1 degree C.).
- J. Ground Surface Preparation (Structural Areas):
1. The existing ground surface which will receive fill shall be stripped of topsoil, root mat, unsatisfactory soils, concrete spoil, obstructions and deleterious material to a minimum depth of 1 foot below existing grade (refer to SECTION 02110, SITE CLEARING). The entire area shall be compacted, a minimum of four (4) passes, with a suitable compactor. Upon completion of the stripping and compaction, the area shall then be proofrolled with appropriate equipment (gross weight greater than 30 tons). Soft spots identified by the Soils Architect during profiling will be undercut and backfilled in accordance with Item 3.03 below. Proofrolling and compaction equipment shall be as necessary to meet the requirement of Item 3.02 below. Payment for undercutting and backfilling to eliminate soft spots shall be made accordance with the Contract provisions affecting changes in the work.
 2. Immediately prior to the construction of paving or slabs, the entire subgrade shall again be proofrolled in the presence of the Soils Architect. Soft areas encountered during proofrolling shall be undercut and backfilled using materials meeting the requirement set forth in Item 2.01. The cost of this work, including replacement of fills placed by the Contractor, shall be included in the Base Bid.
- K. Earthwork Quantities: Contractor shall be responsible for determining earthwork quantities for the completion of the Work.
- L. Dewatering: Contractor shall be responsible for controlling all forms of surface and subsurface water, from whatever source at no additional cost to DNREC. Plan for and provide the structures, equipment, and construction for the collection and disposal of surface and subsurface water encountered (when applicable) in the course of construction. Drainage and dewatering necessary for completion of the work specified is considered to be incidental to the construction. The Contractor shall include all costs for equipment, labor and incidentals in the respective Bid Item associated with each aspect of the work. No additional cost will be paid by DNREC for drainage and/or dewatering activities. The Contractor shall conduct the activities subject to approval of DNREC. The Contractor will be required to conduct the drainage and/or dewatering activities as necessary to control the release of sediment from the project site. The Contractor's attention is directed to the boring logs that indicate the groundwater at the time of the geotechnical investigations was at or near the ground surface. The water table at the site is subject to seasonal variations and may be at or near the surface during construction.

1. Drainage: Surface water shall be directed away from excavation and construction sites so as to prevent erosion and undermining of foundations. Diversion ditches, dikes and grading shall be provided and maintained as necessary during construction. Excavated slopes and backfill surfaces shall be protected to prevent erosion and sloughing. Excavation shall be performed so that the site and the area immediately surrounding the site and affecting operations at the site shall be continually and effectively drained.
2. Dewatering: Groundwater flowing toward or into excavations shall be controlled to prevent sloughing of excavation slopes and walls, boils, uplift and heave in the excavation and to eliminate interference with orderly progress of construction. French drains, sumps, ditches or dewatering trenches will not be permitted within 3 feet of the foundation of any structure, except with specific written approval, and after specific contractual provisions for restoration of the foundation area have been made. Control measures shall be taken by the time the excavation reaches the water level in order to maintain the integrity of the in-situ material. While the excavation is open, the water level shall be maintained continuously, at least 2 feet below the working level.

Operate the dewatering system until work below existing water levels is complete. Measure and record the performance of the dewatering system at the same time each day with observation wells and piezometers installed in conjunction with the dewatering system. The Contractor shall maintain a back-up pump and system on site available for immediate use.

- M. Structures and Surfaces: Protect "shurry wall", newly backfilled areas and adjacent structures, slopes, or grades from traffic, erosion settlement, or any other damage. Repair and reestablish damaged or eroded grades and slopes and restore surface construction prior to acceptance. Protect existing streams, ditches, and non-tidal wetland areas from water borne soil as indicated on the contract drawings.

1. Disposal of Excavated Material: Dispose of excavated material so that it will not obstruct the flow of runoff, streams, endanger a partly finished structure, impair the efficiency or appearance of any facilities, or be detrimental to the completed work.

3.02 COMPACTION

- A. General: Control soil compaction during construction, providing minimum percentage of maximum dry density specified for each area classification.
- B. Percentage of Maximum Density Requirements: Compact soil to not less than the following percentages of the maximum dry density for in-place soils which exhibit a well-defined moisture density relationship determined in accordance with A.S.T.M. D-1557 (Modified Proctor).
1. Lawn or Unpaved Areas: Compact after proofrolling, each layer of backfill or fill materials, to 90% of maximum dry density per ASTM D-1557.
 2. Structural backfill: Compact after proofrolling, and each layer of backfill (unless aggregate is specified) or fill materials, to the following density:
 - Fills supporting the revetment 98% of maximum dry density or foundations per ASTM D-1557
 - Fills within top 1 foot 98% of maximum dry density of revetment subgrade per ASTM D-1557 subgrade
 - Fills below top 1 foot 90% of maximum dry density of finished pavement per ASTM D-1557 subgrade
- C. Moisture control: The soils used in fill and backfill shall be moistened or aerated to within 3 percentage points of the optimum at no additional cost to DNREC.
1. Where the soil layer is too dry, the Contractor shall apply water uniformly using suitable equipment to increase the moisture content to within two (2) percentage points of the optimum.
 2. Where the soil layer is too wet, the Contractor shall dry the soils by plowing, discing, or any other method necessary to aerate the soil and reduce the moisture content to within two (2) percentage points of the optimum.
- D. Compaction equipment shall be as required to complete the Work.

3.03 BACKFILL AND FILL

- A. General: Place acceptable soil material in layers to the required subgrade elevations, for each area classification listed under Item 2.01.B above. Fill and backfill within 1 foot of finished subgrade located below walkways and pavements shall be constructed of granular soils meeting the requirements of Item 2.01.A.1 unless directed otherwise by the Soils Architect.
- B. Backfill excavations as promptly as work permits, but not until completion of the following:
1. Acceptance of construction below finish grade including, where applicable, damproofing, waterproofing, etc.
 2. Inspection, testing, approval and recording locations of underground utilities.
 3. Removal of concrete formwork.
 4. Removal of trash and debris.
- C. Placement and Compaction: Place backfill and fill materials in layers not more than six (6) inches in loose depth for material compacted by heavy compaction equipment and not more than four (4) inches in loose depth for material compacted by hand

operated tampers.

1. Before compaction, moisten or aerate each layer as necessary to provide moisture content within the specified limits. Do not place backfill or fill material on surfaces that are muddy, frozen or contain frost or ice.
2. Place backfill and fill materials evenly adjacent to structures, to the required elevations. Take care to prevent wedging action of backfill against structures by carrying material uniformly around each structure to approximately the same elevation in each lift.

3.04 GRADING

- A. General: Uniformly grade areas within the limit of disturbance including adjacent transition areas. Smooth finished surfaces with specified tolerances, compact with uniform levels and slopes between points where elevations are shown, or between such points and existing grades.
- B. Grading Outside Structure Lines: Grade areas adjacent to structure lines to drain away from structures and to prevent ponding. Finish surfaces free from irregular surface changes and as follows:
 1. Lawn or unpaved areas: Finish areas to receive topsoil, not more than .10 foot above or below required subgrade elevations.
 2. Walks: Shape surface or areas under walks to line, grade and cross-section with finish surface not more than .10 foot above or below required subgrade elevation.
 3. Pavements: Shape surface areas under pavement to line, grade and cross-section with finish surface not more than .04 foot for bituminous surfaces, and .10 foot for stone surfaces, above or below the required subgrade elevation.

3.05 MAINTENANCE

- A. Protection of Graded Areas: Protect newly graded and compacted areas from traffic and erosion. Keep free of trash and debris. Repair and re-establish grades in settled, eroded and rutted areas to specified tolerances.
- B. Reconditioning Compacted Areas: Where completed compacted areas are disturbed by subsequent construction operations or adverse weather, scarify, reshape and compact to required density prior to further construction. The cost of reconditioning shall be at the expense of the Contractor.

3.06 DISPOSAL OF EXCESS, UNSUITABLE AND WASTE MATERIALS

- A. All excess and unsuitable soil materials shall be legally disposed of off-site.
- B. All waste materials shall be disposed of off-site in accordance with applicable regulations of Agencies having jurisdiction.
- C. Burning of debris and waste materials on the site shall not be permitted.

