

Bid Documents

For

City of Morris

East WWTP Expansion 2025

September, 2025



Chamlin & Associates
ENGINEERS • SURVEYORS • PLANNERS

Project No. 05989.00

CITY OF MORRIS
EAST WWTP EXPANSION 2025

SEPTEMBER, 2025



Don W. Bixby
ENGINEER'S SEAL & SIGNATURE

9/8/2025
DATE

Prepared by
Chamlin & Associates, Inc.
Peru Morris Ottawa
Illinois

Professional Design Firm
License No. 184-001717

TABLE OF CONTENTS

INVITATION TO BID.....	
STANDARD FORM OF INSTRUCTIONS TO BIDDERS.....	
BID FORM.....	
BID BOND.....	
RESPONSIBLE BIDDER CERTIFICATION – MORRIS.....	
NOTICE OF AWARD.....	
STANDARD FORM OF AGREEMENT BETWEEN OWNER AND CONTRACTOR.....	
PERFORMANCE BOND.....	
PAYMENT BOND.....	
NOTICE TO PROCEED.....	
STANDARD GENERAL CONDITIONS OF THE CONSTRUCTION CONTRACT.....	
SUPPLEMENTARY CONDITIONS - GENERAL.....	
ILLINOIS STEEL PRODUCTS PROCUREMENT ACT.....	
CITY OF MORRIS – RESOLUTION NO. R-08-01.....	
SUPPLEMENTARY CONDITIONS – INSURANCE.....	

TECHNICAL SPECIFICATIONS

01 1000 SUMMARY.....	
01 1500 PROJECT COORDINATION.....	
01 6000 PRODUCT REQUIREMENTS.....	
01 7000 EXECUTION AND CLOSEOUT REQUIREMENTS.....	
03 1000 CONCRETE FORMING AND ACCESSORIES.....	
03 2000 CONCRETE REINFORCING.....	
03 3000 CAST-IN-PLACE CONCRETE.....	
04 0513 MASONRY MORTARING.....	
04 0516 MASONRY GROUTING.....	
04 2013 SINGLE-WYTHE UNIT MASONRY.....	
05 1200 STRUCTURAL STEEL FRAMING.....	
05 5200 METAL RAILINGS AND HANDRAILS.....	
05 5300 METAL GRATINGS.....	

06 1000	ROUGH CARPENTRY.....
06 1753	SHOP-FABRICATED WOOD TRUSSES.....
07 2116	BLANKET INSULATION.....
07 3113	ASPHALT SHINGLES.....
07 7123	MANUFACTURED GUTTERS AND DOWNSPOUTS.....
07 9000	JOINT PROTECTION.....
08 1342	FRP DOORS AND FRAMES.....
08 3323	OVERHEAD COILING DOORS.....
08 5113	ALUMINUM WINDOWS.....
08 7100	DOOR HARDWARE.....
08 8000	GLAZING.....
09 7001	DECORATIVE QUARTZ EPOXY FLOORING SYSTEM.....
09 9000	PAINTING AND COATING.....
11 8000	SUPERVISORY CONTROL AND DATA ACQUISITION SYSTEM (SCADA).....
26 0943	FIBER OPTIC NETWORK.....
26 1000	ELECTRICAL.....
31 0513	SOILS FOR EARTHWORK.....
31 0516	AGGREGATES FOR EARTHWORK.....
31 1000	SITE CLEARING.....
31 2213	ROUGH GRADING.....
31 2316	EXCAVATION.....
31 2317	TRENCHING.....
31 2319	DEWATERING.....
31 2323	FILL.....
31 2500	EROSION AND SEDIMENTATION CONTROLS.....
32 1123	AGGREGATE BASE AND SURFACE COURSES.....
32 9119	LANDSCAPE GRADING.....
32 9219	SEEDING.....
33 0513	MANHOLES AND STRUCTURES.....
33 2617	DEWATERING LIFT STATION.....
33 2618	SELF PRIMING DRAIN PUMPS.....
40 0513	PIPING.....
40 0559	STOP LOGS.....

43 2140	DRY PIT SUBMERSIBLE PUMPS
46 3338	ALUM CHEMICAL FEED EQUIPMENT
46 6624	NON-CONTACT ULTRAVIOLET DISINFECTION EQUIPMENT

INVITATION TO BID

Sealed Bids will be received by the City of Morris for "East WWTP Expansion 2025" and is further described as follows: Installation of a new concrete UV channel with equipment, an alum chemical addition system in a new building enclosure, new return sludge pumps, and a drainage/dewatering pump system, with all associated electrical, piping, I&C, and site work as necessary.

Bids shall be submitted no later than 2:00 p.m. at the office of the City Clerk, at 700 N. Division Street, Morris, IL 60450 on ~~Wednesday, October 8, 2025~~ **Tuesday, October 14, 2025**. Proposals will be opened and publicly read at that time.

Plans and specifications may be accessed on-line at: www.chamlin.com

Plans may also be viewed at:

Chamlin & Associates, Inc., 221 W. Washington Street, Morris, IL 60450
City of Morris, 700 N. Division Street, Morris, IL 60450

Full-size plans and specifications are available from Chamlin & Associates, Inc., 4152 Progress Boulevard, Peru, IL 61354 at the non-refundable cost of \$50 per set.

Bidders are advised that this Contract will be subject to the Illinois Prevailing Wage Act and Illinois Steel Products Procurement Act.

This project is subject to the Employment of Illinois Workers on Public Works Act.

The successful Bidder shall provide at least 40% of all labor required for the completion of this project.

The Bid shall be accompanied by a certified check or bid bond, in the amount of five percent (5%) of the gross amount of the bid and be payable to the order of the City of Morris.

A non-mandatory Pre-Bid Meeting has been scheduled for Tuesday, September 30, 2025 at 9:30 a.m. at the Morris East WWTP at 1547 Ashley Road, Morris, IL 60450.

Bids may be held by the City of Morris for a period not to exceed 60 days from the date of the opening of Bids for the purpose of reviewing the Bids and investigating the qualifications of Bidders, prior to awarding of the Contract.

The Owner reserves the right to accept or reject any or all Bids and to waive any informalities in the bidding.

BY ORDER OF:

MAYOR & CITY COUNCIL
CITY OF MORRIS

REVISED PER ADDENDUM 1

INSTRUCTIONS TO BIDDERS FOR CONSTRUCTION CONTRACT

Prepared By



Endorsed By



Copyright© 2018

National Society of Professional Engineers
1420 King Street, Alexandria, VA 22314-2794
(703) 684-2882
www.nspe.org

American Council of Engineering Companies
1015 15th Street N.W., Washington, DC 20005
(202) 347-7474
www.acec.org

American Society of Civil Engineers
1801 Alexander Bell Drive, Reston, VA 20191-4400
(800) 548-2723
www.asce.org

The copyright for this EJCDC document is owned jointly by the three sponsoring organizations listed above. The National Society of Professional Engineers is the Copyright Administrator for the EJCDC documents; please direct all inquiries regarding EJCDC copyrights to NSPE.

NOTE: EJCDC publications may be purchased at www.ejcdc.org, or from any of the sponsoring organizations above.

INSTRUCTIONS TO BIDDERS FOR CONSTRUCTION CONTRACT

TABLE OF CONTENTS

	Page
Article 1— Defined Terms	1
Article 2— Bidding Documents	1
Article 3— Qualifications of Bidders	2
Article 4— Pre-Bid Conference	2
Article 5— Site and Other Areas; Existing Site Conditions; Examination of Site; Owner’s Safety Program; Other Work at the Site	3
Article 6— Bidder’s Representations and Certifications	5
Article 7— Interpretations and Addenda	5
Article 8— Bid Security	6
Article 9— Contract Times	6
Article 10— Substitute and “Or Equal” Items	6
Article 11— Subcontractors, Suppliers, and Others	7
Article 12— Preparation of Bid	7
Article 13— Basis of Bid	8
Article 14— Submittal of Bid	9
Article 15— Modification and Withdrawal of Bid	10
Article 16— Opening of Bids	10
Article 17— Bids to Remain Subject to Acceptance	10
Article 18— Evaluation of Bids and Award of Contract	10
Article 19— Bonds and Insurance	11
Article 20— Signing of Agreement	11
Article 21— Sales and Use Taxes	11
Article 22— ~~Contracts to Be Assigned~~	11

Modifications are shown by strikeout and/or bold text.

ARTICLE 1—DEFINED TERMS

- 1.01 Terms used in these Instructions to Bidders have the meanings indicated in the General Conditions and ~~Supplementary Conditions~~. Additional terms used in these Instructions to Bidders have the meanings indicated below:
- A. *Issuing Office*—The office from which the Bidding Documents are to be issued, and which registers plan holders.

ARTICLE 2—BIDDING DOCUMENTS

- 2.01 Bidder shall obtain a complete set of Bidding Requirements and proposed Contract Documents (together, the Bidding Documents). See the Agreement for a list of the Contract Documents. It is Bidder's responsibility to determine that it is using a complete set of documents in the preparation of a Bid. Bidder assumes sole responsibility for errors or misinterpretations resulting from the use of incomplete documents, by Bidder itself or by its prospective Subcontractors and Suppliers.
- 2.02 Bidding Documents are made available for the sole purpose of obtaining Bids for completion of the Project and permission to download or distribution of the Bidding Documents does not confer a license or grant permission or authorization for any other use. Authorization to download documents, or other distribution, includes the right for plan holders to print documents solely for their use, and the use of their prospective Subcontractors and Suppliers, provided the plan holder pays all costs associated with printing or reproduction. Printed documents may not be re-sold under any circumstances.
- 2.03 Owner has established a Bidding Documents Website (see www.chamlin.com) as indicated in the Advertisement or invitation to bid. Owner recommends that Bidder register as a plan holder with the Issuing Office at such website, and obtain a complete set of the Bidding Documents from such website. Bidders may rely that sets of Bidding Documents obtained from the Bidding Documents Website are complete, unless an omission is blatant. Registered plan holders will receive Addenda issued by Owner.
- 2.04 Bidder may register as a plan holder and obtain complete sets of Bidding Documents, in the number and format stated in the Advertisement or invitation to bid, from the Issuing Office. Bidders may rely that sets of Bidding Documents obtained from the Issuing Office are complete, unless an omission is blatant. Registered plan holders will receive Addenda issued by Owner.
- 2.05 Plan rooms (including construction information subscription services, and electronic and virtual plan rooms) may distribute the Bidding Documents, or make them available for examination. Those prospective bidders that obtain an electronic (digital) copy of the Bidding Documents from a plan room are encouraged to register as plan holders from the Bidding Documents Website or Issuing Office. Owner is not responsible for omissions in Bidding Documents or other documents obtained from plan rooms, or for a Bidder's failure to obtain Addenda from a plan room.
- 2.06 *Electronic Documents*
- A. When the Bidding Requirements indicate that electronic (digital) copies of the Bidding Documents are available, such documents will be made available to the Bidders as Electronic Documents in the manner specified.
1. Bidding Documents will be provided in Adobe PDF (Portable Document Format) (.pdf) that is readable by Adobe Acrobat Reader Version ~~[insert version number]~~ or later. It is

the intent of the Engineer and Owner that such Electronic Documents are to be exactly representative of the paper copies of the documents. However, because the Owner and Engineer cannot totally control the transmission and receipt of Electronic Documents nor the Contractor's means of reproduction of such documents, the Owner and Engineer cannot and do not guarantee that Electronic Documents and reproductions prepared from those versions are identical in every manner to the paper copies.

- B. Unless otherwise stated in the Bidding Documents, the Bidder may use and rely upon complete sets of Electronic Documents of the Bidding Documents, described in Paragraph 2.06.A above. However, Bidder assumes all risks associated with differences arising from transmission/receipt of Electronic Documents versions of Bidding Documents and reproductions prepared from those versions and, further, assumes all risks, costs, and responsibility associated with use of the Electronic Documents versions to derive information that is not explicitly contained in printed paper versions of the documents, and for Bidder's reliance upon such derived information.

ARTICLE 3—QUALIFICATIONS OF BIDDERS

- 3.01 Bidder ~~is~~ **may be required** to submit the following information with its Bid to demonstrate Bidder's qualifications to perform the Work:
 - A. Written evidence establishing its qualifications such as financial data, previous experience, and present commitments, **and other qualifications as shown on the Statement of Bidder's Qualifications, if included in the Bidding Documents.**
- 3.02 A Bidder's failure to submit required qualification information within the times indicated may disqualify Bidder from receiving an award of the Contract.
- 3.03 No requirement in this Article 3 to submit information will prejudice the right of Owner to seek additional pertinent information regarding Bidder's qualifications.

ARTICLE 4—PRE-BID CONFERENCE

- 4.01 A ~~mandatory~~ pre-bid conference ~~will~~ **may** be held at the time and location indicated in the Advertisement or invitation to bid. **Attendance may be mandatory and shall be so indicated in the advertisement or invitation to bid.** Representatives of Owner and Engineer will be present to discuss the Project. **If attendance is mandatory at the pre-bid conference,** proposals will not be accepted from Bidders who do not attend the conference. It is each Bidder's responsibility to sign in at the pre-bid conference to verify its participation. Bidders must sign in using the name of the organization that will be submitting a Bid. A list of qualified Bidders that attended the pre-bid conference and are eligible to submit a Bid for this Project will be issued in an Addendum.
- 4.02 Information presented at the pre-Bid conference does not alter the Contract Documents. Owner will issue Addenda to make any changes to the Contract Documents that result from discussions at the pre-Bid conference. Information presented, and statements made at the pre-bid conference will not be binding or legally effective unless incorporated in an Addendum.

ARTICLE 5—SITE AND OTHER AREAS; EXISTING SITE CONDITIONS; EXAMINATION OF SITE; OWNER’S SAFETY PROGRAM; OTHER WORK AT THE SITE

5.01 *Site and Other Areas*

- A. The Site is identified in the Bidding Documents. By definition, the Site includes rights-of-way, easements, and other lands furnished by Owner for the use of the Contractor. Any additional lands required for temporary construction facilities, construction equipment, or storage of materials and equipment, and any access needed for such additional lands, are to be obtained and paid for by Contractor.

5.02 *Existing Site Conditions*

A. *Subsurface and Physical Conditions; Hazardous Environmental Conditions*

1. The ~~Supplementary Conditions~~ **Specification sections** may identify the following regarding existing conditions at or adjacent to the Site:
 - a. Those reports **known to Owner** of explorations and tests of subsurface conditions at or adjacent to the Site that contain Technical Data.
 - b. Those drawings known to Owner of existing physical conditions at or adjacent to the Site, including those drawings depicting existing surface or subsurface structures at or adjacent to the Site (except Underground Facilities), that contain Technical Data.
 - c. Reports and drawings known to Owner relating to Hazardous Environmental Conditions that have been identified at or adjacent to the Site.
 - d. Technical Data contained in such reports and drawings.
2. Owner will make copies of reports and drawings referenced above available to any Bidder on request. These reports and drawings are not part of the Contract Documents, but the Technical Data contained therein upon whose accuracy Bidder is entitled to rely, as provided in the General Conditions, ~~has been~~ **may be** identified and established in the ~~Supplementary Conditions~~ **Specification sections**. Bidder is responsible for any interpretation or conclusion Bidder draws from any Technical Data or any other data, interpretations, opinions, or information contained in such reports or shown or indicated in such drawings.
3. If the ~~Supplementary Conditions~~ **Specification sections** do not identify Technical Data, the default definition of Technical Data set forth in Article 1 of the General Conditions will apply.
4. *Geotechnical Baseline Report/Geotechnical Data Report:* The Bidding Documents may contain a Geotechnical Baseline Report (GBR) and Geotechnical Data Report (GDR).
 - a. As may be set forth in the ~~Supplementary Conditions~~ **Specification sections**, the GBR describes certain select subsurface conditions that are anticipated to be encountered by Contractor during construction in specified locations (“Baseline Conditions”). The GBR is a Contract Document.
 - b. The Baseline Conditions in the GBR are intended to reduce uncertainty and the degree of contingency in submitted Bids. However, Bidders cannot rely solely on the Baseline Conditions. Bids should be based on a comprehensive approach that

includes an independent review and analysis of the GBR, all other Contract Documents, Technical Data, other available information, and observable surface conditions. Not all potential subsurface conditions are baselined.

- c. Nothing in the GBR is intended to relieve Bidders of the responsibility to make their own determinations regarding construction costs, bidding strategies, and Bid prices, nor of the responsibility to select and be responsible for the means, methods, techniques, sequences, and procedures of construction, and for safety precautions and programs incident thereto.
 - d. As set forth in the ~~Supplementary Conditions~~ **Specification sections**, the GDR is a Contract Document containing data prepared by or for the Owner in support of the GBR.
- B. *Underground Facilities:* Underground Facilities are shown or indicated on the Drawings, pursuant to Paragraph 5.05 of the General Conditions, and not in the drawings referred to in Paragraph 5.02.A of these Instructions to Bidders. Information and data regarding the presence or location of Underground Facilities are not intended to be categorized, identified, or defined as Technical Data.
- 5.03 *Other Site-related Documents*
- A. No other Site-related documents are available, **unless so indicated in the Specification sections.**
- 5.04 *Site Visit and Testing by Bidders*
- A. **It is suggested** the Bidder ~~is required to~~ visit the Site and conduct a thorough visual examination of the Site and adjacent areas. During the visit the Bidder must not disturb any ongoing operations at the Site.
 - B. A Site visit ~~is~~ **may be** scheduled following the pre-bid conference. ~~Maps~~ **Directions or maps** to the Site will be available at the pre-Bid conference.
 - ~~C. A Site visit is scheduled for [designate, date, time and location]. Maps to the Site will be made available upon request.~~
 - D. Bidders visiting the Site are required to arrange their own transportation to the Site.
 - E. All access to the Site other than during a regularly scheduled Site visit must be coordinated through the ~~following~~ Owner or Engineer. Bidder must conduct the required Site visit during normal working hours.
 - F. Bidder is not required to conduct any subsurface testing, or exhaustive investigations of Site conditions.
 - G. On request, and to the extent Owner has control over the Site, and schedule permitting, the Owner will provide Bidder general access to the Site to conduct such additional examinations, investigations, explorations, tests, and studies as Bidder deems necessary for preparing and submitting a successful Bid. Owner will not have any obligation to grant such access if doing so is not practical because of existing operations, security or safety concerns, or restraints on Owner's authority regarding the Site. Bidder is responsible for establishing access needed to reach specific selected test sites.

- H. Bidder must comply with all applicable Laws and Regulations regarding excavation and location of utilities, obtain all permits, and comply with all terms and conditions established by Owner or by property owners or other entities controlling the Site with respect to schedule, access, existing operations, security, liability insurance, and applicable safety programs.
- I. Bidder must fill all holes and clean up and restore the Site to its former condition upon completion of such explorations, investigations, tests, and studies.

5.05 *Owner's Safety Program*

- A. Site visits and work at the Site may be governed by an Owner safety program. If an Owner safety program exists, it will be noted in the ~~Supplementary Conditions~~ **Specification sections**.

5.06 *Other Work at the Site*

- A. ~~Reference is made to Article 8 of the Supplementary Conditions for the identification of the general nature of other work of which Owner is aware (if any)~~ **If Owner is aware of other work** that is to be performed at the Site by Owner or others (such as utilities and other prime contractors) and relates to the Work contemplated by these Bidding Documents. If Owner is party to a written contract for such other work, then on request, Owner will provide to each Bidder access to examine such contracts (other than portions thereof related to price and other confidential matters), if any.

ARTICLE 6—BIDDER'S REPRESENTATIONS AND CERTIFICATIONS

6.01 *Express Representations and Certifications in Bid Form, Agreement*

- A. The Bid Form that each Bidder will submit contains express representations regarding the Bidder's examination of Project documentation, Site visit, and preparation of the Bid, and certifications regarding lack of collusion or fraud in connection with the Bid. Bidder should review these representations and certifications, and assure that Bidder can make the representations and certifications in good faith, before executing and submitting its Bid.
- B. If Bidder is awarded the Contract, Bidder (as Contractor) will make similar express representations and certifications when it executes the Agreement.

ARTICLE 7—INTERPRETATIONS AND ADDENDA

- 7.01 Owner on its own initiative may issue Addenda to clarify, correct, supplement, or change the Bidding Documents.
- 7.02 Bidder shall submit all questions about the meaning or intent of the Bidding Documents to Engineer in writing. Contact information **shall be provided on the Bidding Documents Website (www.chamlin.com)**.
- 7.03 Interpretations or clarifications considered necessary by Engineer in response to such questions will be issued by Addenda delivered to all registered plan holders. Questions received less than seven days prior to the date for opening of Bids may not be answered.
- 7.04 Only responses set forth in an Addendum will be binding. Oral and other interpretations or clarifications will be without legal effect. Responses to questions are not part of the Contract

Documents unless set forth in an Addendum that expressly modifies or supplements the Contract Documents.

ARTICLE 8—BID SECURITY

- 8.01 A Bid must be accompanied by Bid security made payable to Owner in an amount of 5 percent of Bidder's maximum Bid price (determined by adding the base bid and all alternates) and in the form of a Bid bond issued by a surety meeting the requirements of Paragraph 6.01 of the General Conditions. Such Bid bond will be issued in the form included in the Bidding Documents. **Bidder may use Bid bond form from surety, unless indicated otherwise in Bid Package or in grant or loan documentation. If certified checks or bank money orders are not to be allowed, it shall be noted in the advertisement or invitation for bid.**
- 8.02 The Bid security of the apparent Successful Bidder will be retained until Owner awards the contract to such Bidder, and such Bidder has executed the Contract, furnished the required Contract security, and met the other conditions of the Notice of Award, whereupon the Bid security will be released. If the Successful Bidder fails to execute and deliver the Contract and furnish the required Contract security within 15 days after the Notice of Award, Owner may consider Bidder to be in default, annul the Notice of Award, and the Bid security of that Bidder will be forfeited, in whole in the case of a penal sum bid bond, and to the extent of Owner's damages in the case of a damages-form bond. Such forfeiture will be Owner's exclusive remedy if Bidder defaults.
- 8.03 The Bid security of other Bidders that Owner believes to have a reasonable chance of receiving the award may be retained by Owner until the earlier of 7 days after the Effective Date of the Contract or 61 days after the Bid opening, whereupon Bid security furnished by such Bidders will be released.
- 8.04 Bid security of other Bidders that Owner believes do not have a reasonable chance of receiving the award will be released within 7 days after the Bid opening.

ARTICLE 9—CONTRACT TIMES

- 9.01 The number of days within which, or the dates by which, the Work is to be (a) substantially completed and (b) ready for final payment, and (c) Milestones (if any) are to be achieved, are set forth in the Agreement.
- 9.02 Provisions for liquidated damages, if any, for failure to timely attain a Milestone, Substantial Completion, or completion of the Work in readiness for final payment, are set forth in the Agreement.

ARTICLE 10—SUBSTITUTE AND "OR EQUAL" ITEMS

- 10.01 The Contract for the Work, as awarded, will be on the basis of materials and equipment specified or described in the Bidding Documents, and those "or-equal" or substitute or materials and equipment subsequently approved by Engineer prior to the submittal of Bids and identified by Addendum. No item of material or equipment will be considered by Engineer as an "or-equal" or substitute unless written request for approval has been submitted by Bidder and has been received by Engineer within 10 days of the issuance of the Advertisement for Bids or invitation to Bidders. Each such request must comply with the requirements of Paragraphs 7.05 and 7.06 of

the General Conditions, and the review of the request will be governed by the principles in those paragraphs. The burden of proof of the merit of the proposed item is upon Bidder. Engineer's decision of approval or disapproval of a proposed item will be final. If Engineer approves any such proposed item, such approval will be set forth in an Addendum issued to all registered Bidders. Bidders cannot rely upon approvals made in any other manner.

- 10.02 All prices that Bidder sets forth in its Bid will be based on the presumption that the Contractor will furnish the materials and equipment specified or described in the Bidding Documents, as supplemented by Addenda. Any assumptions regarding the possibility of post-Bid approvals of "or-equal" or substitution requests are made at Bidder's sole risk.

ARTICLE 11—SUBCONTRACTORS, SUPPLIERS, AND OTHERS

- 11.01 A Bidder ~~must~~ ~~may~~ ~~be prepared~~ **required** to retain specific Subcontractors and Suppliers for the performance of the Work if required to do so by the Bidding Documents or in the Specifications. If a prospective Bidder objects to retaining any such Subcontractor or Supplier and the concern is not relieved by an Addendum, then the prospective Bidder should refrain from submitting a Bid.
- 11.02 The apparent Successful Bidder, and any other Bidder so requested, must submit to Owner a list of the Subcontractors or Suppliers proposed for the following portions of the Work within five days after Bid opening.
- 11.03 If requested by Owner, such list must be accompanied by an experience statement with pertinent information regarding similar projects and other evidence of qualification for each such Subcontractor or Supplier. If Owner or Engineer, after due investigation, has reasonable objection to any proposed Subcontractor or Supplier, Owner may, before the Notice of Award is given, request apparent Successful Bidder to submit an acceptable substitute, in which case apparent Successful Bidder will submit a substitute, Bidder's Bid price will be increased (or decreased) by the difference in cost occasioned by such substitution, and Owner may consider such price adjustment in evaluating Bids and making the Contract award.
- 11.04 If apparent Successful Bidder declines to make any such substitution, Owner may award the Contract to the next lowest Bidder that proposes to use acceptable Subcontractors and Suppliers. Declining to make requested substitutions will constitute grounds for forfeiture of the Bid security of any Bidder. Any Subcontractor or Supplier, so listed and against which Owner or Engineer makes no written objection prior to the giving of the Notice of Award will be deemed acceptable to Owner and Engineer subject to subsequent revocation of such acceptance as provided in Paragraph 7.07 of the General Conditions.

ARTICLE 12—PREPARATION OF BID

- 12.01 The Bid Form is included with the Bidding Documents.
- A. All blanks on the Bid Form must be completed in ink and the Bid Form signed in ink. Erasures or alterations must be initialed in ink by the person signing the Bid Form. A Bid price must be indicated for each section, Bid item, alternate, adjustment unit price item, and unit price item listed therein.
- B. If the Bid Form expressly indicates that submitting pricing on a specific alternate item is optional, and Bidder elects to not furnish pricing for such optional alternate item, then Bidder may enter the words "No Bid" or "Not Applicable."

- 12.02 If Bidder has obtained the Bidding Documents as Electronic Documents, then Bidder shall prepare its Bid on a paper copy of the Bid Form printed from the Electronic Documents version of the Bidding Documents. The printed copy of the Bid Form must be clearly legible, printed on 8½ inch by 11-inch paper and as closely identical in appearance to the Electronic Document version of the Bid Form as may be practical. The Owner reserves the right to accept Bid Forms which nominally vary in appearance from the original paper version of the Bid Form, providing that all required information and submittals are included with the Bid.
- 12.03 A Bid by a corporation must be executed in the corporate name by a corporate officer (whose title must appear under the signature), accompanied by evidence of authority to sign. ***The corporate seal shall be affixed and attested by the secretary or an assistant secretary.*** The corporate address and state of incorporation must be shown.
- 12.04 A Bid by a partnership must be executed in the partnership name and signed by a partner (whose title must appear under the signature), accompanied by evidence of authority to sign. The official address of the partnership must be shown.
- 12.05 A Bid by a limited liability company must be executed in the name of the firm by a member or other authorized person and accompanied by evidence of authority to sign. The state of formation of the firm and the official address of the firm must be shown.
- 12.06 A Bid by an individual must show the Bidder's name and official address.
- 12.07 A Bid by a joint venture must be executed by an authorized representative of each joint venturer in the manner indicated on the Bid Form. The joint venture must have been formally established prior to submittal of a Bid, and the official address of the joint venture must be shown.
- 12.08 All names must be printed in ink below the signatures.
- 12.09 The Bid must contain an acknowledgment of receipt of all Addenda, the numbers of which must be filled in on the Bid Form.
- 12.10 Postal and e-mail addresses and telephone number for communications regarding the Bid must be shown.
- 12.11 The Bid must contain evidence of Bidder's authority to do business in the state where the Project is located, or Bidder must certify in writing that it will obtain such authority within the time for acceptance of Bids and attach such certification to the Bid.
- 12.12 If Bidder is required to be licensed to submit a Bid or perform the Work in the state where the Project is located, the Bid must contain evidence of Bidder's licensure, or Bidder must certify in writing that it will obtain such licensure within the time for acceptance of Bids and attach such certification to the Bid. Bidder's state contractor license number, if any, must also be shown on the Bid Form.

ARTICLE 13—BASIS OF BID

13.01 *Lump Sum*

A. Bidders must submit a Bid on a lump sum basis as set forth in the Bid Form.

OR

13.02 *Base Bid with Alternates*

- A. Bidders must submit a Bid on a lump sum basis for the base Bid and include a separate price for each alternate described in the Bidding Documents and as provided for in the Bid Form. The price for each alternate will be the amount added to or deleted from the base Bid if Owner selects the alternate.
- ~~B. In the comparison of Bids, alternates will be applied in the same order of priority as listed in the Bid Form.~~

OR

13.03 *Unit Price*

- A. Bidders must submit a Bid on a unit price basis for each item of Work listed in the unit price section of the Bid Form.
- B. The "Bid Price" (sometimes referred to as the extended price) for each unit price Bid item will be the product of the "Estimated Quantity", which Owner or its representative has set forth in the Bid Form, for the item and the corresponding "Bid Unit Price" offered by the Bidder. The total of all unit price Bid items will be the sum of these "Bid Prices"; such total will be used by Owner for Bid comparison purposes. The final quantities and Contract Price will be determined in accordance with Paragraph 13.03 of the General Conditions.
- C. Discrepancies between the multiplication of units of Work and unit prices will be resolved in favor of the unit prices. Discrepancies between the indicated sum of any column of figures and the correct sum thereof will be resolved in favor of the correct sum.

ARTICLE 14—SUBMITTAL OF BID

- 14.01 The Bidding Documents include one separate unbound copy of the Bid Form, and, if required, the Bid Bond Form. The unbound copy of the Bid Form is to be completed and submitted with the Bid security and the other documents required to be submitted under the terms of Article 2 of the Bid Form.
- 14.02 A Bid must be received no later than the date and time prescribed and at the place indicated in the Advertisement or invitation to bid and must be enclosed in a plainly marked package with the Project title, and, if applicable, the designated portion of the Project for which the Bid is submitted, the name and address of Bidder, and must be accompanied by the Bid security and other required documents. If a Bid is sent by mail or other delivery system, the sealed envelope containing the Bid must be enclosed in a separate package plainly marked on the outside with the notation "BID ENCLOSED." ~~A mailed Bid must be addressed to the location designated in the Advertisement.~~ **When using mail or other delivery system, the Bidder is totally responsible for the mail or other delivery system delivering the Bid at the place and prior to the time indicated in the advertisement or invitation for bid. If a Bid is to be delivered by mail or other delivery system, Bidder is advised to contact the Owner to confirm physical delivery address and availability for delivery. The Engineer will not accept Bids for delivery to the Bid opening.**
- 14.03 Bids received after the date and time prescribed for the opening of bids, or not submitted at the correct location or in the designated manner, will not be accepted and will be returned to the Bidder unopened.

ARTICLE 15—MODIFICATION AND WITHDRAWAL OF BID

- 15.01 An unopened Bid may be withdrawn by an appropriate document duly executed in the same manner that a Bid must be executed and delivered to the place where Bids are to be submitted prior to the date and time for the opening of Bids. Upon receipt of such notice, the unopened Bid will be returned to the Bidder.
- 15.02 If a Bidder wishes to modify its Bid prior to Bid opening, Bidder must withdraw its initial Bid in the manner specified in Paragraph 15.01 and submit a new Bid prior to the date and time for the opening of Bids.
- 15.03 If within 24 hours after Bids are opened any Bidder files a duly signed written notice with Owner and promptly thereafter demonstrates to the reasonable satisfaction of Owner that there was a material and substantial mistake in the preparation of its Bid, the Bidder may withdraw its Bid, and the Bid security will be returned. Thereafter, if the Work is rebid, the Bidder will be disqualified from further bidding on the Work. **This provision to withdraw a Bid without forfeiting the Bid security does not apply to Bidder's errors in judgment in preparing a Bid.**

ARTICLE 16—OPENING OF BIDS

- 16.01 Bids will be opened at the time and place indicated in the advertisement or invitation to bid and, unless obviously non-responsive, read aloud publicly. An abstract of the amounts of the base Bids and major alternates, if any, will be made available to Bidders after the opening of Bids.
- 16.02 If Bids are to be opened privately, it shall be indicated in the advertisement or invitation to bid.

ARTICLE 17—BIDS TO REMAIN SUBJECT TO ACCEPTANCE

- 17.01 All Bids will remain subject to acceptance for the period of time stated in the Bid Form, but Owner may, in its sole discretion, release any Bid and return the Bid security prior to the end of this period.

ARTICLE 18—EVALUATION OF BIDS AND AWARD OF CONTRACT

- 18.01 Owner reserves the right to reject any or all Bids, including without limitation, nonconforming, nonresponsive, unbalanced, or conditional Bids. Owner also reserves the right to waive all minor Bid informalities not involving price, time, or changes in the Work.
- 18.02 Owner will reject the Bid of any Bidder that Owner finds, after reasonable inquiry and evaluation, to not be responsible.
- 18.03 If Bidder purports to add terms or conditions to its Bid, takes exception to any provision of the Bidding Documents, or attempts to alter the contents of the Contract Documents for purposes of the Bid, whether in the Bid itself or in a separate communication to Owner or Engineer, then Owner will reject the Bid as nonresponsive.
- 18.04 If Owner awards the contract for the Work, such award will be to the responsible Bidder submitting the lowest responsive Bid. **Owner may have adopted a Responsible Bidder Ordinance or Resolution, as described in the Supplementary Conditions.**

18.05 *Evaluation of Bids*

- A. In evaluating Bids, Owner will consider whether the Bids comply with the prescribed requirements, and such alternates, unit prices, and other data, as may be requested in the Bid Form or prior to the Notice of Award.
 - B. For the determination of the apparent low Bidder when unit price bids are submitted, Bids will be compared on the basis of the total of the products of the estimated quantity of each item and unit price Bid for that item, together with any lump sum items. **Any other method of determining apparent low Bidder will be as described on the Bid form.**
 - C. For the determination of the apparent low Bidder when cost-plus-fee bids are submitted, Bids will be compared on the basis of the Guaranteed Maximum Price set forth by Bidder on the Bid Form.
- 18.06 In evaluating whether a Bidder is responsible, Owner will consider the qualifications of the Bidder and may consider the qualifications and experience of Subcontractors and Suppliers proposed for those portions of the Work for which the identity of Subcontractors and Suppliers must be submitted as provided in the Bidding Documents.
- 18.07 Owner may conduct such investigations as Owner deems necessary to establish the responsibility, qualifications, and financial ability of Bidders and any proposed Subcontractors or Suppliers.

ARTICLE 19—BONDS AND INSURANCE

- 19.01 Article 6 of the General Conditions, as may be modified by the Supplementary Conditions, sets forth Owner's requirements as to performance and payment bonds, other required bonds (if any), and insurance. When the Successful Bidder delivers the executed Agreement to Owner, it must be accompanied by required bonds and insurance documentation.
- 19.02 Article 8, Bid Security, of these Instructions, addresses any requirements for providing bid bonds as part of the bidding process.

ARTICLE 20—SIGNING OF AGREEMENT

- 20.01 When Owner issues a Notice of Award to the Successful Bidder, it will be accompanied by the unexecuted counterparts of the Agreement along with the other Contract Documents as identified in the Agreement. Within 15 days thereafter, Successful Bidder must execute and deliver the required number of counterparts of the Agreement and any bonds and insurance documentation required to be delivered by the Contract Documents to Owner. Within 10 days thereafter, Owner will deliver one fully executed counterpart of the Agreement to Successful Bidder, together with printed and electronic copies of the Contract Documents as stated in Paragraph 2.02 of the General Conditions.

ARTICLE 21—SALES AND USE TAXES

- 21.01 Owner (if municipal or government entity) is exempt from ~~[name of state]~~ state sales and use taxes on materials and equipment to be incorporated in the Work. ~~(Exemption No. [number])~~. Said taxes must not be included in the Bid. ~~Refer to Paragraph SC 7.10 of the Supplementary Conditions for additional information.~~

ARTICLE 22—CONTRACTS TO BE ASSIGNED

BID BOND (PENAL SUM FORM)

Bidder Name: Address <i>(principal place of business)</i> :	Surety Name: Address <i>(principal place of business)</i> :
Owner Name: City of Morris Address <i>(principal place of business)</i> : 700 N. Division Street Morris, IL 60450	Bid Project <i>(name and location)</i> : Morris – East WWTP Expansion 2025 1547 Ashley Road, Morris, IL 60450 Bid Due Date: ~~10/08/2025~~ 10/14/2025
Bond Penal Sum: Date of Bond:	
Surety and Bidder, intending to be legally bound hereby, subject to the terms set forth in this Bid Bond, do each cause this Bid Bond to be duly executed by an authorized officer, agent, or representative.	
Bidder	Surety
<i>(Full formal name of Bidder)</i>	<i>(Full formal name of Surety) (corporate seal)</i>
By: _____ <i>(Signature)</i>	By: _____ <i>(Signature) (Attach Power of Attorney)</i>
Name: _____ <i>(Printed or typed)</i>	Name: _____ <i>(Printed or typed)</i>
Title: _____	Title: _____
Attest: _____ <i>(Signature)</i>	Attest: _____ <i>(Signature)</i>
Name: _____ <i>(Printed or typed)</i>	Name: _____ <i>(Printed or typed)</i>
Title: _____	Title: _____
<i>Notes: (1) Note: Addresses are to be used for giving any required notice. (2) Provide execution by any additional parties, such as joint venturers, if necessary.</i>	

1. Bidder and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors, and assigns to pay to Owner upon default of Bidder the penal sum set forth on the face of this Bond. Payment of the penal sum is the extent of Bidder's and Surety's liability. Recovery of such penal sum under the terms of this Bond will be Owner's sole and exclusive remedy upon default of Bidder.
2. Default of Bidder occurs upon the failure of Bidder to deliver within the time required by the Bidding Documents (or any extension thereof agreed to in writing by Owner) the executed Agreement required by the Bidding Documents and any performance and payment bonds required by the Bidding Documents.
3. This obligation will be null and void if:
 - 3.1. Owner accepts Bidder's Bid and Bidder delivers within the time required by the Bidding Documents (or any extension thereof agreed to in writing by Owner) the executed Agreement required by the Bidding Documents and any performance and payment bonds required by the Bidding Documents, or
 - 3.2. All Bids are rejected by Owner, or
 - 3.3. Owner fails to issue a Notice of Award to Bidder within the time specified in the Bidding Documents (or any extension thereof agreed to in writing by Bidder and, if applicable, consented to by Surety when required by Paragraph 5 hereof).
4. Payment under this Bond will be due and payable upon default of Bidder and within 30 calendar days after receipt by Bidder and Surety of written notice of default from Owner, which notice will be given with reasonable promptness, identifying this Bond and the Project and including a statement of the amount due.
5. Surety waives notice of any and all defenses based on or arising out of any time extension to issue Notice of Award agreed to in writing by Owner and Bidder, provided that the total time for issuing Notice of Award including extensions does not in the aggregate exceed 120 days from the Bid due date without Surety's written consent.
6. No suit or action will be commenced under this Bond prior to 30 calendar days after the notice of default required in Paragraph 4 above is received by Bidder and Surety, and in no case later than one year after the Bid due date.
7. Any suit or action under this Bond will be commenced only in a court of competent jurisdiction located in the state in which the Project is located.
8. Notices required hereunder must be in writing and sent to Bidder and Surety at their respective addresses shown on the face of this Bond. Such notices may be sent by personal delivery, commercial courier, or by United States Postal Service registered or certified mail, return receipt requested, postage pre-paid, and will be deemed to be effective upon receipt by the party concerned.
9. Surety shall cause to be attached to this Bond a current and effective Power of Attorney evidencing the authority of the officer, agent, or representative who executed this Bond on behalf of Surety to execute, seal, and deliver such Bond and bind the Surety thereby.
10. This Bond is intended to conform to all applicable statutory requirements. Any applicable requirement of any applicable statute that has been omitted from this Bond will be deemed to be included herein as if set forth at length. If any provision of this Bond conflicts with any applicable statute, then the provision of said statute governs and the remainder of this Bond that is not in conflict therewith continues in full force and effect.
11. The term "Bid" as used herein includes a Bid, offer, or proposal as applicable.