3.07 SURFACE PREPARATION

- A. Stockpiling Topsoil: Strip suitable soil from the site where excavation or grading is indicated and stockpile separately from other excavated material. Material unsuitable for use as topsoil and backfilling shall be wasted at an approved, legal location at the Contractor's expense. Locate topsoil so that the material can be used readily for the finished grading. Where sufficient existing topsoil conforming to the material requirements is not available on site, provide borrow materials suitable for use as topsoil. Protect topsoil and keep in segregated piles until needed.
- B. Cutting Pavement: Saw cut with neat, parallel, straight lines one foot wider than trench width on each side of trenches and one foot beyond each edge of pits.

3.08 FIELD QUALITY CONTROL

- A. Quality Control Testing During Construction: Allow Inspection Agency to inspect and approve subgrades and fill layers before further Work is performed.
 - 1. Perform field density tests in accordance with A.S.T.M. D-1556 (Sand Cone method) or A.S.T.M. D-2922 (Shallow Depth Nuclear method), as applicable.
 - 2. Paved Areas: make at least one field density test of subgrade for every 500 square feet of paved area, but in no case less than 6 tests. In each compacted fill layer, make one field density test for every 500 square feet of paved area, but in no case less than 6 tests.

3.09 TESTING AND INSPECTION

- A. INSPECTION AGENCY: The Contractor shall retain an independent Inspection Agency or Soils Architect to inspect and test construction embankments, fills, backfills, and subgrades and certify to DNREC's Representative conformance in all particulars relating to specification requirements.
 - 1. Scheduling:
 - a. Inspection Agency will assign qualified personnel to be on site at all times when operations are scheduled.
 - b. No earthwork operation shall be permitted in the absence of the Inspection Agency unless authorized by DNREC's Representative.
 - 2. Responsibilities of Inspection Agency:
 - a. Certification of subgrade preparation and suitability.
 - b. Moisture content and field density tests on all layers of material placed.
 - 3. Results of Tests: Provide results of test to the Department's Representative and Contractor immediately upon completion of the area.
 - 4. Final Report: The Department's Representative shall be provided with a written report indicating that the Work has been completed in accordance with the Drawings and Specification, prior to final payment of earthwork to the

Contractor.

B. Testing and Inspection shall be performed at the Contractor's cost.

PART 4. MEASUREMENT AND PAYMENT

No measurement for payment of these items of work will be made since their cost shall be included in the lump sum price bid.

--END OF SECTION--

NOT FOR BIDDING PURPOSES

SECTION 312500

SEDIMENT AND EROSION CONTROL

PART 1. GENERAL

1.01 DESCRIPTION

- A. Work consists of all labor, equipment and services necessary for and incidental to the execution and completion of SEDIMENT AND EROSION CONTROL as indicated on the Drawings and specified herein.
- B. Include:
 - 1. Measures to prevent erosion and runoff of earth and silt.
 - 2. Methods to prevent the transport of sediment off-site by construction vehicles.
 - 3. Air quality and dust control.
 - 4. Compliance with all requirements of the Kent County Soil Conservation District and DNREC approvals.
 - 5. Record keeping and project monitoring per the Project manual and requirements of all project approvals from authorities having jurisdiction.

1.02 RELATED WORK IN OTHER SECTIONS

- A. All Division 2 through 33 Specification Sections.

1.03 REFERENCES AND QUALITY ASSURANCE

- A. "Delaware Erosion & Sediment Control Handbook – February 2019"
- B. The Contractor shall employ a responsible person involved in the Project who has a Certificate of Attendance at a DNREC approved training program for the control of sediment and erosion.

PART 2. PRODUCTS

All erosion control materials shall be as noted on the Drawings or as specified by the appropriate QUALITY ASSURANCE references.

PART 3. EXECUTION

The Contractor shall notify the KSCD, the Architect, and DNREC seventy-two (72) hours prior to the start of construction.

3.01 GRADING

- A. Initial demolition and disturbance will be limited to that necessary to gain access to the site and to revetment construction in accordance with the approved Sequence of Operations.
- B. Work shall be accomplished such that existing surface drainage is not impaired, a potential hazard is not created, hazardous erosion will not occur or sediment will not collect in existing drainage systems.
- C. Refer to the Drawings for appropriate sequencing of construction.

3.02 DRAINAGE CONTROL

- A. Drainage shall be controlled before it can cause erosion, if such is feasible, or it shall be directed into stable areas at non-erosive velocities in a manner consistent with established practices for erosion control.
- B. Additional measures to control velocities and/or erosion will be installed in the field as directed by the KSCD Inspector as required. Payment for this additional effort shall be made in accordance with the Contract provisions affecting changes in the Work.

3.03 DUST CONTROL

Provide water or approved techniques as necessary to reduce airborne dust at no additional cost to DNREC.

3.04 DAILY INSPECTION

The Contractor shall inspect all sediment control devices at the end of each day and after each rainfall to insure that the devices are functional.

3.05 PERMANENT STABILIZATION AND FINAL RESTORATION

- A. Unless otherwise noted on the Drawings, all Sediment Control Devices shall be removed at the end of the project and the areas occupied by these devices shall be stabilized in accordance with the Drawings and other applicable sections of the Specifications.
- B. Any excess soil, stone or erosion control materials shall become the property of the Contractor and shall be removed from the site at no additional cost to DNREC.

PART 4. MEASUREMENT

No measurement for payment for this work will be made except as explicitly noted above, since the cost shall be included in the lump sum price bid.

END OF SECTION -

SECTION 315000
EXCAVATION SUPPORT SYSTEMS

PART 1. GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 & 3 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. This Section includes, but is not limited to, the following:
1. Shoring and bracing necessary to protect the existing buildings, streets, parking lots, walkways, utilities, and other improvements and protection against loss of ground or caving embankment.
 2. Maintenance of shoring and bracing.
 3. Removal of shoring and bracing, as required.
- B. Types of shoring and bracing systems include, but are not limited to, the following:
1. Steel H-section (soldier) piles.
 2. Timber lagging.
 3. Steel sheet piles.

1.03 SUBMITTALS

- A. Layout drawings for excavation support system and other data prepared by, or under the supervision of, a qualified professional engineer. System design and calculations must be acceptable to local authorities having jurisdiction.

1.04 QUALITY ASSURANCE

- A. Engineer Qualifications: A professional engineer legally authorized to practice in jurisdiction where the Project is located and experienced in providing successful engineering services for excavation support systems similar in extent required for this Project.
- B. Supervision: Engage and assign supervision of excavation support system to a qualified professional engineer foundation consultant.
- C. Submit name of engaged consultant and qualifying technical experience.
- D. Regulations: Comply with codes and ordinances of governing authorities having jurisdiction.

1.05 JOB CONDITIONS

- A. Before starting work, verify governing dimensions and elevations. Verify condition of adjoining properties. Take photographs to record any existing settlement or cracking of structures, pavements, and other improvements. Prepare a list of such damages, verified by dated photographs, and signed by Contractor and others conducting investigation.
- B. Survey adjacent structures and improvements, employing qualified professional engineer, establishing exact elevations at fixed points to act as benchmarks. Clearly identify benchmarks and record existing elevations.
- C. During excavation, resurvey benchmarks weekly, maintaining accurate log of surveyed elevations for comparison with original elevations. Promptly notify Engineer if changes in elevations occur or if cracks, sags, or other damage is evident.

1.06 EXISTING UTILITIES

- A. Protect existing active sewer, water, gas, electricity and other utility services and structures.
- B. Notify municipal agencies and service utility companies having jurisdiction. Comply with requirements of governing authorities and agencies for protection, relocation, removal, and discontinuing of services.

PART 2. PRODUCTS**2.01 MATERIALS**

- A. General: Provide adequate shoring and bracing materials which will support loads imposed. Materials need not be new, but should be in serviceable condition.
- B. Structural Steel: ASTM A 300.
- C. Steel Sheet Piles: ASTM A 328.
- D. Timber Lagging: Any species, rough-cut, mixed hardwood, nominal 3 inches thick, unless otherwise indicated.

PART 3. EXECUTION**3.01 SHORING**

- A. Wherever shoring is required, locate the system to clear permanent construction and to permit forming and finishing of concrete surfaces. Provide shoring system adequately anchored and braced to resist earth and hydrostatic pressures.
- B. Shoring systems retaining earth on which the support or stability of existing structures is dependent must be left in place at completion of work.

3.02 BRACING

- A. Locate bracing to clear columns, floor framing construction, and other permanent work. If necessary to move a brace, install new bracing prior to removal of original brace.
- B. Do not place bracing where it will be cast into or included in permanent concrete work, except as otherwise acceptable to Engineer.
- C. Install internal bracing, if required, to prevent spreading or distortion of braced frames.

- D. Maintain bracing until structural elements are supported by other bracing or until permanent construction is able to withstand lateral earth and hydrostatic pressures.
- E. Remove sheeting, shoring, and bracing in stages to avoid disturbance to underlying soils and damage to structures, pavements, facilities, and utilities.
- F. Repair or replace, as acceptable to Engineer, adjacent work damaged or displaced through installation or removal of shoring and bracing work.

PART 4. MEASUREMENT AND PAYMENT

No measurement for payment of these items of work will be made since their cost shall be included in the lump sum price bid.

-END OF SECTION-

NOT FOR BIDDING PURPOSES

SECTION 329219

SEEDING FOR LAWNS AND GRASSES

PART 1. GENERAL:

1.01 SUMMARY:

- A. This work shall cover all operations incidental to the establishment of turf grass and upland meadow grasses, including the furnishing of seed, preparation of the seed bed, sowing of seed, applying mulch, and maintenance of the planting until establishment, all in accordance with this Project Manual and at locations indicated on the Plans.

1.02 DEFINITIONS:

- A. Finish Grade: Elevation of finished surface of planting soil.
- B. Planting Soil: Native or imported topsoil, manufactured topsoil, or surface soil modified to become topsoil; mixed with soil amendments.
- C. Subgrade: Surface or elevation of subsoil remaining after completing excavation, or top surface of a fill or backfill immediately beneath planting soil.

1.03 SUBMITTALS:

- A. Product Data: For each type of product indicated.
- B. Product certificates.
- C. Planting Schedule: Indicating anticipated planting dates.

1.04 QUALITY ASSURANCE:

- A. Work described under this specification shall be performed by a contractor with a minimum of five years of experience in successfully establishing meadow or prairie plantings composed of species native to the Mid-Atlantic.
- B. Installer's Field Supervision: Require Installer to maintain a full-time supervisor, with a minimum of 5 years' experience in similar applications, on Project site when planting is in progress.
- C. Topsoil Analysis: Furnish soil analysis by a qualified soil-testing laboratory.

PART 2. PRODUCTS:

2.01 SEED:

- A. Seed Quality:
 - 1. The pure live seed (PLS) value for each species of seed to be planted shall match or compensate for a percentage value of 100. This value shall be obtained by testing each species of seed for the percent purity and the germination percent of the seed lot and multiplying the two values to determine the PLS value. Seed which has a PLS value less than that indicated shall have the specified quantity adjusted to meet the intended pure live seed yield. The adjusted quantity to be sown shall be calculated as follows:

$$\text{Adjusted lb/acre} = \frac{\text{Intended PLS} \times \text{Intended lb/acre}}{100}$$

Actual PLS

2. Seeds having a total inert matter and weed seed content greater than 20% shall be rejected. Any sample containing greater than 1% by weight of seed species other than the species intended shall be rejected.

B. Seed Source:

1. All seed shall be obtained from a source within 100 miles of the planting site. If the Contractor is unable to locate a source within the said area, the contractor shall submit an alternate source to the Landscape Architect for approval. All seed shall be guaranteed by the vendor to be true to its name and variety. All seed furnished shall be guaranteed to be from the origin specified.

2. Sources: (other sources meeting the above requirements may be submitted)

ERNST Conservation Seeds
9006 Mercer Pike
Meadville, PA 16335
1-800-873-3321

Lotts Seed
9327 US Route 1
Suite J
Laurel, MD 20723
1-800-732-3322

C. Documentation:

1. A minimum of thirty days prior to the time of seeding, the Contractor shall provide for the approval of the Landscape Architect, a written description of the Meadow Mixes showing the following:
 - a. Name and location of the seed supplier for each species of seed.
 - b. Origin and date of harvest of each species of seed.
 - c. A statement of the purity and germination rate of each species of seed.
 - d. The estimated number of seeds/lb. for each species of seed.
 - e. The percentage by weight for each seed species in a Meadow Mix.

D. Packing and Storage:

1. Seeds shall be packed in suitable bags for delivery according to standard commercial practice. Each bag shall be tagged and labeled. If it is necessary to store the seeds after their arrival on the work site, they shall be stored in an approved weatherproof building in such a manner so as to protect the seeds from deterioration and to permit easy access for inspection. The Landscape Architect's approval of the storage building and the method of storage shall not relieve the contractor of his/her responsibilities for the quality and fitness of the seeds at the time of their use.

E. Seed Mixes:

1. Seed mixtures shall be proportioned by weight; Mixing of the individual varieties of seed to form such mixtures shall be performed in accordance with these specifications. The seed quantities indicated per acre for seed shall be the amount of 100% pure live seed per acre for each species listed. Seed which has actual pure live seed yield according to tests less than the intended yield will have the specified quantity adjusted to meet the intended pure live seed yields. See Table 2 for quality of seed according to seed species for lawn mix

Table 1: GENERAL LAWN MIX

<u>Common Name</u>	<u>% by Weight</u>	<u>Min % Purity</u>	<u>Min % Germination</u>
-Turf Type Tall Fescue (Rebel II, Tribute)	80	95	85
-Perennial Ryegrass (Palmer, Prelude)	10	95	85
-Kentucky Bluegrass (Georgetown, Baron, Merit)	10	95	85

F. Nurse Crop:

1. Meadow Mix shall also include a quantity of Annual Rye Grass to act as a nurse crop in the establishment of the meadow. Seed mixes planted between March 1 and June 15 shall include 5 lbs/acre of Annual Rye Grass. Seed mixes planted between August 1 and October 15 shall include 15 lbs/acre of Annual Rye Grass. Annual Rye Grass shall be of a commercial grade meeting the requirements of the State Seed Law. Seed labeled with the notation "germination below standard" shall not be used. Seed shall not be used after one year from date of germination test shown on the label.
2. The nurse crop shall be cut back at the end of one year.

2.02 SEEDING EQUIPMENT:

A. Disk:

1. The disk shall meet the approval of the Landscape Architect and have sound unbroken blades, which have a minimum diameter of 15 inches. The disk shall be weighted, if necessary, to obtain the required tillage depth of 2 inches.

B. Slope Harrow:

1. Slope harrows shall consist of a rolling mass (weight) attached by heavy chain to a tractor. The chain shall be of a suitable length, shall have picks welded to the links, and shall have a means of rotating the picks as the rolling mass (weight) is pulled in a direction parallel to the movement of the tractor.

C. Cultipacker:

1. The roller or cultipacker shall have rollers at least 300 mm (12 in.) in diameter and shall be of sufficient mass (weight) to pulverize the clods of soil. A double gang style shall be used.

D. Rangeland Type Grass Drill with Interseeding attachment:

1. These seeders shall be designed specifically for the seeding of native grasses and shall be approved by the Landscape Architect prior to use. When seeding over existing turf, the rangeland type grass drill shall be equipped with a no-till interseeding attachment that is capable of cutting a slit in the soil free of leaves and debris, placing the seed in the slit, and compacting the seed into the soil of the slit.

E. Additional Equipment:

1. Any other equipment needed for proper seeding shall be furnished by the Contractor in consultation with the Landscape Architect.