CITY OF MORRIS
RESPONSIBLE BIDDER CERTIFICATION
BID PROPOSAL

PROJECT NAME: East WWTP Expansion 2025

As part of its bid on a Contract for the above-mentioned project, Contractor hereby certifies that said Contractor meets the requirements for "Responsible Bidder" as defined in Section 1 of City of Morris Resolution No. R-08-01, "A Resolution Defining Responsible Bidder", dated February 19, 2008 and shall submit evidence of compliance upon the request of the City of Morris or the Engineer.

Contractor Name: _____

Address: _____

BY: _____

Subscribed and sworn to

before me this _____

day of _____, _____

NOTARY PUBLIC

NOTICE OF AWARD

Date of Issuance:

Owner:

Owner's Contract No.:

Engineer:

Engineer's Project No.:

Project:

Bidder:

Bidder's Address:

You are notified that Owner has accepted your Bid dated _____ for the above Contract, and that you are the Successful Bidder and are awarded a Contract for:

The Contract Price of the awarded Contract is \$_____.

Contract Price is subject to adjustment based on the provisions of the Contract, including but not limited to, approved change orders.

You must comply with the following conditions precedent within 15 days of the date of receipt of this Notice of Award:

1. Deliver to Owner all counterparts of the Agreement, signed by Bidder (as Contractor).
2. Deliver with the signed Agreement(s) the Contract security (such as required performance and payment bonds) and insurance documentation, as specified in the Instructions to Bidders and in the General Conditions, Articles 2 and 6, and Supplementary Conditions.
3. Other conditions precedent (as may be noted elsewhere).

Failure to comply with these conditions within the time specified will entitle Owner to consider you in default, annul this Notice of Award, and declare your Bid security forfeited.

Within 10 days after you comply with the above conditions, Owner will return to you one fully signed counterpart of the Agreement, together with any additional copies of the Contract Documents as indicated in Paragraph 2.02 of the General Conditions.

Owner: _____

By (signature): _____

Name (printed): _____

Title: _____

Copy: Engineer

AGREEMENT BETWEEN OWNER AND CONTRACTOR FOR CONSTRUCTION CONTRACT (STIPULATED PRICE)

This Agreement is by and between [name of contracting entity] ("Owner") and [name of contracting entity] ("Contractor").

Terms used in this Agreement have the meanings stated in the General Conditions and the Supplementary Conditions.

Owner and Contractor hereby agree as follows:

ARTICLE 1—WORK

- 1.01 Contractor shall complete all Work as specified or indicated in the Contract Documents. The Work is generally described as follows:

[Brief description of Work]

ARTICLE 2—THE PROJECT

- 2.01 The Project, of which the Work under the Contract Documents is a part, is generally described as follows:

[Project Name]

ARTICLE 3—ENGINEER

- 3.01 The Owner has retained **Chamlin & Associates, Inc.** ("Engineer") to act as Owner's representative, assume all duties and responsibilities of Engineer, and have the rights and authority assigned to Engineer in the Contract.
- 3.02 The part of the Project that pertains to the Work has been designed by Engineer.

ARTICLE 4—CONTRACT TIMES

4.01 *Time is of the Essence*

- A. All time limits for Milestones, if any, Substantial Completion, and completion and readiness for final payment as stated in the Contract Documents are of the essence of the Contract.

4.02 *Contract Times: Dates*

- A. The Work will be substantially complete on or before [date], and completed and ready for final payment in accordance with Paragraph 15.06 of the General Conditions on or before [date].

OR

4.03 *Contract Times: Days*

- A. The Work will be substantially complete within _____ calendar days after the date when the Contract Times commence to run as provided in Paragraph 4.01 of the General Conditions,

and completed and ready for final payment in accordance with Paragraph 15.06 of the General Conditions within _____ calendar days after the date when the Contract Times commence to run.

4.04 *Milestones*

- A. Parts of the Work must be substantially completed on or before the following Milestone(s):
1. Milestone 1 **N/A**
 2. Milestone 2 **N/A**
 3. Milestone 3 **N/A**

4.05 *Liquidated Damages*

- A. Contractor and Owner recognize that time is of the essence as stated in Paragraph 4.01 above and that Owner will suffer financial and other losses if the Work is not completed and Milestones not achieved within the Contract Times, as duly modified. The parties also recognize the delays, expense, and difficulties involved in proving, in a legal or arbitration proceeding, the actual loss suffered by Owner if the Work is not completed on time. Accordingly, instead of requiring any such proof, Owner and Contractor agree that as liquidated damages for delay (but not as a penalty):
1. *Substantial Completion*: Contractor shall pay Owner \$_____ for each day that expires after the time (as duly adjusted pursuant to the Contract) specified above for Substantial Completion, until the Work is substantially complete.
 2. *Completion of Remaining Work*: After Substantial Completion, if Contractor shall neglect, refuse, or fail to complete the remaining Work within the Contract Times (as duly adjusted pursuant to the Contract) for completion and readiness for final payment, Contractor shall pay Owner \$_____ for each day that expires after such time until the Work is completed and ready for final payment.
 3. ~~*Milestones*: Contractor shall pay Owner \$[number] for each day that expires after the time (as duly adjusted pursuant to the Contract) specified above for achievement of Milestone 1, until Milestone 1 is achieved, or until the time specified for Substantial Completion is reached, at which time the rate indicated in Paragraph 4.05.A.1 will apply, rather than the Milestone rate.~~
 4. Liquidated damages for failing to timely attain Substantial Completion and final completion are not additive, and will not be imposed concurrently.
- B. If Owner recovers liquidated damages for a delay in completion by Contractor, then such liquidated damages are Owner's sole and exclusive remedy for such delay, and Owner is precluded from recovering any other damages, whether actual, direct, excess, or consequential, for such delay, except for special damages (if any) specified in this Agreement.

4.06 *Special Damages*

- A. Contractor shall reimburse Owner (1) for any fines or penalties imposed on Owner as a direct result of the Contractor's failure to attain Substantial Completion according to the Contract Times, and (2) for the actual costs reasonably incurred by Owner for engineering, construction observation, inspection, and administrative services needed after the time specified in

Paragraph 4.02 for Substantial Completion (as duly adjusted pursuant to the Contract), until the Work is substantially complete.

- B. After Contractor achieves Substantial Completion, if Contractor shall neglect, refuse, or fail to complete the remaining Work within the Contract Times, Contractor shall reimburse Owner for the actual costs reasonably incurred by Owner for engineering, construction observation, inspection, and administrative services needed after the time specified in Paragraph 4.02 for Work to be completed and ready for final payment (as duly adjusted pursuant to the Contract), until the Work is completed and ready for final payment.
- C. The special damages imposed in this paragraph are supplemental to any liquidated damages for delayed completion established in this Agreement.

ARTICLE 5—CONTRACT PRICE

5.01 Owner shall pay Contractor for completion of the Work in accordance with the Contract Documents, the amounts that follow, subject to adjustment under the Contract:

- A. For all Work other than Unit Price Work, a lump sum of \$_____.

All specific cash allowances are included in the above price in accordance with Paragraph 13.02 of the General Conditions.

- B. For all Unit Price Work, an amount equal to the sum of the extended prices (established for each separately identified item of Unit Price Work by multiplying the unit price times the actual quantity of that item).

Unit Price Work					
Item No.	Description	Unit	Estimated Quantity	Unit Price	Extended Price
	SEE ATTACHED BID SCHEDULE.				
Total of all Extended Prices for Unit Price Work (subject to final adjustment based on actual quantities)					\$_____

The extended prices for Unit Price Work set forth as of the Effective Date of the Contract are based on estimated quantities. As provided in Paragraph 13.03 of the General Conditions, estimated quantities are not guaranteed, and determinations of actual quantities and classifications are to be made by Engineer.

- C. For all Work, at the prices stated in Contractor's Bid, attached hereto as an exhibit.

ARTICLE 6—PAYMENT PROCEDURES

6.01 *Submittal and Processing of Payments*

- A. Contractor shall submit Applications for Payment in accordance with Article 15 of the General Conditions. Applications for Payment will be processed by Engineer as provided in the General Conditions.

6.02 *Progress Payments; Retainage*

- A. Owner shall make progress payments on the basis of Contractor's Applications for Payment on or about the 1st day of each month during performance of the Work as provided in Paragraph 6.02.A.1 below, provided that such Applications for Payment have been submitted in a timely manner and otherwise meet the requirements of the Contract. All such payments will be measured by the Schedule of Values established as provided in the General Conditions (and in the case of Unit Price Work based on the number of units completed) or, in the event there is no Schedule of Values, as provided elsewhere in the Contract.
 - 1. Prior to Substantial Completion, progress payments will be made in an amount equal to the percentage indicated below but, in each case, less the aggregate of payments previously made and less such amounts as Owner may withhold, including but not limited to liquidated damages, in accordance with the Contract.
 - a. 90 percent of the value of the Work completed (with the balance being retainage).
 - 1) If 49 percent or more of the Work has been completed, as determined by Engineer, and if the character and progress of the Work have been satisfactory to Owner and Engineer, then as long as the character and progress of the Work remain satisfactory to Owner and Engineer, there will be no additional retainage; and
 - b. 90 percent of cost of materials and equipment not incorporated in the Work (with the balance being retainage).
 - B. **Upon 50 percent completion**, Owner shall pay an amount sufficient to increase total payments to Contractor to 95 percent of the Work completed, less such amounts set off by Owner pursuant to Paragraph 15.01.E of the General Conditions, and less 125 percent of Engineer's estimate of the value of Work to be completed or corrected as shown on the punch list of items to be completed or corrected prior to final payment.

6.03 *Final Payment*

- A. Upon final completion and acceptance of the Work, Owner shall pay the remainder of the Contract Price in accordance with Paragraph 15.06 of the General Conditions.

6.04 *~~Consent of Surety~~*

- ~~A. Owner will not make final payment, or return or release retainage at Substantial Completion or any other time, unless Contractor submits written consent of the surety to such payment, return, or release.~~

6.05 *Interest*

- A. All amounts not paid when due will bear interest at the rate of 0 percent per annum.

ARTICLE 7—CONTRACT DOCUMENTS

7.01 *Contents*

- A. The Contract Documents consist of all of the following:
 - 1. This Agreement.
 - 2. Bonds:
 - a. Performance bond (together with power of attorney).
 - b. Payment bond (together with power of attorney).
 - 3. General Conditions.
 - 4. Supplementary Conditions.
 - 5. Specifications as listed in the table of contents of the project manual.
 - 6. Drawings (not attached but incorporated by reference) consisting of **[number]** sheets with each sheet bearing the following general title: **[title on Drawings]**.
 - 7. Addenda (numbers **[number]** to **[number]**, inclusive).
 - 8. Exhibits to this Agreement (enumerated as follows):
 - a. Contractor's Bid & Bid Schedule (pages 1 to ____, inclusive.)
 - 9. The following which may be delivered or issued on or after the Effective Date of the Contract and are not attached hereto:
 - a. Notice to Proceed.
 - b. Work Change Directives.
 - c. Change Orders.
 - d. Field Orders.
- B. The Contract Documents listed in Paragraph 7.01.A are attached to this Agreement (except as expressly noted otherwise above).
- C. There are no Contract Documents other than those listed above in this Article 7.
- D. The Contract Documents may only be amended, modified, or supplemented as provided in the Contract.

ARTICLE 8—REPRESENTATIONS, CERTIFICATIONS, AND STIPULATIONS

8.01 *Contractor's Representations*

- A. In order to induce Owner to enter into this Contract, Contractor makes the following representations:
 - 1. Contractor has examined and carefully studied the Contract Documents, including Addenda.
 - 2. Contractor has visited the Site, conducted a thorough visual examination of the Site and adjacent areas, and become familiar with the general, local, and Site conditions that may affect cost, progress, and performance of the Work.

3. Contractor is familiar with all Laws and Regulations that may affect cost, progress, and performance of the Work.
4. Contractor has carefully studied the reports of explorations and tests of subsurface conditions at or adjacent to the Site and the drawings of physical conditions relating to existing surface or subsurface structures at the Site that have been identified in the Supplementary Conditions, with respect to the Technical Data in such reports and drawings.
5. Contractor has carefully studied the reports and drawings relating to Hazardous Environmental Conditions, if any, at or adjacent to the Site that have been identified in the Supplementary Conditions, with respect to Technical Data in such reports and drawings.
6. Contractor has considered the information known to Contractor itself; information commonly known to contractors doing business in the locality of the Site; information and observations obtained from visits to the Site; the Contract Documents; and the Technical Data identified in the Supplementary Conditions or by definition, with respect to the effect of such information, observations, and Technical Data on (a) the cost, progress, and performance of the Work; (b) the means, methods, techniques, sequences, and procedures of construction to be employed by Contractor; and (c) Contractor's safety precautions and programs.
7. Based on the information and observations referred to in the preceding paragraph, Contractor agrees that no further examinations, investigations, explorations, tests, studies, or data are necessary for the performance of the Work at the Contract Price, within the Contract Times, and in accordance with the other terms and conditions of the Contract.
8. Contractor is aware of the general nature of work to be performed by Owner and others at the Site that relates to the Work as indicated in the Contract Documents.
9. Contractor has given Engineer written notice of all conflicts, errors, ambiguities, or discrepancies that Contractor has discovered in the Contract Documents, and of discrepancies between Site conditions and the Contract Documents, and the written resolution thereof by Engineer is acceptable to Contractor.
10. The Contract Documents are generally sufficient to indicate and convey understanding of all terms and conditions for performance and furnishing of the Work.
11. Contractor's entry into this Contract constitutes an incontrovertible representation by Contractor that without exception all prices in the Agreement are premised upon performing and furnishing the Work required by the Contract Documents.

8.02 *Contractor's Certifications*

- A. Contractor certifies that it has not engaged in corrupt, fraudulent, collusive, or coercive practices in competing for or in executing the Contract. For the purposes of this Paragraph 8.02:
 1. "corrupt practice" means the offering, giving, receiving, or soliciting of anything of value likely to influence the action of a public official in the bidding process or in the Contract execution;

2. "fraudulent practice" means an intentional misrepresentation of facts made (a) to influence the bidding process or the execution of the Contract to the detriment of Owner, (b) to establish Bid or Contract prices at artificial non-competitive levels, or (c) to deprive Owner of the benefits of free and open competition;
3. "collusive practice" means a scheme or arrangement between two or more Bidders, with or without the knowledge of Owner, a purpose of which is to establish Bid prices at artificial, non-competitive levels; and
4. "coercive practice" means harming or threatening to harm, directly or indirectly, persons or their property to influence their participation in the bidding process or affect the execution of the Contract.

B. Contractor also certifies that it is not barred from executing a Contract as a result of a violation of either 720 ILCS 5/33E-3 or 720 ILCS 5/33E-4.

8.03 *Standard General Conditions*

- A. Owner stipulates that if the General Conditions that are made a part of this Contract are EJCDC® C-700, Standard General Conditions for the Construction Contract (2018), published by the Engineers Joint Contract Documents Committee, and if Owner is the party that has furnished said General Conditions, then Owner has plainly shown all modifications to the standard wording of such published document to the Contractor, through a process such as highlighting or "track changes" (redline/strikeout).

IN WITNESS WHEREOF, Owner and Contractor have signed this Agreement.

This Agreement will be effective on _____ (which is the Effective Date of the Contract).

Owner:

(typed or printed name of organization)

By: _____
(individual's signature)

Date: _____
(date signed)

Name: _____
(typed or printed)

Title: _____
(typed or printed)

Attest: _____
(individual's signature)

Title: _____
(typed or printed)

Address for giving notices:

Designated Representative:

Name: _____
(typed or printed)

Title: _____
(typed or printed)

Address:

Phone: _____

Email: _____

Contractor:

(typed or printed name of organization)

By: _____
(individual's signature)

Date: _____
(date signed)

Name: _____
(typed or printed)

Title: _____
(typed or printed)

Attest: _____
(individual's signature)

Title: _____
(typed or printed)

Address for giving notices:

Designated Representative:

Name: _____
(typed or printed)

Title: _____
(typed or printed)

Address:

Phone: _____

Email: _____

License No.: _____
(where applicable)

State: _____

PERFORMANCE BOND

Contractor Name: _____ Address <i>(principal place of business)</i> : _____ 	Surety Name: _____ Address <i>(principal place of business)</i> : _____
Owner Name: [Full formal name of Owner] Mailing address <i>(principal place of business)</i> : [Address of Owner's principal place of business] 	Contract Description <i>(name and location)</i> : [Owner's project/contract name, and location of the project] Contract Price: [Amount from Contract] Effective Date of Contract: [Date from Contract]
Bond Bond Amount: _____ Date of Bond: _____ <i>(Date of Bond cannot be earlier than Effective Date of Contract)</i> Modifications to this Bond form: ☒ None ☐ See Paragraph 16	
Surety and Contractor, intending to be legally bound hereby, subject to the terms set forth in this Performance Bond, do each cause this Performance Bond to be duly executed by an authorized officer, agent, or representative.	
Contractor as Principal	Surety
_____ <i>(Full formal name of Contractor)</i>	_____ <i>(Full formal name of Surety) (corporate seal)</i>
By: _____ <i>(Signature)</i>	By: _____ <i>(Signature)(Attach Power of Attorney)</i>
Name: _____ <i>(Printed or typed)</i>	Name: _____ <i>(Printed or typed)</i>
Title: _____	Title: _____
Attest: _____ <i>(Signature)</i>	Attest: _____ <i>(Signature)</i>
Name: _____ <i>(Printed or typed)</i>	Name: _____ <i>(Printed or typed)</i>
Title: _____	Title: _____
<i>Notes: (1) Provide supplemental execution by any additional parties, such as joint venturers. (2) Any singular reference to Contractor, Surety, Owner, or other party is considered plural where applicable.</i>	

1. The Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors, and assigns to the Owner for the performance of the Construction Contract, which is incorporated herein by reference.
2. If the Contractor performs the Construction Contract, the Surety and the Contractor shall have no obligation under this Bond, except when applicable to participate in a conference as provided in Paragraph 3.
3. If there is no Owner Default under the Construction Contract, the Surety's obligation under this Bond will arise after:
 - 3.1. The Owner first provides notice to the Contractor and the Surety that the Owner is considering declaring a Contractor Default. Such notice may indicate whether the Owner is requesting a conference among the Owner, Contractor, and Surety to discuss the Contractor's performance. If the Owner does not request a conference, the Surety may, within five (5) business days after receipt of the Owner's notice, request such a conference. If the Surety timely requests a conference, the Owner shall attend. Unless the Owner agrees otherwise, any conference requested under this Paragraph 3.1 will be held within ten (10) business days of the Surety's receipt of the Owner's notice. If the Owner, the Contractor, and the Surety agree, the Contractor shall be allowed a reasonable time to perform the Construction Contract, but such an agreement does not waive the Owner's right, if any, subsequently to declare a Contractor Default;
 - 3.2. The Owner declares a Contractor Default, terminates the Construction Contract and notifies the Surety; and
 - 3.3. The Owner has agreed to pay the Balance of the Contract Price in accordance with the terms of the Construction Contract to the Surety or to a contractor selected to perform the Construction Contract.
4. Failure on the part of the Owner to comply with the notice requirement in Paragraph 3.1 does not constitute a failure to comply with a condition precedent to the Surety's obligations, or release the Surety from its obligations, except to the extent the Surety demonstrates actual prejudice.
5. When the Owner has satisfied the conditions of Paragraph 3, the Surety shall promptly and at the Surety's expense take one of the following actions:
 - 5.1. Arrange for the Contractor, with the consent of the Owner, to perform and complete the Construction Contract;
 - 5.2. Undertake to perform and complete the Construction Contract itself, through its agents or independent contractors;
 - 5.3. Obtain bids or negotiated proposals from qualified contractors acceptable to the Owner for a contract for performance and completion of the Construction Contract, arrange for a contract to be prepared for execution by the Owner and a contractor selected with the Owners concurrence, to be secured with performance and payment bonds executed by a qualified surety equivalent to the bonds issued on the Construction Contract, and pay to the Owner the amount of damages as described in Paragraph 7 in excess of the Balance of the Contract Price incurred by the Owner as a result of the Contractor Default; or
 - 5.4. Waive its right to perform and complete, arrange for completion, or obtain a new contractor, and with reasonable promptness under the circumstances:

- 5.4.1 After investigation, determine the amount for which it may be liable to the Owner and, as soon as practicable after the amount is determined, make payment to the Owner; or
 - 5.4.2 Deny liability in whole or in part and notify the Owner, citing the reasons for denial.
- 6. If the Surety does not proceed as provided in Paragraph 5 with reasonable promptness, the Surety shall be deemed to be in default on this Bond seven days after receipt of an additional written notice from the Owner to the Surety demanding that the Surety perform its obligations under this Bond, and the Owner shall be entitled to enforce any remedy available to the Owner. If the Surety proceeds as provided in Paragraph 5.4, and the Owner refuses the payment, or the Surety has denied liability, in whole or in part, without further notice, the Owner shall be entitled to enforce any remedy available to the Owner.
- 7. If the Surety elects to act under Paragraph 5.1, 5.2, or 5.3, then the responsibilities of the Surety to the Owner will not be greater than those of the Contractor under the Construction Contract, and the responsibilities of the Owner to the Surety will not be greater than those of the Owner under the Construction Contract. Subject to the commitment by the Owner to pay the Balance of the Contract Price, the Surety is obligated, without duplication for:
 - 7.1. the responsibilities of the Contractor for correction of defective work and completion of the Construction Contract;
 - 7.2. additional legal, design professional, and delay costs resulting from the Contractor's Default, and resulting from the actions or failure to act of the Surety under Paragraph 5; and
 - 7.3. liquidated damages, or if no liquidated damages are specified in the Construction Contract, actual damages caused by delayed performance or non-performance of the Contractor.
- 8. If the Surety elects to act under Paragraph 5.1, 5.3, or 5.4, the Surety's liability is limited to the amount of this Bond.
- 9. The Surety shall not be liable to the Owner or others for obligations of the Contractor that are unrelated to the Construction Contract, and the Balance of the Contract Price will not be reduced or set off on account of any such unrelated obligations. No right of action will accrue on this Bond to any person or entity other than the Owner or its heirs, executors, administrators, successors, and assigns.
- 10. The Surety hereby waives notice of any change, including changes of time, to the Construction Contract or to related subcontracts, purchase orders, and other obligations.
- 11. Any proceeding, legal or equitable, under this Bond must be instituted in any court of competent jurisdiction in the location in which the work or part of the work is located and must be instituted within two years after a declaration of Contractor Default or within two years after the Contractor ceased working or within two years after the Surety refuses or fails to perform its obligations under this Bond, whichever occurs first. If the provisions of this paragraph are void or prohibited by law, the minimum periods of limitations available to sureties as a defense in the jurisdiction of the suit will be applicable.
- 12. Notice to the Surety, the Owner, or the Contractor must be mailed or delivered to the address shown on the page on which their signature appears.
- 13. When this Bond has been furnished to comply with a statutory or other legal requirement in the location where the construction was to be performed, any provision in this Bond conflicting with said statutory or legal requirement will be deemed deleted therefrom and provisions conforming to such

statutory or other legal requirement will be deemed incorporated herein. When so furnished, the intent is that this Bond will be construed as a statutory bond and not as a common law bond.

14. Definitions

- 14.1. *Balance of the Contract Price*—The total amount payable by the Owner to the Contractor under the Construction Contract after all proper adjustments have been made including allowance for the Contractor for any amounts received or to be received by the Owner in settlement of insurance or other claims for damages to which the Contractor is entitled, reduced by all valid and proper payments made to or on behalf of the Contractor under the Construction Contract.
 - 14.2. *Construction Contract*—The agreement between the Owner and Contractor identified on the cover page, including all Contract Documents and changes made to the agreement and the Contract Documents.
 - 14.3. *Contractor Default*—Failure of the Contractor, which has not been remedied or waived, to perform or otherwise to comply with a material term of the Construction Contract.
 - 14.4. *Owner Default*—Failure of the Owner, which has not been remedied or waived, to pay the Contractor as required under the Construction Contract or to perform and complete or comply with the other material terms of the Construction Contract.
 - 14.5. *Contract Documents*—All the documents that comprise the agreement between the Owner and Contractor.
15. If this Bond is issued for an agreement between a contractor and subcontractor, the term Contractor in this Bond will be deemed to be Subcontractor and the term Owner will be deemed to be Contractor.
16. Modifications to this Bond are as follows: **None**

PAYMENT BOND

Contractor Name: _____ Address (<i>principal place of business</i>): _____	Surety Name: _____ Address (<i>principal place of business</i>): _____
Owner Name: [Full formal name of Owner] Mailing address (<i>principal place of business</i>): [Address of Owner's principal place of business]	Contract Description (<i>name and location</i>): [Owner's project/contract name, and location of the project] Contract Price: [Amount, from Contract] Effective Date of Contract: [Date, from Contract]
Bond Bond Amount: _____ Date of Bond: _____ <i>(Date of Bond cannot be earlier than Effective Date of Contract)</i> Modifications to this Bond form: ☒ None ☐ See Paragraph 18	
Surety and Contractor, intending to be legally bound hereby, subject to the terms set forth in this Payment Bond, do each cause this Payment Bond to be duly executed by an authorized officer, agent, or representative.	
Contractor as Principal	Surety
_____ <i>(Full formal name of Contractor)</i>	_____ <i>(Full formal name of Surety) (corporate seal)</i>
By: _____ <i>(Signature)</i>	By: _____ <i>(Signature)(Attach Power of Attorney)</i>
Name: _____ <i>(Printed or typed)</i>	Name: _____ <i>(Printed or typed)</i>
Title: _____	Title: _____
Attest: _____ <i>(Signature)</i>	Attest: _____ <i>(Signature)</i>
Name: _____ <i>(Printed or typed)</i>	Name: _____ <i>(Printed or typed)</i>
Title: _____	Title: _____
<i>Notes: (1) Provide supplemental execution by any additional parties, such as joint venturers. (2) Any singular reference to Contractor, Surety, Owner, or other party is considered plural where applicable.</i>	

1. The Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors, and assigns to the Owner to pay for labor, materials, and equipment furnished for use in the performance of the Construction Contract, which is incorporated herein by reference, subject to the following terms.
2. If the Contractor promptly makes payment of all sums due to Claimants, and defends, indemnifies, and holds harmless the Owner from claims, demands, liens, or suits by any person or entity seeking payment for labor, materials, or equipment furnished for use in the performance of the Construction Contract, then the Surety and the Contractor shall have no obligation under this Bond.
3. If there is no Owner Default under the Construction Contract, the Surety's obligation to the Owner under this Bond will arise after the Owner has promptly notified the Contractor and the Surety (at the address described in Paragraph 13) of claims, demands, liens, or suits against the Owner or the Owner's property by any person or entity seeking payment for labor, materials, or equipment furnished for use in the performance of the Construction Contract, and tendered defense of such claims, demands, liens, or suits to the Contractor and the Surety.
4. When the Owner has satisfied the conditions in Paragraph 3, the Surety shall promptly and at the Surety's expense defend, indemnify, and hold harmless the Owner against a duly tendered claim, demand, lien, or suit.
5. The Surety's obligations to a Claimant under this Bond will arise after the following:
 - 5.1. Claimants who do not have a direct contract with the Contractor
 - 5.1.1. have furnished a written notice of non-payment to the Contractor, stating with substantial accuracy the amount claimed and the name of the party to whom the materials were, or equipment was, furnished or supplied or for whom the labor was done or performed, within ninety (90) days after having last performed labor or last furnished materials or equipment included in the Claim; and
 - 5.1.2. have sent a Claim to the Surety (at the address described in Paragraph 13).
 - 5.2. Claimants who are employed by or have a direct contract with the Contractor have sent a Claim to the Surety (at the address described in Paragraph 13).
6. If a notice of non-payment required by Paragraph 5.1.1 is given by the Owner to the Contractor, that is sufficient to satisfy a Claimant's obligation to furnish a written notice of non-payment under Paragraph 5.1.1.
7. When a Claimant has satisfied the conditions of Paragraph 5.1 or 5.2, whichever is applicable, the Surety shall promptly and at the Surety's expense take the following actions:
 - 7.1. Send an answer to the Claimant, with a copy to the Owner, within sixty (60) days after receipt of the Claim, stating the amounts that are undisputed and the basis for challenging any amounts that are disputed; and
 - 7.2. Pay or arrange for payment of any undisputed amounts.
 - 7.3. The Surety's failure to discharge its obligations under Paragraph 7.1 or 7.2 will not be deemed to constitute a waiver of defenses the Surety or Contractor may have or acquire as to a Claim, except as to undisputed amounts for which the Surety and Claimant have reached agreement. If, however, the Surety fails to discharge its obligations under Paragraph 7.1 or 7.2, the Surety shall indemnify the Claimant for the reasonable attorney's fees the Claimant incurs thereafter to recover any sums found to be due and owing to the Claimant.

8. The Surety's total obligation will not exceed the amount of this Bond, plus the amount of reasonable attorney's fees provided under Paragraph 7.3, and the amount of this Bond will be credited for any payments made in good faith by the Surety.
9. Amounts owed by the Owner to the Contractor under the Construction Contract will be used for the performance of the Construction Contract and to satisfy claims, if any, under any construction performance bond. By the Contractor furnishing and the Owner accepting this Bond, they agree that all funds earned by the Contractor in the performance of the Construction Contract are dedicated to satisfying obligations of the Contractor and Surety under this Bond, subject to the Owner's priority to use the funds for the completion of the work.
10. The Surety shall not be liable to the Owner, Claimants, or others for obligations of the Contractor that are unrelated to the Construction Contract. The Owner shall not be liable for the payment of any costs or expenses of any Claimant under this Bond, and shall have under this Bond no obligation to make payments to or give notice on behalf of Claimants, or otherwise have any obligations to Claimants under this Bond.
11. The Surety hereby waives notice of any change, including changes of time, to the Construction Contract or to related subcontracts, purchase orders, and other obligations.
12. No suit or action will be commenced by a Claimant under this Bond other than in a court of competent jurisdiction in the state in which the project that is the subject of the Construction Contract is located or after the expiration of one year from the date (1) on which the Claimant sent a Claim to the Surety pursuant to Paragraph 5.1.2 or 5.2, or (2) on which the last labor or service was performed by anyone or the last materials or equipment were furnished by anyone under the Construction Contract, whichever of (1) or (2) first occurs. If the provisions of this paragraph are void or prohibited by law, the minimum period of limitation available to sureties as a defense in the jurisdiction of the suit will be applicable.
13. Notice and Claims to the Surety, the Owner, or the Contractor must be mailed or delivered to the address shown on the page on which their signature appears. Actual receipt of notice or Claims, however accomplished, will be sufficient compliance as of the date received.
14. When this Bond has been furnished to comply with a statutory or other legal requirement in the location where the construction was to be performed, any provision in this Bond conflicting with said statutory or legal requirement will be deemed deleted here from and provisions conforming to such statutory or other legal requirement will be deemed incorporated herein. When so furnished, the intent is that this Bond will be construed as a statutory bond and not as a common law bond.
15. Upon requests by any person or entity appearing to be a potential beneficiary of this Bond, the Contractor and Owner shall promptly furnish a copy of this Bond or shall permit a copy to be made.
16. Definitions
 - 16.1. *Claim*—A written statement by the Claimant including at a minimum:
 - 16.1.1. The name of the Claimant;
 - 16.1.2. The name of the person for whom the labor was done, or materials or equipment furnished;
 - 16.1.3. A copy of the agreement or purchase order pursuant to which labor, materials, or equipment was furnished for use in the performance of the Construction Contract;
 - 16.1.4. A brief description of the labor, materials, or equipment furnished;

- 16.1.5. The date on which the Claimant last performed labor or last furnished materials or equipment for use in the performance of the Construction Contract;
 - 16.1.6. The total amount earned by the Claimant for labor, materials, or equipment furnished as of the date of the Claim;
 - 16.1.7. The total amount of previous payments received by the Claimant; and
 - 16.1.8. The total amount due and unpaid to the Claimant for labor, materials, or equipment furnished as of the date of the Claim.
- 16.2. *Claimant*—An individual or entity having a direct contract with the Contractor or with a subcontractor of the Contractor to furnish labor, materials, or equipment for use in the performance of the Construction Contract. The term Claimant also includes any individual or entity that has rightfully asserted a claim under an applicable mechanic's lien or similar statute against the real property upon which the Project is located. The intent of this Bond is to include without limitation in the terms of "labor, materials, or equipment" that part of the water, gas, power, light, heat, oil, gasoline, telephone service, or rental equipment used in the Construction Contract, architectural and engineering services required for performance of the work of the Contractor and the Contractor's subcontractors, and all other items for which a mechanic's lien may be asserted in the jurisdiction where the labor, materials, or equipment were furnished.
- 16.3. *Construction Contract*—The agreement between the Owner and Contractor identified on the cover page, including all Contract Documents and all changes made to the agreement and the Contract Documents.
- 16.4. *Owner Default*—Failure of the Owner, which has not been remedied or waived, to pay the Contractor as required under the Construction Contract or to perform and complete or comply with the other material terms of the Construction Contract.
- 16.5. *Contract Documents*—All the documents that comprise the agreement between the Owner and Contractor.
17. If this Bond is issued for an agreement between a contractor and subcontractor, the term Contractor in this Bond will be deemed to be Subcontractor and the term Owner will be deemed to be Contractor.
18. Modifications to this Bond are as follows: **None**

NOTICE TO PROCEED

Owner: _____ Owner's Project No.: _____
Engineer: _____ Engineer's Project No.: _____
Contractor: _____
Project: _____

Effective Date of Contract: _____

Owner hereby notifies Contractor that the Contract Times under the above Contract will commence to run on _____ **[date Contract Times are to start]** pursuant to Paragraph 4.01 of the General Conditions.

On that date, Contractor shall start performing its obligations under the Contract Documents. No Work will be done at the Site prior to such date.

In accordance with the Agreement: **[Select one of the following two alternatives, insert dates or number of days, and delete the other alternative.]**

The date by which Substantial Completion must be achieved is **[date for Substantial Completion, from Agreement]**, and the date by which readiness for final payment must be achieved is **[date for readiness, from Agreement]**.

[or]

The number of days to achieve Substantial Completion is **[number of days, from Agreement]** from the date stated above for the commencement of the Contract Times, and the number of days to achieve readiness for final payment is **[number of days, from Agreement]** from the commencement date of the Contract Times.

Before starting any Work at the Site, Contractor must comply with the following:

[Note any access limitations, security procedures, or other restrictions]

Owner: _____
By (signature): _____
Name (printed): _____
Title: _____
Date Issued: _____

Copy: Engineer

STANDARD GENERAL CONDITIONS OF THE CONSTRUCTION CONTRACT

Prepared By



Copyright® 2018

National Society of Professional Engineers
1420 King Street, Alexandria, VA 22314-2794
(703) 684-2882
www.nspe.org

American Council of Engineering Companies
1015 15th Street N.W., Washington, DC 20005
(202) 347-7474
www.acec.org

American Society of Civil Engineers
1801 Alexander Bell Drive, Reston, VA 20191-4400
(800) 548-2723
www.asce.org

The copyright for this EJCDC document is owned jointly by the three sponsoring organizations listed above. The National Society of Professional Engineers is the Copyright Administrator for the EJCDC documents; please direct all inquiries regarding EJCDC copyrights to NSPE.

NOTE: EJCDC publications may be purchased at www.ejcdc.org, or from any of the sponsoring organizations above.

STANDARD GENERAL CONDITIONS OF THE CONSTRUCTION CONTRACT

TABLE OF CONTENTS

	Page
Article 1—Definitions and Terminology	1
1.01 Defined Terms	1
1.02 Terminology.....	6
Article 2—Preliminary Matters	7
2.01 Delivery of Performance and Payment Bonds; Evidence of Insurance.....	7
2.02 Copies of Documents	7
2.03 Before Starting Construction.....	7
2.04 Preconstruction Conference; Designation of Authorized Representatives	8
2.05 Acceptance of Schedules.....	8
2.06 Electronic Transmittals.....	8
Article 3—Contract Documents: Intent, Requirements, Reuse	9
3.01 Intent.....	9
3.02 Reference Standards	9
3.03 Reporting and Resolving Discrepancies	10
3.04 Requirements of the Contract Documents	10
3.05 Reuse of Documents	11
Article 4—Commencement and Progress of the Work.....	11
4.01 Commencement of Contract Times; Notice to Proceed	11
4.02 Starting the Work	11
4.03 Reference Points	12
4.04 Progress Schedule	12
4.05 Delays in Contractor’s Progress.....	12
Article 5—Site; Subsurface and Physical Conditions; Hazardous Environmental Conditions.....	14
5.01 Availability of Lands.....	14
5.02 Use of Site and Other Areas	14
5.03 Subsurface and Physical Conditions.....	15
5.04 Differing Subsurface or Physical Conditions.....	16

5.05	Underground Facilities	17
5.06	Hazardous Environmental Conditions at Site.....	19
Article 6—Bonds and Insurance		21
6.01	Performance, Payment, and Other Bonds	21
6.02	Insurance—General Provisions	22
6.03	Contractor’s Insurance	24
6.04	Builder’s Risk and Other Property Insurance	25
6.05	Property Losses; Subrogation.....	25
6.06	Receipt and Application of Property Insurance Proceeds.....	27
Article 7—Contractor’s Responsibilities.....		27
7.01	Contractor’s Means and Methods of Construction.....	27
7.02	Supervision and Superintendence.....	27
7.03	Labor; Working Hours	27
7.04	Services, Materials, and Equipment.....	28
7.05	“Or Equals”	28
7.06	Substitutes.....	29
7.07	Concerning Subcontractors and Suppliers	31
7.08	Patent Fees and Royalties	32
7.09	Permits	33
7.10	Taxes.....	33
7.11	Laws and Regulations	33
7.12	Record Documents	33
7.13	Safety and Protection.....	34
7.14	Hazard Communication Programs	35
7.15	Emergencies	35
7.16	Submittals.....	35
7.17	Contractor’s General Warranty and Guarantee.....	38
7.18	Indemnification	39
7.19	Delegation of Professional Design Services.....	39
Article 8—Other Work at the Site		40
8.01	Other Work.....	40
8.02	Coordination.....	41
8.03	Legal Relationships.....	41

Article 9—Owner’s Responsibilities	42
9.01 Communications to Contractor	42
9.02 Replacement of Engineer	42
9.03 Furnish Data	42
9.04 Pay When Due	42
9.05 Lands and Easements; Reports, Tests, and Drawings	43
9.06 Insurance	43
9.07 Change Orders.....	43
9.08 Inspections, Tests, and Approvals	43
9.09 Limitations on Owner’s Responsibilities	43
9.10 Undisclosed Hazardous Environmental Condition	43
9.11 Evidence of Financial Arrangements	43
9.12 Safety Programs	43
Article 10—Engineer’s Status During Construction	44
10.01 Owner’s Representative	44
10.02 Visits to Site	44
10.03 Resident Project Representative	44
10.04 Engineer’s Authority	44
10.05 Determinations for Unit Price Work.....	45
10.06 Decisions on Requirements of Contract Documents and Acceptability of Work	45
10.07 Limitations on Engineer’s Authority and Responsibilities	45
10.08 Compliance with Safety Program	45
Article 11—Changes to the Contract.....	46
11.01 Amending and Supplementing the Contract.....	46
11.02 Change Orders.....	46
11.03 Work Change Directives	46
11.04 Field Orders	47
11.05 Owner-Authorized Changes in the Work	47
11.06 Unauthorized Changes in the Work	47
11.07 Change of Contract Price.....	47
11.08 Change of Contract Times	49
11.09 Change Proposals	49
11.10 Notification to Surety	50

Article 12—Claims	50
12.01 Claims	50
Article 13—Cost of the Work; Allowances; Unit Price Work	51
13.01 Cost of the Work	51
13.02 Allowances.....	55
13.03 Unit Price Work	55
Article 14—Tests and Inspections; Correction, Removal, or Acceptance of Defective Work.....	56
14.01 Access to Work	56
14.02 Tests, Inspections, and Approvals	56
14.03 Defective Work.....	57
14.04 Acceptance of Defective Work.....	58
14.05 Uncovering Work.....	58
14.06 Owner May Stop the Work.....	58
14.07 Owner May Correct Defective Work	59
Article 15—Payments to Contractor; Set-Offs; Completion; Correction Period.....	59
15.01 Progress Payments	59
15.02 Contractor’s Warranty of Title	62
15.03 Substantial Completion	62
15.04 Partial Use or Occupancy	63
15.05 Final Inspection	64
15.06 Final Payment.....	64
15.07 Waiver of Claims.....	65
15.08 Correction Period	66
Article 16—Suspension of Work and Termination.....	67
16.01 Owner May Suspend Work	67
16.02 Owner May Terminate for Cause	67
16.03 Owner May Terminate for Convenience.....	68
16.04 Contractor May Stop Work or Terminate	68
Article 17—Final Resolution of Disputes.....	69
17.01 Methods and Procedures	69
Article 18—Miscellaneous.....	69
18.01 Giving Notice	69
18.02 Computation of Times.....	69

18.03	Cumulative Remedies.....	70
18.04	Limitation of Damages	70
18.05	No Waiver.....	70
18.06	Survival of Obligations.....	70
18.07	Controlling Law.....	70
18.08	Assignment of Contract.....	70
18.09	Successors and Assigns.....	70
18.10	Headings.....	70

Modifications are shown by strikeout and/or bold text.