2.03 SEED PREPARATION:

- A. All seeds shall be treated and propagated in the following methods depending on the type of treatment necessary. Table 3 identifies the seed treatment for each seed species.
- B. Cold Moist Stratification (CM):
 1. Seed species identified with this treatment type shall be cold moist stratified if they are to be planted between March 1 and July 15. Seed planted between August 1 and October 15 do not require this treatment. To perform cold-moist stratification, seeds are mixed in damp builder sand, vermiculite, or old saw dust at a ratio between 1:1 and 2:1 stratifying material to seed. The mixture is loosely packed and refrigerated at a temperature of 34-40°F in airtight bags for 10-120 days depending on species. Check with the State Agricultural Extension or other sources to determine required period of stratification. Care should be taken that seeds do not start to sprout before they are planted.
- C. Cold Dry Stratification (CD):
 1. Seed species identified with this treatment type shall be cold dry stratified if they are to be planted between March 1 and July 15. Seed planted between August 1 and October 15 do not require this treatment. The dry seed shall be placed in plastic bags and refrigerated at a temperature of 34-40° F until planting.

2.04 MATERIALS:

- A. Topsoil: ASTM D 5268, pH range of 5.5 to 7, a minimum of 4 percent organic material content; free of stones 1 inch (25 mm) or larger in any dimension and other extraneous materials harmful to plant growth.
 1. Topsoil Source: Reuse surface soil stockpiled on-site and supplement with imported or manufactured topsoil from off-site sources when quantities are insufficient. Verify suitability of stockpiled surface soil to produce topsoil.
 2. Organic content shall not be less than 4 percent. Mechanical analysis shall be as follows:

Min. % passing (by weight)

50 mm	100
4.75 mm	90
2.00 mm	80
2.0-0.050 mm (sand)	20-75
0.050-0.002 mm (silt)	10-60
less than 0.002 (clay)	0-15

3. Acceptable Soil Test Results:

pH Range	5.5 - 7.0

Organic Matter	Minimum 4%
Magnesium - Mg	105-225 pounds per acre (ppa)
Phosphorus - P ₂ O ₅	140-250 pounds per acre (ppa)
Potassium - K ₂ O	450 pounds per acre (ppa)
Soluble Salts/Conductivity	Not to exceed 900 parts per million (ppm) in soil. Not to exceed 3000 parts per million (ppm) in high organic mixes.

Amend on site stock piled top soil as necessary to meet the above minimum requirements

B. Inorganic Soil Amendments:

1. Lime: ASTM C 602, Class T or O, agricultural limestone containing a minimum 80 percent calcium carbonate equivalent.
2. Sulfur: Granular, biodegradable, containing a minimum of 90 percent sulfur, with a minimum 99 percent passing through No. 8 (2.35-mm) sieve and a maximum 10 percent passing through No. 40 (0.425-mm) sieve.
3. Iron Sulfate: Granulated ferrous sulfate containing a minimum of 20 percent iron and 10 percent sulfur.
4. Aluminum Sulfate: Commercial grade, unadulterated.

C. Organic Soil Amendments:

1. Compost: Well-composted, stable, and weed-free organic matter, pH range of 5.5 to 8.
2. Wood Derivatives: Decomposed, nitrogen-treated sawdust, ground bark, or wood waste, of uniform texture, free of chips, stones, sticks, soil, or toxic materials.
3. Leaf Mold: Thoroughly shredded, well-composted leaf material, free of trash such as 'Leafgro' or approved equal.
4. Pine Fines: Aged at least 9 months and screened with a pH range between 4 and 4.3; Pro Base, as manufactured by Summit Inc., Wakefield, Va. or approved equal.

D. Fertilizer:

1. Bonemeal: Commercial, raw or steamed, finely ground.
2. Superphosphate: Commercial, phosphate mixture, soluble; a minimum of 20 percent available phosphoric acid.
3. Commercial Fertilizer: Commercial-grade complete fertilizer of neutral character, consisting of fast- and slow-release nitrogen, 50 percent derived from natural organic sources of urea formaldehyde, phosphorous, and potassium.
4. Slow-Release Fertilizer: Granular or pelleted fertilizer consisting of 50 percent water-insoluble nitrogen, phosphorus, and potassium.

E. Mulches:

1. Straw Mulch: Provide air-dry, clean, mildew- and seed-free, salt hay or threshed straw of wheat, rye, oats, or barley.
2. Compost Mulch: Well-composted, stable, and weed-free organic matter, pH range of 5.5 to 8.

PART 3. EXECUTION

3.01 SITE PREPARATION:

A. Lawn Preparation:

1. Newly Graded Subgrades: Loosen subgrade to a minimum depth of 4 inches (100 mm). Remove stones larger than 1 inch (25 mm) in any dimension and sticks, roots, rubbish, and other extraneous matter and legally dispose of them off the Department's property. Delete first subparagraph below if not required in accordance with Section 2.4. Coordinate with "Planting Soil Mix" Article in Part 2.
 - a. Apply fertilizer directly to subgrade before loosening at rates dictated by soil test results.
 - b. Spread topsoil, apply soil amendments and fertilizer on surface, and thoroughly blend planting soil mix.
 - c. Spread planting soil mix to a minimum depth of 4" (100mm) but not less than required to meet finish grades after light rolling and natural settlement. Do not spread if planting soil or subgrade is frozen, muddy, or excessively wet.
2. Unchanged Subgrades: If lawns are to be planted in areas unaltered or undisturbed by excavating, grading, or surface soil stripping operations, prepare surface soil as follows:
 - a. Remove existing grass, vegetation, and turf. Do not mix into surface soil.
 - b. Loosen surface soil to a depth of at least 4 inches (100 mm). Apply soil amendments and fertilizers according to planting soil mix proportions and mix thoroughly into top 4 inches (100 mm) of soil. Till soil to a homogeneous mixture of fine texture.
 - c. Remove stones larger than 1 inch (25 mm) in any dimension and sticks, roots, trash, and other extraneous matter.
 - d. Legally dispose of waste material, including grass, vegetation, and turf, off the Department's property.
3. Finish Grading: Grade planting areas to a smooth, uniform surface plane with loose, uniformly fine texture. Grade to within plus or minus 1/2 inch (13 mm) of finish elevation. Roll and rake, remove ridges, and fill depressions to meet finish grades. Limit fine grading to areas that can be planted in the immediate future.
4. Moisten prepared lawn areas before planting if soil is dry. Water thoroughly and allow surface to dry before planting. Do not create muddy soil.
5. Restore areas if eroded or otherwise disturbed after finish grading and before planting.

B. Meadow Area Preparation:

1. Areas with existing vegetation shall be mowed with debris removed from site. Remove stones larger than 1 inch (25 mm) in any dimension and sticks, roots, rubbish, and other extraneous matter and legally dispose of them off the Department's property.
2. The area with existing vegetation shall be sprayed with glyphosate according to the manufacturer's recommendations. Other herbicides may be considered if necessary upon approval of the Landscape Architect. Application shall be repeated as necessary until existing vegetation is dead. Dead vegetation shall be mowed and loose debris removed from the site. Existing root mat and soil shall not be disturbed.
3. In areas with slopes of 3:1 or less soil shall be compacted to 80% using a water filled roller or cultipacker. Areas which are steeper than 3:1 shall not be compacted until after seeding.
4. If lawn areas are seeded before the meadow mix, care shall be taken that the lawn areas are not damaged or disturbed. In case of any disturbances or damages, the contractor shall assume responsibility and shall repair all damages and reseed.
5. If the meadow mix is seeded before the lawn mix, care shall be taken that the meadow areas are not damaged or disturbed. In case of any disturbances or damages, the contractor shall assume responsibility and shall repair all damages and reseed.
6. The Landscape Architect reserves the right to point out any damages done by the contractor for a period of 1 year after the work has been carried out to ensure the visibility of such damages. Repair of these damages shall be the responsibility of the Contractor.

3.02 SEEDING OF MEADOW:**A. Season of Work:**

1. No seed shall be sown in high winds or when the ground is not in proper condition for seeding. No seed shall be sown until the purity test has been carried out and the seed meets all the requirements mentioned under Section 2.1 A. Seeding shall be carried out between March 1st and June 15th or between August 1st and October 15th. If possible, seeding shall be performed before a forecasted rain event.

B. Planting Bed:

1. For bare earth seeding, seed bed preparation shall not be started until all stones, boulders, debris and similar material larger than 1 inch in diameter have been removed.
2. The prepared surface shall be relatively free from weeds, clods, stones, roots, sticks, rivulets, gullies, crusting and caking. No seeds shall be sown until the seed bed has been approved by the Landscape Architect.

C. Method of Seeding:

1. Native Seed Drilling: Drill seeding should be done immediately after the last cultivation and roller packing. When using a native seed drill, care shall be taken to ensure that the seed is clean and free of straw. The ground speed of the seed drill shall be 2-3 miles an hour. Seeding depth shall be $\frac{1}{2}$ " in clay, silt, or loam soils and $\frac{3}{4}$ " in sandy soils. Care shall be taken to cover the site completely and evenly. Corners should be slightly overlapped to avoid gaps when turning. The site shall be covered entirely once. The second time the site shall be covered at right angles to the first pass to prevent row effect. The seed- tube windows of the seed drill shall be monitored continuously to ensure they do not become plugged. Occluded seed-tubes shall be cleaned out as soon as they become clogged.
 2. In areas that are too small or tight to operate drill seeding equipment, seed shall be hand broadcast. Ensure even coverage of seed to match the rate accomplished by the drill seed operation. Once seed is broadcast, rake seed lightly into top 1/8 inch of topsoil.
- D. Reseeding and Remulching:
1. Any area failing to establish a stand due to weather conditions or adverse soil conditions shall be reseeded and remulched as directed by the Landscape Architect. Areas where trees and shrubs are planted in the meadow areas after initial seeding shall be reseeded and remulched so that the entire meadow area is seeded and mulched upon completion of planting.

3.03 APPLYING MULCH:

A. General:

1. The following criteria shall be followed in regard to mulching. Straw mulch (including hay) shall be used on all areas and slopes $1\frac{1}{2}$ to 1 or flatter. Wood cellulose fiber mulch shall be used on slopes steeper than $1\frac{1}{2}$ to 1. The Engineer may make adjustments in the type of mulch to meet local conditions on the job. The straw shall be placed within 24 hours of seeding.

B. Straw Mulch:

1. Straw shall be applied at the rate of approximately two tons per acre (4.5 Mg per hectare). The straw mulch may be anchored with 100 gal. of asphalt per acre (93.5 L of asphalt per hectare). The asphalt may be sprayed on the straw as it leaves the blower or it may be applied in a separate operation. The Contractor shall be responsible for any damage to the structures from the asphalt spray. Straw mulch around buildings, sidewalks or other structures may be held in place with a form of netting or may be sprayed with asphalt by hand while protecting the structures from the asphalt spray. Other types of chemical mulch binders may be substituted for asphalt material. These mulch binders shall be applied according to the manufacturers' specifications through the asphalt spray system or by an agricultural crop sprayer.

C. Hydraulic Application of Wood Cellulose Fiber as a Mulching Agent:

1. Equipment: Hydraulic equipment shall be used for the application of a slurry of prepared wood cellulose fiber and water. This equipment shall have a built-in agitation system with an operating capacity sufficient to agitate, suspend, and homogeneously mix a slurry of the specified amount of fiber and water. The

slurry distribution lines shall be large enough to prevent stoppage. This discharge line shall be equipped with a set of hydraulic spray nozzles which will provide even distribution of the mixture or slurry in the various areas to be mulched. The slurry tank shall have a minimum capacity of 1,000 gal (3 750 L) and shall be mounted on a traveling unit which may be either self-propelled or drawn, with a separate unit which will place the slurry tank and spray nozzles within sufficient proximity to the areas to be mulched to provide uniform distribution without waste.

2. Preparation of Slurry and Application of Mulch: Wood cellulose fiber shall be applied at a minimum rate of 1,500 lbs. (1 680 kg) net dry weight per acre (ha) when seeding bare soil or new construction. The wood cellulose fiber and water shall be combined into the slurry tank for distribution. The agitator shall be operating at a rate sufficient to keep materials in suspension at the time such material is added. Spraying may commence at such time as the full complement of water has been mixed into the slurry. It is the intent of this Specification to maintain the slurry, during the spraying operation, as a homogenous mixture of suspended solids in the tank until the tank is emptied.

3.04 SEEDING FOR LAWN:

- A. Season of seeding shall be the same as the season for seeding of meadow.
- B. Sow seed at the rate of 5 to 8 lb/1000 sq. ft. (2.3 to 3.6 kg/92.9 sq. m).
- C. Rake seed lightly into top 1/8 inch (3 mm) of topsoil, roll lightly, and water with fine spray.
- D. Protect seeded areas with slopes not exceeding 1:6 by spreading straw mulch. Spread uniformly at a minimum rate of 2 tons/acre (42 kg/92.9 sq. m) to form a continuous blanket 1-1/2 inches (38 mm) in loose depth over seeded areas. Spread by hand, blower, or other suitable equipment.
- E. Protect seeded areas from hot, dry weather or drying winds by applying compost mulch within 24 hours after completing seeding operations. Soak and scatter uniformly to a depth of 3/16 inch (4.8 mm) and roll to a smooth surface.

3.05 SATISFACTORY LAWNS:

- A. Satisfactory Seeded Lawn: At end of maintenance period, a healthy, uniform, close stand of grass has been established, free of weeds and surface irregularities, with coverage exceeding 90 percent over any 10 sq. ft. (0.92 sq. m).
- B. Reestablish lawns that do not comply with requirements and continue maintenance until lawns are satisfactory.

3.06 TURF MAINTENANCE:

- A. Begin maintenance immediately after each area is planted and continue until acceptable lawn is established, but for not less than the following periods:
Seeded Lawns: 60 days from date of Substantial Completion.
- B. Mow lawn as soon as top growth is tall enough to cut. Remove no more than 40 percent of grass-leaf growth in initial or subsequent mowing's.

NOT FOR BIDDING PURPOSES

PART 4 MEASUREMENT AND PAYMENT

No measurement for payment for this work will be made, since the cost shall be included in the lump sum price bid.

--END OF SECTION--

NOT FOR BIDDING PURPOSES

SECTION 32 92 23 - SODDING

PART 1. GENERAL:

1.01 DESCRIPTION:

Sodding shall consist of preparing the ground area, furnishing, and placing approved sod at such locations as may be indicated on the plans, or as directed and in reasonably close conformity with the requirements of these specifications.

PART 2. MATERIALS

- 2.01** Sod shall be well rooted from high quality seed of known origin and native to the locality of the work. The Owners representative reserves the right to visit the proposed sod source prior to the granting of a source approval. Sod shall be stripped, delivered and laid within a period of 36 hours. Sod stripped and/or delivered but not laid within this period shall be rejected.

<u>Common Name</u>	<u>% by Weight</u>	<u>Min. % Purity</u>	<u>Min % Germination</u>
Mix No. 1 (General Lawn)			
-Rebel II or Tribute Tall Fescue	80	95	85
-Palmer or Prelude Perennial Ryegrass	10	95	85
-Georgetown or Baron Kentucky Bluegrass	10	95	85

- 2.02** Sod shall be free of objectionable grassy and broadleaf weeds. Sod shall be considered free of such weeds if less than 5 such plants are found per 10 square yards of area. Sod shall not be acceptable if it contains any of the following weeds: common bermudagrass (wiregrass), quackgrass, johnsongrass, poison ivy, nutsedge, nimblewill, dandelions, Canada thistle, bindweed, bentgrass, wild garlic, ground ivy, perennial sorrel and brome grass.

- 2.03** Sod shall be reasonably free of thatch, diseases, nematodes and soil-borne insects. All sod must display the official State Certification tags of the State from which the sod originated.

- A. Cutting Sod. Before stripping, sod shall be mowed uniformly at a height of 1 to 2 ½ inches. Sod shall be machine cut at a uniform soil thickness of ½ inch plus or minus ¼ inch, at the time of cutting. Measurement for thickness shall exclude top growth and thatch.