STANDARD GENERAL CONDITIONS OF THE CONSTRUCTION CONTRACT

ARTICLE 1—DEFINITIONS AND TERMINOLOGY

1.01 *Defined Terms*

- A. Wherever used in the Bidding Requirements or Contract Documents, a term printed with initial capital letters, including the term's singular and plural forms, will have the meaning indicated in the definitions below. In addition to terms specifically defined, terms with initial capital letters in the Contract Documents include references to identified articles and paragraphs, and the titles of other documents or forms.
1. *Addenda*—Written or graphic instruments issued prior to the opening of Bids which clarify, correct, or change the Bidding Requirements or the proposed Contract Documents.
 2. *Agreement*—The written instrument, executed by Owner and Contractor, that sets forth the Contract Price and Contract Times, identifies the parties and the Engineer, and designates the specific items that are Contract Documents.
 3. *Application for Payment*—The document prepared by Contractor, in a form acceptable to Engineer, to request progress or final payments, and which is to be accompanied by such supporting documentation as is required by the Contract Documents.
 4. *Bid*—The offer of a Bidder submitted on the prescribed form setting forth the prices for the Work to be performed.
 5. *Bidder*—An individual or entity that submits a Bid to Owner.
 6. *Bidding Documents*—The Bidding Requirements, the proposed Contract Documents, and all Addenda.
 7. *Bidding Requirements*—The Advertisement or invitation to bid, Instructions to Bidders, Bid Bond or other Bid security, if any, the Bid Form, and the Bid with any attachments.
 8. *Change Order*—A document which is signed by Contractor and Owner and authorizes an addition, deletion, or revision in the Work or an adjustment in the Contract Price or the Contract Times, or other revision to the Contract, issued on or after the Effective Date of the Contract.
 9. *Change Proposal*—A written request by Contractor, duly submitted in compliance with the procedural requirements set forth herein, seeking an adjustment in Contract Price or Contract Times; contesting an initial decision by Engineer concerning the requirements of the Contract Documents or the acceptability of Work under the Contract Documents; challenging a set-off against payments due; or seeking other relief with respect to the terms of the Contract.
 10. *Claim*
 - a. A demand or assertion by Owner directly to Contractor, duly submitted in compliance with the procedural requirements set forth herein, seeking an adjustment of Contract Price or Contract Times; contesting an initial decision by Engineer concerning the

requirements of the Contract Documents or the acceptability of Work under the Contract Documents; contesting Engineer's decision regarding a Change Proposal; seeking resolution of a contractual issue that Engineer has declined to address; or seeking other relief with respect to the terms of the Contract.

- b. A demand or assertion by Contractor directly to Owner, duly submitted in compliance with the procedural requirements set forth herein, contesting Engineer's decision regarding a Change Proposal, or seeking resolution of a contractual issue that Engineer has declined to address.
 - c. A demand or assertion by Owner or Contractor, duly submitted in compliance with the procedural requirements set forth herein, made pursuant to Paragraph 12.01.A.4, concerning disputes arising after Engineer has issued a recommendation of final payment.
 - d. A demand for money or services by a third party is not a Claim.
- 11. *Constituent of Concern*—Asbestos, petroleum, radioactive materials, polychlorinated biphenyls (PCBs), lead-based paint (as defined by the HUD/EPA standard), hazardous waste, and any substance, product, waste, or other material of any nature whatsoever that is or becomes listed, regulated, or addressed pursuant to Laws and Regulations regulating, relating to, or imposing liability or standards of conduct concerning, any hazardous, toxic, or dangerous waste, substance, or material.
 - 12. *Contract*—The entire and integrated written contract between Owner and Contractor concerning the Work.
 - 13. *Contract Documents*—Those items so designated in the Agreement, and which together comprise the Contract.
 - 14. *Contract Price*—The money that Owner has agreed to pay Contractor for completion of the Work in accordance with the Contract Documents.
 - 15. *Contract Times*—The number of days or the dates by which Contractor shall: (a) achieve Milestones, if any; (b) achieve Substantial Completion; and (c) complete the Work.
 - 16. *Contractor*—The individual or entity with which Owner has contracted for performance of the Work.
 - 17. *Cost of the Work*—See Paragraph 13.01 for definition.
 - 18. *Drawings*—The part of the Contract that graphically shows the scope, extent, and character of the Work to be performed by Contractor.
 - 19. *Effective Date of the Contract*—The date, indicated in the Agreement, on which the Contract becomes effective.
 - 20. *Electronic Document*—Any Project-related correspondence, attachments to correspondence, data, documents, drawings, information, or graphics, including but not limited to Shop Drawings and other Submittals, that are in an electronic or digital format.
 - 21. *Electronic Means*—Electronic mail (email), upload/download from a secure Project website, or other communications methods that allow: (a) the transmission or communication of Electronic Documents; (b) the documentation of transmissions, including sending and receipt; (c) printing of the transmitted Electronic Document by the

recipient; (d) the storage and archiving of the Electronic Document by sender and recipient; and (e) the use by recipient of the Electronic Document for purposes permitted by this Contract. Electronic Means does not include the use of text messaging, or of Facebook, Twitter, Instagram, or similar social media services for transmission of Electronic Documents.

22. *Engineer*—The individual or entity named as such in the Agreement.
23. *Field Order*—A written order issued by Engineer which requires minor changes in the Work but does not change the Contract Price or the Contract Times.
24. *Hazardous Environmental Condition*—The presence at the Site of Constituents of Concern in such quantities or circumstances that may present a danger to persons or property exposed thereto.
 - a. The presence at the Site of materials that are necessary for the execution of the Work, or that are to be incorporated into the Work, and that are controlled and contained pursuant to industry practices, Laws and Regulations, and the requirements of the Contract, is not a Hazardous Environmental Condition.
 - b. The presence of Constituents of Concern that are to be removed or remediated as part of the Work is not a Hazardous Environmental Condition.
 - c. The presence of Constituents of Concern as part of the routine, anticipated, and obvious working conditions at the Site, is not a Hazardous Environmental Condition.
25. *Laws and Regulations; Laws or Regulations*—Any and all applicable laws, statutes, rules, regulations, ordinances, codes, and binding decrees, resolutions, and orders of any and all governmental bodies, agencies, authorities, and courts having jurisdiction.
26. *Liens*—Charges, security interests, or encumbrances upon Contract-related funds, real property, or personal property.
27. *Milestone*—A principal event in the performance of the Work that the Contract requires Contractor to achieve by an intermediate completion date, or by a time prior to Substantial Completion of all the Work.
28. *Notice of Award*—The written notice by Owner to a Bidder of Owner's acceptance of the Bid.
29. *Notice to Proceed*—A written notice by Owner to Contractor fixing the date on which the Contract Times will commence to run and on which Contractor shall start to perform the Work.
30. *Owner*—The individual or entity with which Contractor has contracted regarding the Work, and which has agreed to pay Contractor for the performance of the Work, pursuant to the terms of the Contract.
31. *Progress Schedule*—A schedule, prepared and maintained by Contractor, describing the sequence and duration of the activities comprising Contractor's plan to accomplish the Work within the Contract Times.
32. *Project*—The total undertaking to be accomplished for Owner by engineers, contractors, and others, including planning, study, design, construction, testing, commissioning, and start-up, and of which the Work to be performed under the Contract Documents is a part.

33. *Resident Project Representative*—The authorized representative of Engineer assigned to assist Engineer at the Site. As used herein, the term Resident Project Representative (RPR) includes any assistants or field staff of Resident Project Representative.
34. *Samples*—Physical examples of materials, equipment, or workmanship that are representative of some portion of the Work and that establish the standards by which such portion of the Work will be judged.
35. *Schedule of Submittals*—A schedule, prepared and maintained by Contractor, of required submittals and the time requirements for Engineer’s review of the submittals.
36. *Schedule of Values*—A schedule, prepared and maintained by Contractor, allocating portions of the Contract Price to various portions of the Work and used as the basis for reviewing Contractor’s Applications for Payment.
37. *Shop Drawings*—All drawings, diagrams, illustrations, schedules, and other data or information that are specifically prepared or assembled by or for Contractor and submitted by Contractor to illustrate some portion of the Work. Shop Drawings, whether approved or not, are not Drawings and are not Contract Documents.
38. *Site*—Lands or areas indicated in the Contract Documents as being furnished by Owner upon which the Work is to be performed, including rights-of-way and easements, and such other lands or areas furnished by Owner which are designated for the use of Contractor.
39. *Specifications*—The part of the Contract that consists of written requirements for materials, equipment, systems, standards, and workmanship as applied to the Work, and certain administrative requirements and procedural matters applicable to the Work.
40. *Subcontractor*—An individual or entity having a direct contract with Contractor or with any other Subcontractor for the performance of a part of the Work.
41. *Submittal*—A written or graphic document, prepared by or for Contractor, which the Contract Documents require Contractor to submit to Engineer, or that is indicated as a Submittal in the Schedule of Submittals accepted by Engineer. Submittals may include Shop Drawings and Samples; schedules; product data; Owner-delegated designs; sustainable design information; information on special procedures; testing plans; results of tests and evaluations, source quality-control testing and inspections, and field or Site quality-control testing and inspections; warranties and certifications; Suppliers’ instructions and reports; records of delivery of spare parts and tools; operations and maintenance data; Project photographic documentation; record documents; and other such documents required by the Contract Documents. Submittals, whether or not approved or accepted by Engineer, are not Contract Documents. Change Proposals, Change Orders, Claims, notices, Applications for Payment, and requests for interpretation or clarification are not Submittals.
42. *Substantial Completion*—The time at which the Work (or a specified part thereof) has progressed to the point where, in the opinion of Engineer, the Work (or a specified part thereof) is sufficiently complete, in accordance with the Contract Documents, so that the Work (or a specified part thereof) can be utilized for the purposes for which it is intended. The terms “substantially complete” and “substantially completed” as applied to all or part of the Work refer to Substantial Completion of such Work.

43. *Successful Bidder*—The Bidder to which the Owner makes an award of contract.
44. *Supplementary Conditions*—The part of the Contract that amends or supplements these General Conditions.
45. *Supplier*—A manufacturer, fabricator, supplier, distributor, or vendor having a direct contract with Contractor or with any Subcontractor to furnish materials or equipment to be incorporated in the Work by Contractor or a Subcontractor.
46. *Technical Data*
- a. Those items expressly identified as Technical Data in the ~~Supplementary Conditions~~ **certain Specification sections**, with respect to either (1) existing subsurface conditions at or adjacent to the Site, or existing physical conditions at or adjacent to the Site including existing surface or subsurface structures (except Underground Facilities) or (2) Hazardous Environmental Conditions at the Site.
 - b. If no such express identifications of Technical Data have been made with respect to conditions at the Site, then Technical Data is defined, with respect to conditions at the Site under Paragraphs 5.03, 5.04, and 5.06, as the data contained in boring logs, recorded measurements of subsurface water levels, assessments of the condition of subsurface facilities, laboratory test results, and other factual, objective information regarding conditions at the Site that are set forth in any geotechnical, environmental, or other Site or facilities conditions report prepared for the Project and made available to Contractor.
 - c. Information and data regarding the presence or location of Underground Facilities are not intended to be categorized, identified, or defined as Technical Data, and instead Underground Facilities are shown or indicated on the Drawings.
47. *Underground Facilities*—All active or not-in-service underground lines, pipelines, conduits, ducts, encasements, cables, wires, manholes, vaults, tanks, tunnels, or other such facilities or systems at the Site, including but not limited to those facilities or systems that produce, transmit, distribute, or convey telephone or other communications, cable television, fiber optic transmissions, power, electricity, light, heat, gases, oil, crude oil products, liquid petroleum products, water, steam, waste, wastewater, storm water, other liquids or chemicals, or traffic or other control systems. An abandoned facility or system is not an Underground Facility.
48. *Unit Price Work*—Work to be paid for on the basis of unit prices.
49. *Work*—The entire construction or the various separately identifiable parts thereof required to be provided under the Contract Documents. Work includes and is the result of performing or providing all labor, services, and documentation necessary to produce such construction; furnishing, installing, and incorporating all materials and equipment into such construction; and may include related services such as testing, start-up, and commissioning, all as required by the Contract Documents.
50. *Work Change Directive*—A written directive to Contractor issued on or after the Effective Date of the Contract, signed by Owner and recommended by Engineer, ordering an addition, deletion, or revision in the Work.

1.02 Terminology

- A. The words and terms discussed in Paragraphs 1.02.B, C, D, and E are not defined terms that require initial capital letters, but, when used in the Bidding Requirements or Contract Documents, have the indicated meaning.
- B. *Intent of Certain Terms or Adjectives:* The Contract Documents include the terms “as allowed,” “as approved,” “as ordered,” “as directed” or terms of like effect or import to authorize an exercise of professional judgment by Engineer. In addition, the adjectives “reasonable,” “suitable,” “acceptable,” “proper,” “satisfactory,” or adjectives of like effect or import are used to describe an action or determination of Engineer as to the Work. It is intended that such exercise of professional judgment, action, or determination will be solely to evaluate, in general, the Work for compliance with the information in the Contract Documents and with the design concept of the Project as a functioning whole as shown or indicated in the Contract Documents (unless there is a specific statement indicating otherwise). The use of any such term or adjective is not intended to and shall not be effective to assign to Engineer any duty or authority to supervise or direct the performance of the Work, or any duty or authority to undertake responsibility contrary to the provisions of Article 10 or any other provision of the Contract Documents.
- C. *Day:* The word “day” means a calendar day of 24 hours measured from midnight to the next midnight.
- D. *Defective:* The word “defective,” when modifying the word “Work,” refers to Work that is unsatisfactory, faulty, or deficient in that it:
 - 1. does not conform to the Contract Documents;
 - 2. does not meet the requirements of any applicable inspection, reference standard, test, or approval referred to in the Contract Documents; or
 - 3. has been damaged prior to Engineer’s recommendation of final payment (unless responsibility for the protection thereof has been assumed by Owner at Substantial Completion in accordance with Paragraph 15.03 or Paragraph 15.04).
- E. *Furnish, Install, Perform, Provide*
 - 1. The word “furnish,” when used in connection with services, materials, or equipment, means to supply and deliver said services, materials, or equipment to the Site (or some other specified location) ready for use or installation and in usable or operable condition.
 - 2. The word “install,” when used in connection with services, materials, or equipment, means to put into use or place in final position said services, materials, or equipment complete and ready for intended use.
 - 3. The words “perform” or “provide,” when used in connection with services, materials, or equipment, means to furnish and install said services, materials, or equipment complete and ready for intended use.
 - 4. If the Contract Documents establish an obligation of Contractor with respect to specific services, materials, or equipment, but do not expressly use any of the four words “furnish,” “install,” “perform,” or “provide,” then Contractor shall furnish and install said services, materials, or equipment complete and ready for intended use.

- F. *Contract Price or Contract Times*: References to a change in “Contract Price or Contract Times” or “Contract Times or Contract Price” or similar, indicate that such change applies to (1) Contract Price, (2) Contract Times, or (3) both Contract Price and Contract Times, as warranted, even if the term “or both” is not expressed.
- G. Unless stated otherwise in the Contract Documents, words or phrases that have a well-known technical or construction industry or trade meaning are used in the Contract Documents in accordance with such recognized meaning.

ARTICLE 2—PRELIMINARY MATTERS

2.01 *Delivery of Performance and Payment Bonds; Evidence of Insurance*

- A. *Performance and Payment Bonds*: When Contractor delivers the signed counterparts of the Agreement to Owner, Contractor shall also deliver to Owner the performance bond and payment bond (if the Contract requires Contractor to furnish such bonds).
- B. *Evidence of Contractor’s Insurance*: When Contractor delivers the signed counterparts of the Agreement to Owner, Contractor shall also deliver to Owner, with copies to each additional insured (as identified in the Contract), the certificates, endorsements, and other evidence of insurance required to be provided by Contractor in accordance with Article 6, except to the extent the Supplementary Conditions expressly establish other dates for delivery of specific insurance policies.
- C. *Evidence of Owner’s Insurance*: After receipt of the signed counterparts of the Agreement and all required bonds and insurance documentation, Owner shall promptly deliver to Contractor, with copies to each additional insured (as identified in the Contract), the certificates and other evidence of insurance required to be provided by Owner under Article 6.

2.02 *Copies of Documents*

- A. Owner shall furnish to Contractor ~~four~~ **one** printed ~~copies~~ **copy** of the Contract (including one fully signed counterpart of the Agreement), and one copy in electronic portable document format (PDF), **if requested**. Additional printed copies will be furnished upon request at the cost of reproduction.
- B. Owner shall maintain and safeguard at least one original printed record version of the Contract, including Drawings and Specifications signed and sealed by Engineer and other design professionals. Owner shall make such original printed record version of the Contract available to Contractor for review. Owner may delegate the responsibilities under this provision to Engineer.

2.03 *Before Starting Construction*

- A. *Preliminary Schedules*: Within 10 days after the Effective Date of the Contract (or as otherwise required by the Contract Documents), Contractor shall submit to Engineer for timely review:
 - 1. a preliminary Progress Schedule indicating the times (numbers of days or dates) for starting and completing the various stages of the Work, including any Milestones specified in the Contract;
 - 2. a preliminary Schedule of Submittals; and

3. a preliminary Schedule of Values for all of the Work which includes quantities and prices of items which when added together equal the Contract Price and subdivides the Work into component parts in sufficient detail to serve as the basis for progress payments during performance of the Work. Such prices will include an appropriate amount of overhead and profit applicable to each item of Work.

2.04 *Preconstruction Conference; Designation of Authorized Representatives*

- A. Before any Work at the Site is started, a conference attended by Owner, Contractor, Engineer, and others as appropriate will be held to establish a working understanding among the parties as to the Work, and to discuss the schedules referred to in Paragraph 2.03.A, procedures for handling Shop Drawings, Samples, and other Submittals, processing Applications for Payment, electronic or digital transmittals, and maintaining required records.
- B. At this conference Owner and Contractor each shall designate, in writing, a specific individual to act as its authorized representative with respect to the services and responsibilities under the Contract. Such individuals shall have the authority to transmit and receive information, render decisions relative to the Contract, and otherwise act on behalf of each respective party.

2.05 *Acceptance of Schedules*

- A. At least 10 days before submission of the first Application for Payment a conference, attended by Contractor, Engineer, and others as appropriate, will be held to review the schedules submitted in accordance with Paragraph 2.03.A. No progress payment will be made to Contractor until acceptable schedules are submitted to Engineer.
 1. The Progress Schedule will be acceptable to Engineer if it provides an orderly progression of the Work to completion within the Contract Times. Such acceptance will not impose on Engineer responsibility for the Progress Schedule, for sequencing, scheduling, or progress of the Work, nor interfere with or relieve Contractor from Contractor's full responsibility therefor.
 2. Contractor's Schedule of Submittals will be acceptable to Engineer if it provides a workable arrangement for reviewing and processing the required submittals.
 3. Contractor's Schedule of Values will be acceptable to Engineer as to form and substance if it provides a reasonable allocation of the Contract Price to the component parts of the Work.
 4. If a schedule is not acceptable, Contractor will have an additional 10 days to revise and resubmit the schedule.

2.06 *Electronic Transmittals*

- A. Except as otherwise stated elsewhere in the Contract, the Owner, Engineer, and Contractor may send, and shall accept, Electronic Documents transmitted by Electronic Means.
- B. If the Contract does not establish protocols for Electronic Means, then Owner, Engineer, and Contractor shall jointly develop such protocols.
- C. Subject to any governing protocols for Electronic Means, when transmitting Electronic Documents by Electronic Means, the transmitting party makes no representations as to long-term compatibility, usability, or readability of the Electronic Documents resulting from the

recipient's use of software application packages, operating systems, or computer hardware differing from those used in the drafting or transmittal of the Electronic Documents.

ARTICLE 3—CONTRACT DOCUMENTS: INTENT, REQUIREMENTS, REUSE

3.01 Intent

- A. The Contract Documents are complementary; what is required by one Contract Document is as binding as if required by all.
- B. It is the intent of the Contract Documents to describe a functionally complete Project (or part thereof) to be constructed in accordance with the Contract Documents.
- C. Unless otherwise stated in the Contract Documents, if there is a discrepancy between the electronic versions of the Contract Documents (including any printed copies derived from such electronic versions) and the printed record version, the printed record version will govern.
- D. The Contract supersedes prior negotiations, representations, and agreements, whether written or oral.
- E. Engineer will issue clarifications and interpretations of the Contract Documents as provided herein.
- F. Any provision or part of the Contract Documents held to be void or unenforceable under any Law or Regulation will be deemed stricken, and all remaining provisions will continue to be valid and binding upon Owner and Contractor, which agree that the Contract Documents will be reformed to replace such stricken provision or part thereof with a valid and enforceable provision that comes as close as possible to expressing the intention of the stricken provision.
- G. Nothing in the Contract Documents creates:
 - 1. any contractual relationship between Owner or Engineer and any Subcontractor, Supplier, or other individual or entity performing or furnishing any of the Work, for the benefit of such Subcontractor, Supplier, or other individual or entity; or
 - 2. any obligation on the part of Owner or Engineer to pay or to see to the payment of any money due any such Subcontractor, Supplier, or other individual or entity, except as may otherwise be required by Laws and Regulations.

3.02 Reference Standards

- A. *Standards Specifications, Codes, Laws and Regulations*
 - 1. Reference in the Contract Documents to standard specifications, manuals, reference standards, or codes of any technical society, organization, or association, or to Laws or Regulations, whether such reference be specific or by implication, means the standard specification, manual, reference standard, code, or Laws or Regulations in effect at the time of opening of Bids (or on the Effective Date of the Contract if there were no Bids), except as may be otherwise specifically stated in the Contract Documents.
 - 2. No provision of any such standard specification, manual, reference standard, or code, and no instruction of a Supplier, will be effective to change the duties or responsibilities of Owner, Contractor, or Engineer from those set forth in the part of the Contract Documents prepared by or for Engineer. No such provision or instruction shall be effective

to assign to Owner or Engineer any duty or authority to supervise or direct the performance of the Work, or any duty or authority to undertake responsibility inconsistent with the provisions of the part of the Contract Documents prepared by or for Engineer.

3.03 *Reporting and Resolving Discrepancies*

A. *Reporting Discrepancies*

1. *Contractor's Verification of Figures and Field Measurements:* Before undertaking each part of the Work, Contractor shall carefully study the Contract Documents, and check and verify pertinent figures and dimensions therein, particularly with respect to applicable field measurements. Contractor shall promptly report in writing to Engineer any conflict, error, ambiguity, or discrepancy that Contractor discovers, or has actual knowledge of, and shall not proceed with any Work affected thereby until the conflict, error, ambiguity, or discrepancy is resolved by a clarification or interpretation by Engineer, or by an amendment or supplement to the Contract issued pursuant to Paragraph 11.01.
2. *Contractor's Review of Contract Documents:* If, before or during the performance of the Work, Contractor discovers any conflict, error, ambiguity, or discrepancy within the Contract Documents, or between the Contract Documents and (a) any applicable Law or Regulation, (b) actual field conditions, (c) any standard specification, manual, reference standard, or code, or (d) any instruction of any Supplier, then Contractor shall promptly report it to Engineer in writing. Contractor shall not proceed with the Work affected thereby (except in an emergency as required by Paragraph 7.15) until the conflict, error, ambiguity, or discrepancy is resolved, by a clarification or interpretation by Engineer, or by an amendment or supplement to the Contract issued pursuant to Paragraph 11.01.
3. Contractor shall not be liable to Owner or Engineer for failure to report any conflict, error, ambiguity, or discrepancy in the Contract Documents unless Contractor had actual knowledge thereof.

B. *Resolving Discrepancies*

1. Except as may be otherwise specifically stated in the Contract Documents, the provisions of the part of the Contract Documents prepared by or for Engineer take precedence in resolving any conflict, error, ambiguity, or discrepancy between such provisions of the Contract Documents and:
 - a. the provisions of any standard specification, manual, reference standard, or code, or the instruction of any Supplier (whether or not specifically incorporated by reference as a Contract Document); or
 - b. the provisions of any Laws or Regulations applicable to the performance of the Work (unless such an interpretation of the provisions of the Contract Documents would result in violation of such Law or Regulation).

3.04 *Requirements of the Contract Documents*

- A. During the performance of the Work and until final payment, Contractor and Owner shall submit to the Engineer in writing all matters in question concerning the requirements of the Contract Documents (sometimes referred to as requests for information or interpretation—RFIs), or relating to the acceptability of the Work under the Contract Documents, as soon as

possible after such matters arise. Engineer will be the initial interpreter of the requirements of the Contract Documents, and judge of the acceptability of the Work.

- B. Engineer will, with reasonable promptness, render a written clarification, interpretation, or decision on the issue submitted, or initiate an amendment or supplement to the Contract Documents. Engineer's written clarification, interpretation, or decision will be final and binding on Contractor, unless it appeals by submitting a Change Proposal, and on Owner, unless it appeals by filing a Claim.
- C. If a submitted matter in question concerns terms and conditions of the Contract Documents that do not involve (1) the performance or acceptability of the Work under the Contract Documents, (2) the design (as set forth in the Drawings, Specifications, or otherwise), or (3) other engineering or technical matters, then Engineer will promptly notify Owner and Contractor in writing that Engineer is unable to provide a decision or interpretation. If Owner and Contractor are unable to agree on resolution of such a matter in question, either party may pursue resolution as provided in Article 12.

3.05 *Reuse of Documents*

- A. Contractor and its Subcontractors and Suppliers shall not:
 - 1. have or acquire any title to or ownership rights in any of the Drawings, Specifications, or other documents (or copies of any thereof) prepared by or bearing the seal of Engineer or its consultants, including electronic media versions, or reuse any such Drawings, Specifications, other documents, or copies thereof on extensions of the Project or any other project without written consent of Owner and Engineer and specific written verification or adaptation by Engineer; or
 - 2. have or acquire any title or ownership rights in any other Contract Documents, reuse any such Contract Documents for any purpose without Owner's express written consent, or violate any copyrights pertaining to such Contract Documents.
- B. The prohibitions of this Paragraph 3.05 will survive final payment, or termination of the Contract. Nothing herein precludes Contractor from retaining copies of the Contract Documents for record purposes.

ARTICLE 4—COMMENCEMENT AND PROGRESS OF THE WORK

4.01 *Commencement of Contract Times; Notice to Proceed*

- A. The Contract Times will commence to run on the 30th day after the Effective Date of the Contract or, if a Notice to Proceed is given, on the day indicated in the Notice to Proceed. A Notice to Proceed may be given at any time within 30 days after the Effective Date of the Contract. In no event will the Contract Times commence to run later than the 60th day after the day of Bid opening or the 30th day after the Effective Date of the Contract, whichever date is earlier.

4.02 *Starting the Work*

- A. Contractor shall start to perform the Work on the date when the Contract Times commence to run. No Work may be done at the Site prior to such date.

4.03 *Reference Points*

- A. Owner shall provide engineering surveys to establish reference points for construction which in Engineer's judgment are necessary to enable Contractor to proceed with the Work. Contractor shall be responsible for laying out the Work, shall protect and preserve the established reference points and property monuments, and shall make no changes or relocations without the prior written approval of Owner. Contractor shall report to Engineer whenever any reference point or property monument is lost or destroyed or requires relocation because of necessary changes in grades or locations, and shall be responsible for the accurate replacement or relocation of such reference points or property monuments by professionally qualified personnel.

4.04 *Progress Schedule*

- A. Contractor shall adhere to the Progress Schedule established in accordance with Paragraph 2.05 as it may be adjusted from time to time as provided below.
 - 1. Contractor shall submit to Engineer for acceptance (to the extent indicated in Paragraph 2.05) proposed adjustments in the Progress Schedule that will not result in changing the Contract Times.
 - 2. Proposed adjustments in the Progress Schedule that will change the Contract Times must be submitted in accordance with the requirements of Article 11.
- B. Contractor shall carry on the Work and adhere to the Progress Schedule during all disputes or disagreements with Owner. No Work will be delayed or postponed pending resolution of any disputes or disagreements, or during any appeal process, except as permitted by Paragraph 16.04, or as Owner and Contractor may otherwise agree in writing.

4.05 *Delays in Contractor's Progress*

- A. If Owner, Engineer, or anyone for whom Owner is responsible, delays, disrupts, or interferes with the performance or progress of the Work, then Contractor shall be entitled to an equitable adjustment in Contract Price or Contract Times.
- B. Contractor shall not be entitled to an adjustment in Contract Price or Contract Times for delay, disruption, or interference caused by or within the control of Contractor. Delay, disruption, and interference attributable to and within the control of a Subcontractor or Supplier shall be deemed to be within the control of Contractor.
- C. If Contractor's performance or progress is delayed, disrupted, or interfered with by unanticipated causes not the fault of and beyond the control of Owner, Contractor, and those for which they are responsible, then Contractor shall be entitled to an equitable adjustment in Contract Times. Such an adjustment will be Contractor's sole and exclusive remedy for the delays, disruption, and interference described in this paragraph. Causes of delay, disruption, or interference that may give rise to an adjustment in Contract Times under this paragraph include but are not limited to the following:
 - 1. Severe and unavoidable natural catastrophes such as fires, floods, epidemics, and earthquakes;
 - 2. Abnormal weather conditions;
 - 3. Acts or failures to act of third-party utility owners or other third-party entities (other than those third-party utility owners or other third-party entities performing other work at or

adjacent to the Site as arranged by or under contract with Owner, as contemplated in Article 8); and

4. Acts of war or terrorism.
- D. Contractor's entitlement to an adjustment of Contract Times or Contract Price is limited as follows:
1. Contractor's entitlement to an adjustment of the Contract Times is conditioned on the delay, disruption, or interference adversely affecting an activity on the critical path to completion of the Work, as of the time of the delay, disruption, or interference.
 2. Contractor shall not be entitled to an adjustment in Contract Price for any delay, disruption, or interference if such delay is concurrent with a delay, disruption, or interference caused by or within the control of Contractor. Such a concurrent delay by Contractor shall not preclude an adjustment of Contract Times to which Contractor is otherwise entitled.
 3. Adjustments of Contract Times or Contract Price are subject to the provisions of Article 11.
- E. Each Contractor request or Change Proposal seeking an increase in Contract Times or Contract Price must be supplemented by supporting data that sets forth in detail the following:
1. The circumstances that form the basis for the requested adjustment;
 2. The date upon which each cause of delay, disruption, or interference began to affect the progress of the Work;
 3. The date upon which each cause of delay, disruption, or interference ceased to affect the progress of the Work;
 4. The number of days' increase in Contract Times claimed as a consequence of each such cause of delay, disruption, or interference; and
 5. The impact on Contract Price, in accordance with the provisions of Paragraph 11.07.
- Contractor shall also furnish such additional supporting documentation as Owner or Engineer may require including, where appropriate, a revised progress schedule indicating all the activities affected by the delay, disruption, or interference, and an explanation of the effect of the delay, disruption, or interference on the critical path to completion of the Work.
- F. Delays, disruption, and interference to the performance or progress of the Work resulting from the existence of a differing subsurface or physical condition, an Underground Facility that was not shown or indicated by the Contract Documents, or not shown or indicated with reasonable accuracy, and those resulting from Hazardous Environmental Conditions, are governed by Article 5, together with the provisions of Paragraphs 4.05.D and 4.05.E.
- G. Paragraph 8.03 addresses delays, disruption, and interference to the performance or progress of the Work resulting from the performance of certain other work at or adjacent to the Site.

ARTICLE 5—SITE; SUBSURFACE AND PHYSICAL CONDITIONS; HAZARDOUS ENVIRONMENTAL CONDITIONS

5.01 *Availability of Lands*

- A. Owner shall furnish the Site. Owner shall notify Contractor in writing of any encumbrances or restrictions not of general application but specifically related to use of the Site with which Contractor must comply in performing the Work.
- B. Upon reasonable written request, Owner shall furnish Contractor with a current statement of record legal title and legal description of the lands upon which permanent improvements are to be made and Owner's interest therein as necessary for giving notice of or filing a mechanic's or construction lien against such lands in accordance with applicable Laws and Regulations.
- C. Contractor shall provide for all additional lands and access thereto that may be required for temporary construction facilities or storage of materials and equipment.

5.02 *Use of Site and Other Areas*

A. *Limitation on Use of Site and Other Areas*

- 1. Contractor shall confine construction equipment, temporary construction facilities, the storage of materials and equipment, and the operations of workers to the Site, adjacent areas that Contractor has arranged to use through construction easements or otherwise, and other adjacent areas permitted by Laws and Regulations, and shall not unreasonably encumber the Site and such other adjacent areas with construction equipment or other materials or equipment. Contractor shall assume full responsibility for (a) damage to the Site; (b) damage to any such other adjacent areas used for Contractor's operations; (c) damage to any other adjacent land or areas, or to improvements, structures, utilities, or similar facilities located at such adjacent lands or areas; and (d) for injuries and losses sustained by the owners or occupants of any such land or areas; provided that such damage or injuries result from the performance of the Work or from other actions or conduct of the Contractor or those for which Contractor is responsible.
- 2. If a damage or injury claim is made by the owner or occupant of any such land or area because of the performance of the Work, or because of other actions or conduct of the Contractor or those for which Contractor is responsible, Contractor shall (a) take immediate corrective or remedial action as required by Paragraph 7.13, or otherwise; (b) promptly attempt to settle the claim as to all parties through negotiations with such owner or occupant, or otherwise resolve the claim by arbitration or other dispute resolution proceeding, or in a court of competent jurisdiction; and (c) to the fullest extent permitted by Laws and Regulations, indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them, from and against any such claim, and against all costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to any claim or action, legal or equitable, brought by any such owner or occupant against Owner, Engineer, or any other party indemnified hereunder to the extent caused directly or indirectly, in whole or in part by, or based upon, Contractor's performance of the Work, or because of other actions or conduct of the Contractor or those for which Contractor is responsible.

- B. *Removal of Debris During Performance of the Work:* During the progress of the Work the Contractor shall keep the Site and other adjacent areas free from accumulations of waste materials, rubbish, and other debris. Removal and disposal of such waste materials, rubbish, and other debris will conform to applicable Laws and Regulations.
- C. *Cleaning:* Prior to Substantial Completion of the Work Contractor shall clean the Site and the Work and make it ready for utilization by Owner. At the completion of the Work Contractor shall remove from the Site and adjacent areas all tools, appliances, construction equipment and machinery, and surplus materials and shall restore to original condition all property not designated for alteration by the Contract Documents.
- D. *Loading of Structures:* Contractor shall not load nor permit any part of any structure to be loaded in any manner that will endanger the structure, nor shall Contractor subject any part of the Work or adjacent structures or land to stresses or pressures that will endanger them.

5.03 *Subsurface and Physical Conditions*

- A. *Reports and Drawings:* ~~The Supplementary Conditions~~ ***Specification sections may*** identify:
 - 1. Those reports of explorations and tests of subsurface conditions at or adjacent to the Site that contain Technical Data;
 - 2. Those drawings of existing physical conditions at or adjacent to the Site, including those drawings depicting existing surface or subsurface structures at or adjacent to the Site (except Underground Facilities), that contain Technical Data; and
 - 3. Technical Data contained in such reports and drawings.
- B. *Underground Facilities:* Underground Facilities are shown or indicated on the Drawings, pursuant to Paragraph 5.05, and not in the drawings referred to in Paragraph 5.03.A. Information and data regarding the presence or location of Underground Facilities are not intended to be categorized, identified, or defined as Technical Data.
- C. *Reliance by Contractor on Technical Data:* Contractor may rely upon the accuracy of the Technical Data expressly identified in ~~the Supplementary Conditions~~ ***certain Specification sections*** with respect to such reports and drawings, but such reports and drawings are not Contract Documents. If no such express identification has been made, then Contractor may rely upon the accuracy of the Technical Data as defined in Paragraph 1.01.A.46.b.
- D. *Limitations of Other Data and Documents:* Except for such reliance on Technical Data, Contractor may not rely upon or make any claim against Owner or Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors, with respect to:
 - 1. the completeness of such reports and drawings for Contractor's purposes, including, but not limited to, any aspects of the means, methods, techniques, sequences, and procedures of construction to be employed by Contractor, and safety precautions and programs incident thereto;
 - 2. other data, interpretations, opinions, and information contained in such reports or shown or indicated in such drawings;
 - 3. the contents of other Site-related documents made available to Contractor, such as record drawings from other projects at or adjacent to the Site, or Owner's archival documents concerning the Site; or

4. any Contractor interpretation of or conclusion drawn from any Technical Data or any such other data, interpretations, opinions, or information.

5.04 *Differing Subsurface or Physical Conditions*

A. *Notice by Contractor:* If Contractor believes that any subsurface or physical condition that is uncovered or revealed at the Site:

1. is of such a nature as to establish that any Technical Data on which Contractor is entitled to rely as provided in Paragraph 5.03 is materially inaccurate;
2. is of such a nature as to require a change in the Drawings or Specifications;
3. differs materially from that shown or indicated in the Contract Documents; or
4. is of an unusual nature, and differs materially from conditions ordinarily encountered and generally recognized as inherent in work of the character provided for in the Contract Documents;

then Contractor shall, promptly after becoming aware thereof and before further disturbing the subsurface or physical conditions or performing any Work in connection therewith (except in an emergency as required by Paragraph 7.15), notify Owner and Engineer in writing about such condition. Contractor shall not further disturb such condition or perform any Work in connection therewith (except with respect to an emergency) until receipt of a written statement permitting Contractor to do so.

B. *Engineer's Review:* After receipt of written notice as required by the preceding paragraph, Engineer will promptly review the subsurface or physical condition in question; determine whether it is necessary for Owner to obtain additional exploration or tests with respect to the condition; conclude whether the condition falls within any one or more of the differing site condition categories in Paragraph 5.04.A; obtain any pertinent cost or schedule information from Contractor; prepare recommendations to Owner regarding the Contractor's resumption of Work in connection with the subsurface or physical condition in question and the need for any change in the Drawings or Specifications; and advise Owner in writing of Engineer's findings, conclusions, and recommendations.

C. *Owner's Statement to Contractor Regarding Site Condition:* After receipt of Engineer's written findings, conclusions, and recommendations, Owner shall issue a written statement to Contractor (with a copy to Engineer) regarding the subsurface or physical condition in question, addressing the resumption of Work in connection with such condition, indicating whether any change in the Drawings or Specifications will be made, and adopting or rejecting Engineer's written findings, conclusions, and recommendations, in whole or in part.

D. *Early Resumption of Work:* If at any time Engineer determines that Work in connection with the subsurface or physical condition in question may resume prior to completion of Engineer's review or Owner's issuance of its statement to Contractor, because the condition in question has been adequately documented, and analyzed on a preliminary basis, then the Engineer may at its discretion instruct Contractor to resume such Work.

E. *Possible Price and Times Adjustments*

1. Contractor shall be entitled to an equitable adjustment in Contract Price or Contract Times, to the extent that the existence of a differing subsurface or physical condition, or any related delay, disruption, or interference, causes an increase or decrease in

Contractor's cost of, or time required for, performance of the Work; subject, however, to the following:

- a. Such condition must fall within any one or more of the categories described in Paragraph 5.04.A;
 - b. With respect to Work that is paid for on a unit price basis, any adjustment in Contract Price will be subject to the provisions of Paragraph 13.03; and,
 - c. Contractor's entitlement to an adjustment of the Contract Times is subject to the provisions of Paragraphs 4.05.D and 4.05.E.
2. Contractor shall not be entitled to any adjustment in the Contract Price or Contract Times with respect to a subsurface or physical condition if:
 - a. Contractor knew of the existence of such condition at the time Contractor made a commitment to Owner with respect to Contract Price and Contract Times by the submission of a Bid or becoming bound under a negotiated contract, or otherwise;
 - b. The existence of such condition reasonably could have been discovered or revealed as a result of any examination, investigation, exploration, test, or study of the Site and contiguous areas expressly required by the Bidding Requirements or Contract Documents to be conducted by or for Contractor prior to Contractor's making such commitment; or
 - c. Contractor failed to give the written notice required by Paragraph 5.04.A.
 3. If Owner and Contractor agree regarding Contractor's entitlement to and the amount or extent of any adjustment in the Contract Price or Contract Times, then any such adjustment will be set forth in a Change Order.
 4. Contractor may submit a Change Proposal regarding its entitlement to or the amount or extent of any adjustment in the Contract Price or Contract Times, no later than 30 days after Owner's issuance of the Owner's written statement to Contractor regarding the subsurface or physical condition in question.
- F. *Underground Facilities; Hazardous Environmental Conditions:* Paragraph 5.05 governs rights and responsibilities regarding the presence or location of Underground Facilities. Paragraph 5.06 governs rights and responsibilities regarding Hazardous Environmental Conditions. The provisions of Paragraphs 5.03 and 5.04 are not applicable to the presence or location of Underground Facilities, or to Hazardous Environmental Conditions.

5.05 *Underground Facilities*

- A. *Contractor's Responsibilities:* Unless it is otherwise expressly provided in the ~~Supplementary Conditions~~ **Specifications**, the cost of all of the following is included in the Contract Price, and Contractor shall have full responsibility for:
1. reviewing and checking all information and data regarding existing Underground Facilities at the Site;
 2. complying with applicable state and local utility damage prevention Laws and Regulations;

3. verifying the actual location of those Underground Facilities shown or indicated in the Contract Documents as being within the area affected by the Work, by exposing such Underground Facilities during the course of construction;
 4. coordination of the Work with the owners (including Owner) of such Underground Facilities, during construction; and
 5. the safety and protection of all existing Underground Facilities at the Site, and repairing any damage thereto resulting from the Work.
- B. *Notice by Contractor:* If Contractor believes that an Underground Facility that is uncovered or revealed at the Site was not shown or indicated on the Drawings, or was not shown or indicated on the Drawings with reasonable accuracy, then Contractor shall, promptly after becoming aware thereof and before further disturbing conditions affected thereby or performing any Work in connection therewith (except in an emergency as required by Paragraph 7.15), notify Owner and Engineer in writing regarding such Underground Facility.
- C. *Engineer's Review:* Engineer will:
1. promptly review the Underground Facility and conclude whether such Underground Facility was not shown or indicated on the Drawings, or was not shown or indicated with reasonable accuracy;
 2. identify and communicate with the owner of the Underground Facility; prepare recommendations to Owner (and if necessary issue any preliminary instructions to Contractor) regarding the Contractor's resumption of Work in connection with the Underground Facility in question;
 3. obtain any pertinent cost or schedule information from Contractor; determine the extent, if any, to which a change is required in the Drawings or Specifications to reflect and document the consequences of the existence or location of the Underground Facility; and
 4. advise Owner in writing of Engineer's findings, conclusions, and recommendations.
- During such time, Contractor shall be responsible for the safety and protection of such Underground Facility.
- D. *Owner's Statement to Contractor Regarding Underground Facility:* After receipt of Engineer's written findings, conclusions, and recommendations, Owner shall issue a written statement to Contractor (with a copy to Engineer) regarding the Underground Facility in question addressing the resumption of Work in connection with such Underground Facility, indicating whether any change in the Drawings or Specifications will be made, and adopting or rejecting Engineer's written findings, conclusions, and recommendations in whole or in part.
- E. *Early Resumption of Work:* If at any time Engineer determines that Work in connection with the Underground Facility may resume prior to completion of Engineer's review or Owner's issuance of its statement to Contractor, because the Underground Facility in question and conditions affected by its presence have been adequately documented, and analyzed on a preliminary basis, then the Engineer may at its discretion instruct Contractor to resume such Work.
- F. *Possible Price and Times Adjustments*
1. Contractor shall be entitled to an equitable adjustment in the Contract Price or Contract Times, to the extent that any existing Underground Facility at the Site that was not shown

or indicated on the Drawings, or was not shown or indicated with reasonable accuracy, or any related delay, disruption, or interference, causes an increase or decrease in Contractor's cost of, or time required for, performance of the Work; subject, however, to the following:

- a. With respect to Work that is paid for on a unit price basis, any adjustment in Contract Price will be subject to the provisions of Paragraph 13.03;
 - b. Contractor's entitlement to an adjustment of the Contract Times is subject to the provisions of Paragraphs 4.05.D and 4.05.E; and
 - c. Contractor gave the notice required in Paragraph 5.05.B.
2. If Owner and Contractor agree regarding Contractor's entitlement to and the amount or extent of any adjustment in the Contract Price or Contract Times, then any such adjustment will be set forth in a Change Order.
 3. Contractor may submit a Change Proposal regarding its entitlement to or the amount or extent of any adjustment in the Contract Price or Contract Times, no later than 30 days after Owner's issuance of the Owner's written statement to Contractor regarding the Underground Facility in question.
 4. The information and data shown or indicated on the Drawings with respect to existing Underground Facilities at the Site is based on information and data (a) furnished by the owners of such Underground Facilities, or by others, (b) obtained from available records, or (c) gathered in an investigation conducted in accordance with the current edition of ASCE 38, Standard Guideline for the Collection and Depiction of Existing Subsurface Utility Data, by the American Society of Civil Engineers. If such information or data is incorrect or incomplete, Contractor's remedies are limited to those set forth in this Paragraph 5.05.F.

5.06 *Hazardous Environmental Conditions at Site*

A. *Reports and Drawings: The Supplementary Conditions **Specification sections** may identify:*

1. those reports known to Owner relating to Hazardous Environmental Conditions that have been identified at or adjacent to the Site;
2. drawings known to Owner relating to Hazardous Environmental Conditions that have been identified at or adjacent to the Site; and
3. Technical Data contained in such reports and drawings.

B. *Reliance by Contractor on Technical Data Authorized:* Contractor may rely upon the accuracy of the Technical Data expressly identified in the ~~Supplementary Conditions~~ **Specification sections** with respect to such reports and drawings, but such reports and drawings are not Contract Documents. If no such express identification has been made, then Contractor may rely on the accuracy of the Technical Data as defined in Paragraph 1.01.A.46.b. Except for such reliance on Technical Data, Contractor may not rely upon or make any claim against Owner or Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors, with respect to:

1. the completeness of such reports and drawings for Contractor's purposes, including, but not limited to, any aspects of the means, methods, techniques, sequences and procedures

- of construction to be employed by Contractor, and safety precautions and programs incident thereto;
2. other data, interpretations, opinions, and information contained in such reports or shown or indicated in such drawings; or
 3. any Contractor interpretation of or conclusion drawn from any Technical Data or any such other data, interpretations, opinions or information.
- C. Contractor shall not be responsible for removing or remediating any Hazardous Environmental Condition encountered, uncovered, or revealed at the Site unless such removal or remediation is expressly identified in the Contract Documents to be within the scope of the Work.
- D. Contractor shall be responsible for controlling, containing, and duly removing all Constituents of Concern brought to the Site by Contractor, Subcontractors, Suppliers, or anyone else for whom Contractor is responsible, and for any associated costs; and for the costs of removing and remediating any Hazardous Environmental Condition created by the presence of any such Constituents of Concern.
- E. If Contractor encounters, uncovers, or reveals a Hazardous Environmental Condition whose removal or remediation is not expressly identified in the Contract Documents as being within the scope of the Work, or if Contractor or anyone for whom Contractor is responsible creates a Hazardous Environmental Condition, then Contractor shall immediately: (1) secure or otherwise isolate such condition; (2) stop all Work in connection with such condition and in any area affected thereby (except in an emergency as required by Paragraph 7.15); and (3) notify Owner and Engineer (and promptly thereafter confirm such notice in writing). Owner shall promptly consult with Engineer concerning the necessity for Owner to retain a qualified expert to evaluate such condition or take corrective action, if any. Promptly after consulting with Engineer, Owner shall take such actions as are necessary to permit Owner to timely obtain required permits and provide Contractor the written notice required by Paragraph 5.06.F. If Contractor or anyone for whom Contractor is responsible created the Hazardous Environmental Condition in question, then Owner may remove and remediate the Hazardous Environmental Condition, and impose a set-off against payments to account for the associated costs.
- F. Contractor shall not resume Work in connection with such Hazardous Environmental Condition or in any affected area until after Owner has obtained any required permits related thereto, and delivered written notice to Contractor either (1) specifying that such condition and any affected area is or has been rendered safe for the resumption of Work, or (2) specifying any special conditions under which such Work may be resumed safely.
- G. If Owner and Contractor cannot agree as to entitlement to or on the amount or extent, if any, of any adjustment in Contract Price or Contract Times, as a result of such Work stoppage, such special conditions under which Work is agreed to be resumed by Contractor, or any costs or expenses incurred in response to the Hazardous Environmental Condition, then within 30 days of Owner's written notice regarding the resumption of Work, Contractor may submit a Change Proposal, or Owner may impose a set-off. Entitlement to any such adjustment is subject to the provisions of Paragraphs 4.05.D, 4.05.E, 11.07, and 11.08.
- H. If, after receipt of such written notice, Contractor does not agree to resume such Work based on a reasonable belief it is unsafe, or does not agree to resume such Work under such special

conditions, then Owner may order the portion of the Work that is in the area affected by such condition to be deleted from the Work, following the contractual change procedures in Article 11. Owner may have such deleted portion of the Work performed by Owner's own forces or others in accordance with Article 8.

- I. To the fullest extent permitted by Laws and Regulations, Owner shall indemnify and hold harmless Contractor, Subcontractors, and Engineer, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals, and all court, arbitration, or other dispute resolution costs) arising out of or relating to a Hazardous Environmental Condition, provided that such Hazardous Environmental Condition (1) was not shown or indicated in the Drawings, Specifications, or other Contract Documents, identified as Technical Data entitled to limited reliance pursuant to Paragraph 5.06.B, or identified in the Contract Documents to be included within the scope of the Work, and (2) was not created by Contractor or by anyone for whom Contractor is responsible. Nothing in this Paragraph 5.06.I obligates Owner to indemnify any individual or entity from and against the consequences of that individual's or entity's own negligence.
- J. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to the failure to control, contain, or remove a Constituent of Concern brought to the Site by Contractor or by anyone for whom Contractor is responsible, or to a Hazardous Environmental Condition created by Contractor or by anyone for whom Contractor is responsible. Nothing in this Paragraph 5.06.J obligates Contractor to indemnify any individual or entity from and against the consequences of that individual's or entity's own negligence.
- K. The provisions of Paragraphs 5.03, 5.04, and 5.05 do not apply to the presence of Constituents of Concern or to a Hazardous Environmental Condition uncovered or revealed at the Site.

ARTICLE 6—BONDS AND INSURANCE

6.01 *Performance, Payment, and Other Bonds*

- A. Contractor shall furnish a performance bond and a payment bond, each in an amount at least equal to the Contract Price, as security for the faithful performance and payment of Contractor's obligations under the Contract. These bonds must remain in effect until one year after the date when final payment becomes due or until completion of the correction period specified in Paragraph 15.08, whichever is later, except as provided otherwise by Laws or Regulations, the terms of a prescribed bond form, ~~the Supplementary Conditions~~, or other provisions of the Contract.
- B. Contractor shall also furnish such other bonds (if any) as are required by ~~the Supplementary Conditions~~ or other provisions of the Contract.
- C. All bonds must be in the form included in the Bidding Documents or otherwise specified by Owner prior to execution of the Contract, except as provided otherwise by Laws or

Regulations, and must be issued and signed by a surety named in "Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies" as published in Department Circular 570 (as amended and supplemented) by the Bureau of the Fiscal Service, U.S. Department of the Treasury. A bond signed by an agent or attorney-in-fact must be accompanied by a certified copy of that individual's authority to bind the surety. The evidence of authority must show that it is effective on the date the agent or attorney-in-fact signed the accompanying bond.

- D. Contractor shall obtain the required bonds from surety companies that are duly licensed or authorized, in the state or jurisdiction in which the Project is located, to issue bonds in the required amounts.
- E. If the surety on a bond furnished by Contractor is declared bankrupt or becomes insolvent, or the surety ceases to meet the requirements above, then Contractor shall promptly notify Owner and Engineer in writing and shall, within 20 days after the event giving rise to such notification, provide another bond and surety, both of which must comply with the bond and surety requirements above.
- F. If Contractor has failed to obtain a required bond, Owner may exclude the Contractor from the Site and exercise Owner's termination rights under Article 16.
- G. Upon request to Owner from any Subcontractor, Supplier, or other person or entity claiming to have furnished labor, services, materials, or equipment used in the performance of the Work, Owner shall provide a copy of the payment bond to such person or entity.
- H. Upon request to Contractor from any Subcontractor, Supplier, or other person or entity claiming to have furnished labor, services, materials, or equipment used in the performance of the Work, Contractor shall provide a copy of the payment bond to such person or entity.

6.02 *Insurance—General Provisions*

- A. Owner and Contractor shall obtain and maintain insurance as required in this article and in the Supplementary Conditions.
- B. All insurance required by the Contract to be purchased and maintained by Owner or Contractor shall be obtained from insurance companies that are duly licensed or authorized in the state or jurisdiction in which the Project is located to issue insurance policies for the required limits and coverages. Unless a different standard is indicated in the Supplementary Conditions, all companies that provide insurance policies required under this Contract shall have an A.M. Best rating of A-VII or better.
- C. Alternative forms of insurance coverage, including but not limited to self-insurance and "Occupational Accident and Excess Employer's Indemnity Policies," are not sufficient to meet the insurance requirements of this Contract, unless expressly allowed in the Supplementary Conditions.
- D. Contractor shall deliver to Owner, with copies to each additional insured identified in the Contract, certificates of insurance and endorsements establishing that Contractor has obtained and is maintaining the policies and coverages required by the Contract. Upon request by Owner or any other insured, Contractor shall also furnish other evidence of such required insurance, including but not limited to copies of policies, documentation of applicable self-insured retentions (if allowed) and deductibles, full disclosure of all relevant exclusions, and evidence of insurance required to be purchased and maintained by

Subcontractors or Suppliers. In any documentation furnished under this provision, Contractor, Subcontractors, and Suppliers may block out (redact) (1) any confidential premium or pricing information and (2) any wording specific to a project or jurisdiction other than those applicable to this Contract.

- E. Owner shall deliver to Contractor, with copies to each additional insured identified in the Contract, certificates of insurance and endorsements establishing that Owner has obtained and is maintaining the policies and coverages required of Owner by the Contract (if any). Upon request by Contractor or any other insured, Owner shall also provide other evidence of such required insurance (if any), including but not limited to copies of policies, documentation of applicable self-insured retentions (if allowed) and deductibles, and full disclosure of all relevant exclusions. In any documentation furnished under this provision, Owner may block out (redact) (1) any confidential premium or pricing information and (2) any wording specific to a project or jurisdiction other than those relevant to this Contract.
- F. Failure of Owner or Contractor to demand such certificates or other evidence of the other party's full compliance with these insurance requirements, or failure of Owner or Contractor to identify a deficiency in compliance from the evidence provided, will not be construed as a waiver of the other party's obligation to obtain and maintain such insurance.
- G. In addition to the liability insurance required to be provided by Contractor, the Owner, at Owner's option, may purchase and maintain Owner's own liability insurance. Owner's liability policies, if any, operate separately and independently from policies required to be provided by Contractor, and Contractor cannot rely upon Owner's liability policies for any of Contractor's obligations to the Owner, Engineer, or third parties.
- H. Contractor shall require:
 - 1. Subcontractors to purchase and maintain worker's compensation, commercial general liability, and other insurance that is appropriate for their participation in the Project, and to name as additional insureds Owner and Engineer (and any other individuals or entities identified in the Supplementary Conditions as additional insureds on Contractor's liability policies) on each Subcontractor's commercial general liability insurance policy; and
 - 2. Suppliers to purchase and maintain insurance that is appropriate for their participation in the Project.
- I. If either party does not purchase or maintain the insurance required of such party by the Contract, such party shall notify the other party in writing of such failure to purchase prior to the start of the Work, or of such failure to maintain prior to any change in the required coverage.
- J. If Contractor has failed to obtain and maintain required insurance, Contractor's entitlement to enter or remain at the Site will end immediately, and Owner may impose an appropriate set-off against payment for any associated costs (including but not limited to the cost of purchasing necessary insurance coverage), and exercise Owner's termination rights under Article 16.
- K. Without prejudice to any other right or remedy, if a party has failed to obtain required insurance, the other party may elect (but is in no way obligated) to obtain equivalent insurance to protect such other party's interests at the expense of the party who was required to provide such coverage, and the Contract Price will be adjusted accordingly.

- L. Owner does not represent that insurance coverage and limits established in this Contract necessarily will be adequate to protect Contractor or Contractor's interests. Contractor is responsible for determining whether such coverage and limits are adequate to protect its interests, and for obtaining and maintaining any additional insurance that Contractor deems necessary.
- M. The insurance and insurance limits required herein will not be deemed as a limitation on Contractor's liability, or that of its Subcontractors or Suppliers, under the indemnities granted to Owner and other individuals and entities in the Contract or otherwise.
- N. All the policies of insurance required to be purchased and maintained under this Contract will contain a provision or endorsement that the coverage afforded will not be canceled, or renewal refused, until at least 10 days prior written notice has been given to the purchasing policyholder. Within three days of receipt of any such written notice, the purchasing policyholder shall provide a copy of the notice to each other insured and Engineer.

6.03 *Contractor's Insurance*

- A. *Required Insurance:* Contractor shall purchase and maintain Worker's Compensation, Commercial General Liability, and other insurance pursuant to the specific requirements of the Supplementary Conditions.
- B. *General Provisions:* The policies of insurance required by this Paragraph 6.03 as supplemented must:
 - 1. include at least the specific coverages required;
 - 2. be written for not less than the limits provided, or those required by Laws or Regulations, whichever is greater;
 - 3. remain in effect at least until the Work is complete (as set forth in Paragraph 15.06.D), and longer if expressly required elsewhere in this Contract, and at all times thereafter when Contractor may be correcting, removing, or replacing defective Work as a warranty or correction obligation, or otherwise, or returning to the Site to conduct other tasks arising from the Contract;
 - 4. apply with respect to the performance of the Work, whether such performance is by Contractor, any Subcontractor or Supplier, or by anyone directly or indirectly employed by any of them to perform any of the Work, or by anyone for whose acts any of them may be liable; and
 - 5. include all necessary endorsements to support the stated requirements.
- C. *Additional Insureds:* The Contractor's commercial general liability, automobile liability, employer's liability, umbrella or excess, ~~pollution liability~~, and unmanned aerial vehicle liability policies, if required by this Contract, must:
 - 1. include and list as additional insureds Owner and Engineer, and any individuals or entities identified as additional insureds in the Supplementary Conditions;
 - 2. include coverage for the respective officers, directors, members, partners, employees, and consultants of all such additional insureds;
 - 3. afford primary coverage to these additional insureds for all claims covered thereby (including as applicable those arising from both ongoing and completed operations);

4. not seek contribution from insurance maintained by the additional insured; and
5. as to commercial general liability insurance, apply to additional insureds with respect to liability caused in whole or in part by Contractor's acts or omissions, or the acts and omissions of those working on Contractor's behalf, in the performance of Contractor's operations.

6.04 *Builder's Risk and Other Property Insurance*

- A. *Builder's Risk:* Unless otherwise provided in the Supplementary Conditions, Contractor shall purchase and maintain builder's risk insurance upon the Work on a completed value basis, in the amount of the Work's full insurable replacement cost (subject to such deductible amounts as may be provided in the Supplementary Conditions or required by Laws and Regulations). The specific requirements applicable to the builder's risk insurance are set forth in the Supplementary Conditions.
- B. *Property Insurance for Facilities of Owner Where Work Will Occur:* Owner is responsible for obtaining and maintaining property insurance covering each existing structure, building, or facility in which any part of the Work will occur, or to which any part of the Work will attach or be adjoined. Such property insurance will be written on a special perils (all-risk) form, on a replacement cost basis, providing coverage consistent with that required for the builder's risk insurance, and will be maintained until the Work is complete, as set forth in Paragraph 15.06.D.
- C. *Property Insurance for Substantially Complete Facilities:* Promptly after Substantial Completion, and before actual occupancy or use of the substantially completed Work, Owner will obtain property insurance for such substantially completed Work, and maintain such property insurance at least until the Work is complete, as set forth in Paragraph 15.06.D. Such property insurance will be written on a special perils (all-risk) form, on a replacement cost basis, and provide coverage consistent with that required for the builder's risk insurance. The builder's risk insurance may terminate upon written confirmation of Owner's procurement of such property insurance.
- D. *Partial Occupancy or Use by Owner:* If Owner will occupy or use a portion or portions of the Work prior to Substantial Completion of all the Work, as provided in Paragraph 15.04, then Owner (directly, if it is the purchaser of the builder's risk policy, or through Contractor) will provide advance notice of such occupancy or use to the builder's risk insurer, and obtain an endorsement consenting to the continuation of coverage prior to commencing such partial occupancy or use.
- E. *Insurance of Other Property; Additional Insurance:* If the express insurance provisions of the Contract do not require or address the insurance of a property item or interest, then the entity or individual owning such property item will be responsible for insuring it. If Contractor elects to obtain other special insurance to be included in or supplement the builder's risk or property insurance policies provided under this Paragraph 6.04, it may do so at Contractor's expense.

6.05 *Property Losses; Subrogation*

- A. The builder's risk insurance policy purchased and maintained in accordance with Paragraph 6.04 (or an installation floater policy if authorized by the Supplementary Conditions), will contain provisions to the effect that in the event of payment of any loss or damage the insurer will have no rights of recovery against any insureds thereunder, or against

Engineer or its consultants, or their officers, directors, members, partners, employees, agents, consultants, or subcontractors.

1. Owner and Contractor waive all rights against each other and the respective officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, for all losses and damages caused by, arising out of, or resulting from any of the perils, risks, or causes of loss covered by such policies and any other property insurance applicable to the Work; and, in addition, waive all such rights against Engineer, its consultants, all individuals or entities identified in the Supplementary Conditions as builder's risk or installation floater insureds, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, under such policies for losses and damages so caused.
 2. None of the above waivers extends to the rights that any party making such waiver may have to the proceeds of insurance held by Owner or Contractor as trustee or fiduciary, or otherwise payable under any policy so issued.
- B. Any property insurance policy maintained by Owner covering any loss, damage, or consequential loss to Owner's existing structures, buildings, or facilities in which any part of the Work will occur, or to which any part of the Work will attach or adjoin; to adjacent structures, buildings, or facilities of Owner; or to part or all of the completed or substantially completed Work, during partial occupancy or use pursuant to Paragraph 15.04, after Substantial Completion pursuant to Paragraph 15.03, or after final payment pursuant to Paragraph 15.06, will contain provisions to the effect that in the event of payment of any loss or damage the insurer will have no rights of recovery against any insureds thereunder, or against Contractor, Subcontractors, or Engineer, or the officers, directors, members, partners, employees, agents, consultants, or subcontractors of each and any of them, and that the insured is allowed to waive the insurer's rights of subrogation in a written contract executed prior to the loss, damage, or consequential loss.
1. Owner waives all rights against Contractor, Subcontractors, and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them, for all losses and damages caused by, arising out of, or resulting from fire or any of the perils, risks, or causes of loss covered by such policies.
- C. The waivers in this Paragraph 6.05 include the waiver of rights due to business interruption, loss of use, or other consequential loss extending beyond direct physical loss or damage to Owner's property or the Work caused by, arising out of, or resulting from fire or other insured peril, risk, or cause of loss.
- D. Contractor shall be responsible for assuring that each Subcontract contains provisions whereby the Subcontractor waives all rights against Owner, Contractor, all individuals or entities identified in the Supplementary Conditions as insureds, the Engineer and its consultants, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, for all losses and damages caused by, arising out of, relating to, or resulting from fire or other peril, risk, or cause of loss covered by builder's risk insurance, installation floater, and any other property insurance applicable to the Work.

6.06 *Receipt and Application of Property Insurance Proceeds*

- A. Any insured loss under the builder's risk and other policies of property insurance required by Paragraph 6.04 will be adjusted and settled with the named insured that purchased the policy. Such named insured shall act as fiduciary for the other insureds, and give notice to such other insureds that adjustment and settlement of a claim is in progress. Any other insured may state its position regarding a claim for insured loss in writing within 15 days after notice of such claim.
- B. Proceeds for such insured losses may be made payable by the insurer either jointly to multiple insureds, or to the named insured that purchased the policy in its own right and as fiduciary for other insureds, subject to the requirements of any applicable mortgage clause. A named insured receiving insurance proceeds under the builder's risk and other policies of insurance required by Paragraph 6.04 shall maintain such proceeds in a segregated account, and distribute such proceeds in accordance with such agreement as the parties in interest may reach, or as otherwise required under the dispute resolution provisions of this Contract or applicable Laws and Regulations.
- C. If no other special agreement is reached, Contractor shall repair or replace the damaged Work, using allocated insurance proceeds.

ARTICLE 7—CONTRACTOR'S RESPONSIBILITIES

7.01 *Contractor's Means and Methods of Construction*

- A. Contractor shall be solely responsible for the means, methods, techniques, sequences, and procedures of construction.
- B. If the Contract Documents note, or Contractor determines, that professional engineering or other design services are needed to carry out Contractor's responsibilities for construction means, methods, techniques, sequences, and procedures, or for Site safety, then Contractor shall cause such services to be provided by a properly licensed design professional, at Contractor's expense. Such services are not Owner-delegated professional design services under this Contract, and neither Owner nor Engineer has any responsibility with respect to (1) Contractor's determination of the need for such services, (2) the qualifications or licensing of the design professionals retained or employed by Contractor, (3) the performance of such services, or (4) any errors, omissions, or defects in such services.

7.02 *Supervision and Superintendence*

- A. Contractor shall supervise, inspect, and direct the Work competently and efficiently, devoting such attention thereto and applying such skills and expertise as may be necessary to perform the Work in accordance with the Contract Documents.
- B. At all times during the progress of the Work, Contractor shall assign a competent resident superintendent who will not be replaced without written notice to Owner and Engineer except under extraordinary circumstances.

7.03 *Labor; Working Hours*

- A. Contractor shall provide competent, suitably qualified personnel to survey and lay out the Work and perform construction as required by the Contract Documents. Contractor shall maintain good discipline and order at the Site.

- B. Contractor shall be fully responsible to Owner and Engineer for all acts and omissions of Contractor's employees; of Suppliers and Subcontractors, and their employees; and of any other individuals or entities performing or furnishing any of the Work, just as Contractor is responsible for Contractor's own acts and omissions.
- C. Except as otherwise required for the safety or protection of persons or the Work or property at the Site or adjacent thereto, and except as otherwise stated in the Contract Documents, all Work at the Site will be performed during regular working hours, Monday through Friday. Contractor will not perform Work on a Saturday, Sunday, or any legal holiday. Contractor may perform Work outside regular working hours or on Saturdays, Sundays, or legal holidays only with Owner's written consent, which will not be unreasonably withheld.

7.04 *Services, Materials, and Equipment*

- A. Unless otherwise specified in the Contract Documents, Contractor shall provide and assume full responsibility for all services, materials, equipment, labor, transportation, construction equipment and machinery, tools, appliances, fuel, power, light, heat, telephone, water, sanitary facilities, temporary facilities, and all other facilities and incidentals necessary for the performance, testing, start up, and completion of the Work, whether or not such items are specifically called for in the Contract Documents.
- B. All materials and equipment incorporated into the Work must be new and of good quality, except as otherwise provided in the Contract Documents. All special warranties and guarantees required by the Specifications will expressly run to the benefit of Owner. If required by Engineer, Contractor shall furnish satisfactory evidence (including reports of required tests) as to the source, kind, and quality of materials and equipment.
- C. All materials and equipment must be stored, applied, installed, connected, erected, protected, used, cleaned, and conditioned in accordance with instructions of the applicable Supplier, except as otherwise may be provided in the Contract Documents.

7.05 *"Or Equals"*

- A. *Contractor's Request; Governing Criteria:* Whenever an item of equipment or material is specified or described in the Contract Documents by using the names of one or more proprietary items or specific Suppliers, the Contract Price has been based upon Contractor furnishing such item as specified. The specification or description of such an item is intended to establish the type, function, appearance, and quality required. Unless the specification or description contains or is followed by words reading that no like, equivalent, or "or equal" item is permitted, Contractor may request that Engineer authorize the use of other items of equipment or material, or items from other proposed Suppliers, under the circumstances described below.
 - 1. If Engineer in its sole discretion determines that an item of equipment or material proposed by Contractor is functionally equal to that named and sufficiently similar so that no change in related Work will be required, Engineer will deem it an "or equal" item. For the purposes of this paragraph, a proposed item of equipment or material will be considered functionally equal to an item so named if:
 - a. in the exercise of reasonable judgment Engineer determines that the proposed item:
 - 1) is at least equal in materials of construction, quality, durability, appearance, strength, and design characteristics;

- 2) will reliably perform at least equally well the function and achieve the results imposed by the design concept of the completed Project as a functioning whole;
 - 3) has a proven record of performance and availability of responsive service; and
 - 4) is not objectionable to Owner.
- b. Contractor certifies that, if the proposed item is approved and incorporated into the Work:
- 1) there will be no increase in cost to the Owner or increase in Contract Times; and
 - 2) the item will conform substantially to the detailed requirements of the item named in the Contract Documents.
- B. *Contractor's Expense*: Contractor shall provide all data in support of any proposed "or equal" item at Contractor's expense.
- C. *Engineer's Evaluation and Determination*: Engineer will be allowed a reasonable time to evaluate each "or-equal" request. Engineer may require Contractor to furnish additional data about the proposed "or-equal" item. Engineer will be the sole judge of acceptability. No "or-equal" item will be ordered, furnished, installed, or utilized until Engineer's review is complete and Engineer determines that the proposed item is an "or-equal," which will be evidenced by an approved Shop Drawing or other written communication. Engineer will advise Contractor in writing of any negative determination.
- D. *Effect of Engineer's Determination*: Neither approval nor denial of an "or-equal" request will result in any change in Contract Price. The Engineer's denial of an "or-equal" request will be final and binding, and may not be reversed through an appeal under any provision of the Contract.
- E. *Treatment as a Substitution Request*: If Engineer determines that an item of equipment or material proposed by Contractor does not qualify as an "or-equal" item, Contractor may request that Engineer consider the item a proposed substitute pursuant to Paragraph 7.06.

7.06 Substitutes

- A. *Contractor's Request; Governing Criteria*: Unless the specification or description of an item of equipment or material required to be furnished under the Contract Documents contains or is followed by words reading that no substitution is permitted, Contractor may request that Engineer authorize the use of other items of equipment or material under the circumstances described below. To the extent possible such requests must be made before commencement of related construction at the Site.
1. Contractor shall submit sufficient information as provided below to allow Engineer to determine if the item of material or equipment proposed is functionally equivalent to that named and an acceptable substitute therefor. Engineer will not accept requests for review of proposed substitute items of equipment or material from anyone other than Contractor.
 2. The requirements for review by Engineer will be as set forth in Paragraph 7.06.B, as supplemented by the Specifications, and as Engineer may decide is appropriate under the circumstances.

3. Contractor shall make written application to Engineer for review of a proposed substitute item of equipment or material that Contractor seeks to furnish or use. The application:
 - a. will certify that the proposed substitute item will:
 - 1) perform adequately the functions and achieve the results called for by the general design;
 - 2) be similar in substance to the item specified; and
 - 3) be suited to the same use as the item specified.
 - b. will state:
 - 1) the extent, if any, to which the use of the proposed substitute item will necessitate a change in Contract Times;
 - 2) whether use of the proposed substitute item in the Work will require a change in any of the Contract Documents (or in the provisions of any other direct contract with Owner for other work on the Project) to adapt the design to the proposed substitute item; and
 - 3) whether incorporation or use of the proposed substitute item in connection with the Work is subject to payment of any license fee or royalty.
 - c. will identify:
 - 1) all variations of the proposed substitute item from the item specified; and
 - 2) available engineering, sales, maintenance, repair, and replacement services.
 - d. will contain an itemized estimate of all costs or credits that will result directly or indirectly from use of such substitute item, including but not limited to changes in Contract Price, shared savings, costs of redesign, and claims of other contractors affected by any resulting change.
- B. *Engineer's Evaluation and Determination:* Engineer will be allowed a reasonable time to evaluate each substitute request, and to obtain comments and direction from Owner. Engineer may require Contractor to furnish additional data about the proposed substitute item. Engineer will be the sole judge of acceptability. No substitute will be ordered, furnished, installed, or utilized until Engineer's review is complete and Engineer determines that the proposed item is an acceptable substitute. Engineer's determination will be evidenced by a Field Order or a proposed Change Order accounting for the substitution itself and all related impacts, including changes in Contract Price or Contract Times. Engineer will advise Contractor in writing of any negative determination.
- C. *Special Guarantee:* Owner may require Contractor to furnish at Contractor's expense a special performance guarantee or other surety with respect to any substitute.
- D. *Reimbursement of Engineer's Cost:* Engineer will record Engineer's costs in evaluating a substitute proposed or submitted by Contractor. Whether or not Engineer approves a substitute so proposed or submitted by Contractor, Contractor shall reimburse Owner for the reasonable charges of Engineer for evaluating each such proposed substitute. Contractor shall also reimburse Owner for the reasonable charges of Engineer for making changes in the Contract Documents (or in the provisions of any other direct contract with Owner) resulting from the acceptance of each proposed substitute.

- E. *Contractor's Expense*: Contractor shall provide all data in support of any proposed substitute at Contractor's expense.
- F. *Effect of Engineer's Determination*: If Engineer approves the substitution request, Contractor shall execute the proposed Change Order and proceed with the substitution. The Engineer's denial of a substitution request will be final and binding, and may not be reversed through an appeal under any provision of the Contract. Contractor may challenge the scope of reimbursement costs imposed under Paragraph 7.06.D, by timely submittal of a Change Proposal.

7.07 *Concerning Subcontractors and Suppliers*

- A. Contractor may retain Subcontractors and Suppliers for the performance of parts of the Work. Such Subcontractors and Suppliers must be acceptable to Owner. The Contractor's retention of a Subcontractor or Supplier for the performance of parts of the Work will not relieve Contractor's obligation to Owner to perform and complete the Work in accordance with the Contract Documents.
- B. Contractor shall retain specific Subcontractors and Suppliers for the performance of designated parts of the Work if required by the Contract to do so.
- C. Subsequent to the submittal of Contractor's Bid or final negotiation of the terms of the Contract, Owner may not require Contractor to retain any Subcontractor or Supplier to furnish or perform any of the Work against which Contractor has reasonable objection.
- D. Prior to entry into any binding subcontract or purchase order, Contractor shall submit to Owner the identity of the proposed Subcontractor or Supplier (unless Owner has already deemed such proposed Subcontractor or Supplier acceptable during the bidding process or otherwise). Such proposed Subcontractor or Supplier shall be deemed acceptable to Owner unless Owner raises a substantive, reasonable objection within 5 days.
- E. Owner may require the replacement of any Subcontractor or Supplier. Owner also may require Contractor to retain specific replacements; provided, however, that Owner may not require a replacement to which Contractor has a reasonable objection. If Contractor has submitted the identity of certain Subcontractors or Suppliers for acceptance by Owner, and Owner has accepted it (either in writing or by failing to make written objection thereto), then Owner may subsequently revoke the acceptance of any such Subcontractor or Supplier so identified solely on the basis of substantive, reasonable objection after due investigation. Contractor shall submit an acceptable replacement for the rejected Subcontractor or Supplier.
- F. If Owner requires the replacement of any Subcontractor or Supplier retained by Contractor to perform any part of the Work, then Contractor shall be entitled to an adjustment in Contract Price or Contract Times, with respect to the replacement; and Contractor shall initiate a Change Proposal for such adjustment within 30 days of Owner's requirement of replacement.
- G. No acceptance by Owner of any such Subcontractor or Supplier, whether initially or as a replacement, will constitute a waiver of the right of Owner to the completion of the Work in accordance with the Contract Documents.