PART 3. EXECUTION

3.01 PLACING:

- A. Sod shall be placed only when the soil is moist and favorable to growth. Sod shall not be placed between November 1 and April 1, unless weather and soil conditions are considered favorable and permission is granted.
- B. Preparation of sub grade:

1. Work shall proceed only after rough grading has been completed and the subgrade is within 2/10 of 1 inch (.2 inches) from final subgrade. If the graded area develops volunteer weed growth, the growth must be eliminated at the expense of the general contractor.
2. Grades which have been previously established in conformance with the drawings and/or other applicable specifications shall be maintained in a true and even grade.
3. Lime shall be spread based on soil test recommendations. Lime shall be distributed uniformly over designated areas and worked into the soil in conjunction with an expanded tillage operation as described below. If the subsoil is heavy clay, apply 50 pounds of gypsum per 1000 square feet in addition to the limestone.
4. After the areas have been brought to grade, the subgrade shall be loosened by disking or by scarifying to a depth of 2"-4" inches. This is especially critical when topsoil is to be added.
5. All fertilizers shall be uniform in composition, free flowing and suitable for application with approved equipment. Fertilizers shall be delivered to the site fully labeled according to applicable State Fertilizer laws and shall bear the name or trade-mark and warranty of the producer. Applications shall be determined by soil test recommendations and shall be applied with approved granular roots product.

C. Laying the Sod.

1. The sod shall be placed on the prepared surface with the edges in close contact. Each strip or section of sod shall be fitted and rolled into place with hand rollers.
2. After slopes of either cuts or fills have been shaped to conform to the finished grade and cross-section shown on the plans, the shoulders and toes of the slope shall be rounded off to a 5 foot radius.
3. On all slopes, sod shall be laid with the long edges parallel to the contour starting at the bottom of the slope. Successive strips shall be neatly matched and all joints staggered or broken. When placing sod in drainage ditches, the length of the strip shall be laid parallel to the direction of the flow of the water. Where the sod may be displaced during sodding operations, the workers when replacing it shall work from ladders or treated planks to prevent further displacement.
4. Each strip or section of sod placed on slopes 1:3 (vertical to horizontal) and steeper and surface drainage V-shaped or flat bottom ditches or gutters shall be staked securely with at least two stakes or pins spaced not more than 24 inches apart with the flat side against the slope. Stakes may be wood wedges and shall be ½ inch by 1 inch by 12 inches to ½ inch by 1 inch by 24 inches as required by soil condition, driven so that the last 1 inch remains above the top of the sod, or T-shaped pins, machine bent from 15 inch pieces. Wire pins shall be driven flush with the top of the sod.
5. When sodding adjacent to a sidewalk, curb, pavement, or retaining walls, sufficient allowance shall be made in grading for the thickness of the sod, so that when placed the sod shall be tamped to insure tight joints and a smooth

level surface. As the top of the slope is reached the sod shall be trimmed to a line placed a fixed distance from the break of the bank and along the entire length of the cut or fill. The top of the bank shall have been previously graded, so that the sod when applied shall come flush with the average level of the top of the bank. All surfaces shall be uniform in appearance and reasonably true to line and grade.

3.02 MAINTENANCE

- A. The contractor shall water the sod immediately after placement to a depth sufficient so that the underside of the new sod pad(s) and soil immediately below the sod are thoroughly wet and it shall be kept moist until growth is established. All sod in which shrinking, burning or turning brown occurs shall be rejected, removed and replaced.
- B. A satisfactory stand of grass from sod as determined by the Owner shall be required. To be acceptable, a stand of grass from sod must display an even flush of growth and show evidence of soil surface contact, minimal undermining or erosion.
- C. All sod, placed as specified above, shall be watered three times at two week intervals, beginning one week from placement and initial watering or as determined by the Owner based on site conditions. Watering shall be applied over the sod with a fan type nozzle, whether applied remotely by hand hose or directly by hydroseeder.

3.03 CLEAN-UP

- A. Upon the completion of this section, final cleaning shall be done within the limits of the project and shall consist of completely cleaning the project of excess material, sweeping pavements and structures of dirt and rubbish, and the removal of any unused material which will mar the appearance of the project or repairing any areas as determined by the Owner as not meeting the specifications.

PART 4 MEASUREMENT

No measurement for payment of these items of work will be made since their cost shall be included in the lump sum bid.

--END OF SECTION--

SECTION 32 93 00 - TREES, SHRUBS AND GROUND COVERS

PART 1. GENERAL:

1.01 SUMMARY

- A. This Section includes the following:
 - 1. Trees.
 - 2. Shrubs.
 - 3. Groundcover.
 - 4. Perennials.

1.02 DEFINITIONS

- A. Finish Grade: Elevation of finished surface of planting soil.
- B. Planting Soil: Native or imported topsoil, manufactured topsoil, or surface soil modified to become topsoil; mixed with soil amendments.
- C. Sub-grade: Surface or elevation of subsoil remaining after completing excavation, or top surface of a fill or backfill, before placing planting soil.

1.03 SCHEDULE

- A. Planting shall not begin until final sub-grade has been established and approved by the Landscape Architect. Under no circumstance shall any work be done if weather or soil conditions are not satisfactory.
- B. The planting season shall be as follows: Trees, Shrubs and Groundcover – April 1 to June 1 or September 15 to November 1
- C. Variations in the schedule will be permitted with the approval of the Department representative. Requests must be submitted in writing.

1.04 QUALITY ASSURANCE

- A. Installer Qualifications: A qualified landscape installer who maintains an experienced full-time supervisor on Project site when exterior planting is in progress and has five years of documented experience.
- B. Topsoil Analysis: Furnish soil analysis by a qualified soil-testing laboratory.
- C. Provide quality, size, genus, species, and variety of exterior plants indicated, complying with applicable requirements in ANSI Z60.1, "American Standard for Nursery Stock."
- D. Pre-installation Conference: Conduct conference at Project site.

1.05 QUALIFICATIONS

- A. Nursery: Company with five years documented experience specializing in growing and cultivating the plants.
- B. Installer: Company with five years documented experience specializing in installing and planting the plants.
- C. All work specified shall be performed by qualified personnel experienced in this type of work. Prior to awarding of the Contract, the Contractor shall submit to the Landscape

Architect for approval the subcontractor proposed for the landscape work specified herein. The subcontractor shall be a member in good standing of one of the following organizations:

1. Associated Landscape Contractors of America.
2. American Association of Nurserymen.
3. A member of the Landscape and Nurserymen's Association of Delaware.

1.06 ENVIRONMENTAL REQUIREMENTS

- A. Do not install plants when ambient temperatures rise above 90 degrees F.
- B. In general, do not install plants when temperatures are expected to fall below 35 degrees F within a week
- C. Do not install plants when wind velocity exceeds 30 mph.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Do not prune trees and shrubs before delivery. Protect bark, branches, and root systems from sun scald, drying, sweating, whipping, and other handling and tying damage. Do not bend or bind-tie trees or shrubs in such a manner as to destroy their natural shape. Provide protective covering of exterior plants during delivery. Do not drop exterior plants during delivery.
- B. Deliver exterior plants after preparations for planting have been completed and install immediately. If planting is delayed more than six hours after delivery, set exterior plants in shade, protect from weather and mechanical damage, and keep roots moist.

1.08 WARRANTY

- A. Special Warranty: Warrant the following exterior plants, for the warranty period indicated, against defects including death and unsatisfactory growth, except for defects resulting from lack of adequate maintenance, neglect, or abuse by DNREC, or incidents that are beyond Contractor's control.
 1. Warranty Period for Plant Material: One year from date of Substantial Completion.
- B. Trees shall be considered dead if the main leader or if 25% or more of the canopy has died back. Deciduous plants, installed during the dormant season, shall be guaranteed to break dormancy. During the warranty period, immediately remove and replace dead or unhealthy plants as directed by DNREC or DNREC's Representative.
- C. Replacements shall be made with plants of same size, quality and species as originally specified, unless adequate cause is given to select a replacement species. All replacement species must be approved by the Department.
- D. All plants replaced within the one-year Warranty period shall be guaranteed an additional year. If the plant does not survive the second replacement (third planting), the Contractor shall not be responsible for any further replacements.

1.09 MAINTENANCE

- A. Trees and Shrubs: Maintain during construction period until project acceptance by the Department by pruning, cultivating, watering, weeding, fertilizing, restoring planting saucers, tightening and repairing stakes and guy supports, and resetting to proper

grades or vertical position, as required to establish healthy, viable plantings. Spray as required to keep trees and shrubs free of insects and disease.

- B. Ground Cover and Perennials: Maintain during construction period by watering, weeding, fertilizing, and other operations as required to establish healthy, viable plantings.