- H. On a monthly basis, Contractor shall submit to Engineer a complete list of all Subcontractors and Suppliers having a direct contract with Contractor, and of all other Subcontractors and Suppliers known to Contractor at the time of submittal.
- I. Contractor shall be solely responsible for scheduling and coordinating the work of Subcontractors and Suppliers.
- J. The divisions and sections of the Specifications and the identifications of any Drawings do not control Contractor in dividing the Work among Subcontractors or Suppliers, or in delineating the Work to be performed by any specific trade.
- K. All Work performed for Contractor by a Subcontractor or Supplier must be pursuant to an appropriate contractual agreement that specifically binds the Subcontractor or Supplier to the applicable terms and conditions of the Contract for the benefit of Owner and Engineer.
- L. Owner may furnish to any Subcontractor or Supplier, to the extent practicable, information about amounts paid to Contractor for Work performed for Contractor by the Subcontractor or Supplier.
- M. Contractor shall restrict all Subcontractors and Suppliers from communicating with Engineer or Owner, except through Contractor or in case of an emergency, or as otherwise expressly allowed in this Contract.

7.08 *Patent Fees and Royalties*

- A. Contractor shall pay all license fees and royalties and assume all costs incident to the use in the performance of the Work or the incorporation in the Work of any invention, design, process, product, or device which is the subject of patent rights or copyrights held by others. If an invention, design, process, product, or device is specified in the Contract Documents for use in the performance of the Work and if, to the actual knowledge of Owner or Engineer, its use is subject to patent rights or copyrights calling for the payment of any license fee or royalty to others, the existence of such rights will be disclosed in the Contract Documents.
- B. To the fullest extent permitted by Laws and Regulations, Owner shall indemnify and hold harmless Contractor, and its officers, directors, members, partners, employees, agents, consultants, and subcontractors, from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals, and all court or arbitration or other dispute resolution costs) arising out of or relating to any infringement of patent rights or copyrights incident to the use in the performance of the Work or resulting from the incorporation in the Work of any invention, design, process, product, or device specified in the Contract Documents, but not identified as being subject to payment of any license fee or royalty to others required by patent rights or copyrights.
- C. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them, from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to any infringement of patent rights or copyrights incident to the use in the performance of the Work or resulting from the incorporation in the Work of any invention, design, process, product, or device not specified in the Contract Documents.

7.09 *Permits*

- A. Unless otherwise provided in the Contract Documents, Contractor shall obtain and pay for all construction permits, licenses, and certificates of occupancy. Owner shall assist Contractor, when necessary, in obtaining such permits and licenses. Contractor shall pay all governmental charges and inspection fees necessary for the prosecution of the Work which are applicable at the time of the submission of Contractor's Bid (or when Contractor became bound under a negotiated contract). Owner shall pay all charges of utility owners for connections for providing permanent service to the Work.

7.10 *Taxes*

- A. Contractor shall pay all sales, consumer, use, and other similar taxes required to be paid by Contractor in accordance with the Laws and Regulations of the place of the Project which are applicable during the performance of the Work.

7.11 *Laws and Regulations*

- A. Contractor shall give all notices required by and shall comply with all Laws and Regulations applicable to the performance of the Work. Neither Owner nor Engineer shall be responsible for monitoring Contractor's compliance with any Laws or Regulations.
- B. If Contractor performs any Work or takes any other action knowing or having reason to know that it is contrary to Laws or Regulations, Contractor shall bear all resulting costs and losses, and shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such Work or other action. It is not Contractor's responsibility to make certain that the Work described in the Contract Documents is in accordance with Laws and Regulations, but this does not relieve Contractor of its obligations under Paragraph 3.03.
- C. Owner or Contractor may give written notice to the other party of any changes after the submission of Contractor's Bid (or after the date when Contractor became bound under a negotiated contract) in Laws or Regulations having an effect on the cost or time of performance of the Work, including but not limited to changes in Laws or Regulations having an effect on procuring permits and on sales, use, value-added, consumption, and other similar taxes. If Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in Contract Price or Contract Times resulting from such changes, then within 30 days of such written notice Contractor may submit a Change Proposal, or Owner may initiate a Claim.

7.12 *Record Documents*

- A. Contractor shall maintain in a safe place at the Site one printed record copy of all Drawings, Specifications, Addenda, Change Orders, Work Change Directives, Field Orders, written interpretations and clarifications, and approved Shop Drawings. Contractor shall keep such record documents in good order and annotate them to show changes made during construction. These record documents, together with all approved Samples, will be available to Engineer for reference. Upon completion of the Work, Contractor shall deliver these record documents to Engineer.

7.13 *Safety and Protection*

- A. Contractor shall be solely responsible for initiating, maintaining, and supervising all safety precautions and programs in connection with the Work. Such responsibility does not relieve Subcontractors of their responsibility for the safety of persons or property in the performance of their work, nor for compliance with applicable safety Laws and Regulations.
- B. Contractor shall designate a qualified and experienced safety representative whose duties and responsibilities are the prevention of Work-related accidents and the maintenance and supervision of safety precautions and programs.
- C. Contractor shall take all necessary precautions for the safety of, and shall provide the necessary protection to prevent damage, injury, or loss to:
 - 1. all persons on the Site or who may be affected by the Work;
 - 2. all the Work and materials and equipment to be incorporated therein, whether in storage on or off the Site; and
 - 3. other property at the Site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures, other work in progress, utilities, and Underground Facilities not designated for removal, relocation, or replacement in the course of construction.
- D. All damage, injury, or loss to any property referred to in Paragraph 7.13.C.2 or 7.13.C.3 caused, directly or indirectly, in whole or in part, by Contractor, any Subcontractor, Supplier, or any other individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable, shall be remedied by Contractor at its expense (except damage or loss attributable to the fault of Drawings or Specifications or to the acts or omissions of Owner or Engineer or anyone employed by any of them, or anyone for whose acts any of them may be liable, and not attributable, directly or indirectly, in whole or in part, to the fault or negligence of Contractor or any Subcontractor, Supplier, or other individual or entity directly or indirectly employed by any of them).
- E. Contractor shall comply with all applicable Laws and Regulations relating to the safety of persons or property, or to the protection of persons or property from damage, injury, or loss; and shall erect and maintain all necessary safeguards for such safety and protection.
- F. Contractor shall notify Owner; the owners of adjacent property; the owners of Underground Facilities and other utilities (if the identity of such owners is known to Contractor); and other contractors and utility owners performing work at or adjacent to the Site, in writing, when Contractor knows that prosecution of the Work may affect them, and shall cooperate with them in the protection, removal, relocation, and replacement of their property or work in progress.
- G. Contractor shall comply with the applicable requirements of Owner's safety programs, if any. Any Owner's safety programs that are applicable to the Work ~~are~~ **may be** identified or included in the ~~Supplementary Conditions or~~ Specifications.
- H. Contractor shall inform Owner and Engineer of the specific requirements of Contractor's safety program with which Owner's and Engineer's employees and representatives must comply while at the Site.

- I. Contractor's duties and responsibilities for safety and protection will continue until all the Work is completed, Engineer has issued a written notice to Owner and Contractor in accordance with Paragraph 15.06.C that the Work is acceptable, and Contractor has left the Site (except as otherwise expressly provided in connection with Substantial Completion).
- J. Contractor's duties and responsibilities for safety and protection will resume whenever Contractor or any Subcontractor or Supplier returns to the Site to fulfill warranty or correction obligations, or to conduct other tasks arising from the Contract Documents.

7.14 *Hazard Communication Programs*

- A. Contractor shall be responsible for coordinating any exchange of safety data sheets (formerly known as material safety data sheets) or other hazard communication information required to be made available to or exchanged between or among employers at the Site in accordance with Laws or Regulations.

7.15 *Emergencies*

- A. In emergencies affecting the safety or protection of persons or the Work or property at the Site or adjacent thereto, Contractor is obligated to act to prevent damage, injury, or loss. Contractor shall give Engineer prompt written notice if Contractor believes that any significant changes in the Work or variations from the Contract Documents have been caused by an emergency, or are required as a result of Contractor's response to an emergency. If Engineer determines that a change in the Contract Documents is required because of an emergency or Contractor's response, a Work Change Directive or Change Order will be issued.

7.16 *Submittals*

A. *Shop Drawing and Sample Requirements*

- 1. Before submitting a Shop Drawing or Sample, Contractor shall:
 - a. review and coordinate the Shop Drawing or Sample with other Shop Drawings and Samples and with the requirements of the Work and the Contract Documents;
 - b. determine and verify:
 - 1) all field measurements, quantities, dimensions, specified performance and design criteria, installation requirements, materials, catalog numbers, and similar information with respect to the Submittal;
 - 2) the suitability of all materials and equipment offered with respect to the indicated application, fabrication, shipping, handling, storage, assembly, and installation pertaining to the performance of the Work; and
 - 3) all information relative to Contractor's responsibilities for means, methods, techniques, sequences, and procedures of construction, and safety precautions and programs incident thereto;
 - c. confirm that the Submittal is complete with respect to all related data included in the Submittal.
- 2. Each Shop Drawing or Sample must bear a stamp or specific written certification that Contractor has satisfied Contractor's obligations under the Contract Documents with respect to Contractor's review of that Submittal, and that Contractor approves the Submittal.

3. With each Shop Drawing or Sample, Contractor shall give Engineer specific written notice of any variations that the Submittal may have from the requirements of the Contract Documents. This notice must be set forth in a written communication separate from the Submittal; and, in addition, in the case of a Shop Drawing by a specific notation made on the Shop Drawing itself.
- B. *Submittal Procedures for Shop Drawings and Samples:* Contractor shall label and submit Shop Drawings and Samples to Engineer for review and approval in accordance with the accepted Schedule of Submittals.
1. *Shop Drawings*
 - a. Contractor shall submit the number of copies required in the Specifications.
 - b. Data shown on the Shop Drawings must be complete with respect to quantities, dimensions, specified performance and design criteria, materials, and similar data to show Engineer the services, materials, and equipment Contractor proposes to provide, and to enable Engineer to review the information for the limited purposes required by Paragraph 7.16.C.
 2. *Samples*
 - a. Contractor shall submit the number of Samples required in the Specifications.
 - b. Contractor shall clearly identify each Sample as to material, Supplier, pertinent data such as catalog numbers, the use for which intended and other data as Engineer may require to enable Engineer to review the Submittal for the limited purposes required by Paragraph 7.16.C.
 3. Where a Shop Drawing or Sample is required by the Contract Documents or the Schedule of Submittals, any related Work performed prior to Engineer's review and approval of the pertinent submittal will be at the sole expense and responsibility of Contractor.
- C. *Engineer's Review of Shop Drawings and Samples*
1. Engineer will provide timely review of Shop Drawings and Samples in accordance with the accepted Schedule of Submittals. Engineer's review and approval will be only to determine if the items covered by the Submittals will, after installation or incorporation in the Work, comply with the requirements of the Contract Documents, and be compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents.
 2. Engineer's review and approval will not extend to means, methods, techniques, sequences, or procedures of construction, or to safety precautions or programs incident thereto.
 3. Engineer's review and approval of a separate item as such will not indicate approval of the assembly in which the item functions.
 4. Engineer's review and approval of a Shop Drawing or Sample will not relieve Contractor from responsibility for any variation from the requirements of the Contract Documents unless Contractor has complied with the requirements of Paragraph 7.16.A.3 and Engineer has given written approval of each such variation by specific written notation thereof incorporated in or accompanying the Shop Drawing or Sample. Engineer will

document any such approved variation from the requirements of the Contract Documents in a Field Order or other appropriate Contract modification.

5. Engineer's review and approval of a Shop Drawing or Sample will not relieve Contractor from responsibility for complying with the requirements of Paragraphs 7.16.A and B.
6. Engineer's review and approval of a Shop Drawing or Sample, or of a variation from the requirements of the Contract Documents, will not, under any circumstances, change the Contract Times or Contract Price, unless such changes are included in a Change Order.
7. Neither Engineer's receipt, review, acceptance, or approval of a Shop Drawing or Sample will result in such item becoming a Contract Document.
8. Contractor shall perform the Work in compliance with the requirements and commitments set forth in approved Shop Drawings and Samples, subject to the provisions of Paragraph 7.16.C.4.

D. Resubmittal Procedures for Shop Drawings and Samples

1. Contractor shall make corrections required by Engineer and shall return the required number of corrected copies of Shop Drawings and submit, as required, new Samples for review and approval. Contractor shall direct specific attention in writing to revisions other than the corrections called for by Engineer on previous Submittals.
2. Contractor shall furnish required Shop Drawing and Sample submittals with sufficient information and accuracy to obtain required approval of an item with no more than two resubmittals. Engineer will record Engineer's time for reviewing a third or subsequent resubmittal of a Shop Drawing or Sample, and Contractor shall be responsible for Engineer's charges to Owner for such time. Owner may impose a set-off against payments due Contractor to secure reimbursement for such charges.
3. If Contractor requests a change of a previously approved Shop Drawing or Sample, Contractor shall be responsible for Engineer's charges to Owner for its review time, and Owner may impose a set-off against payments due Contractor to secure reimbursement for such charges, unless the need for such change is beyond the control of Contractor.

E. Submittals Other than Shop Drawings, Samples, and Owner-Delegated Designs

1. The following provisions apply to all Submittals other than Shop Drawings, Samples, and Owner-delegated designs:
 - a. Contractor shall submit all such Submittals to the Engineer in accordance with the Schedule of Submittals and pursuant to the applicable terms of the Contract Documents.
 - b. Engineer will provide timely review of all such Submittals in accordance with the Schedule of Submittals and return such Submittals with a notation of either Accepted or Not Accepted. Any such Submittal that is not returned within the time established in the Schedule of Submittals will be deemed accepted.
 - c. Engineer's review will be only to determine if the Submittal is acceptable under the requirements of the Contract Documents as to general form and content of the Submittal.

- d. If any such Submittal is not accepted, Contractor shall confer with Engineer regarding the reason for the non-acceptance, and resubmit an acceptable document.
- 2. Procedures for the submittal and acceptance of the Progress Schedule, the Schedule of Submittals, and the Schedule of Values are set forth in Paragraphs 2.03, 2.04, and 2.05.
- F. Owner-delegated Designs: Submittals pursuant to Owner-delegated designs are governed by the provisions of Paragraph 7.19.

7.17 Contractor's General Warranty and Guarantee

- A. Contractor warrants and guarantees to Owner that all Work will be in accordance with the Contract Documents and will not be defective. Engineer is entitled to rely on Contractor's warranty and guarantee.
- B. Owner's rights under this warranty and guarantee are in addition to, and are not limited by, Owner's rights under the correction period provisions of Paragraph 15.08. The time in which Owner may enforce its warranty and guarantee rights under this Paragraph 7.17 is limited only by applicable Laws and Regulations restricting actions to enforce such rights; provided, however, that after the end of the correction period under Paragraph 15.08:
 - 1. Owner shall give Contractor written notice of any defective Work within 60 days of the discovery that such Work is defective; and
 - 2. Such notice will be deemed the start of an event giving rise to a Claim under Paragraph 12.01.B, such that any related Claim must be brought within 30 days of the notice.
- C. Contractor's warranty and guarantee hereunder excludes defects or damage caused by:
 - 1. abuse, or improper modification, maintenance, or operation, by persons other than Contractor, Subcontractors, Suppliers, or any other individual or entity for whom Contractor is responsible; or
 - 2. normal wear and tear under normal usage.
- D. Contractor's obligation to perform and complete the Work in accordance with the Contract Documents is absolute. None of the following will constitute an acceptance of Work that is not in accordance with the Contract Documents, a release of Contractor's obligation to perform the Work in accordance with the Contract Documents, or a release of Owner's warranty and guarantee rights under this Paragraph 7.17:
 - 1. Observations by Engineer;
 - 2. Recommendation by Engineer or payment by Owner of any progress or final payment;
 - 3. The issuance of a certificate of Substantial Completion by Engineer or any payment related thereto by Owner;
 - 4. Use or occupancy of the Work or any part thereof by Owner;
 - 5. Any review and approval of a Shop Drawing or Sample submittal;
 - 6. The issuance of a notice of acceptability by Engineer;
 - 7. The end of the correction period established in Paragraph 15.08;
 - 8. Any inspection, test, or approval by others; or

9. Any correction of defective Work by Owner.
- E. If the Contract requires the Contractor to accept the assignment of a contract entered into by Owner, then the specific warranties, guarantees, and correction obligations contained in the assigned contract will govern with respect to Contractor's performance obligations to Owner for the Work described in the assigned contract.

7.18 Indemnification

- A. To the fullest extent permitted by Laws and Regulations, and in addition to any other obligations of Contractor under the Contract or otherwise, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them, from losses, damages, costs, and judgments (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals, and all court or arbitration or other dispute resolution costs) arising from third-party claims or actions relating to or resulting from the performance or furnishing of the Work, provided that any such claim, action, loss, cost, judgment or damage is attributable to bodily injury, sickness, disease, or death, or to damage to or destruction of tangible property (other than the Work itself), including the loss of use resulting therefrom, but only to the extent caused by any negligent act or omission of Contractor, any Subcontractor, any Supplier, or any individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable.
- B. In any and all claims against Owner or Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors, by any employee (or the survivor or personal representative of such employee) of Contractor, any Subcontractor, any Supplier, or any individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable, the indemnification obligation under Paragraph 7.18.A will not be limited in any way by any limitation on the amount or type of damages, compensation, or benefits payable by or for Contractor or any such Subcontractor, Supplier, or other individual or entity under workers' compensation acts, disability benefit acts, or other employee benefit acts.

7.19 Delegation of Professional Design Services

- A. Owner may require Contractor to provide professional design services for a portion of the Work by express delegation in the Contract Documents. Such delegation will specify the performance and design criteria that such services must satisfy, and the Submittals that Contractor must furnish to Engineer with respect to the Owner-delegated design.
- B. Contractor shall cause such Owner-delegated professional design services to be provided pursuant to the professional standard of care by a properly licensed design professional, whose signature and seal must appear on all drawings, calculations, specifications, certifications, and Submittals prepared by such design professional. Such design professional must issue all certifications of design required by Laws and Regulations.
- C. If a Shop Drawing or other Submittal related to the Owner-delegated design is prepared by Contractor, a Subcontractor, or others for submittal to Engineer, then such Shop Drawing or other Submittal must bear the written approval of Contractor's design professional when submitted by Contractor to Engineer.

- D. Owner and Engineer shall be entitled to rely upon the adequacy, accuracy, and completeness of the services, certifications, and approvals performed or provided by the design professionals retained or employed by Contractor under an Owner-delegated design, subject to the professional standard of care and the performance and design criteria stated in the Contract Documents.
- E. Pursuant to this Paragraph 7.19, Engineer's review, approval, and other determinations regarding design drawings, calculations, specifications, certifications, and other Submittals furnished by Contractor pursuant to an Owner-delegated design will be only for the following limited purposes:
 - 1. Checking for conformance with the requirements of this Paragraph 7.19;
 - 2. Confirming that Contractor (through its design professionals) has used the performance and design criteria specified in the Contract Documents; and
 - 3. Establishing that the design furnished by Contractor is consistent with the design concept expressed in the Contract Documents.
- F. Contractor shall not be responsible for the adequacy of performance or design criteria specified by Owner or Engineer.
- G. Contractor is not required to provide professional services in violation of applicable Laws and Regulations.

ARTICLE 8—OTHER WORK AT THE SITE

8.01 *Other Work*

- A. In addition to and apart from the Work under the Contract Documents, the Owner may perform other work at or adjacent to the Site. Such other work may be performed by Owner's employees, or through contracts between the Owner and third parties. Owner may also arrange to have third-party utility owners perform work on their utilities and facilities at or adjacent to the Site.
- B. If Owner performs other work at or adjacent to the Site with Owner's employees, or through contracts for such other work, then Owner shall give Contractor written notice thereof prior to starting any such other work. If Owner has advance information regarding the start of any third-party utility work that Owner has arranged to take place at or adjacent to the Site, Owner shall provide such information to Contractor.
- C. Contractor shall afford proper and safe access to the Site to each contractor that performs such other work, each utility owner performing other work, and Owner, if Owner is performing other work with Owner's employees, and provide a reasonable opportunity for the introduction and storage of materials and equipment and the execution of such other work.
- D. Contractor shall do all cutting, fitting, and patching of the Work that may be required to properly connect or otherwise make its several parts come together and properly integrate with such other work. Contractor shall not endanger any work of others by cutting, excavating, or otherwise altering such work; provided, however, that Contractor may cut or alter others' work with the written consent of Engineer and the others whose work will be affected.

- E. If the proper execution or results of any part of Contractor's Work depends upon work performed by others, Contractor shall inspect such other work and promptly report to Engineer in writing any delays, defects, or deficiencies in such other work that render it unavailable or unsuitable for the proper execution and results of Contractor's Work. Contractor's failure to so report will constitute an acceptance of such other work as fit and proper for integration with Contractor's Work except for latent defects and deficiencies in such other work.
- F. The provisions of this article are not applicable to work that is performed by third-party utilities or other third-party entities without a contract with Owner, or that is performed without having been arranged by Owner. If such work occurs, then any related delay, disruption, or interference incurred by Contractor is governed by the provisions of Paragraph 4.05.C.3.

8.02 *Coordination*

- A. If Owner intends to contract with others for the performance of other work at or adjacent to the Site, to perform other work at or adjacent to the Site with Owner's employees, or to arrange to have utility owners perform work at or adjacent to the Site, the following will be set forth in the ~~Supplementary Conditions~~ **Specifications** or provided to Contractor prior to the start of any such other work:
 - 1. The identity of the individual or entity that will have authority and responsibility for coordination of the activities among the various contractors;
 - 2. An itemization of the specific matters to be covered by such authority and responsibility; and
 - 3. The extent of such authority and responsibilities.
- B. Unless otherwise provided in the ~~Supplementary Conditions~~ **Specifications**, Owner shall have sole authority and responsibility for such coordination.

8.03 *Legal Relationships*

- A. If, in the course of performing other work for Owner at or adjacent to the Site, the Owner's employees, any other contractor working for Owner, or any utility owner that Owner has arranged to perform work, causes damage to the Work or to the property of Contractor or its Subcontractors, or delays, disrupts, interferes with, or increases the scope or cost of the performance of the Work, through actions or inaction, then Contractor shall be entitled to an equitable adjustment in the Contract Price or the Contract Times. Contractor must submit any Change Proposal seeking an equitable adjustment in the Contract Price or the Contract Times under this paragraph within 30 days of the damaging, delaying, disrupting, or interfering event. The entitlement to, and extent of, any such equitable adjustment will take into account information (if any) regarding such other work that was provided to Contractor in the Contract Documents prior to the submittal of the Bid or the final negotiation of the terms of the Contract, and any remedies available to Contractor under Laws or Regulations concerning utility action or inaction. When applicable, any such equitable adjustment in Contract Price will be conditioned on Contractor assigning to Owner all Contractor's rights against such other contractor or utility owner with respect to the damage, delay, disruption, or interference that is the subject of the adjustment. Contractor's entitlement to an adjustment of the Contract Times or Contract Price is subject to the provisions of Paragraphs 4.05.D and 4.05.E.

- B. Contractor shall take reasonable and customary measures to avoid damaging, delaying, disrupting, or interfering with the work of Owner, any other contractor, or any utility owner performing other work at or adjacent to the Site.
 - 1. If Contractor fails to take such measures and as a result damages, delays, disrupts, or interferes with the work of any such other contractor or utility owner, then Owner may impose a set-off against payments due Contractor, and assign to such other contractor or utility owner the Owner's contractual rights against Contractor with respect to the breach of the obligations set forth in this Paragraph 8.03.B.
 - 2. When Owner is performing other work at or adjacent to the Site with Owner's employees, Contractor shall be liable to Owner for damage to such other work, and for the reasonable direct delay, disruption, and interference costs incurred by Owner as a result of Contractor's failure to take reasonable and customary measures with respect to Owner's other work. In response to such damage, delay, disruption, or interference, Owner may impose a set-off against payments due Contractor.
- C. If Contractor damages, delays, disrupts, or interferes with the work of any other contractor, or any utility owner performing other work at or adjacent to the Site, through Contractor's failure to take reasonable and customary measures to avoid such impacts, or if any claim arising out of Contractor's actions, inactions, or negligence in performance of the Work at or adjacent to the Site is made by any such other contractor or utility owner against Contractor, Owner, or Engineer, then Contractor shall (1) promptly attempt to settle the claim as to all parties through negotiations with such other contractor or utility owner, or otherwise resolve the claim by arbitration or other dispute resolution proceeding or at law, and (2) indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them from and against any such claims, and against all costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such damage, delay, disruption, or interference.

ARTICLE 9—OWNER'S RESPONSIBILITIES

9.01 *Communications to Contractor*

- A. Except as otherwise provided in these General Conditions, Owner shall issue all communications to Contractor through Engineer.

9.02 *Replacement of Engineer*

- A. Owner may at its discretion appoint an engineer to replace Engineer, provided Contractor makes no reasonable objection to the replacement engineer. The replacement engineer's status under the Contract Documents will be that of the former Engineer.

9.03 *Furnish Data*

- A. Owner shall promptly furnish the data required of Owner under the Contract Documents.

9.04 *Pay When Due*

- A. Owner shall make payments to Contractor when they are due as provided in the Agreement.

9.05 *Lands and Easements; Reports, Tests, and Drawings*

- A. Owner's duties with respect to providing lands and easements are set forth in Paragraph 5.01.
- B. Owner's duties with respect to providing engineering surveys to establish reference points are set forth in Paragraph 4.03.
- C. Article 5 refers to Owner's identifying and making available to Contractor copies of reports of explorations and tests of conditions at the Site, and drawings of physical conditions relating to existing surface or subsurface structures at the Site.

9.06 *Insurance*

- A. Owner's responsibilities, if any, with respect to purchasing and maintaining liability and property insurance are set forth in Article 6.

9.07 *Change Orders*

- A. Owner's responsibilities with respect to Change Orders are set forth in Article 11.

9.08 *Inspections, Tests, and Approvals*

- A. Owner's responsibility with respect to certain inspections, tests, and approvals is set forth in Paragraph 14.02.B.

9.09 *Limitations on Owner's Responsibilities*

- A. The Owner shall not supervise, direct, or have control or authority over, nor be responsible for, Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work. Owner will not be responsible for Contractor's failure to perform the Work in accordance with the Contract Documents.

9.10 *Undisclosed Hazardous Environmental Condition*

- A. Owner's responsibility in respect to an undisclosed Hazardous Environmental Condition is set forth in Paragraph 5.06.

9.11 *Evidence of Financial Arrangements*

- A. Upon request of Contractor, Owner shall furnish Contractor reasonable evidence that financial arrangements have been made to satisfy Owner's obligations under the Contract (including obligations under proposed changes in the Work).

9.12 *Safety Programs*

- A. While at the Site, Owner's employees and representatives shall comply with the specific applicable requirements of Contractor's safety programs of which Owner has been informed.
- B. Owner shall furnish copies of any applicable Owner safety programs to Contractor.

ARTICLE 10—ENGINEER'S STATUS DURING CONSTRUCTION

10.01 *Owner's Representative*

- A. Engineer will be Owner's representative during the construction period. The duties and responsibilities and the limitations of authority of Engineer as Owner's representative during construction are set forth in the Contract.

10.02 *Visits to Site*

- A. Engineer will make visits to the Site at intervals appropriate to the various stages of construction as Engineer deems necessary in order to observe, as an experienced and qualified design professional, the progress that has been made and the quality of the various aspects of Contractor's executed Work. Based on information obtained during such visits and observations, Engineer, for the benefit of Owner, will determine, in general, if the Work is proceeding in accordance with the Contract Documents. Engineer will not be required to make exhaustive or continuous inspections on the Site to check the quality or quantity of the Work. Engineer's efforts will be directed toward providing for Owner a greater degree of confidence that the completed Work will conform generally to the Contract Documents. On the basis of such visits and observations, Engineer will keep Owner informed of the progress of the Work and will endeavor to guard Owner against defective Work.
- B. Engineer's visits and observations are subject to all the limitations on Engineer's authority and responsibility set forth in Paragraph 10.07. Particularly, but without limitation, during or as a result of Engineer's visits or observations of Contractor's Work, Engineer will not supervise, direct, control, or have authority over or be responsible for Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work.

10.03 *Resident Project Representative*

- A. If Owner and Engineer have agreed that Engineer will furnish a Resident Project Representative to represent Engineer at the Site and assist Engineer in observing the progress and quality of the Work, then the authority and responsibilities of any such Resident Project Representative will be as provided in the ~~Supplementary Conditions~~ **Specifications**, and limitations on the responsibilities thereof will be as provided in the ~~Supplementary Conditions~~ **Specifications** and in Paragraph 10.07.
- B. If Owner designates an individual or entity who is not Engineer's consultant, agent, or employee to represent Owner at the Site, then the responsibilities and authority of such individual or entity will be as provided in the ~~Supplementary Conditions~~ **Specifications**.

10.04 *Engineer's Authority*

- A. Engineer has the authority to reject Work in accordance with Article 14.
- B. Engineer's authority as to Submittals is set forth in Paragraph 7.16.
- C. Engineer's authority as to design drawings, calculations, specifications, certifications and other Submittals from Contractor in response to Owner's delegation (if any) to Contractor of professional design services, is set forth in Paragraph 7.19.
- D. Engineer's authority as to changes in the Work is set forth in Article 11.

E. Engineer's authority as to Applications for Payment is set forth in Article 15.

10.05 *Determinations for Unit Price Work*

A. Engineer will determine the actual quantities and classifications of Unit Price Work performed by Contractor as set forth in Paragraph 13.03.

10.06 *Decisions on Requirements of Contract Documents and Acceptability of Work*

A. Engineer will render decisions regarding the requirements of the Contract Documents, and judge the acceptability of the Work, pursuant to the specific procedures set forth herein for initial interpretations, Change Proposals, and acceptance of the Work. In rendering such decisions and judgments, Engineer will not show partiality to Owner or Contractor, and will not be liable to Owner, Contractor, or others in connection with any proceedings, interpretations, decisions, or judgments conducted or rendered in good faith.

10.07 *Limitations on Engineer's Authority and Responsibilities*

- A. Neither Engineer's authority or responsibility under this Article 10 or under any other provision of the Contract, nor any decision made by Engineer in good faith either to exercise or not exercise such authority or responsibility or the undertaking, exercise, or performance of any authority or responsibility by Engineer, will create, impose, or give rise to any duty in contract, tort, or otherwise owed by Engineer to Contractor, any Subcontractor, any Supplier, any other individual or entity, or to any surety for or employee or agent of any of them.
- B. Engineer will not supervise, direct, control, or have authority over or be responsible for Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work. Engineer will not be responsible for Contractor's failure to perform the Work in accordance with the Contract Documents.
- C. Engineer will not be responsible for the acts or omissions of Contractor or of any Subcontractor, any Supplier, or of any other individual or entity performing any of the Work.
- D. Engineer's review of the final Application for Payment and accompanying documentation, and all maintenance and operating instructions, schedules, guarantees, bonds, certificates of inspection, tests and approvals, and other documentation required to be delivered by Contractor under Paragraph 15.06.A, will only be to determine generally that their content complies with the requirements of, and in the case of certificates of inspections, tests, and approvals, that the results certified indicate compliance with the Contract Documents.
- E. The limitations upon authority and responsibility set forth in this Paragraph 10.07 also apply to the Resident Project Representative, if any.

10.08 *Compliance with Safety Program*

A. While at the Site, Engineer's employees and representatives will comply with the specific applicable requirements of Owner's and Contractor's safety programs of which Engineer has been informed.

ARTICLE 11—CHANGES TO THE CONTRACT

11.01 *Amending and Supplementing the Contract*

- A. The Contract may be amended or supplemented by a Change Order, a Work Change Directive, or a Field Order.
- B. If an amendment or supplement to the Contract includes a change in the Contract Price or the Contract Times, such amendment or supplement must be set forth in a Change Order.
- C. All changes to the Contract that involve (1) the performance or acceptability of the Work, (2) the design (as set forth in the Drawings, Specifications, or otherwise), or (3) other engineering or technical matters, must be supported by Engineer's recommendation. Owner and Contractor may amend other terms and conditions of the Contract without the recommendation of the Engineer.

11.02 *Change Orders*

- A. Owner and Contractor shall execute appropriate Change Orders covering:
 - 1. Changes in Contract Price or Contract Times which are agreed to by the parties, including any undisputed sum or amount of time for Work actually performed in accordance with a Work Change Directive;
 - 2. Changes in Contract Price resulting from an Owner set-off, unless Contractor has duly contested such set-off;
 - 3. Changes in the Work which are: (a) ordered by Owner pursuant to Paragraph 11.05, (b) required because of Owner's acceptance of defective Work under Paragraph 14.04 or Owner's correction of defective Work under Paragraph 14.07, or (c) agreed to by the parties, subject to the need for Engineer's recommendation if the change in the Work involves the design (as set forth in the Drawings, Specifications, or otherwise) or other engineering or technical matters; and
 - 4. Changes that embody the substance of any final and binding results under: Paragraph 11.03.B, resolving the impact of a Work Change Directive; Paragraph 11.09, concerning Change Proposals; Article 12, Claims; Paragraph 13.02.D, final adjustments resulting from allowances; Paragraph 13.03.D, final adjustments relating to determination of quantities for Unit Price Work; and similar provisions.
- B. If Owner or Contractor refuses to execute a Change Order that is required to be executed under the terms of Paragraph 11.02.A, it will be deemed to be of full force and effect, as if fully executed.

11.03 *Work Change Directives*

- A. A Work Change Directive will not change the Contract Price or the Contract Times but is evidence that the parties expect that the modification ordered or documented by a Work Change Directive will be incorporated in a subsequently issued Change Order, following negotiations by the parties as to the Work Change Directive's effect, if any, on the Contract Price and Contract Times; or, if negotiations are unsuccessful, by a determination under the terms of the Contract Documents governing adjustments, expressly including Paragraph 11.07 regarding change of Contract Price.

- B. If Owner has issued a Work Change Directive and:
 - 1. Contractor believes that an adjustment in Contract Times or Contract Price is necessary, then Contractor shall submit any Change Proposal seeking such an adjustment no later than 30 days after the completion of the Work set out in the Work Change Directive.
 - 2. Owner believes that an adjustment in Contract Times or Contract Price is necessary, then Owner shall submit any Claim seeking such an adjustment no later than 60 days after issuance of the Work Change Directive.

11.04 *Field Orders*

- A. Engineer may authorize minor changes in the Work if the changes do not involve an adjustment in the Contract Price or the Contract Times and are compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents. Such changes will be accomplished by a Field Order and will be binding on Owner and also on Contractor, which shall perform the Work involved promptly.
- B. If Contractor believes that a Field Order justifies an adjustment in the Contract Price or Contract Times, then before proceeding with the Work at issue, Contractor shall submit a Change Proposal as provided herein.

11.05 *Owner-Authorized Changes in the Work*

- A. Without invalidating the Contract and without notice to any surety, Owner may, at any time or from time to time, order additions, deletions, or revisions in the Work. Changes involving the design (as set forth in the Drawings, Specifications, or otherwise) or other engineering or technical matters will be supported by Engineer's recommendation.
- B. Such changes in the Work may be accomplished by a Change Order, if Owner and Contractor have agreed as to the effect, if any, of the changes on Contract Times or Contract Price; or by a Work Change Directive. Upon receipt of any such document, Contractor shall promptly proceed with the Work involved; or, in the case of a deletion in the Work, promptly cease construction activities with respect to such deleted Work. Added or revised Work must be performed under the applicable conditions of the Contract Documents.
- C. Nothing in this Paragraph 11.05 obligates Contractor to undertake work that Contractor reasonably concludes cannot be performed in a manner consistent with Contractor's safety obligations under the Contract Documents or Laws and Regulations.

11.06 *Unauthorized Changes in the Work*

- A. Contractor shall not be entitled to an increase in the Contract Price or an extension of the Contract Times with respect to any work performed that is not required by the Contract Documents, as amended, modified, or supplemented, except in the case of an emergency as provided in Paragraph 7.15 or in the case of uncovering Work as provided in Paragraph 14.05.C.2.

11.07 *Change of Contract Price*

- A. The Contract Price may only be changed by a Change Order. Any Change Proposal for an adjustment in the Contract Price must comply with the provisions of Paragraph 11.09. Any Claim for an adjustment of Contract Price must comply with the provisions of Article 12.
- B. An adjustment in the Contract Price will be determined as follows:

1. Where the Work involved is covered by unit prices contained in the Contract Documents, then by application of such unit prices to the quantities of the items involved (subject to the provisions of Paragraph 13.03);
 2. Where the Work involved is not covered by unit prices contained in the Contract Documents, then by a mutually agreed lump sum (which may include an allowance for overhead and profit not necessarily in accordance with Paragraph 11.07.C.2); or
 3. Where the Work involved is not covered by unit prices contained in the Contract Documents and the parties do not reach mutual agreement to a lump sum, then on the basis of the Cost of the Work (determined as provided in Paragraph 13.01) plus a Contractor's fee for overhead and profit (determined as provided in Paragraph 11.07.C).
- C. *Contractor's Fee:* When applicable, the Contractor's fee for overhead and profit will be determined as follows:
1. A mutually acceptable fixed fee; or
 2. If a fixed fee is not agreed upon, then a fee based on the following percentages of the various portions of the Cost of the Work:
 - a. For costs incurred under Paragraphs 13.01.B.1 and 13.01.B.2, the Contractor's fee will be 15 percent;
 - b. For costs incurred under Paragraph 13.01.B.3, the Contractor's fee will be 5 percent;
 - c. Where one or more tiers of subcontracts are on the basis of Cost of the Work plus a fee and no fixed fee is agreed upon, the intent of Paragraphs 11.07.C.2.a and 11.07.C.2.b is that the Contractor's fee will be based on: (1) a fee of 15 percent of the costs incurred under Paragraphs 13.01.B.1 and 13.01.B.2 by the Subcontractor that actually performs the Work, at whatever tier, and (2) with respect to Contractor itself and to any Subcontractors of a tier higher than that of the Subcontractor that actually performs the Work, a fee of 5 percent of the amount (fee plus underlying costs incurred) attributable to the next lower tier Subcontractor; provided, however, that for any such subcontracted Work the maximum total fee to be paid by Owner will be no greater than 27 percent of the costs incurred by the Subcontractor that actually performs the Work;
 - d. No fee will be payable on the basis of costs itemized under Paragraphs 13.01.B.4, 13.01.B.5, and 13.01.C;
 - e. The amount of credit to be allowed by Contractor to Owner for any change which results in a net decrease in Cost of the Work will be the amount of the actual net decrease in Cost of the Work and a deduction of an additional amount equal to 5 percent of such actual net decrease in Cost of the Work; and
 - f. When both additions and credits are involved in any one change or Change Proposal, the adjustment in Contractor's fee will be computed by determining the sum of the costs in each of the cost categories in Paragraph 13.01.B (specifically, payroll costs, Paragraph 13.01.B.1; incorporated materials and equipment costs, Paragraph 13.01.B.2; Subcontract costs, Paragraph 13.01.B.3; special consultants costs, Paragraph 13.01.B.4; and other costs, Paragraph 13.01.B.5) and applying to each such cost category sum the appropriate fee from Paragraphs 11.07.C.2.a through 11.07.C.2.e, inclusive.

11.08 *Change of Contract Times*

- A. The Contract Times may only be changed by a Change Order. Any Change Proposal for an adjustment in the Contract Times must comply with the provisions of Paragraph 11.09. Any Claim for an adjustment in the Contract Times must comply with the provisions of Article 12.
- B. Delay, disruption, and interference in the Work, and any related changes in Contract Times, are addressed in and governed by Paragraph 4.05.