PART 2. PRODUCTS:

2.01 EXTERIOR PLANTS

- A. Tree and Shrub Material: Furnish nursery-grown trees and shrubs complying with ANSI Z60.1, with healthy root systems developed by transplanting or root pruning. Provide well-shaped, fully branched, healthy, vigorous stock free of disease, insects, eggs, larvae, and defects such as knots, sun scald, injuries, abrasions, and disfigurement. Tree whips and seedlings shall have healthy, vigorous root systems and branching.
- B. Ground Cover: Provide ground cover of species indicated, established and well rooted in pots or similar containers, and complying with ANSI Z60.1.
- C. Perennials: Provide healthy, field-grown plants from a commercial nursery, of species and variety shown or listed.

2.02 PLANTING MATERIALS

- A. Topsoil: ASTM D 5268, pH range of 5.5 to 6.5, a minimum of 4 percent organic material content; free of stones 1 inch (25 mm) or larger in any dimension and other extraneous materials harmful to plant growth.

Topsoil Source: Reuse surface soil stockpiled on-site and supplement with imported or manufactured topsoil from off-site sources when quantities are insufficient. Verify suitability of stockpiled surface soil to produce topsoil.

1. Organic content shall not be less than 4 percent. Mechanical analysis shall be as follows:

	<u>Min. % passing (by weight)</u>
50 mm	100
4.75 mm	90
2.00 mm	80
2.0-0.050 mm (sand)	20-75
0.050-0.002 mm (silt)	10-60
less than 0.002 (clay)	0-15

2. Acceptable Soil Test Results:

pH Range	5.5 – 6.5
Organic Matter	Minimum 4%
Magnesium - Mg	105-225 pounds per acre (ppa)
Phosphorus - P ₂ O ₅	140-250 pounds per acre (ppa)
Potassium - K ₂ O	450 pounds per acre (ppa)
	Soluble Salts/ Conductivity
	Not to exceed 900 parts per million (ppm)
	in soil. Not to exceed 3000 parts per
	million (ppm) in high organic mixes.

B. Inorganic Soil Amendments:

1. Lime: ASTM C 602, Class T or O, agricultural limestone containing a minimum 80 percent calcium carbonate equivalent.
2. Sulfur: Granular, biodegradable, containing a minimum of 90 percent sulfur, with a minimum 99 percent passing through No. 60 (250-µm) sieve and a maximum 10 percent passing through No. 40 (475-µm) sieve.
3. Aluminum Sulfate: Commercial grade, unadulterated.

C. Organic Soil Amendments:

1. Compost: Well-composted, stable, and weed-free organic matter, pH range of 5.5 to 8; moisture content 35 to 55 percent by weight; 100 percent passing through 3/4-inch (19-mm) sieve.
2. Wood Derivatives: Decomposed, nitrogen-treated sawdust, ground bark, or wood waste; of uniform texture, free of chips, stones, sticks, soil, or toxic materials.
3. Leaf Mold: Thoroughly shredded, well-composted leaf material, free of trash such as 'leafgro' or approved equal.
4. Pine Fines: Aged at least 9 months and screened with a pH range between 4 and 4.3; Pro Base, as manufactured by Summit Inc., Wakefield, Va. or approved equal.

D. Fertilizer:

1. Bonemeal: Commercial, raw or steamed, finely ground.
2. Superphosphate: Commercial, phosphate mixture, soluble; a minimum of 20 percent available phosphoric acid.
3. Commercial Fertilizer: Commercial-grade complete fertilizer of neutral character, consisting of fast- and slow-release nitrogen, 50 percent derived from natural organic sources of urea formaldehyde, phosphorous, and potassium.
4. Slow-Release Fertilizer: 10-10-10 granular or pelleted fertilizer consisting of 50 percent water-insoluble nitrogen, phosphorus, and potassium.

E. Mulches:

1. Organic Mulch: Double-shredded hardwood bark.

2. Compost Mulch: Well-composted, stable, and weed-free organic matter, pH range of 5.5 to 8; moisture content 35 to 55 percent by weight; 100 percent passing through 1-inch (25-mm) sieve.

PART 3. EXECUTION

3.01 EXTERIOR PLANTING

A. Bed Establishment:

1. Loosen and rototill subgrade of planting beds to a minimum depth of 12 inches (150 mm).
2. Remove stones larger than 1 inch (25 mm) in any dimension and sticks, roots, rubbish, and other extraneous matter and legally dispose of them off the Department's property.
3. Thoroughly blend planting soil mix with organic additives off-site before spreading, apply soil amendments and fertilizer on surface, and thoroughly blend planting soil mix.
4. Spread planting soil amendments to specified depth and till to a depth of 6 inches (150 mm) to 8 inches (200 mm). Do not spread if planting mix or subgrade is frozen, muddy, or excessively wet.
5. Finish Grading: Grade planting beds to a smooth, uniform surface plane with loose, uniformly fine texture. Rake, remove ridges, and fill depressions to meet finish grades.

B. Trees and Shrubs:

1. Pits and Trenches: Excavate circular pits with sides sloped inward. Trim base leaving center area raised slightly to support root ball and assist in drainage. Do not further disturb base. Scarify sides of plant pit smeared or smoothed during excavation. Excavate approximately three times as wide as ball diameter.
2. Set trees and shrubs plumb and in center of pit or trench with 1/8 of root ball above adjacent finish grades.
 - a. Balled and Burlapped: Remove burlap and wire baskets from tops of root balls and partially from sides, but do not remove from under root balls. Remove pallets, if any, before setting. Do not use planting stock if root ball is cracked or broken before or during planting operation.
 - b. Container Grown: Carefully remove root ball from container without damaging root ball or plant.
 - c. Fabric Bag Grown: Carefully remove root ball from fabric bag without damaging root ball or plant. Do not use planting stock if root ball is cracked or broken before or during planting operation.
 - d. Bare root material shall be kept moist until planting. If root systems become dry, plant material will be rejected. Plant to maintain finished grade with top of root system, so that all roots are covered with soil.
 - e. Place planting soil mix around root ball in layers, tamping to settle mix and eliminate voids and air pockets. When pit is approximately one-half backfilled, water thoroughly before placing remainder of backfill. Repeat

watering until no more water is absorbed. Water again after placing and tamping final layer of planting soil mix.

3. Organic Mulching: Apply 2-inch (50-mm) average thickness of organic mulch extending 12 inches (300 mm) beyond edge of planting pit or trench. Do not place mulch within 3 inches (75 mm) of trunks or stems.
- C. Tree and Shrub Pruning: Prune, thin, and shape trees and shrubs according to standard horticultural practice. Prune trees to retain required height and spread. Do not cut tree leaders; remove only injured or dead branches from flowering trees. Prune shrubs to retain natural character. Shrub sizes indicated are sizes after pruning.
- D. Ground Cover and Perennial Planting:
1. Set out and space ground cover and plants as indicated on prepared bed.
 2. Dig holes large enough to allow spreading of roots, and backfill with planting soil.
 3. Work soil around roots to eliminate air pockets and leave a slight saucer indentation around plants to hold water.
 4. Apply slow-release fertilizer at manufacturer's recommendations
 5. Water thoroughly after planting, taking care not to cover plant crowns with wet soil.
 6. Protect plants from hot sun and wind; remove protection if plants show evidence of recovery from transplanting shock.
- F. Planting Bed Mulching:
1. Mulch backfilled surfaces of planting beds and other areas indicated. Apply 3-inch (75-mm) average thickness of mulch, and finish level with adjacent finish grades. Do not place mulch against plant stems.
- G. Protect exterior plants from damage due to landscape operations, operations by other contractors, and trades, and others. Maintain protection during installation and maintenance periods. Treat, repair, or replace damaged exterior planting.
- H. Remove surplus soil and waste material, including excess subsoil, unsuitable soil, trash and debris, and legally dispose of them off the Department's property.

PART 4 MEASUREMENT

No measurement for payment of these items of work will be made since their cost shall be included in the lump sum bid.