11.09 *Change Proposals*

- A. *Purpose and Content:* Contractor shall submit a Change Proposal to Engineer to request an adjustment in the Contract Times or Contract Price; contest an initial decision by Engineer concerning the requirements of the Contract Documents or relating to the acceptability of the Work under the Contract Documents; challenge a set-off against payment due; or seek other relief under the Contract. The Change Proposal will specify any proposed change in Contract Times or Contract Price, or other proposed relief, and explain the reason for the proposed change, with citations to any governing or applicable provisions of the Contract Documents. Each Change Proposal will address only one issue, or a set of closely related issues.
- B. *Change Proposal Procedures*
 - 1. *Submittal:* Contractor shall submit each Change Proposal to Engineer within 30 days after the start of the event giving rise thereto, or after such initial decision.
 - 2. *Supporting Data:* The Contractor shall submit supporting data, including the proposed change in Contract Price or Contract Time (if any), to the Engineer and Owner within 15 days after the submittal of the Change Proposal.
 - a. Change Proposals based on or related to delay, interruption, or interference must comply with the provisions of Paragraphs 4.05.D and 4.05.E.
 - b. Change proposals related to a change of Contract Price must include full and detailed accounts of materials incorporated into the Work and labor and equipment used for the subject Work.

The supporting data must be accompanied by a written statement that the supporting data are accurate and complete, and that any requested time or price adjustment is the entire adjustment to which Contractor believes it is entitled as a result of said event.

- 3. *Engineer's Initial Review:* Engineer will advise Owner regarding the Change Proposal, and consider any comments or response from Owner regarding the Change Proposal. If in its discretion Engineer concludes that additional supporting data is needed before conducting a full review and making a decision regarding the Change Proposal, then Engineer may request that Contractor submit such additional supporting data by a date specified by Engineer, prior to Engineer beginning its full review of the Change Proposal.
- 4. *Engineer's Full Review and Action on the Change Proposal:* Upon receipt of Contractor's supporting data (including any additional data requested by Engineer), Engineer will conduct a full review of each Change Proposal and, within 30 days after such receipt of the Contractor's supporting data, either approve the Change Proposal in whole, deny it in whole, or approve it in part and deny it in part. Such actions must be in writing, with a copy provided to Owner and Contractor. If Engineer does not take action on the Change

Proposal within 30 days, then either Owner or Contractor may at any time thereafter submit a letter to the other party indicating that as a result of Engineer's inaction the Change Proposal is deemed denied, thereby commencing the time for appeal of the denial under Article 12.

5. *Binding Decision:* Engineer's decision is final and binding upon Owner and Contractor, unless Owner or Contractor appeals the decision by filing a Claim under Article 12.
- C. *Resolution of Certain Change Proposals:* If the Change Proposal does not involve the design (as set forth in the Drawings, Specifications, or otherwise), the acceptability of the Work, or other engineering or technical matters, then Engineer will notify the parties in writing that the Engineer is unable to resolve the Change Proposal. For purposes of further resolution of such a Change Proposal, such notice will be deemed a denial, and Contractor may choose to seek resolution under the terms of Article 12.
- D. *Post-Completion:* Contractor shall not submit any Change Proposals after Engineer issues a written recommendation of final payment pursuant to Paragraph 15.06.B.

11.10 Notification to Surety

- A. If the provisions of any bond require notice to be given to a surety of any change affecting the general scope of the Work or the provisions of the Contract Documents (including, but not limited to, Contract Price or Contract Times), the giving of any such notice will be Contractor's responsibility. The amount of each applicable bond will be adjusted to reflect the effect of any such change.

ARTICLE 12—CLAIMS

12.01 Claims

- A. *Claims Process:* The following disputes between Owner and Contractor are subject to the Claims process set forth in this article:
 1. Appeals by Owner or Contractor of Engineer's decisions regarding Change Proposals;
 2. Owner demands for adjustments in the Contract Price or Contract Times, or other relief under the Contract Documents;
 3. Disputes that Engineer has been unable to address because they do not involve the design (as set forth in the Drawings, Specifications, or otherwise), the acceptability of the Work, or other engineering or technical matters; and
 4. Subject to the waiver provisions of Paragraph 15.07, any dispute arising after Engineer has issued a written recommendation of final payment pursuant to Paragraph 15.06.B.
- B. *Submittal of Claim:* The party submitting a Claim shall deliver it directly to the other party to the Contract promptly (but in no event later than 30 days) after the start of the event giving rise thereto; in the case of appeals regarding Change Proposals within 30 days of the decision under appeal. The party submitting the Claim shall also furnish a copy to the Engineer, for its information only. The responsibility to substantiate a Claim rests with the party making the Claim. In the case of a Claim by Contractor seeking an increase in the Contract Times or Contract Price, Contractor shall certify that the Claim is made in good faith, that the supporting data are accurate and complete, and that to the best of Contractor's knowledge

- and belief the amount of time or money requested accurately reflects the full amount to which Contractor is entitled.
- C. *Review and Resolution*: The party receiving a Claim shall review it thoroughly, giving full consideration to its merits. The two parties shall seek to resolve the Claim through the exchange of information and direct negotiations. The parties may extend the time for resolving the Claim by mutual agreement. All actions taken on a Claim will be stated in writing and submitted to the other party, with a copy to Engineer.
 - D. *Mediation*
 - 1. At any time after initiation of a Claim, Owner and Contractor may mutually agree to mediation of the underlying dispute. The agreement to mediate will stay the Claim submittal and response process.
 - 2. If Owner and Contractor agree to mediation, then after 60 days from such agreement, either Owner or Contractor may unilaterally terminate the mediation process, and the Claim submittal and decision process will resume as of the date of the termination. If the mediation proceeds but is unsuccessful in resolving the dispute, the Claim submittal and decision process will resume as of the date of the conclusion of the mediation, as determined by the mediator.
 - 3. Owner and Contractor shall each pay one-half of the mediator's fees and costs.
 - E. *Partial Approval*: If the party receiving a Claim approves the Claim in part and denies it in part, such action will be final and binding unless within 30 days of such action the other party invokes the procedure set forth in Article 17 for final resolution of disputes.
 - F. *Denial of Claim*: If efforts to resolve a Claim are not successful, the party receiving the Claim may deny it by giving written notice of denial to the other party. If the receiving party does not take action on the Claim within 90 days, then either Owner or Contractor may at any time thereafter submit a letter to the other party indicating that as a result of the inaction, the Claim is deemed denied, thereby commencing the time for appeal of the denial. A denial of the Claim will be final and binding unless within 30 days of the denial the other party invokes the procedure set forth in Article 17 for the final resolution of disputes.
 - G. *Final and Binding Results*: If the parties reach a mutual agreement regarding a Claim, whether through approval of the Claim, direct negotiations, mediation, or otherwise; or if a Claim is approved in part and denied in part, or denied in full, and such actions become final and binding; then the results of the agreement or action on the Claim will be incorporated in a Change Order or other written document to the extent they affect the Contract, including the Work, the Contract Times, or the Contract Price.

ARTICLE 13—COST OF THE WORK; ALLOWANCES; UNIT PRICE WORK

13.01 *Cost of the Work*

- A. *Purposes for Determination of Cost of the Work*: The term Cost of the Work means the sum of all costs necessary for the proper performance of the Work at issue, as further defined below. The provisions of this Paragraph 13.01 are used for two distinct purposes:
 - 1. To determine Cost of the Work when Cost of the Work is a component of the Contract Price, under cost-plus-fee, time-and-materials, or other cost-based terms; or

2. When needed to determine the value of a Change Order, Change Proposal, Claim, set-off, or other adjustment in Contract Price. When the value of any such adjustment is determined on the basis of Cost of the Work, Contractor is entitled only to those additional or incremental costs required because of the change in the Work or because of the event giving rise to the adjustment.
- B. *Costs Included:* Except as otherwise may be agreed to in writing by Owner, costs included in the Cost of the Work will be in amounts no higher than those commonly incurred in the locality of the Project, will not include any of the costs itemized in Paragraph 13.01.C, and will include only the following items:
1. Payroll costs for employees in the direct employ of Contractor in the performance of the Work under schedules of job classifications agreed upon by Owner and Contractor in advance of the subject Work. Such employees include, without limitation, superintendents, foremen, safety managers, safety representatives, and other personnel employed full time on the Work. Payroll costs for employees not employed full time on the Work will be apportioned on the basis of their time spent on the Work. Payroll costs include, but are not limited to, salaries and wages plus the cost of fringe benefits, which include social security contributions, unemployment, excise, and payroll taxes, workers' compensation, health and retirement benefits, sick leave, and vacation and holiday pay applicable thereto. The expenses of performing Work outside of regular working hours, on Saturday, Sunday, or legal holidays, will be included in the above to the extent authorized by Owner.
 2. Cost of all materials and equipment furnished and incorporated in the Work, including costs of transportation and storage thereof, and Suppliers' field services required in connection therewith. All cash discounts accrue to Contractor unless Owner deposits funds with Contractor with which to make payments, in which case the cash discounts will accrue to Owner. All trade discounts, rebates, and refunds and returns from sale of surplus materials and equipment will accrue to Owner, and Contractor shall make provisions so that they may be obtained.
 3. Payments made by Contractor to Subcontractors for Work performed by Subcontractors. If required by Owner, Contractor shall obtain competitive bids from subcontractors acceptable to Owner and Contractor and shall deliver such bids to Owner, which will then determine, with the advice of Engineer, which bids, if any, will be acceptable. If any subcontract provides that the Subcontractor is to be paid on the basis of Cost of the Work plus a fee, the Subcontractor's Cost of the Work and fee will be determined in the same manner as Contractor's Cost of the Work and fee as provided in this Paragraph 13.01.
 4. Costs of special consultants (including but not limited to engineers, architects, testing laboratories, surveyors, attorneys, and accountants) employed or retained for services specifically related to the Work.
 5. Other costs consisting of the following:
 - a. The proportion of necessary transportation, travel, and subsistence expenses of Contractor's employees incurred in discharge of duties connected with the Work.
 - b. Cost, including transportation and maintenance, of all materials, supplies, equipment, machinery, appliances, office, and temporary facilities at the Site, which are

consumed in the performance of the Work, and cost, less market value, of such items used but not consumed which remain the property of Contractor.

- 1) In establishing included costs for materials such as scaffolding, plating, or sheeting, consideration will be given to the actual or the estimated life of the material for use on other projects; or rental rates may be established on the basis of purchase or salvage value of such items, whichever is less. Contractor will not be eligible for compensation for such items in an amount that exceeds the purchase cost of such item.

c. *Construction Equipment Rental*

- 1) Rentals of all construction equipment and machinery, and the parts thereof, in accordance with rental agreements approved by Owner as to price (including any surcharge or special rates applicable to overtime use of the construction equipment or machinery), and the costs of transportation, loading, unloading, assembly, dismantling, and removal thereof. All such costs will be in accordance with the terms of said rental agreements. The rental of any such equipment, machinery, or parts must cease when the use thereof is no longer necessary for the Work.
 - 2) Costs for equipment and machinery owned by Contractor or a Contractor-related entity will be paid at a rate shown for such equipment in the equipment rental rate book specified ~~in the Supplementary Conditions~~ **by the Engineer**. An hourly rate will be computed by dividing the monthly rates by 176. These computed rates will include all operating costs.
 - 3) With respect to Work that is the result of a Change Order, Change Proposal, Claim, set-off, or other adjustment in Contract Price ("changed Work"), included costs will be based on the time the equipment or machinery is in use on the changed Work and the costs of transportation, loading, unloading, assembly, dismantling, and removal when directly attributable to the changed Work. The cost of any such equipment or machinery, or parts thereof, must cease to accrue when the use thereof is no longer necessary for the changed Work.
- d. Sales, consumer, use, and other similar taxes related to the Work, and for which Contractor is liable, as imposed by Laws and Regulations.
- e. Deposits lost for causes other than negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, and royalty payments and fees for permits and licenses.
- f. Losses and damages (and related expenses) caused by damage to the Work, not compensated by insurance or otherwise, sustained by Contractor in connection with the performance of the Work (except losses and damages within the deductible amounts of builder's risk or other property insurance established in accordance with Paragraph 6.04), provided such losses and damages have resulted from causes other than the negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable. Such losses include settlements made with the written consent and approval of Owner. No such losses, damages, and expenses will be included in the Cost of the Work for the purpose of determining Contractor's fee.

- g. The cost of utilities, fuel, and sanitary facilities at the Site.
 - h. Minor expenses such as communication service at the Site, express and courier services, and similar petty cash items in connection with the Work.
 - i. The costs of premiums for all bonds and insurance that Contractor is required by the Contract Documents to purchase and maintain.
- C. *Costs Excluded:* The term Cost of the Work does not include any of the following items:
- 1. Payroll costs and other compensation of Contractor's officers, executives, principals, general managers, engineers, architects, estimators, attorneys, auditors, accountants, purchasing and contracting agents, expeditors, timekeepers, clerks, and other personnel employed by Contractor, whether at the Site or in Contractor's principal or branch office for general administration of the Work and not specifically included in the agreed upon schedule of job classifications referred to in Paragraph 13.01.B.1 or specifically covered by Paragraph 13.01.B.4. The payroll costs and other compensation excluded here are to be considered administrative costs covered by the Contractor's fee.
 - 2. The cost of purchasing, renting, or furnishing small tools and hand tools.
 - 3. Expenses of Contractor's principal and branch offices other than Contractor's office at the Site.
 - 4. Any part of Contractor's capital expenses, including interest on Contractor's capital employed for the Work and charges against Contractor for delinquent payments.
 - 5. Costs due to the negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, including but not limited to, the correction of defective Work, disposal of materials or equipment wrongly supplied, and making good any damage to property.
 - 6. Expenses incurred in preparing and advancing Claims.
 - 7. Other overhead or general expense costs of any kind and the costs of any item not specifically and expressly included in Paragraph 13.01.B.
- D. *Contractor's Fee*
- 1. When the Work as a whole is performed on the basis of cost-plus-a-fee, then:
 - a. Contractor's fee for the Work set forth in the Contract Documents as of the Effective Date of the Contract will be determined as set forth in the Agreement.
 - b. for any Work covered by a Change Order, Change Proposal, Claim, set-off, or other adjustment in Contract Price on the basis of Cost of the Work, Contractor's fee will be determined as follows:
 - 1) When the fee for the Work as a whole is a percentage of the Cost of the Work, the fee will automatically adjust as the Cost of the Work changes.
 - 2) When the fee for the Work as a whole is a fixed fee, the fee for any additions or deletions will be determined in accordance with Paragraph 11.07.C.2.
 - 2. When the Work as a whole is performed on the basis of a stipulated sum, or any other basis other than cost-plus-a-fee, then Contractor's fee for any Work covered by a Change

Order, Change Proposal, Claim, set-off, or other adjustment in Contract Price on the basis of Cost of the Work will be determined in accordance with Paragraph 11.07.C.2.

- E. *Documentation and Audit:* Whenever the Cost of the Work for any purpose is to be determined pursuant to this Article 13, Contractor and pertinent Subcontractors will establish and maintain records of the costs in accordance with generally accepted accounting practices. Subject to prior written notice, Owner will be afforded reasonable access, during normal business hours, to all Contractor's accounts, records, books, correspondence, instructions, drawings, receipts, vouchers, memoranda, and similar data relating to the Cost of the Work and Contractor's fee. Contractor shall preserve all such documents for a period of three years after the final payment by Owner. Pertinent Subcontractors will afford such access to Owner, and preserve such documents, to the same extent required of Contractor.

13.02 Allowances

- A. It is understood that Contractor has included in the Contract Price all allowances so named in the Contract Documents and shall cause the Work so covered to be performed for such sums and by such persons or entities as may be acceptable to Owner and Engineer.
- B. *Cash Allowances:* Contractor agrees that:
1. the cash allowances include the cost to Contractor (less any applicable trade discounts) of materials and equipment required by the allowances to be delivered at the Site, and all applicable taxes; and
 2. Contractor's costs for unloading and handling on the Site, labor, installation, overhead, profit, and other expenses contemplated for the cash allowances have been included in the Contract Price and not in the allowances, and no demand for additional payment for any of the foregoing will be valid.
- C. *Owner's Contingency Allowance:* Contractor agrees that an Owner's contingency allowance, if any, is for the sole use of Owner to cover unanticipated costs.
- D. Prior to final payment, an appropriate Change Order will be issued as recommended by Engineer to reflect actual amounts due Contractor for Work covered by allowances, and the Contract Price will be correspondingly adjusted.

13.03 Unit Price Work

- A. Where the Contract Documents provide that all or part of the Work is to be Unit Price Work, initially the Contract Price will be deemed to include for all Unit Price Work an amount equal to the sum of the unit price for each separately identified item of Unit Price Work times the estimated quantity of each item as indicated in the Agreement.
- B. The estimated quantities of items of Unit Price Work are not guaranteed and are solely for the purpose of comparison of Bids and determining an initial Contract Price. Payments to Contractor for Unit Price Work will be based on actual quantities.
- C. Each unit price will be deemed to include an amount considered by Contractor to be adequate to cover Contractor's overhead and profit for each separately identified item.
- D. Engineer will determine the actual quantities and classifications of Unit Price Work performed by Contractor. Engineer will review with Contractor the Engineer's preliminary determinations on such matters before rendering a written decision thereon (by recommendation of an Application for Payment or otherwise). Engineer's written decision

thereon will be final and binding (except as modified by Engineer to reflect changed factual conditions or more accurate data) upon Owner and Contractor, and the final adjustment of Contract Price will be set forth in a Change Order, subject to the provisions of the following paragraph.

E. Adjustments in Unit Price

1. Contractor or Owner shall be entitled to an adjustment in the unit price with respect to an item of Unit Price Work if:
 - a. the quantity of the item of Unit Price Work performed by Contractor differs materially and significantly from the estimated quantity of such item indicated in the Agreement; and
 - b. Contractor's unit costs to perform the item of Unit Price Work have changed materially and significantly as a result of the quantity change.
2. The adjustment in unit price will account for and be coordinated with any related changes in quantities of other items of Work, and in Contractor's costs to perform such other Work, such that the resulting overall change in Contract Price is equitable to Owner and Contractor.
3. Adjusted unit prices will apply to all units of that item.

ARTICLE 14—TESTS AND INSPECTIONS; CORRECTION, REMOVAL, OR ACCEPTANCE OF DEFECTIVE WORK

14.01 Access to Work

- A. Owner, Engineer, their consultants and other representatives and personnel of Owner, independent testing laboratories, and authorities having jurisdiction have access to the Site and the Work at reasonable times for their observation, inspection, and testing. Contractor shall provide them proper and safe conditions for such access and advise them of Contractor's safety procedures and programs so that they may comply with such procedures and programs as applicable.

14.02 Tests, Inspections, and Approvals

- A. Contractor shall give Engineer timely notice of readiness of the Work (or specific parts thereof) for all required inspections and tests, and shall cooperate with inspection and testing personnel to facilitate required inspections and tests.
- B. Owner shall retain and pay for the services of an independent inspector, testing laboratory, or other qualified individual or entity to perform all inspections and tests expressly required by the Contract Documents to be furnished and paid for by Owner, except that costs incurred in connection with tests or inspections of covered Work will be governed by the provisions of Paragraph 14.05.
- C. If Laws or Regulations of any public body having jurisdiction require any Work (or part thereof) specifically to be inspected, tested, or approved by an employee or other representative of such public body, Contractor shall assume full responsibility for arranging and obtaining such inspections, tests, or approvals, pay all costs in connection therewith, and furnish Engineer the required certificates of inspection or approval.

- D. Contractor shall be responsible for arranging, obtaining, and paying for all inspections and tests required:
1. by the Contract Documents, unless the Contract Documents expressly allocate responsibility for a specific inspection or test to Owner;
 2. to attain Owner's and Engineer's acceptance of materials or equipment to be incorporated in the Work;
 3. by manufacturers of equipment furnished under the Contract Documents;
 4. for testing, adjusting, and balancing of mechanical, electrical, and other equipment to be incorporated into the Work; and
 5. for acceptance of materials, mix designs, or equipment submitted for approval prior to Contractor's purchase thereof for incorporation in the Work.

Such inspections and tests will be performed by independent inspectors, testing laboratories, or other qualified individuals or entities acceptable to Owner and Engineer.

- E. If the Contract Documents require the Work (or part thereof) to be approved by Owner, Engineer, or another designated individual or entity, then Contractor shall assume full responsibility for arranging and obtaining such approvals.
- F. If any Work (or the work of others) that is to be inspected, tested, or approved is covered by Contractor without written concurrence of Engineer, Contractor shall, if requested by Engineer, uncover such Work for observation. Such uncovering will be at Contractor's expense unless Contractor had given Engineer timely notice of Contractor's intention to cover the same and Engineer had not acted with reasonable promptness in response to such notice.

14.03 *Defective Work*

- A. *Contractor's Obligation:* It is Contractor's obligation to assure that the Work is not defective.
- B. *Engineer's Authority:* Engineer has the authority to determine whether Work is defective, and to reject defective Work.
- C. *Notice of Defects:* Prompt written notice of all defective Work of which Owner or Engineer has actual knowledge will be given to Contractor.
- D. *Correction, or Removal and Replacement:* Promptly after receipt of written notice of defective Work, Contractor shall correct all such defective Work, whether or not fabricated, installed, or completed, or, if Engineer has rejected the defective Work, remove it from the Project and replace it with Work that is not defective.
- E. *Preservation of Warranties:* When correcting defective Work, Contractor shall take no action that would void or otherwise impair Owner's special warranty and guarantee, if any, on said Work.
- F. *Costs and Damages:* In addition to its correction, removal, and replacement obligations with respect to defective Work, Contractor shall pay all claims, costs, losses, and damages arising out of or relating to defective Work, including but not limited to the cost of the inspection, testing, correction, removal, replacement, or reconstruction of such defective Work, fines levied against Owner by governmental authorities because the Work is defective, and the costs of repair or replacement of work of others resulting from defective Work. Prior to final payment, if Owner and Contractor are unable to agree as to the measure of such claims, costs,

losses, and damages resulting from defective Work, then Owner may impose a reasonable set-off against payments due under Article 15.

14.04 *Acceptance of Defective Work*

- A. If, instead of requiring correction or removal and replacement of defective Work, Owner prefers to accept it, Owner may do so (subject, if such acceptance occurs prior to final payment, to Engineer's confirmation that such acceptance is in general accord with the design intent and applicable engineering principles, and will not endanger public safety). Contractor shall pay all claims, costs, losses, and damages attributable to Owner's evaluation of and determination to accept such defective Work (such costs to be approved by Engineer as to reasonableness), and for the diminished value of the Work to the extent not otherwise paid by Contractor. If any such acceptance occurs prior to final payment, the necessary revisions in the Contract Documents with respect to the Work will be incorporated in a Change Order. If the parties are unable to agree as to the decrease in the Contract Price, reflecting the diminished value of Work so accepted, then Owner may impose a reasonable set-off against payments due under Article 15. If the acceptance of defective Work occurs after final payment, Contractor shall pay an appropriate amount to Owner.

14.05 *Uncovering Work*

- A. Engineer has the authority to require additional inspection or testing of the Work, whether or not the Work is fabricated, installed, or completed.
- B. If any Work is covered contrary to the written request of Engineer, then Contractor shall, if requested by Engineer, uncover such Work for Engineer's observation, and then replace the covering, all at Contractor's expense.
- C. If Engineer considers it necessary or advisable that covered Work be observed by Engineer or inspected or tested by others, then Contractor, at Engineer's request, shall uncover, expose, or otherwise make available for observation, inspection, or testing as Engineer may require, that portion of the Work in question, and provide all necessary labor, material, and equipment.
 - 1. If it is found that the uncovered Work is defective, Contractor shall be responsible for all claims, costs, losses, and damages arising out of or relating to such uncovering, exposure, observation, inspection, and testing, and of satisfactory replacement or reconstruction (including but not limited to all costs of repair or replacement of work of others); and pending Contractor's full discharge of this responsibility the Owner shall be entitled to impose a reasonable set-off against payments due under Article 15.
 - 2. If the uncovered Work is not found to be defective, Contractor shall be allowed an increase in the Contract Price or an extension of the Contract Times, directly attributable to such uncovering, exposure, observation, inspection, testing, replacement, and reconstruction. If the parties are unable to agree as to the amount or extent thereof, then Contractor may submit a Change Proposal within 30 days of the determination that the Work is not defective.

14.06 *Owner May Stop the Work*

- A. If the Work is defective, or Contractor fails to supply sufficient skilled workers or suitable materials or equipment, or fails to perform the Work in such a way that the completed Work will conform to the Contract Documents, then Owner may order Contractor to stop the Work,

or any portion thereof, until the cause for such order has been eliminated; however, this right of Owner to stop the Work will not give rise to any duty on the part of Owner to exercise this right for the benefit of Contractor, any Subcontractor, any Supplier, any other individual or entity, or any surety for, or employee or agent of any of them.

14.07 Owner May Correct Defective Work

- A. If Contractor fails within a reasonable time after written notice from Engineer to correct defective Work, or to remove and replace defective Work as required by Engineer, then Owner may, after 7 days' written notice to Contractor, correct or remedy any such deficiency.
- B. In exercising the rights and remedies under this Paragraph 14.07, Owner shall proceed expeditiously. In connection with such corrective or remedial action, Owner may exclude Contractor from all or part of the Site, take possession of all or part of the Work and suspend Contractor's services related thereto, and incorporate in the Work all materials and equipment stored at the Site or for which Owner has paid Contractor but which are stored elsewhere. Contractor shall allow Owner, Owner's representatives, agents and employees, Owner's other contractors, and Engineer and Engineer's consultants access to the Site to enable Owner to exercise the rights and remedies under this paragraph.
- C. All claims, costs, losses, and damages incurred or sustained by Owner in exercising the rights and remedies under this Paragraph 14.07 will be charged against Contractor as set-offs against payments due under Article 15. Such claims, costs, losses and damages will include but not be limited to all costs of repair, or replacement of work of others destroyed or damaged by correction, removal, or replacement of Contractor's defective Work.
- D. Contractor shall not be allowed an extension of the Contract Times because of any delay in the performance of the Work attributable to the exercise by Owner of Owner's rights and remedies under this Paragraph 14.07.

ARTICLE 15—PAYMENTS TO CONTRACTOR; SET-OFFS; COMPLETION; CORRECTION PERIOD

15.01 Progress Payments

- A. *Basis for Progress Payments:* The Schedule of Values established as provided in Article 2 will serve as the basis for progress payments and will be incorporated into a form of Application for Payment acceptable to Engineer. Progress payments for Unit Price Work will be based on the number of units completed during the pay period, as determined under the provisions of Paragraph 13.03. Progress payments for cost-based Work will be based on Cost of the Work completed by Contractor during the pay period.
- B. *Applications for Payments*
 - 1. At least 20 days before the date established in the Agreement for each progress payment (but not more often than once a month), Contractor shall submit to Engineer for review an Application for Payment filled out and signed by Contractor covering the Work completed as of the date of the Application and accompanied by such supporting documentation as is required by the Contract Documents.
 - 2. If payment is requested on the basis of materials and equipment not incorporated in the Work but delivered and suitably stored at the Site or at another location agreed to in writing, the Application for Payment must also be accompanied by: (a) a bill of sale, invoice, copies of subcontract or purchase order payments, or other documentation

establishing full payment by Contractor for the materials and equipment; (b) at Owner's request, documentation warranting that Owner has received the materials and equipment free and clear of all Liens; and (c) evidence that the materials and equipment are covered by appropriate property insurance, a warehouse bond, or other arrangements to protect Owner's interest therein, all of which must be satisfactory to Owner.

3. Beginning with the second Application for Payment, each Application must include an affidavit of Contractor stating that all previous progress payments received by Contractor have been applied to discharge Contractor's legitimate obligations associated with prior Applications for Payment.
4. The amount of retainage with respect to progress payments will be as stipulated in the Agreement.

C. *Review of Applications*

1. Engineer will, within 10 days after receipt of each Application for Payment, including each resubmittal, either indicate in writing a recommendation of payment and present the Application to Owner, or return the Application to Contractor indicating in writing Engineer's reasons for refusing to recommend payment. In the latter case, Contractor may make the necessary corrections and resubmit the Application.
2. Engineer's recommendation of any payment requested in an Application for Payment will constitute a representation by Engineer to Owner, based on Engineer's observations of the executed Work as an experienced and qualified design professional, and on Engineer's review of the Application for Payment and the accompanying data and schedules, that to the best of Engineer's knowledge, information and belief:
 - a. the Work has progressed to the point indicated;
 - b. the quality of the Work is generally in accordance with the Contract Documents (subject to an evaluation of the Work as a functioning whole prior to or upon Substantial Completion, the results of any subsequent tests called for in the Contract Documents, a final determination of quantities and classifications for Unit Price Work under Paragraph 13.03, and any other qualifications stated in the recommendation); and
 - c. the conditions precedent to Contractor's being entitled to such payment appear to have been fulfilled in so far as it is Engineer's responsibility to observe the Work.
3. By recommending any such payment Engineer will not thereby be deemed to have represented that:
 - a. inspections made to check the quality or the quantity of the Work as it has been performed have been exhaustive, extended to every aspect of the Work in progress, or involved detailed inspections of the Work beyond the responsibilities specifically assigned to Engineer in the Contract; or
 - b. there may not be other matters or issues between the parties that might entitle Contractor to be paid additionally by Owner or entitle Owner to withhold payment to Contractor.

4. Neither Engineer's review of Contractor's Work for the purposes of recommending payments nor Engineer's recommendation of any payment, including final payment, will impose responsibility on Engineer:
 - a. to supervise, direct, or control the Work;
 - b. for the means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto;
 - c. for Contractor's failure to comply with Laws and Regulations applicable to Contractor's performance of the Work;
 - d. to make any examination to ascertain how or for what purposes Contractor has used the money paid by Owner; or
 - e. to determine that title to any of the Work, materials, or equipment has passed to Owner free and clear of any Liens.
 5. Engineer may refuse to recommend the whole or any part of any payment if, in Engineer's opinion, it would be incorrect to make the representations to Owner stated in Paragraph 15.01.C.2.
 6. Engineer will recommend reductions in payment (set-offs) necessary in Engineer's opinion to protect Owner from loss because:
 - a. the Work is defective, requiring correction or replacement;
 - b. the Contract Price has been reduced by Change Orders;
 - c. Owner has been required to correct defective Work in accordance with Paragraph 14.07, or has accepted defective Work pursuant to Paragraph 14.04;
 - d. Owner has been required to remove or remediate a Hazardous Environmental Condition for which Contractor is responsible; or
 - e. Engineer has actual knowledge of the occurrence of any of the events that would constitute a default by Contractor and therefore justify termination for cause under the Contract Documents.
- D. *Payment Becomes Due*
1. Ten days after presentation of the Application for Payment to Owner with Engineer's recommendation, the amount recommended (subject to any Owner set-offs) will become due, and when due will be paid by Owner to Contractor.
- E. *Reductions in Payment by Owner*
1. In addition to any reductions in payment (set-offs) recommended by Engineer, Owner is entitled to impose a set-off against payment based on any of the following:
 - a. Claims have been made against Owner based on Contractor's conduct in the performance or furnishing of the Work, or Owner has incurred costs, losses, or damages resulting from Contractor's conduct in the performance or furnishing of the Work, including but not limited to claims, costs, losses, or damages from workplace injuries, adjacent property damage, non-compliance with Laws and Regulations, and patent infringement;

- b. Contractor has failed to take reasonable and customary measures to avoid damage, delay, disruption, and interference with other work at or adjacent to the Site;
 - c. Contractor has failed to provide and maintain required bonds or insurance;
 - d. Owner has been required to remove or remediate a Hazardous Environmental Condition for which Contractor is responsible;
 - e. Owner has incurred extra charges or engineering costs related to submittal reviews, evaluations of proposed substitutes, tests and inspections, or return visits to manufacturing or assembly facilities;
 - f. The Work is defective, requiring correction or replacement;
 - g. Owner has been required to correct defective Work in accordance with Paragraph 14.07, or has accepted defective Work pursuant to Paragraph 14.04;
 - h. The Contract Price has been reduced by Change Orders;
 - i. An event has occurred that would constitute a default by Contractor and therefore justify a termination for cause;
 - j. Liquidated or other damages have accrued as a result of Contractor's failure to achieve Milestones, Substantial Completion, or final completion of the Work;
 - k. Liens have been filed in connection with the Work, except where Contractor has delivered a specific bond satisfactory to Owner to secure the satisfaction and discharge of such Liens; or
 - l. Other items entitle Owner to a set-off against the amount recommended.
2. If Owner imposes any set-off against payment, whether based on its own knowledge or on the written recommendations of Engineer, Owner will give Contractor immediate written notice (with a copy to Engineer) stating the reasons for such action and the specific amount of the reduction, and promptly pay Contractor any amount remaining after deduction of the amount so withheld. Owner shall promptly pay Contractor the amount so withheld, or any adjustment thereto agreed to by Owner and Contractor, if Contractor remedies the reasons for such action. The reduction imposed will be binding on Contractor unless it duly submits a Change Proposal contesting the reduction.
 3. Upon a subsequent determination that Owner's refusal of payment was not justified, the amount wrongfully withheld will be treated as an amount due as determined by Paragraph 15.01.D.1 and subject to interest as provided in the Agreement.

15.02 *Contractor's Warranty of Title*

- A. Contractor warrants and guarantees that title to all Work, materials, and equipment furnished under the Contract will pass to Owner free and clear of (1) all Liens and other title defects, and (2) all patent, licensing, copyright, or royalty obligations, no later than 7 days after the time of payment by Owner.

15.03 *Substantial Completion*

- A. When Contractor considers the entire Work ready for its intended use Contractor shall notify Owner and Engineer in writing that the entire Work is substantially complete and request that Engineer issue a certificate of Substantial Completion. Contractor shall at the same time

- submit to Owner and Engineer an initial draft of punch list items to be completed or corrected before final payment.
- B. Promptly after Contractor's notification, Owner, Contractor, and Engineer shall make an inspection of the Work to determine the status of completion. If Engineer does not consider the Work substantially complete, Engineer will notify Contractor in writing giving the reasons therefor.
 - C. If Engineer considers the Work substantially complete, Engineer will deliver to Owner a preliminary certificate of Substantial Completion which will fix the date of Substantial Completion. Engineer shall attach to the certificate a punch list of items to be completed or corrected before final payment. Owner shall have 7 days after receipt of the preliminary certificate during which to make written objection to Engineer as to any provisions of the certificate or attached punch list. If, after considering the objections to the provisions of the preliminary certificate, Engineer concludes that the Work is not substantially complete, Engineer will, within 14 days after submission of the preliminary certificate to Owner, notify Contractor in writing that the Work is not substantially complete, stating the reasons therefor. If Owner does not object to the provisions of the certificate, or if despite consideration of Owner's objections Engineer concludes that the Work is substantially complete, then Engineer will, within said 14 days, execute and deliver to Owner and Contractor a final certificate of Substantial Completion (with a revised punch list of items to be completed or corrected) reflecting such changes from the preliminary certificate as Engineer believes justified after consideration of any objections from Owner.
 - D. At the time of receipt of the preliminary certificate of Substantial Completion, Owner and Contractor will confer regarding Owner's use or occupancy of the Work following Substantial Completion, review the builder's risk insurance policy with respect to the end of the builder's risk coverage, and confirm the transition to coverage of the Work under a permanent property insurance policy held by Owner. Unless Owner and Contractor agree otherwise in writing, Owner shall bear responsibility for security, operation, protection of the Work, property insurance, maintenance, heat, and utilities upon Owner's use or occupancy of the Work.
 - E. After Substantial Completion the Contractor shall promptly begin work on the punch list of items to be completed or corrected prior to final payment. In appropriate cases Contractor may submit monthly Applications for Payment for completed punch list items, following the progress payment procedures set forth above.
 - F. Owner shall have the right to exclude Contractor from the Site after the date of Substantial Completion subject to allowing Contractor reasonable access to remove its property and complete or correct items on the punch list.

15.04 *Partial Use or Occupancy*

- A. Prior to Substantial Completion of all the Work, Owner may use or occupy any substantially completed part of the Work which has specifically been identified in the Contract Documents, or which Owner, Engineer, and Contractor agree constitutes a separately functioning and usable part of the Work that can be used by Owner for its intended purpose without

significant interference with Contractor's performance of the remainder of the Work, subject to the following conditions:

1. At any time, Owner may request in writing that Contractor permit Owner to use or occupy any such part of the Work that Owner believes to be substantially complete. If and when Contractor agrees that such part of the Work is substantially complete, Contractor, Owner, and Engineer will follow the procedures of Paragraph 15.03.A through 15.03.E for that part of the Work.
2. At any time, Contractor may notify Owner and Engineer in writing that Contractor considers any such part of the Work substantially complete and request Engineer to issue a certificate of Substantial Completion for that part of the Work.
3. Within a reasonable time after either such request, Owner, Contractor, and Engineer shall make an inspection of that part of the Work to determine its status of completion. If Engineer does not consider that part of the Work to be substantially complete, Engineer will notify Owner and Contractor in writing giving the reasons therefor. If Engineer considers that part of the Work to be substantially complete, the provisions of Paragraph 15.03 will apply with respect to certification of Substantial Completion of that part of the Work and the division of responsibility in respect thereof and access thereto.
4. No use or occupancy or separate operation of part of the Work may occur prior to compliance with the requirements of Paragraph 6.04 regarding builder's risk or other property insurance.

15.05 *Final Inspection*

- A. Upon written notice from Contractor that the entire Work or an agreed portion thereof is complete, Engineer will promptly make a final inspection with Owner and Contractor and will notify Contractor in writing of all particulars in which this inspection reveals that the Work, or agreed portion thereof, is incomplete or defective. Contractor shall immediately take such measures as are necessary to complete such Work or remedy such deficiencies.

15.06 *Final Payment*

A. *Application for Payment*

1. After Contractor has, in the opinion of Engineer, satisfactorily completed all corrections identified during the final inspection and has delivered, in accordance with the Contract Documents, all maintenance and operating instructions, schedules, guarantees, bonds, certificates or other evidence of insurance, certificates of inspection, annotated record documents (as provided in Paragraph 7.12), and other documents, Contractor may make application for final payment.
2. The final Application for Payment must be accompanied (except as previously delivered) by:
 - a. all documentation called for in the Contract Documents;
 - b. consent of the surety, if any, to final payment;
 - c. satisfactory evidence that all title issues have been resolved such that title to all Work, materials, and equipment has passed to Owner free and clear of any Liens or other title defects, or will so pass upon final payment.

- d. a list of all duly pending Change Proposals and Claims; and
 - e. complete and legally effective releases or waivers (satisfactory to Owner) of all Lien rights arising out of the Work, and of Liens filed in connection with the Work.
- 3. In lieu of the releases or waivers of Liens specified in Paragraph 15.06.A.2 and as approved by Owner, Contractor may furnish receipts or releases in full and an affidavit of Contractor that: (a) the releases and receipts include all labor, services, material, and equipment for which a Lien could be filed; and (b) all payrolls, material and equipment bills, and other indebtedness connected with the Work for which Owner might in any way be responsible, or which might in any way result in liens or other burdens on Owner's property, have been paid or otherwise satisfied. If any Subcontractor or Supplier fails to furnish such a release or receipt in full, Contractor may furnish a bond or other collateral satisfactory to Owner to indemnify Owner against any Lien, or Owner at its option may issue joint checks payable to Contractor and specified Subcontractors and Suppliers.
- B. *Engineer's Review of Final Application and Recommendation of Payment:* If, on the basis of Engineer's observation of the Work during construction and final inspection, and Engineer's review of the final Application for Payment and accompanying documentation as required by the Contract Documents, Engineer is satisfied that the Work has been completed and Contractor's other obligations under the Contract have been fulfilled, Engineer will, within 10 days after receipt of the final Application for Payment, indicate in writing Engineer's recommendation of final payment and present the final Application for Payment to Owner for payment. Such recommendation will account for any set-offs against payment that are necessary in Engineer's opinion to protect Owner from loss for the reasons stated above with respect to progress payments. Otherwise, Engineer will return the Application for Payment to Contractor, indicating in writing the reasons for refusing to recommend final payment, in which case Contractor shall make the necessary corrections and resubmit the Application for Payment.
- C. *Notice of Acceptability:* In support of its recommendation of payment of the final Application for Payment, Engineer will also give written notice to Owner and Contractor that the Work is acceptable, subject to stated limitations in the notice and to the provisions of Paragraph 15.07.
- D. *Completion of Work:* The Work is complete (subject to surviving obligations) when it is ready for final payment as established by the Engineer's written recommendation of final payment and issuance of notice of the acceptability of the Work.
- E. *Final Payment Becomes Due:* Upon receipt from Engineer of the final Application for Payment and accompanying documentation, Owner shall set off against the amount recommended by Engineer for final payment any further sum to which Owner is entitled, including but not limited to set-offs for liquidated damages and set-offs allowed under the provisions of this Contract with respect to progress payments. Owner shall pay the resulting balance due to Contractor within 30 days of Owner's receipt of the final Application for Payment from Engineer.

15.07 *Waiver of Claims*

- A. By making final payment, Owner waives its claim or right to liquidated damages or other damages for late completion by Contractor, except as set forth in an outstanding Claim,

appeal under the provisions of Article 17, set-off, or express reservation of rights by Owner. Owner reserves all other claims or rights after final payment.

- B. The acceptance of final payment by Contractor will constitute a waiver by Contractor of all claims and rights against Owner other than those pending matters that have been duly submitted as a Claim, or appealed under the provisions of Article 17.

15.08 *Correction Period*

- A. If within one year after the date of Substantial Completion (or such longer period of time as may be prescribed by the ~~Supplementary Conditions~~ **Specifications** or the terms of any applicable special guarantee required by the Contract Documents), Owner gives Contractor written notice that any Work has been found to be defective, or that Contractor's repair of any damages to the Site or adjacent areas has been found to be defective, then after receipt of such notice of defect Contractor shall promptly, without cost to Owner and in accordance with Owner's written instructions:
 - 1. correct the defective repairs to the Site or such adjacent areas;
 - 2. correct such defective Work;
 - 3. remove the defective Work from the Project and replace it with Work that is not defective, if the defective Work has been rejected by Owner, and
 - 4. satisfactorily correct or repair or remove and replace any damage to other Work, to the work of others, or to other land or areas resulting from the corrective measures.
- B. Owner shall give any such notice of defect within 60 days of the discovery that such Work or repairs is defective. If such notice is given within such 60 days but after the end of the correction period, the notice will be deemed a notice of defective Work under Paragraph 7.17.B.
- C. If, after receipt of a notice of defect within 60 days and within the correction period, Contractor does not promptly comply with the terms of Owner's written instructions, or in an emergency where delay would cause serious risk of loss or damage, Owner may have the defective Work corrected or repaired or may have the rejected Work removed and replaced. Contractor shall pay all costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such correction or repair or such removal and replacement (including but not limited to all costs of repair or replacement of work of others). Contractor's failure to pay such costs, losses, and damages within 10 days of invoice from Owner will be deemed the start of an event giving rise to a Claim under Paragraph 12.01.B, such that any related Claim must be brought within 30 days of the failure to pay.
- D. In special circumstances where a particular item of equipment is placed in continuous service before Substantial Completion of all the Work, the correction period for that item may start to run from an earlier date if so provided in the Specifications.
- E. Where defective Work (and damage to other Work resulting therefrom) has been corrected or removed and replaced under this paragraph, the correction period hereunder with respect to such Work will be extended for an additional period of one year after such correction or removal and replacement has been satisfactorily completed.

- F. Contractor's obligations under this paragraph are in addition to all other obligations and warranties. The provisions of this paragraph are not to be construed as a substitute for, or a waiver of, the provisions of any applicable statute of limitation or repose.

ARTICLE 16—SUSPENSION OF WORK AND TERMINATION

16.01 *Owner May Suspend Work*

- A. At any time and without cause, Owner may suspend the Work or any portion thereof for a period of not more than 90 consecutive days by written notice to Contractor and Engineer. Such notice will fix the date on which Work will be resumed. Contractor shall resume the Work on the date so fixed. Contractor shall be entitled to an adjustment in the Contract Price or an extension of the Contract Times directly attributable to any such suspension. Any Change Proposal seeking such adjustments must be submitted no later than 30 days after the date fixed for resumption of Work.

16.02 *Owner May Terminate for Cause*

- A. The occurrence of any one or more of the following events will constitute a default by Contractor and justify termination for cause:
1. Contractor's persistent failure to perform the Work in accordance with the Contract Documents (including, but not limited to, failure to supply sufficient skilled workers or suitable materials or equipment, or failure to adhere to the Progress Schedule);
 2. Failure of Contractor to perform or otherwise to comply with a material term of the Contract Documents;
 3. Contractor's disregard of Laws or Regulations of any public body having jurisdiction; or
 4. Contractor's repeated disregard of the authority of Owner or Engineer.
- B. If one or more of the events identified in Paragraph 16.02.A occurs, then after giving Contractor (and any surety) 10 days' written notice that Owner is considering a declaration that Contractor is in default and termination of the Contract, Owner may proceed to:
1. declare Contractor to be in default, and give Contractor (and any surety) written notice that the Contract is terminated; and
 2. enforce the rights available to Owner under any applicable performance bond.
- C. Subject to the terms and operation of any applicable performance bond, if Owner has terminated the Contract for cause, Owner may exclude Contractor from the Site, take possession of the Work, incorporate in the Work all materials and equipment stored at the Site or for which Owner has paid Contractor but which are stored elsewhere, and complete the Work as Owner may deem expedient.
- D. Owner may not proceed with termination of the Contract under Paragraph 16.02.B if Contractor within 7 days of receipt of notice of intent to terminate begins to correct its failure to perform and proceeds diligently to cure such failure.
- E. If Owner proceeds as provided in Paragraph 16.02.B, Contractor shall not be entitled to receive any further payment until the Work is completed. If the unpaid balance of the Contract Price exceeds the cost to complete the Work, including all related claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects,

attorneys, and other professionals) sustained by Owner, such excess will be paid to Contractor. If the cost to complete the Work including such related claims, costs, losses, and damages exceeds such unpaid balance, Contractor shall pay the difference to Owner. Such claims, costs, losses, and damages incurred by Owner will be reviewed by Engineer as to their reasonableness and, when so approved by Engineer, incorporated in a Change Order. When exercising any rights or remedies under this paragraph, Owner shall not be required to obtain the lowest price for the Work performed.

- F. Where Contractor's services have been so terminated by Owner, the termination will not affect any rights or remedies of Owner against Contractor then existing or which may thereafter accrue, or any rights or remedies of Owner against Contractor or any surety under any payment bond or performance bond. Any retention or payment of money due Contractor by Owner will not release Contractor from liability.
- G. If and to the extent that Contractor has provided a performance bond under the provisions of Paragraph 6.01.A, the provisions of that bond will govern over any inconsistent provisions of Paragraphs 16.02.B and 16.02.D.

16.03 *Owner May Terminate for Convenience*

- A. Upon 7 days' written notice to Contractor and Engineer, Owner may, without cause and without prejudice to any other right or remedy of Owner, terminate the Contract. In such case, Contractor shall be paid for (without duplication of any items):
 - 1. completed and acceptable Work executed in accordance with the Contract Documents prior to the effective date of termination, including fair and reasonable sums for overhead and profit on such Work;
 - 2. expenses sustained prior to the effective date of termination in performing services and furnishing labor, materials, or equipment as required by the Contract Documents in connection with uncompleted Work, plus fair and reasonable sums for overhead and profit on such expenses; and
 - 3. other reasonable expenses directly attributable to termination, including costs incurred to prepare a termination for convenience cost proposal.
- B. Contractor shall not be paid for any loss of anticipated profits or revenue, post-termination overhead costs, or other economic loss arising out of or resulting from such termination.

16.04 *Contractor May Stop Work or Terminate*

- A. If, through no act or fault of Contractor, (1) the Work is suspended for more than 90 consecutive days by Owner or under an order of court or other public authority, or (2) Engineer fails to act on any Application for Payment within 30 days after it is submitted, or (3) Owner fails for 30 days to pay Contractor any sum finally determined to be due, then Contractor may, upon 7 days' written notice to Owner and Engineer, and provided Owner or Engineer do not remedy such suspension or failure within that time, terminate the contract and recover from Owner payment on the same terms as provided in Paragraph 16.03.
- B. In lieu of terminating the Contract and without prejudice to any other right or remedy, if Engineer has failed to act on an Application for Payment within 30 days after it is submitted, or Owner has failed for 30 days to pay Contractor any sum finally determined to be due, Contractor may, 7 days after written notice to Owner and Engineer, stop the Work until payment is made of all such amounts due Contractor, including interest thereon. The

provisions of this paragraph are not intended to preclude Contractor from submitting a Change Proposal for an adjustment in Contract Price or Contract Times or otherwise for expenses or damage directly attributable to Contractor's stopping the Work as permitted by this paragraph.

ARTICLE 17—FINAL RESOLUTION OF DISPUTES

17.01 *Methods and Procedures*

- A. *Disputes Subject to Final Resolution:* The following disputed matters are subject to final resolution under the provisions of this article:
 - 1. A timely appeal of an approval in part and denial in part of a Claim, or of a denial in full, pursuant to Article 12; and
 - 2. Disputes between Owner and Contractor concerning the Work, or obligations under the Contract Documents, that arise after final payment has been made.
- B. *Final Resolution of Disputes:* For any dispute subject to resolution under this article, Owner or Contractor may:
 - 1. elect in writing to invoke the dispute resolution process provided for in the ~~Supplementary Conditions~~ **Specifications**;
 - 2. agree with the other party to submit the dispute to another dispute resolution process; or
 - 3. if no dispute resolution process is provided for in the ~~Supplementary Conditions~~ **Specifications** or mutually agreed to, give written notice to the other party of the intent to submit the dispute to a court of competent jurisdiction.

ARTICLE 18—MISCELLANEOUS

18.01 *Giving Notice*

- A. Whenever any provision of the Contract requires the giving of written notice to Owner, Engineer, or Contractor, it will be deemed to have been validly given only if delivered:
 - 1. in person, by a commercial courier service or otherwise, to the recipient's place of business;
 - 2. by registered or certified mail, postage prepaid, to the recipient's place of business; or
 - 3. by e-mail to the recipient, with the words "Formal Notice" or similar in the e-mail's subject line.

18.02 *Computation of Times*

- A. When any period of time is referred to in the Contract by days, it will be computed to exclude the first and include the last day of such period. If the last day of any such period falls on a Saturday or Sunday or on a day made a legal holiday by the law of the applicable jurisdiction, such day will be omitted from the computation.

18.03 *Cumulative Remedies*

- A. The duties and obligations imposed by these General Conditions and the rights and remedies available hereunder to the parties hereto are in addition to, and are not to be construed in any way as a limitation of, any rights and remedies available to any or all of them which are otherwise imposed or available by Laws or Regulations, by special warranty or guarantee, or by other provisions of the Contract. The provisions of this paragraph will be as effective as if repeated specifically in the Contract Documents in connection with each particular duty, obligation, right, and remedy to which they apply.

18.04 *Limitation of Damages*

- A. With respect to any and all Change Proposals, Claims, disputes subject to final resolution, and other matters at issue, neither Owner nor Engineer, nor any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors, shall be liable to Contractor for any claims, costs, losses, or damages sustained by Contractor on or in connection with any other project or anticipated project.

18.05 *No Waiver*

- A. A party's non-enforcement of any provision will not constitute a waiver of that provision, nor will it affect the enforceability of that provision or of the remainder of this Contract.

18.06 *Survival of Obligations*

- A. All representations, indemnifications, warranties, and guarantees made in, required by, or given in accordance with the Contract, as well as all continuing obligations indicated in the Contract, will survive final payment, completion, and acceptance of the Work or termination of the Contract or of the services of Contractor.

18.07 *Controlling Law*

- A. This Contract is to be governed by the law of the state in which the Project is located.

18.08 *Assignment of Contract*

- A. Unless expressly agreed to elsewhere in the Contract, no assignment by a party to this Contract of any rights under or interests in the Contract will be binding on the other party without the written consent of the party sought to be bound; and, specifically but without limitation, money that may become due and money that is due may not be assigned without such consent (except to the extent that the effect of this restriction may be limited by law), and unless specifically stated to the contrary in any written consent to an assignment, no assignment will release or discharge the assignor from any duty or responsibility under the Contract.

18.09 *Successors and Assigns*

- A. Owner and Contractor each binds itself, its successors, assigns, and legal representatives to the other party hereto, its successors, assigns, and legal representatives in respect to all covenants, agreements, and obligations contained in the Contract Documents.

18.10 *Headings*

- A. Article and paragraph headings are inserted for convenience only and do not constitute parts of these General Conditions.

SUPPLEMENTARY CONDITIONS

UTILITIES

The Contractor shall be responsible for notifying all utilities prior to any excavation. Locations of utilities shown on these plans are approximate and shall be verified by the Contractor prior to any excavation with no additional compensation.

VENUE OF LAWSUITS

The parties of this Contract agree that if any dispute arising from the pursuit of said Contract requires the filing of a lawsuit, venue of such lawsuit shall be in the Circuit Court of Grundy County, Illinois.

SUBSTANCE ABUSE PREVENTION PROGRAM

Before the Contractor and any subcontractor commences work, the Contractor and any subcontractor shall have in place a written Substance Abuse Prevention Program for the prevention of substance abuse among its employees which meets or exceeds the requirements in Public Act 95-0635 as enacted by the Illinois General Assembly or shall have a collective bargaining agreement in effect dealing with the subject matter of Public Act 95-0635.

The Contractor and any subcontractor shall file with a public body: a copy of the substance abuse prevention program along with a cover letter certifying that their program meets the requirements of the Act, or a letter certifying that the Contractor or a subcontractor has a collective bargaining agreement in effect dealing with the subject matter of this Act.

The apparent low Bidder, upon notification of contract award by the Owner, shall submit the required documents with the executed contract documents and insurance certificates. The Contractor is responsible for obtaining all appropriate documentation from their subcontractors and submitting to the Engineer.

PREVAILING WAGE RATES

All wages paid by the Contractor and each subcontractor shall be in compliance with the Prevailing Wage Act (820 ILCS 130), as amended, except where a prevailing wage violates a federal law, order, or ruling, the rate conforming to the federal law, order, or ruling shall govern. The Contractor shall be responsible to notify each subcontractor of the wage rates set forth in this contract and any revisions thereto. If the Department of Labor revises the wage rates, the revised rate as provided by the public body shall apply to this contract and the Contractor will not be allowed additional compensation on account of said revisions.

Current Prevailing Wage Rates can be obtained at the Illinois Department of Labor web site located at: <https://www2.illinois.gov/idol/Laws-Rules/CONMED/Pages/Rates.aspx>

The Contractor and each subcontractor shall make and keep, for a period of not less than 3 years, records of all laborers, mechanics, and other workers employed by them on the project; the records shall include each worker's name, address, telephone number when available, social

security number, classification or classifications, the hourly wages paid in each period, the number of hours worked each day, and the starting and ending times of work each day.

Contractors are to report their certified payroll information directly to the Illinois Department of Labor through their electronic database for certified payroll records. Contractors will no longer need to submit certified payroll records to the Owner or Engineer.

The Certified Transcript of Payroll Portal can be accessed at the Illinois Department of Labor website located at:

<https://www2.illinois.gov/idol/Laws-Rules/CONMED/Pages/CertifiedTranscriptOfPayroll.aspx>

EMPLOYMENT OF ILLINOIS WORKERS ON PUBLIC WORKS

If at the time this Contract is executed, or if during the term of this Contract, there is excessive unemployment in Illinois as defined in the Illinois Workers on Public Works Act, 30 ILCS 570-0.01 *et seq.*, as two consecutive months of unemployment exceeding 5%, the Contractor agrees to employ Illinois laborers. The Act requires the workforce on all public works projects be composed of a minimum of 90% Illinois resident laborers. An "Illinois laborer" is defined as any person who has resided in Illinois for at least thirty (30) days and intends to become or remain an Illinois resident.

OCCUPATIONAL SAFETY & HEALTH ADMINISTRATION RULES & REGULATIONS

All work described herein and as shown on the accompanying plan sheets shall comply in all respects to pertinent articles of the current edition of the State and Federal Governments' rules and regulations concerning occupational safety and health standards.

Within Section 1926.652(a), OSHA requires that every jobsite with excavations must have a "Competent Person" present to evaluate the potential for hazards to employees. It shall be the responsibility of the Contractor to provide the required "Competent Person" as defined below.

He must ensure that every trench 5' or more in depth has a protective system. He must ensure that every trench less than 5' undergoes an inspection to determine whether a collapse hazard to employees exists. If a collapse hazard is detected, an appropriate protective system must be used.

A "Competent Person" is defined as one who is capable of identifying existing and predictable hazards in the surroundings, or working conditions which are unsanitary, hazardous or dangerous to employees and who has the authorization to take prompt corrective measures to eliminate them.

"Competent Person" responsibilities:

- Understand the standards and any and all data provided.
- Select proper protective system based on soil type
- Recognize and reclassify soil after changing conditions
- Conduct air test for hazard atmospheres
- Design structural ramps
- Locate underground installations/utilities
- Monitor water removal equipment
- Perform inspections prior to work daily

- Inspect after each hazard-increasing event
- Responsible for ensuring OSHA compliance

ILLINOIS STEEL PRODUCTS PROCUREMENT ACT

The Illinois Steel Products Procurement Act (30 ILCS 565) is applicable to this project. This Act includes various requirements pertaining to the origin of steel products which will be used in the construction of this project. (Copy enclosed.)

RESPONSIBLE BIDDER

Subject to the terms of the Prevailing Wage Act, 820 ILCS 130/1 seq., the City of Morris must comply with 65 ILCS 5/8-9-1, which provides that contracts advertised for bids shall be awarded to the lowest responsible bidder.

“Responsible bidder” has been defined by the City of Morris per Resolution No. R08-01 dated February 19, 2008. (Copy enclosed.)

Illinois Steel Products Procurement Act

(30 ILCS 565/1) (from Ch. 48, par. 1801)

Sec. 1. This Act shall be known and may be cited as the "Steel Products Procurement Act".
(Source: P.A. 83-1030.)

(30 ILCS 565/2) (from Ch. 48, par. 1802)

Sec. 2. It is hereby found and declared by the Illinois General Assembly that
(1) The production of steel products provides the jobs and family incomes of hundreds of thousands of people in this State and, in turn, the jobs and family incomes of millions of persons in the United States;

(2) The taxes paid to the State and its political subdivisions by employers and employees engaged in the production and sale of steel products are a large source of public revenues in the State;

(3) The economy and general welfare of this State and its people, as well as the economy and general welfare of the United States, are inseparably related to the preservation and development of industry in this State, as well as all the other states of this nation.

The General Assembly therefore declares it to be the policy of the State of Illinois that all public officers and agencies should aid and promote the economy of the State and the United States by specifying steel products produced in the United States in all contracts for construction, reconstruction, repair, improvement or maintenance of public works.

(Source: P.A. 83-1030.)

(30 ILCS 565/3) (from Ch. 48, par. 1803)

Sec. 3. For the purposes of this Act, the following words have the meanings ascribed to them in this Section unless the context clearly requires otherwise.

(a) "Public agency" means the State of Illinois, its departments, agencies, boards, commissions and institutions, and all units of local government, including school districts.

(b) "United States" means the United States and any place subject to the jurisdiction thereof.

(c) "Steel products" means products rolled, formed, shaped, drawn, extruded, forged, cast, fabricated, or otherwise similarly processed, or processed by a combination of two or more such operations, from steel made in the United States by the open hearth, basic oxygen, electric furnace, Bessemer or other steel making process.

(Source: P.A. 83-1030.)

(30 ILCS 565/4) (from Ch. 48, par. 1804)

Sec. 4. Each contract for the construction, reconstruction, alteration, repair, improvement or maintenance of public works made by a public agency shall contain a provision that steel products used or supplied in the performance of that contract or any subcontract thereto shall be manufactured or produced in the United States.

The provisions of this Section shall not apply:

(1) Where the contract involves an expenditure of less than \$500.

(2) Where the executive head of the public agency certifies in writing that (a) the specified products are not manufactured or produced in the United States in sufficient quantities to meet the agency's requirements or cannot be manufactured or produced in the United States within the necessary time in sufficient quantities to meet the agency's requirements, or (b) obtaining the specified products, manufactured or produced in the United States would increase the cost of the contract by more than 10%.

(3) When its application is not in the public interest.

(Source: P.A. 83-1030.)

Illinois Steel Products Procurement Act

(30 ILCS 565/5) (from Ch. 48, par. 1805)

Sec. 5. No public agency may authorize, provide for or make any payment to any vendor or contractor upon any contract in violation of Section 4. It shall be a business offense for any vendor or contractor to knowingly enter into any contract in violation of Section 4 or to knowingly violate contract provisions required by Section 4. Each such violation shall subject the violator to a fine of the greater of \$5,000 or the payment price received by him as a result of such violation. The Attorney General is authorized to file and prosecute a complaint in the circuit court of any county in which the contract was in whole or in part executed or performed.

(Source: P.A. 83-1030.)

(30 ILCS 565/6) (from Ch. 48, par. 1806)

Sec. 6. This Act shall apply only to contracts and subcontracts entered into after the effective date of this Act, and shall not limit the use or supply of steel products purchased or leased prior to the effective date of this Act.

(Source: P.A. 83-1030.)

(30 ILCS 565/7) (from Ch. 48, par. 1807)

Sec. 7. Nothing in this Act is intended to contravene any existing treaty, law, agreement or regulation of the United States. Contracts entered into in accordance with an existing treaty, law, agreement or regulation of the United States shall not be in violation of this Act to the extent of such accordance.

(Source: P.A. 83-1030.)

RESOLUTION NO. R-08-01

A RESOLUTION DEFINING RESPONSIBLE BIDDER

WHEREAS, in many instances and circumstances the City is required to let contracts to the lowest, responsive, responsible bidder; and

WHEREAS, the City has not heretofore defined the term "responsible bidder";

BE IT RESOLVED, by the Mayor and City Council of the City of Morris for all projects over \$25,000.00 as follows:

Section 1: That the term "responsible bidder" for construction contracts means a bidder who meets all of the following applicable criteria, and submits evidence of such compliance:

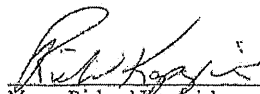
- (1) All applicable laws pre-requisite to doing business in Illinois,
- (2) Evidence of compliance with
 - (a) federal employer tax identification number or social security number (for individuals)
 - (b) provision of Section 2000(e) of Chapter 21, Title 42 of the United States Code and Federal Executive Order No. 11246 as amended by Executive Order No. 11375 (known as the Equal Opportunity Employer provisions)
- (3) Certificates of insurance indicating the following coverage: general liability, worker's compensation, completed operations, automobile, hazardous occupation, product liability and professional liability
- (4) Compliance with all provisions of the Illinois Prevailing Wage Act, including wages, medical and hospitalization insurance and retirement for those trades as covered in the "Act"
- (5) Participation in apprenticeship and training programs approved and registered with the United States Department of Labor's Bureau of Apprenticeship and Training for each of the trades of work contemplated under the awarded contract

BE IT FURTHER RESOLVED, that nothing herein shall be construed to affect any suit or proceeding now pending in any court or any rights accrued or liability incurred or cause or causes of action accrued or existing under any prior Resolution or Ordinance. Nor shall any right or remedy of any character be lost, impaired, or affected by this Resolution.

BE IT FURTHER ORDAINED, that this Resolution shall be in full force and effect immediately upon its adoption.

Dated this 19th day of February, 2008 at Morris, Illinois.

Ayes:	<u>7</u>
Nays:	<u>0</u>
Abstain:	<u>0</u>
Absent:	<u>0</u>


Mayor Richard Kopczick


City Clerk John D. Enger

SUPPLEMENTARY CONDITIONS - INSURANCE

The **minimum** limits of the Contractor's Liability Insurance as indicated in the Standard General Conditions, Article 6.03 – Contractor's Insurance, shall be as follows:

- A. Claims under workers' compensation, disability benefits, and other similar employee benefit acts, the limits should be the Statutory Limits.
- B. Claims for damages because of bodily injury, occupational sickness or disease, or death of Contractor's employees, the **minimum** limits should be \$1,000,000.
- C. Claims for damages because of bodily injury, occupational sickness or disease, or death of any person other than Contractor's employees, the **minimum** limits should be \$1,000,000.
- D. Claims for damages insured by reasonably available personal injury liability coverage which are sustained by any person as a result of an offense directly or indirectly related to the employment of such person by the Contractor or by any other person for any other reason, the **minimum** limits should be \$1,000,000.
- E. Claims for damages, other than to the Work itself, because of injury to or destruction of tangible property wherever located, including loss of use resulting therefrom, the **minimum** limits should be \$1,000,000.
- F. Claims for damages because of bodily injury or death of any person or property damage arising out of the ownership, maintenance or use of any motor vehicle, the **minimum** limits should be \$1,000,000.

In addition to the above coverages, the Contractor shall carry an umbrella/Excess Liability policy in the amount of **not less than** \$2,000,000 which should include Employer's Liability Coverage.

The Contractor, as indicated in Article 6.03.C shall extend insurance to the Owner and the Engineer for the liability coverages listed above, by endorsement as **additional primary and non contributory insureds**. A copy of the endorsement which adds the additional insureds to the policy shall also be provided as well as any **Waivers of Subrogation** endorsements for the General Liability and Worker's Compensation policies.

Regarding Commercial General Liability Insurance, Products/Completed Operations Coverage shall be maintained and evidence of continuation provided to the Owner and each other additional insured for **three years** after final payment.

BUILDER'S RISK INSURANCE

- ☒ The Contractor **will not** be required to provide Builder's Risk Insurance for this project. (Standard unless otherwise noted below.)
- ☐ ~~Per Article 6.04.A of the General Conditions, the **Contractor** shall purchase and maintain Builder's Risk Insurance upon the Work on a completed value basis, in the amount of the full insurable replacement cost thereof. Any deductible will be the responsibility of the Contractor.~~

All insurance shall provide a minimum of 30 days advance written notice of insurer's intent to cancel or otherwise terminate policy coverage.

The Contractor shall file with all "Additional Insured" named above, and their affiliates on or before the effective date of this agreement a valid Certificate of Insurance for all required insurance policies. Each certificate shall identify said "Additional Insured" and their affiliates as additional insured as required and state that said "Additional Insured" and their affiliates will receive a minimum of 30 days advance written notice of insurer's intent to cancel or otherwise terminate policy coverage. Fifteen (15) days prior to expiration of such insurance, the Contractor shall supply updated Certificates of Insurance that clearly evidence the continuation of all coverage in the same manner, limits of protection, and scope of coverage, as was provided by the original Certificates.

The Contractor hereby waives all rights of subrogation against said "Additional Insured" and their affiliates for damages to the extent covered by insurance. All insurance policies of the Contractor shall allow that any release from liability of or waiver of claim for recovery from any party entered into in writing by the Contractor prior to any loss or damage shall not affect the validity of said policy(ies) or the right of the insured or insureds to recover thereunder.

CITY OF MORRIS
EAST WWTP EXPANSION 2025

SEPTEMBER, 2025

TECHNICAL SPECIFICATIONS

PREPARED BY
CHAMLIN & ASSOCIATES, INC.
4152 PROGRESS BOULEVARD
PERU, IL 61354

SECTION 01 1000 - SUMMARY

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Contract description.
 - 2. Integration.
 - 3. Contractor's use of Site.
 - 4. Specification conventions.

1.2 CONTRACT DESCRIPTION

- A. The work of this project includes four basic elements:
 - 1. Installation of new concrete UV channel with equipment, an alum chemical addition system in a new building enclosure, new return sludge pumps, and a drainage/dewatering pump system, with all associated electrical, piping, I&C, and site work as necessary.
- B. No pay applications will be paid until after May 1, 2026. Any expenses incurred by the Contractor for equipment ordered before this date may be included as "equipment stored" in any pay application submitted on or before April, 2026, along with normal payment for work completed to date at that time, but such pay application(s) will only be paid no earlier than May 1, 2026.
- C. In all cases, the Contractor is responsible for assuring that no items of equipment, piping, or wiring have been omitted, which would prevent the complete system from operating satisfactorily.
- D. Equipment manufacturers shall supply the services of qualified technical personnel during the startup, or for preliminary adjustments to the equipment. Startup shall be considered as being complete only when all equipment is operating to the satisfaction of the Engineer and the Owner.
- E. Services of the technician shall also be supplied as needed after startup in the event of equipment failure or malfunction during warranty period, and also for instruction of operating personnel in the use of the equipment.
- F. It shall be the Contractor's responsibility to coordinate the efforts of all technical personnel involved in the startup of a particular system.
- G. Time Restrictions for Performing Work: Work shall be substantially complete by April 30, 2027 and ready for Final Payment by May 28, 2027.
- H. Perform Work of the Contract in accordance with the General Conditions and Special Conditions.

1.3 INTEGRATION

- A. The Contractor shall coordinate with Micro-Comm to provide, install or direct the work for the instrumentation and control systems, and associated equipment as necessary to integrate all specified components of this work into a fully operational facility.

1.4 CONTRACTOR'S USE OF SITE

- A. Limit use of site to allow:
 - 1. Work by Others and Work by Owner.
 - 2. Use of site by the public and Owner as necessary.

1.5 WORK SEQUENCE

- A. The Contractor shall develop a construction work sequence. The work sequence shall be submitted for discussion and approval.

1.6 SPECIFICATION CONVENTIONS

- A. These Specifications are written in imperative mood and streamlined form. This imperative language is directed to Contractor unless specifically noted otherwise. The words "shall be" are included by inference where a colon (:) is used within sentences or phrases.
- B. In addition to these Specifications, the following documents shall be considered standard specifications for this project:
 - 1. Illinois Department of Transportation's "Standard Specifications for Road and Bridge Construction," adopted April, 2016, and "Supplemental Specifications and Recurring Special Provisions," current edition. These two (2) documents shall herein be referred to as the "Roadway Specifications."
 - 2. Illinois Society of Professional Engineers' "Standard Specifications for Water and Sewer Construction in Illinois," 8th Edition, adopted in 2020. This document shall herein be referred to as the "Water and Sewer Specifications."
- C. In case of conflict between the above-referenced "Standard Specifications" and the Drawings and Specifications for this project, the Drawings and Specifications for this project will govern.

PART 2 PRODUCTS - Not Used

PART 3 EXECUTION - Not Used

END OF SECTION

SECTION 01 5000 - TEMPORARY FACILITIES AND CONTROLS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Temporary Utilities:
 - 1. Temporary electricity.
 - 2. Temporary lighting for construction purposes.
 - 3. Temporary heating.
 - 4. Temporary cooling.
 - 5. Temporary ventilation.
 - 6. Communication services.
 - 7. Temporary water service.
 - 8. Temporary sanitary facilities.
- B. Construction Facilities:
 - 1. Field offices and sheds.
 - 2. Vehicular access.
 - 3. Parking.
 - 4. Progress cleaning and waste removal.
 - 5. Project identification.
 - 6. Traffic regulation.
 - 7. Fire-prevention facilities.
- C. Temporary Controls:
 - 1. Barriers.
 - 2. Enclosures and fencing.
 - 3. Security.
 - 4. Dust control.
 - 5. Erosion and sediment control.
 - 6. Noise control.
 - 7. Pollution control.
 - 8. Pest and rodent control.
- D. Removal of utilities, facilities, and controls.

1.2 TEMPORARY ELECTRICITY

- A. Provide and pay for power service required from utility source as needed for construction operation.
- B. Provide or pay for all necessary feeders, wiring, or cords required to operate the required equipment.
- C. Provide, maintain, and pay for electrical service to optional field office at time of project mobilization.

1.3 TEMPORARY LIGHTING FOR CONSTRUCTION PURPOSES

- A. Provide and maintain lighting for construction operations.
- B. Provide and maintain 1 watt/sq ft lighting to exterior staging and storage areas and portions of site required after dark for security purposes.
- C. Maintain lighting and provide routine repairs.

1.4 TEMPORARY HEATING

- A. Provide and pay for heating devices and heat as needed to maintain specified conditions for construction operations.
- B. Before operating permanent equipment for temporary heating purposes, verify installation is approved for operation, equipment is lubricated, and filters are in place. Provide and pay for operation, maintenance, and regular replacement of filters and worn or consumed parts. Replace filters at Substantial Completion.
- C. Maintain minimum ambient temperature of 50 degrees F in areas where construction is in progress unless indicated otherwise in individual product Sections.
- D. Provide, maintain and pay for heating of optional field office at time of project mobilization.

1.5 TEMPORARY COOLING

- A. Provide and pay for cooling devices and cooling as needed to maintain specified conditions for construction operations.
- B. Before operating permanent equipment for temporary cooling purposes, verify installation is approved for operation, equipment is lubricated, and filters are in place. Provide and pay for operation, maintenance, and regular replacement of filters and worn or consumed parts. Replace filters at Substantial Completion.
- C. Maintain maximum ambient temperature of 80 degrees F in areas where construction is in progress unless indicated otherwise in individual product Sections.
- D. Provide, maintain, and pay for cooling of optional field office at time of project mobilization.

1.6 TEMPORARY VENTILATION

- A. Ventilate enclosed areas to achieve curing of materials, to dissipate humidity, and to prevent accumulation of dust, fumes, vapors, or gases.
- B. Provide, maintain, and pay for ventilation of optional field office at time of project mobilization.

1.7 COMMUNICATION SERVICES

- A. Telephone Service: Provide, maintain, and pay for telephone service to optional field office at time of Project mobilization and until completion of Work.
- B. Facsimile Service: Provide, maintain, and pay for facsimile service to optional field office at time of Project mobilization and until completion of Work.
- C. Internet Service: Provide, maintain, and pay for broadband Internet service to optional field office at time of Project mobilization. Provide desktop computer with Microsoft operating system and appropriate office function software, modem, and printer.

1.8 TEMPORARY WATER SERVICE

- A. Provide and pay for suitable quality water service as needed to maintain specified conditions for construction operations.

1.9 TEMPORARY SANITARY FACILITIES

- A. Provide, pay for, and maintain required facilities and enclosures. Provide facilities at time of Project mobilization.

1.10 FIELD OFFICES AND SHEDS

- A. The Contractor shall provide a field office as required for his Work. The use of a field office and any associated utility costs are the Contractor's option and are not required as a part of the Contract, and any costs associated with these items shall be considered incidental to the Contract.
- B. Storage Areas and Sheds: Size to storage requirements for products of individual Sections, allowing for access and orderly provision for maintenance and for inspection of products to requirements of Section 01 6000 – Product Requirements. The Contractor shall provide storage areas and sheds as required for his Work. The use of a storage area and sheds and any associated utility costs are the Contractor's option and are not required as a part of the Contract, and any costs associated with these items shall be considered incidental to the Contract.
- C. Preparation: Fill and grade site for temporary structures sloped for drainage away from structures.
- D. Removal: At completion of Work remove buildings, foundations utility services, and debris. Restore areas.

1.11 VEHICULAR ACCESS

- A. Use existing on-site roads for construction traffic.
- B. If necessary for timely, efficient progress of the Work, construct temporary all-weather access roads to serve construction area, of width and load-bearing capacity to accommodate unimpeded traffic for construction purposes, Owner's access, and emergency vehicles.

- C. Construct temporary bridges and culverts to span low areas and allow unimpeded drainage.
- D. Provide unimpeded access for emergency vehicles. Maintain 20 foot wide driveways with turning space between and around combustible materials.
- E. Provide means of removing mud from vehicle wheels before entering streets.
- F. Temporary vehicular access shall be incidental to the Contract.

1.12 PARKING

- A. Provide temporary gravel surface parking areas to accommodate construction personnel.
- B. Locate as approved by the Engineer and Owner.
- C. If Site space is not adequate, provide additional off-Site parking.
- D. Do not allow heavy vehicles or construction equipment in parking areas.
- E. Designate one parking space each for Owner and Engineer.
- F. Permanent Pavements and Parking Facilities:
 - 1. Bases for permanent roads and parking areas may be used for construction traffic.
 - 2. Avoid traffic loading beyond paving design capacity. Tracked vehicles not allowed.
 - 3. Use of approved permanent parking structures is permitted.
- G. Maintenance:
 - 1. Maintain traffic and parking areas in sound condition free of excavated material, construction equipment, products, mud, snow, ice, and the like.
 - 2. Maintain existing paved areas used for construction; promptly repair breaks, potholes, low areas, standing water, and other deficiencies, to maintain paving and drainage in original condition.
- H. Removal, Repair:
 - 1. Remove temporary materials and construction at Substantial Completion.
 - 2. Repair existing permanent facilities damaged by use, to original condition.
- I. Mud from Site Vehicles: Provide means of removing mud from vehicle wheels before entering streets.
- J. Temporary parking as described shall be incidental to the Contract.

1.13 PROGRESS CLEANING AND WASTE REMOVAL

- A. Maintain areas free of waste materials, debris, and rubbish. Maintain Site in clean and orderly condition.
- B. Remove debris and rubbish from pipe chases, plenums, attics, crawl spaces, and other closed or remote spaces, before enclosing spaces.

- C. Broom and vacuum clean interior areas before starting surface finishing, and continue cleaning to eliminate dust.
- D. Collect and remove waste materials, debris, and rubbish from Site as required and dispose of off-Site.

1.14 PROJECT IDENTIFICATION

- A. None required.

1.15 TRAFFIC REGULATION

- A. Haul Routes:
 - 1. Consult with authorities having jurisdiction and establish public thoroughfares to be used for haul routes and Site access.
- B. Traffic Signs and Signals:
 - 1. Provide signs at approaches to Site and on Site, at crossroads, detours, parking areas, and elsewhere as needed to direct construction and affected public traffic.
 - 2. Relocate signs and signals as Work progresses, to maintain effective traffic control.
- C. Removal:
 - 1. Remove equipment and signs when no longer required.
 - 2. Repair damage caused by installation.
 - 3. Remove post settings to depth of 2 feet.

1.16 FIRE-PREVENTION FACILITIES

- A. Prohibit smoking within buildings under construction and demolition. Designate area on Site where smoking is permitted. Provide approved ashtrays in designated smoking areas.
- B. Establish fire watch for cutting, welding, and other hazardous operations capable of starting fires. Maintain fire watch before, during, and after hazardous operations until threat of fire does not exist.
- C. Portable Fire Extinguishers: NFPA 10; 10-pound capacity, 4A-60B: C UL rating.
 - 1. Provide one fire extinguisher at each stairway on each floor of buildings under construction and demolition.
 - 2. Provide minimum of one fire extinguisher in every construction trailer and storage shed.
 - 3. Provide minimum of one fire extinguisher on roof during roofing operations using heat-producing equipment.

1.17 BARRIERS

- A. Provide barriers to prevent unauthorized entry to construction areas and to protect existing facilities and adjacent properties from damage from construction operations and demolition. Owner's access to site shall be maintained at all times.
- B. Protect non-owned vehicular traffic, stored materials, Site, and structures from damage.