--END OF SECTION--

SECTION 334400

STORM DRAIN PIPING, FITTINGS AND APPURTENANCES

PART 1. GENERAL

1.01 SCOPE

- A. The Contractor shall provide all materials, labor, equipment and services necessary for furnishing and installing all storm drain piping, fittings, and appurtenant items to the size, dimensions, lines grades, elevations and types as shown on the contract drawings or as directed by the Engineer.
- B. The Contractor shall adhere to the terms of the various permits and approval issued for this project. This shall include permits and approvals from Kent County Soil Conservation District, and any other applicable permits.
- C. The Contractor shall give all notices and comply with all laws, ordinances, rules and regulations applicable to work. If the Contractor observes that the Specifications and/or Drawings are at variance therewith, he will give DNREC prompt written notice thereof. If the Contractor performs any work knowing it to be contrary to such laws, ordinances, rules and regulations, and without such notice to DNREC, he will bear all costs arising therefrom.
- D. The Contractor shall submit certifications to the Engineer that all pipes, fittings, joints, etc. are as specified herein.
- E. All pipe, fittings, etc. shall be stored in an approved manner that will protect them from harmful exposure to the elements and the hazards of construction procedures. Locations of storage sites and methods of storage for materials and equipment will be subject to approval by DNREC.
- F. Related work not included in this Section consists of the following:
 - 1. Earthwork provided under Section 02200.
- G. Related Documents: The general provisions of the Contract, including the General Conditions, DIVISION 1 - GENERAL REQUIREMENTS and the "Maryland Department of Transportation, State Highway Administration Standards and Specifications for Construction and Materials, July, 2023" and all supplements and addenda pertaining thereto apply to this Section.

1.02 SUBMITTALS

- A. Shop Drawings: Furnish complete shop drawings before delivery of any material to the job site.
- B. Product Data:
 - 1. Material list of items proposed to be provided under this section.
 - 2. Manufacturer's specifications and other data needed to prove compliance with the specified requirements.
 - 3. Names and addresses of the nearest service and maintenance organization that readily stocks repair parts.
 - 4. Manufacturer's recommended installation procedures which, when approved by the Engineer, will become the basis for accepting or rejecting actual

installation procedures used on the work.

1.03 DELIVERY, STORAGE, AND HANDLING

- A. Delivery and Storage: Inspect materials delivered to site for damage. Unload and store with minimum handling. Store materials on site in enclosures or under protective covering. Store plastic piping and jointing materials, and rubber gaskets under cover out of direct sunlight. Do not store materials directly on the ground. Keep inside of pipes and fittings free of dirt and debris.
- B. Handling: Handle pipe, fittings and other accessories in a manner to ensure delivery to the trench in sound undamaged condition. Take special care to avoid injury to coatings and linings on pipe and fittings; make satisfactory repairs if coatings or linings are damaged. Carry, do not drag pipe to the trench. Store rubber gaskets and piping and jointing materials that are not to be installed immediately, under cover out of direct sunlight.

PART 2. MATERIALS

2.01 STORM DRAIN PIPING

- A. Corrugated Plastic Pipe (CPP) as shown on the Plans. The Pipe shall be ADS N-12 as manufactured by Advanced Drainage Systems, London, Ohio (800-733-9554) or an approved equal. The Contractor shall use the longest length of pipe that is feasible for him to handle (20' minimum length). Pipe joints shall be silt tight with gaskets. The Contractor shall use ADS N-12 Fabricated Fittings and Pro Link ST couplers or an approved equal. Split Fittings will generally not be accepted and will only be permitted in limited circumstances subject to the approval of the Engineer.
- B. Polyvinyl Chloride (PVC) Pipe for small diameter (12" or less) gravity stormdrain pipes as shown on the Plans.
 - 1. All small diameter gravity stormdrain pipe shall be equal to the sizes indicated on the contract drawings and shall be equal to or exceed the requirements of ASTM D3034-SDR 35. Pipe shall be manufactured in standard lengths not exceeding 20 feet. Pipe shall be J-M Pipe Ring-Tite PVC Gravity Sewer Pipe or equal.
 - 2. All small diameter gravity stormdrain pipe sections shall be marked with the manufacturer's name or trademark, nominal pipe size, and the date and location of where the pipe was manufactured.
 - 3. All joints for the small diameter gravity stormdrain pipes and fittings shall be of the elastomeric gasket joint. Joint tightness shall be established by assembling two sections of pipe according to manufacturer's recommendations and subjecting joint to 25 psi hydrostatic pressure without leakage.
 - 4. Rubber sealing rings shall comply in all respects with the physical requirements specified in ASTM D-3212 and the lubricant used for joint assembly shall have no detrimental effect on the rubber ring or pipe.
 - 5. All bends, fittings, pipe stoppers and other fittings shall be manufactured in accordance with the same specifications and shall have the same thickness depth of socket and annular space as the pipe in accordance with the manufacturer's recommendations.
 - 6. All small diameter gravity stormdrain pipes shall be delivered and stockpiled in

unit pallets. No stacking of pallets above 5 feet in height will be allowed.

- C. Coupling HDPE and CMP: The couple at the connection of the temporary CMP from the stormwater management pond riser structures with the HDPE outfall pipes shall be Fernco Flexible Coupling as manufactured by Fernco Inc., Davison, Michigan. (Telephone Number: 1-800-521-1283) or an approved equal. Prior to coupling the HDPE and CMP, bitumastic should be applied to the valleys of the corrugated metal pipe to create a smooth outer wall. The coupler shall consist of a band 12" minimum wide and shall be fastened to the pipes with high tensile stainless steel straps in accordance with the manufacturer's instructions.
- D. Trench Drain: Trench drain shall be Z884 as manufactured by Zurn Industries, LLC at the slope and invert specified in the project drawings. Grates shall be Heel-Proof Polyethylene and installed per manufacturer's specifications.

2.02 EARTHWORK

- A. Excavating, trenching and backfilling are specified in Section 312000 "Earthwork".
- B. All precast concrete bases shall be installed on a layer of Delaware No.57 stone meeting the requirements of Section 1004, D&DOT Standard Specifications unless otherwise specified on the drawings.

PART 3. EXECUTION

3.01 INSTALLATION OF STORM DRAIN SYSTEM

- A. DNREC shall be notified at least 24 hours prior to placement of work. Review by DNREC does not relieve Contractor of full responsibility for compliance with construction documents.
- B. Samples of the various types of pipe proposed by the Contractor to be used in the work shall be approved by DNREC before any work is started. During the progress of the work, DNREC may require that a sufficient number of samples be tested to ascertain the quality of the various sizes of pipe. The cost of such samples and tests shall be included in the lump sum price bid by the Contractor for furnishing and laying pipe.
- C. The Contractor shall submit certifications to DNREC that all pipe, fittings and joints are as specified herein.

3.02 LAYING STORM DRAINAGE PIPE AND FITTINGS

- A. Pipe, edge drain and fittings shall be carefully handled and lowered into the trench as specified by the manufacturer. Special care shall be taken to insure that each length shall abut against the next in such manner that there shall be no shoulder of unevenness of any kind along the inside of the pipeline.
- B. Before pipe is placed, the bottom of the trench shall be carefully shaped to fit the lower part of the pipe exterior with reasonable closeness for a width of at least 60% of the pipe width as indicated on the plans. No pipe shall be brought into position until the preceding length has been thoroughly bedded and secured in place. Any defects due to settlement shall be made good by the Contractor without additional compensation therefor.
- C. Proper and suitable tools and appliances for the safe and convenient handling and laying of pipe shall be used.

- D. Whenever a pipe requires cutting to fit or to bring it to the required location, the work shall be done in a satisfactory manner to leave a smooth end.
- E. The pipes shall be thoroughly cleaned before they are laid and shall be kept clean until the acceptance of the construction by DNREC.
- F. Backfill materials over storm drainage pipe and fittings shall be hand placed and mechanically tamped in six inch layers, placed uniformly on both sides of the pipe, to a point at least 1 foot above the pipe crown. Each layer shall be thoroughly compacted for the full trench width and under, around and over the pipe. Mechanical tampers shall exert a pressure of not less than 250-foot pounds per square foot of area of tamping face.
- G. For refill of the remaining trench depth, refer to Section 312000 - Earthwork.

PART 4. MEASUREMENT

- 4.01** No measurement for payment of these items of work will be made since their cost shall be included in the lump sum bid.

--END OF SECTION --

NOT FOR BIDDING PURPOSES