1.18 ENCLOSURES AND FENCING

- A. Construction: Commercial-grade chain-link fence.
- B. Provide 6-foot-high fence around construction Site as needed to supplement existing Site fencing; equip with vehicular and pedestrian gates with locks.
- C. Exterior Enclosures:
 - 1. Provide temporary weathertight closure of exterior openings to accommodate acceptable working conditions and protection for products, to allow for temporary heating and maintenance of required ambient temperatures identified in individual Specification Sections, and to prevent entry of unauthorized persons. Provide access doors with self-closing hardware and locks.
- D. Interior Enclosures:
- E. Security Program:
 - 1. Protect Work, existing premises and Owner's operations from theft, vandalism, and unauthorized entry.
 - 2. Restrict entrance of persons and vehicles into Project Site and existing facilities, allowing only authorized persons.
 - 3. Maintain program throughout construction period until directed by Engineer.

1.19 DUST CONTROL

- A. Execute Work by methods that minimize raising dust from construction operations.
- B. Provide positive means to prevent airborne dust from dispersing into atmosphere.

1.20 EROSION AND SEDIMENT CONTROL

- A. Grade Site to drain. Maintain excavations free of water. Provide, operate, and maintain necessary pumping equipment.
- B. Protect Site from puddles or running water. Provide water barriers and/or silt fence as required to protect Site from soil erosion.
- C. Plan and execute construction by methods to control surface drainage from cuts and fills from borrow and waste disposal areas. Prevent erosion and sedimentation.
- D. Minimize surface area of bare soil exposed at one time.
- E. Provide temporary measures including berms, dikes, drains, and other devices to prevent water flow.
- F. Construct fill and waste areas by selective placement to avoid erosive surface silts or clays.
- G. Periodically inspect earthwork to detect evidence of erosion and sedimentation; promptly apply corrective measures.

H. Comply with sediment and erosion control plan indicated on Drawings.

1.21 NOISE CONTROL

A. Provide methods, means, and facilities to minimize noise produced by construction operations.

1.22 POLLUTION CONTROL

A. Provide methods, means, and facilities to prevent contamination of soil, water, and atmosphere from discharge of noxious, toxic substances and pollutants produced by construction operations.

B. Comply with pollution and environmental control requirements of the Illinois Environmental Protection Agency.

1.23 REMOVAL OF UTILITIES, FACILITIES, AND CONTROLS

A. Remove temporary utilities, equipment, facilities, and materials before Final Application for Payment inspection.

B. Remove underground installations to minimum depth of 2 feet. Grade Site as indicated on Drawings.

C. Clean and repair damage caused by installation or use of temporary Work.

D. Restore existing and permanent facilities used during construction to original condition. Restore permanent facilities used during construction to specified condition.

1.24 YARD MAINTENANCE

A. During the Contract times, the Contractor shall provide regular yard maintenance to prevent excessive weed growth.

B. At least once per month during the growing season, the Contractor shall mow the entire area within the work area.

C. Once the final lawns have been installed and until the date of Final Completion, the Contractor shall provide at least weekly mowing during the growing season.

PART 2 PRODUCTS - Not Used

PART 3 EXECUTION - Not Used

END OF SECTION

SECTION 01 6000 - PRODUCT REQUIREMENTS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Products.
- B. Product delivery requirements.
- C. Product storage and handling requirements.
- D. Product options.

1.2 PRODUCTS

- A. At minimum, comply with specified requirements and reference standards.
- B. Specified products define standard of quality, type, function, dimension, appearance, and performance required.
- C. Furnish products of qualified manufacturers that are suitable for intended use. Furnish products of each type by single manufacturer unless specified otherwise. Confirm that manufacturer's production capacity can provide sufficient product, on time, to meet Project requirements.
- D. Domestic Products: Except where specified otherwise, domestic products are preferred and interpreted to mean products mined, manufactured, fabricated, or produced in United States or its territories.

1.3 PRODUCT DELIVERY REQUIREMENTS

- A. Transport and handle products according to manufacturer's instructions.
- B. Promptly inspect shipments to ensure products comply with requirements, quantities are correct, and products are undamaged.
- C. Provide equipment and personnel to handle products; use methods to prevent soiling, disfigurement, or damage.

1.4 PRODUCT STORAGE AND HANDLING REQUIREMENTS

- A. Store and protect products according to manufacturer's instructions.
- B. Store products with seals and labels intact and legible.
- C. Store sensitive products in weathertight, climate-controlled enclosures in an environment suitable to product.
- D. For exterior storage of fabricated products, place products on sloped supports aboveground.

- E. Provide secure, insured off-Site storage and protection when Site does not permit on-Site storage or protection.
- F. Cover products subject to deterioration with impervious sheet covering. Provide ventilation to prevent condensation and degradation of products.
- G. Store loose granular materials on solid flat surfaces in well-drained area. Prevent mixing with foreign matter.
- H. Provide equipment and personnel to store products; use methods to prevent soiling, disfigurement, or damage.
- I. Arrange storage of products to permit access for inspection. Periodically inspect to verify products are undamaged and are maintained in acceptable condition.

1.5 PRODUCT OPTIONS

- A. Products Specified by Reference Standards or by Description Only: Products complying with specified reference standards or description.
- B. Products Specified by Naming One or More Manufacturers: Products of one of manufacturers named and complying with Specifications; no options or substitutions allowed.
- C. Products Specified by Naming One or More Manufacturers with Provision for Substitutions: Submit Request for Substitution for any manufacturer not named, according to Section 01 2500 - Substitution Procedures.

PART 2 PRODUCTS - Not Used

PART 3 EXECUTION - Not Used

END OF SECTION

SECTION 01 7000 - EXECUTION AND CLOSEOUT REQUIREMENTS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Closeout procedures.
- B. Final cleaning.
- C. Starting of systems.
- D. Demonstration and instructions.
- E. Testing, adjusting, and balancing.
- F. Protecting installed construction.
- G. Project record documents.
- H. Operation and maintenance data.
- I. Manual for materials and finishes.
- J. Manual for equipment and systems.
- K. Spare parts and maintenance products.
- L. Product warranties and product bonds.
- M. Maintenance service.

1.2 CLOSEOUT PROCEDURES

- A. Submit written certification that Contract Documents have been reviewed, Work has been inspected, and that Work is complete in accordance with Contract Documents and ready for Engineer's review.
- B. Provide submittals to Engineer required by authorities having jurisdiction.
- C. Submit final Application for Payment identifying total adjusted Contract Sum, previous payments, and sum remaining due.

1.3 FINAL CLEANING

- A. Execute final cleaning prior to final project assessment.
- B. Clean debris from the site.

- C. Clean site; sweep paved areas, rake clean landscaped surfaces.
- D. Remove waste and surplus materials, rubbish, and construction facilities from site.

1.4 STARTING OF SYSTEMS

- A. Coordinate schedule for start-up of various equipment and systems.
- B. Notify Engineer and Owner seven days prior to start-up of each item.
- C. Verify each piece of equipment or system has been checked for proper lubrication, drive rotation, belt tension, control sequence, and for conditions which may cause damage.
- D. Verify tests, meter readings, and specified electrical characteristics agree with those required by equipment or system manufacturer.
- E. Verify wiring and support components for equipment are complete and tested.
- F. Execute start-up under supervision of applicable manufacturer's representative in accordance with manufacturers' instructions.
- G. When specified in individual specification Sections, require manufacturer to provide authorized representative to be present at site to inspect, check, and approve equipment or system installation prior to start-up, and to supervise placing equipment or system in operation.
- H. Submit a written report in accordance with Section 01 3300 - Submittal Procedures that equipment or system has been properly installed and is functioning correctly.

1.5 DEMONSTRATION AND INSTRUCTIONS

- A. Demonstrate operation and maintenance of products to Owner's personnel two weeks prior to date of Substantial Completion.
- B. Demonstrate Project equipment instructed by qualified manufacturer's representative who is knowledgeable about the Project.
- C. For equipment or systems requiring seasonal operation, perform demonstration for other season within six months.
- D. Utilize operation and maintenance manuals as basis for instruction. Review contents of manual with Owner's personnel in detail to explain all aspects of operation and maintenance.
- E. Demonstrate start-up, operation, control, adjustment, troubleshooting, servicing, maintenance, and shutdown of each item of equipment at agreed time, at equipment location.
- F. Prepare and insert additional data in operations and maintenance manuals when need for additional data becomes apparent during instruction.

- G. Required instruction time for each item of equipment and system is specified in individual sections.

1.6 TESTING, ADJUSTING AND BALANCING

- A. The Contractor shall provide and pay for the required independent firm or manufacturer's representatives required to perform testing, adjusting, and balancing specified in individual product Sections.
- B. Reports will be submitted by independent firm/manufacturer's representative to Engineer indicating observations and results of tests and indicating compliance or non-compliance with requirements of Contract Documents.

1.7 PROTECTING INSTALLED CONSTRUCTION

- A. Protect installed Work and provide special protection where specified in individual specification sections.
- B. Provide temporary and removable protection for installed products. Control activity in immediate work area to prevent damage.
- C. Prohibit traffic from landscaped areas.

1.8 PROJECT RECORD DOCUMENTS

- A. Maintain on site one set of the following record documents which the originals will be turned over to the Owner; record actual revisions to the Work:
 - 1. Drawings.
 - 2. Specifications.
 - 3. Addenda.
 - 4. Change Orders and other modifications to the Contract.
 - 5. Reviewed Shop Drawings, Product Data, and Samples.
 - 6. Manufacturer's instruction for assembly, installation, and adjusting.
- B. Ensure entries are complete and accurate, enabling future reference by Owner.
- C. Store record documents separate from documents used for construction.
- D. Record information concurrent with construction progress, not less than weekly.
- E. Specifications: Legibly mark and record at each product section description of actual products installed, including the following:
 - 1. Manufacturer's name and product model and number.
 - 2. Product substitutions or alternates utilized.
 - 3. Changes made by Addenda and modifications.
- F. Record Drawings and Shop Drawings: Legibly mark each item to record actual construction including:
 - 1. Measured depths of foundations in relation to finish first floor datum.

2. Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
 3. Measured locations of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of the Work.
 4. Field changes of dimension and detail.
 5. Details not on original Contract drawings.
- G. Submit documents to Engineer with claim for final Application for Payment.

1.9 OPERATION AND MAINTENANCE DATA

- A. Submit data bound in 8-1/2 x 11 inch (A4) text pages, three D side ring capacity expansion binders with durable plastic covers.
- B. Prepare binder cover with printed title "OPERATION AND MAINTENANCE INSTRUCTIONS", title of project, and subject matter of binder when multiple binders are required.
- C. Internally subdivide binder contents with permanent page dividers, logically organized as described below; with tab titling clearly printed under reinforced laminated plastic tabs.
- D. Drawings: Provide with reinforced punched binder tab. Bind in with text; fold larger drawings to size of text pages.
- E. Contents: Prepare Table of Contents for each volume, with each product or system description identified, typed on white paper, in three parts as follows:
 1. Part 1: Directory, listing names, addresses, and telephone numbers of Engineer, Contractor, Subcontractors, and major equipment suppliers.
 2. Part 2: Operation and maintenance instructions, arranged by system process flow and subdivided by specification section. For each category, identify names, addresses, and telephone numbers of Subcontractors and suppliers. Identify the following:
 - a. Significant design criteria.
 - b. List of equipment.
 - c. Parts list for each component.
 - d. Operating instructions.
 - e. Maintenance instructions for equipment and systems.
 - f. Maintenance instructions for special finishes, including recommended cleaning methods and materials, and special precautions identifying detrimental agents.
 3. Part 3: Project documents and certificates, including the following:
 - a. Shop drawings and product data.
 - b. Air and water balance reports.
 - c. Certificates.
 - d. Photocopies of warranties and bonds.
- F. For equipment, or component parts of equipment put into service during construction and operated by Owner, submit documents within ten days after acceptance.

- G. Submit one copy of completed volumes 15 days prior to final inspection. Draft copy to be reviewed and returned after final inspection, with Engineer comments. Revise content of document sets as required prior to final submission.
- H. Submit three sets of revised final volumes in final form within 10 days after final inspection.

1.10 MANUAL FOR MATERIALS AND FINISHES

- A. Submit two copies of preliminary draft or proposed formats and outlines of contents before start of Work. Engineer will review draft and return one copy with comments.
- B. For equipment, or component parts of equipment put into service during construction and operated by Owner, submit documents within ten days after acceptance.
- C. Submit one copy of completed volumes 15 days prior to final inspection. Draft copy to be reviewed and returned after final inspection, with Engineer comments. Revise content of document sets as required prior to final submission.
- D. Submit three sets of revised final volumes in final form within 10 days after final inspection.
- E. Building Products, Applied Materials, and Finishes: Include product data, with catalog number, size, composition, and color and texture designations. Include information for re-ordering custom manufactured products.
- F. Instructions for Care and Maintenance: Include manufacturer's recommendations for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.
- G. Moisture Protection and Weather Exposed Products: Include product data listing applicable reference standards, chemical composition, and details of installation. Include recommendations for inspections, maintenance, and repair.
- H. Additional Requirements: As specified in individual product specification sections.
- I. Include listing in Table of Contents for design data, with tabbed fly sheet and space for insertion of data.

1.11 MANUAL FOR EQUIPMENT AND SYSTEMS

- A. Submit two copies of preliminary draft or proposed formats and outlines of contents before start of Work. Engineer will review draft and return one copy with comments.
- B. For equipment, or component parts of equipment put into service during construction and operated by Owner, submit documents within ten days after acceptance.
- C. Submit one copy of completed volumes 15 days prior to final inspection. Draft copy to be reviewed and returned after final inspection, with Engineer comments. Revise content of document sets as required prior to final submission.

- D. Submit three sets of revised final volumes in final form within 10 days after final inspection.
- E. Each Item of Equipment and Each System: Include description of unit or system, and component parts. Identify function, normal operating characteristics, and limiting conditions. Include performance curves, with engineering data and tests, and complete nomenclature and model number of replaceable parts.
- F. Panelboard Circuit Directories: Provide electrical service characteristics, controls, and communications; typed.
- G. Include color coded wiring diagrams as installed.
- H. Operating Procedures: Include start-up, break-in, and routine normal operating instructions and sequences. Include regulation, control, stopping, shut-down, and emergency instructions. Include summer, winter, and special operating instructions.
- I. Maintenance Requirements: Include routine procedures and guide for preventative maintenance and troubleshooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.
- J. Include servicing and lubrication schedule, and list of lubricants required.
- K. Include manufacturer's printed operation and maintenance instructions.
- L. Include sequence of operation by controls manufacturer.
- M. Include original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.
- N. Include control diagrams by controls manufacturer as installed.
- O. Include Contractor's coordination drawings, with color coded piping diagrams as installed.
- P. Include charts of valve tag numbers, with location and function of each valve, keyed to flow and control diagrams.
- Q. Include list of original manufacturer's spare parts, current prices, and recommended quantities to be maintained in storage.
- R. Include test and balancing reports as specified in Section 01 4000 - Quality Requirements.
- S. Additional Requirements: As specified in individual product specification sections.
- T. Include listing in Table of Contents for design data, with tabbed dividers and space for insertion of data.

1.12 SPARE PARTS AND MAINTENANCE PRODUCTS

- A. Furnish spare parts, maintenance, and extra products in quantities specified in individual specification sections.
- B. Deliver to Project site and place in location as directed by Owner; obtain receipt prior to final payment.

1.13 PRODUCT WARRANTIES AND PRODUCT BONDS

- A. Obtain warranties and bonds executed in duplicate by responsible subcontractors, suppliers, and manufacturers, within ten days after completion of applicable item of work.
- B. Execute and assemble transferable warranty documents and bonds from subcontractors, suppliers, and manufacturers.
- C. Verify documents are in proper form, contain full information, and are notarized.
- D. Co-execute submittals when required.
- E. Include Table of Contents and assemble in three D side ring binder with durable plastic cover.
- F. Submit prior to final Application for Payment.
- G. Time Of Submittals:
 - 1. For equipment or component parts of equipment put into service during construction with Owner's permission, submit documents within ten days after acceptance.
 - 2. Make other submittals within ten days after Date of Substantial Completion, prior to final Application for Payment.
 - 3. For items of Work for which acceptance is delayed beyond Date of Substantial Completion, submit within ten days after acceptance, listing date of acceptance as beginning of warranty or bond period.

1.14 MAINTENANCE SERVICE

- A. Furnish service and maintenance of components indicated in specification sections during warranty period.
- B. Examine system components at frequency consistent with reliable operation. Clean, adjust, and lubricate as required.
- C. Include systematic examination, adjustment, and lubrication of components. Repair or replace parts whenever required. Use parts produced by manufacturer of original component.
- D. Do not assign or transfer maintenance service to agent or Subcontractor without prior written consent of Owner.

PART 2 PRODUCTS - Not Used

PART 3 EXECUTION - Not Used

END OF SECTION

SECTION 03 1000 - CONCRETE FORMING AND ACCESSORIES

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Formwork for cast-in-place concrete.
 - 2. Shoring, bracing, and anchorage.
 - 3. Form accessories.
 - 4. Form stripping.

1.2 DESIGN REQUIREMENTS

- A. Design, engineer and construct formwork, shoring and bracing in accordance with ACI 347 to conform to design and applicable code requirements to achieve concrete shape, line and dimension as indicated on Drawings.

1.3 PERFORMANCE REQUIREMENTS

- A. Vapor Retarder Permeance: Maximum 1 perm when tested in accordance with ASTM E96, Procedure A.

1.4 QUALITY ASSURANCE

- A. Perform Work in accordance with ACI 347, 301, 318, 350, and International Building Code.
- B. Perform Work in accordance with these Specifications and the Roadway Specifications.

1.5 DELIVERY, STORAGE AND HANDLING

- A. Section 01 6000 – Product Requirements: Products storage and handling requirements.
- B. Deliver forms and installation instructions in manufacturer's packaging.
- C. Store off ground in ventilated and protected manner to prevent deterioration from moisture.

1.6 COORDINATION

- A. Section 01 3000 – Administrative Requirements: Coordination and project conditions.
- B. Coordinate this Section with other sections of work, requiring attachment of components to formwork.

PART 2 PRODUCTS

2.1 WOOD FORM MATERIALS

A. Lumber Forms:

1. Application: Use for edge forms and unexposed finish concrete.
2. Boards: 6 inches or 8 inches in width, shiplapped or tongue and groove, "Standard" Grade Douglass Fir, conforming to WCLIB Standard Grading Rules for West Coast Lumber. Surface boards on four sides.

B. Plywood Forms:

1. Application: Use for exposed finish concrete.
2. Forms: Conform to PS 1; full size 4 x 8 feet panels; each panel labeled with grade trademark of APA/EWA.
3. Plywood for Surfaces to Receive Membrane Waterproofing: Minimum of 5/8 inch thick; APA/EWA "B-B Plyform Structural I Exterior" grade.
4. Plywood where "Smooth Finish" is required, as indicated on Drawings: APA/EWA "HD Overlay Plyform Structural I Exterior" grade, minimum of 3/4 inch thick.

2.2 PREFABRICATED FORMS

A. Manufacturers:

1. Aluma-Systems, Inc., Burke Co.
2. Economy Forms Corp.
3. Molded Fiber Glass Concrete Forms Co.
4. Perma Tubes
5. Sonoco Products Co.
6. Symons Corp.
7. Western Forms, Inc.
8. Substitutions: Section 01 6000 – Product Requirements

B. Preformed Steel Forms: Minimum 16 gauge matched, tight fitting, stiffened to support weight of concrete without deflection detrimental to tolerances and appearance of finished surfaces.

C. Glass Fiber Fabric Reinforced Plastic Forms: Matched, tight fitting, stiffened to support weight of concrete without deflection detrimental to tolerances and appearance of finished concrete surfaces.

D. Steel Forms: Sheet steel, suitably reinforced, and designed for particular use indicated on Drawings.

E. Framing, Studding and Bracing: Stud or No. 3 structural light framing grade.

2.3 FORMWORK ACCESSORIES

A. Form Ties:

1. Removable type, galvanized metal, cone type, with waterproofing washer, free of defects, capable of leaving holes larger than 1 inch in concrete surface.

- B. Spreaders: Standard, non-corrosive metal form clamp assembly, of type acting as spreaders and leaving no metal within 1 inch of concrete face. Wire ties, wood spreaders or through bolts are not permitted.
- C. Form Anchors and Hangers:
 - 1. Do not use anchors and hangers on exposed concrete leaving exposed metal at concrete surface.
 - 2. Symmetrically arrange hangers supporting forms from structural steel members to minimize twisting or rotation of member.
 - 3. Penetration of structural steel members is not permitted.
- D. Form Release Agent: Colorless mineral oil that will not stain concrete, or absorb moisture, or impair natural bonding or color characteristics of coating intended for use on concrete.
- E. Dovetail Anchor Slot: Galvanized steel, 22 gauge thick, foam filled, anchors for securing to concrete formwork.
 - 1. Manufacturers:
 - a. Heckmann, Model 100
 - b. Hohmann & Barnard, Model DA 100
 - c. Substitutions: Section 01 6000 – Product Requirements
- F. Vapor Retarder: Where indicated on Drawings, 8 mil thick polyethylene sheet.
- G. Bituminous Joint Filler: Not allowed.
- H. Nails, Spikes, Lag Bolts, Through Bolts, Anchorages: Size, strength and character to maintain formwork in place while placing concrete.
- I. Water Stops: Polyvinyl chloride, minimum 1,750 psi tensile strength, minimum 50° F to plus 175° F working temperature range, width as indicated on Drawings, maximum possible lengths, ribbed profile, preformed corner sections, heat welded jointing.
- J. Corners: Fillet or chamfer, rigid plastic or wood strip type; 3/4 x 3/4 inch size minimum; maximum possible lengths.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01 3000 – Administrative Requirements: Coordination and project conditions.
- B. Verify lines, levels, and centers before proceeding with formwork. Verify dimensions agree with Drawings.
- C. When formwork is placed after reinforcement resulting in insufficient concrete cover over reinforcement before proceeding, request instructions from Engineer.

3.2 INSTALLATION

- A. Earth Forms:
 - 1. EARTH FORMS ARE NOT PERMITTED.
- B. Formwork – General:
 - 1. Provide top form for sloped surfaces steeper than 1.5 horizontal to 1 vertical to hold shape of concrete during placement, unless it can be demonstrated that top forms can be omitted.
 - 2. Construct forms to correct shape and dimensions, mortar-tight, braced, and of sufficient strength to maintain shape and position under imposed loads from construction operations.
 - 3. Camber forms where necessary to produce level finished soffits unless otherwise shown on Drawings.
 - 4. Carefully verify horizontal and vertical positions of forms. Correct misaligned or misplaced forms before placing concrete.
 - 5. Complete wedging and bracing before placing concrete.
- C. Forms for Smooth Finish Concrete:
 - 1. Concrete surfaces exposed to view in the finished work or surfaces to receive finishes of any type (paint, textured paint, etc.) shall have a smooth form finish as defined by ACI 301. Set and maintain forms so finished concrete dimensions shall conform to the tolerances of ACI 347.
 - 2. Use steel, plywood, or lined board forms.
 - 3. Use clean and smooth plywood and form liners, uniform in size, and free from surface and edge damage capable of affecting resulting concrete finish.
 - 4. Install form lining with close-fitting square joints between separate sheets without springing into place.
 - 5. Use full size sheets of form lines and plywood wherever possible.
 - 6. Tape joints to prevent protrusions in concrete.
 - 7. Use care in forming and stripping wood forms to protect corners and edges.
 - 8. Level and continue horizontal joints.
 - 9. Keep wood forms wet until shipped.
- D. Forms for Surfaces to Receive Membrane Waterproofing: Use plywood or steel forms. After erection of forms, tape form joints to prevent protrusions in concrete.
- E. Framing, Studding and Bracing:
 - 1. Space studs at 16 inches on center maximum for boards and 12 inches on center maximum for plywood.
 - 2. Size framing, bracing, centering, and supporting members with sufficient strength to maintain shape and position under imposed loads from construction operations.
 - 3. Construct beam soffits of material minimum of 2 inches thick.
 - 4. Distribute bracing loads over base area on which bracing is erected.
 - 5. When placed on ground, protect against undermining, settlement or accidental impact.
- F. Erect formwork, shoring, and bracing to achieve design requirements, in accordance with requirements of ACI 301, ACI 318, and ACI 350.
- G. Arrange and assemble formwork to permit dismantling and stripping. Do not damage concrete during stripping. Permit removal of remaining principal shores.

- H. Obtain Engineer's approval before framing openings in structural members not indicated on Drawings.
- I. Install chamfer strips on all external corners.
- J. Install void forms in accordance with manufacturer's recommendations.

3.3 APPLICATION – FORM RELEASE AGENT

- A. Apply form release agent on formwork in accordance with manufacturer's recommendations.
- B. Apply prior to placement of reinforcing steel, anchoring devices, and embedded items.
- C. Do not apply form release agent where concrete surfaces are indicated to receive finishes that are affected by agent. Soak inside surfaces of untreated forms with clean water. Keep surfaces coated prior to placement of concrete.
- D. Reuse and Coating of Forms: Thoroughly clean forms and reapply form coating before each reuse. For exposed work, do not reuse forms with damaged faces or edges. Apply form coating to forms in accordance with manufacturer's specifications. Do not coat forms for concrete indicated to receive "scored finish". Apply form coatings before placing reinforcing steel.

3.4 INSTALLATION – INSERTS, EMBEDDED PARTS, AND OPENINGS

- A. Install formed openings for items to be embedded in or passing through concrete work.
- B. Locate and set in place items required to be cast directly into concrete.
- C. Coordinate with Work of other sections in forming and placing openings, slots, reglets, recesses, sleeves, bolts, anchors, other inserts, and components of other Work.
- D. Install accessories straight, level, and plumb. Ensure items are not disturbed during concrete placement.
- E. Install water stops continuous without displacing reinforcement. Heat seal joints watertight. Water stops shall be installed at all construction joints.
- F. Provide temporary ports or openings in formwork where required to facilitate cleaning and inspection. Locate openings at bottom of forms to allow flushing water to drain.
- G. Close temporary openings with tight fitting panels, flush with inside face of forms, and neatly fitted so joints will not be apparent in exposed concrete surfaces.
- H. Form Ties:
 - 1. Use sufficient strength and sufficient quantity to prevent spreading of forms.
 - 2. Leave inner rods in concrete where forms are stripped.
 - 3. Space form ties equidistant, symmetrical and aligned vertically and horizontally unless otherwise shown on Drawings.

- I. Arrangement: Arrange formwork to allow proper erection sequence and to permit form removal without damage to concrete.
- J. Construction Joints:
 - 1. Install surfaced pouring strip where construction joints intersect exposed surfaces to provide straight line at joints.
 - 2. Just prior to subsequent concrete placement, remove strip and tighten forms to conceal shrinkage.
 - 3. Show no overlapping of construction joints. Construct joints to present same appearance as butted plywood joints.
 - 4. Arrange joints in continuous line straight, true and sharp.
- K. Embedded items:
 - 1. Make provisions for pipes, sleeves, anchors, inserts, reglets, anchor slots, nailers, water stops, and other features.
 - 2. Do not embed wood or uncoated aluminum in concrete.
 - 3. Obtain installation and setting information for embedded items furnished under other Specification sections.
 - 4. Securely anchor embedded items in correct location and alignment prior to placing concrete.
 - 5. Verify conduits and pipes, including those made of coated aluminum, meet requirements of ACI 318 for size and location limitations.
- L. Openings for Items Passing Through Concrete:
 - 1. Frame openings in concrete where indicated on Drawings. Establish exact locations, sizes, and other conditions required for openings and attachment of work specified under other sections.
 - 2. Coordinate work to avoid cutting and patching of concrete after placement.
 - 3. Perform cutting and repairing of concrete required as result of failure to provide required openings.
- M. Screeds:
 - 1. Set screeds and establish levels for tops of concrete slabs and levels for finish on slabs.
 - 2. Slope slabs to drain where required or as shown on Drawings.
 - 3. Before depositing concrete, remove debris from space to be occupied by concrete and thoroughly wet forms. Remove freestanding water.
- N. Screed Supports:
 - 1. For concrete over waterproof membranes and vapor retarder membranes, use cradle, pad or base type screed supports which will not puncture membranes.
 - 2. Staking through membrane is not permitted.
- O. Cleanouts and Access Panels:
 - 1. Provide removable cleanout sections or access panels at bottoms of forms to permit inspection and effective cleaning of loose dirt, debris and waste material.
 - 2. Clean forms and surfaces against which concrete is to be placed. Remove chips, saw dust and other debris. Thoroughly blow out forms with compressed air just before concrete is placed.

3.5 FORM CLEANING

- A. Clean forms as erection proceeds, to remove foreign matter within forms.
- B. Clean formed cavities of debris prior to placing concrete.
- C. Flush with water or use compressed air to remove remaining foreign matter. Ensure that water and debris drain to exterior through clean-out ports.
- D. During cold weather, remove ice and snow from within forms. Do not use de-icing salts. Do not use water to clean out forms, unless formwork and concrete construction proceed within heated enclosure. Use compressed air or other means to remove foreign matter.

3.6 FORM REMOVAL

- A. Do not remove forms or bracing until concrete has gained sufficient strength to carry its own weight and imposed loads and removal has been approved by Engineer.
- B. Loose forms carefully. Do not wedge pry bars, hammers, or tools against finish concrete surfaces scheduled for exposure to view.
- C. Store removed forms in manner that surfaces to be in contact with fresh concrete will not be damaged. Discard damaged forms.
- D. Leave forms in place for minimum number of days as specified in ACI 347. Forms and shoring for elevated beams and floor slabs shall remain in place until the specified concrete compressive strength is obtained and documented by tests.

3.7 ERECTION TOLERANCES

- A. Construct formwork to maintain tolerances by ACI 301 and ACI 318.

3.8 FIELD QUALITY CONTROL

- A. Section 01 4000 – Quality Requirements.
- B. Inspect erected formwork, shoring, and bracing to ensure that work is in accordance with formwork design, and that supports, fastenings, wedges, ties, and items are secure.
- C. Notify Engineer after placement of reinforcing steel in forms, but prior to placing concrete.
- D. Schedule concrete placement to permit formwork inspection before placing concrete.

END OF SECTION

SECTION 03 2000 - CONCRETE REINFORCING

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Reinforcing bars.
 - 2. Welded wire fabric.
 - 3. Reinforcement accessories.

1.2 REFERENCES

- A. American Concrete Institute:
 - 1. ACI 301 – Specifications for Structural Concrete.
 - 2. ACI 318 – Building Code Requirements for Structural Concrete.
 - 3. ACI 503.1 – Specifications for Masonry Structures.
 - 4. ACI SP-66 – ACI Detailing Manual.
 - 5. ACI 350 – Code Requirements for Environmental Engineering Concrete Structures.
- B. ASTM International:
 - 1. ASTM A185 – Standard Specification for Steel Welded Wire, Plain, for Concrete Reinforcement.
 - 2. ASTM A615/A615M – Standard Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement.
- C. American Welding Society:
 - 1. AWS D1.4 – Structural Welding Code – Reinforcing Steel.
- D. Concrete Reinforcing Steel Institute:
 - 1. CRSI – Manual of Standard Practice.
 - 2. CRSI – Placing Reinforcing Bars.

1.3 SUBMITTALS

- A. Section 01 3300 – Submittal Procedures: Submittal procedures.
- B. Shop Drawings: Indicate bar sizes, spacings, locations, and quantities of reinforcing steel and welded wire fabric, bending and cutting schedules, and supporting and spacing devices.
- C. Certificates: Submit AWS qualification certificate for welders employed on the Work.
- D. Manufacturer's Certificate: Certify products meet or exceed specified requirements.
 - 1. Submit certified copies of mill test report of reinforcement materials analysis.

1.4 QUALITY ASSURANCE

- A. Perform Work in accordance with ACI 301, ACI, 318, ACI 350, and CRSI – Manual of Standard Practice.
- B. Prepare shop drawings in accordance with ACI SP-66.
- C. Perform Work in accordance with these Specifications and the Roadway Specifications.
- D. Maintain one copy of each document on site.

1.5 QUALIFICATIONS

- A. Welders: AWS qualified within previous 12 months.

1.6 COORDINATION

- A. Section 01 3000 – Administrative Requirements: Coordination and project conditions.
- B. Coordinate with placement of formwork, formed openings and other Work.

PART 2 PRODUCTS

2.1 REINFORCEMENT

- A. Reinforcing Steel: ASTM A615/A615M; 60 ksi yield strength, deformed billet steel bars, unfinished.
- B. Welded Plain Wire Fabric: ASTM A185; in flat sheets; unfinished.
- C. Epoxy Coated Reinforcing Steel: To be used where indicated on the Drawings. ASTM A775/AASHTO M284; 60 ksi yield strength.

2.2 ACCESSORY MATERIALS

- A. Tie Wire: Minimum 16 gauge annealed type.
- B. Chairs, Bolsters, Bar Supports, Spacers; Sized and shaped for strength and support of reinforcement during concrete placement conditions including load bearing pad on bottom to prevent vapor retarder puncture.
- C. Special Chairs, Bolsters, Bar Supports, Spacers Adjacent to Weather Exposed Concrete Surfaces: Plastic-coated steel type; size and shape to meet Project conditions.
- D. Reinforcing Splicing Devices: Full mechanical type. Splice shall develop at least 125% of the specified yield strength of the bar. The mechanical connection shall be a positive butt splice utilizing lock shear bolts and internal serrated grip rails within the coupling sleeve manufactured

from high quality steel. The heads of the lock shear bolts shall be designed to shear off at a prescribed torque to ensure proper installation. Install per manufacturer's recommendations.

2.3 FABRICATION:

- A. Fabricate concrete reinforcement in accordance with ACI 318, ACI 350, and the CRSI – Manual of Standard Practice.
- B. Form standard hooks as indicated on Drawings.
- C. Form reinforcement bends with minimum diameters in accordance with ACI 318.
- D. Fabricate column reinforcement with offset bends at reinforcement splices.
- E. Do not weld reinforcement.
- F. Locate reinforcement splices not indicated on Drawings, at point of minimum stress. Review location of splices with Engineer.

PART 3 EXECUTION

3.1 PLACEMENT

- A. Place, support and secure reinforcement against displacement. Do not deviate from required position beyond specified tolerance.
 - 1. Do not weld crossing reinforcement bars for assembly.
- B. Do not displace or damage vapor retarder.
- C. Accommodate placement of formed openings.
- D. Space reinforcement bars with minimum clear spacing in accordance with ACI 318.
- E. Maintain concrete cover around reinforcement in accordance with ACI 318 and as indicated on Drawings.
- F. Splice reinforcing where indicated on Drawings and in accordance with splicing device manufacturer's instructions.

3.2 ERECTION TOLERANCES

- A. Section 01 4000 – Quality Requirements: Tolerances.
- B. Install reinforcement within the following tolerances for flexural members, walls, and compression members:

Reinforcement Depth:
Greater than 8 inches
Less than 8 inches

Depth Tolerance:
Plus or minus 3/8 inch
Plus or minus 1/2 inch

Concrete Cover Tolerance:
Minus 3/8 inch
Minus 1/2 inch

C. Install reinforcement for masonry within the tolerances specified in ACI 530.1.

3.3 FIELD QUALITY CONTROL

A. Section 01 4000 – Quality Requirements.

B. Provide free access to Work and cooperate with appointed firm.

C. Reinforcement Inspection:

1. Placement Acceptance: Specified and ACI 318 material requirements and specified placement tolerances.
2. Periodic Placement Inspection: Inspect for correct materials, fabrication, sizes, locations, spacing, concrete cover, and splicing.
3. Welding: Inspect welds in accordance with AWS D1.1.
4. Weldability Inspection. Inspect for reinforcement weldability when formed from steel other than ASTM A706.

END OF SECTION

SECTION 03 3000 - CAST-IN-PLACE CONCRETE

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes cast-in-place concrete for the following:
 - 1. Building frame members.
 - 2. Walls.
 - 3. Foundation walls.
 - 4. Supported slabs.
 - 5. Slabs on grade.
 - 6. Control, expansion and contraction joint devices.
 - 7. Equipment pads.
 - 8. Light pole base.

1.2 PERFORMANCE REQUIREMENTS

- A. Vapor Retarder Permeance: Maximum 1 perm when tested in accordance with ASTM E96, Procedure A.

1.3 SUBMITTALS

- A. Section 01 3300 – Submittal Procedures: Submittal procedures.
- B. Product Data: Submit data on joint devices, and attachment accessories.
- C. Design Data:
 - 1. Submit concrete mix design for each concrete strength.
 - 2. Submit separate mix designs when admixtures are required for the following:
 - a. Hot and cold weather concrete work.
 - b. Air-entrained concrete work.
 - 3. Identify mix ingredients and proportions.
 - 4. Identify chloride content of admixtures and whether or not chloride was added during manufacture.
 - 5. Submit compressive strength test results obtained on a test batch using each mix design to be used on this project.
 - 6. Submit documentation that mix design satisfies alkali-silica reaction (ASR) requirements per IDOT Section 1020.05(d).

1.4 CLOSEOUT SUBMITTALS

- A. Section 01 7000 – Execution and Closeout Requirements: Closeout procedures.
- B. Project Record Documents: Accurately record actual locations of embedded utilities and components concealed from view in finished construction.

1.5 QUALITY ASSURANCE

- A. Perform Work in accordance with ACI 301.
- B. Conform to ACI 305 when concreting during hot weather.
- C. Conform to ACI 306.1 when concreting during cold weather.
- D. Acquire cement and aggregate from one source for Work.
- E. Maintain one copy of each document on site.

1.6 COORDINATION

- A. Section 01 3000 – Administration Requirements: Coordination and project conditions.
- B. Coordinate placement of joint devices with erection of concrete formwork and placement of form accessories.

PART 2 PRODUCTS

2.1 CONCRETE MATERIALS

- A. Cement: ASTM C150, Type I – Normal, Portland type; Type II – Moderate Heat of Hydration; Type III – High Early Strength; or Type IV – Low Heat of Hydration as needed to meet requirements. Use one brand of cement throughout project, unless approved by Engineer.
- B. Aggregates: ASTM C33, normal weight.
 - 1. Fine and Coarse Aggregate
 - a. In accordance with Sections 1003.02, 1004.02, and 1020.05(d) of the Roadway Specifications.
 - b. Maximum size in accordance with ACI 318.
- C. Water: ACI 318; potable, not detrimental to concrete or steel.
- D. Finely Divided Materials: In accordance with Sections 1020.05(c) and (d) of the IDOT Roadway Specifications.

2.2 ADMIXTURES

- A. Air Entrainment: ASTM C260.
 - 1. Manufacturers:
 - a. W. R. Grace – Darex AEA.
 - b. Sika Chemical Corp. – Sika AER
 - c. Master Builders Co. – MB-VR
 - d. Substitutions: Section 01 6000 – Product Requirements.
- B. Water Reducing: ASTM C494/C494M

1. Use only with approval of Engineer.
- C. Calcium Chloride: NOT PERMITTED
- D. Fibers for fiber reinforced concrete slabs shall be FiberMesh 650 or W. R. Grace STRUX BT50 or W. R. Grace STRUX 90/40 or Engineer-approved equal.

2.3 ACCESSORIES

- A. Non-Shrink Grout: ASTM C1107, premixed compound consisting of non-metallic aggregate, cement, water reducing and plasticizing agents; capable of developing minimum compressive strength of 2,400 psi in 48 hours and 7,000 psi in 28 days.
1. Manufacturers:
 - a. Master Builders – Masterflow
 - b. U.S. Grout Corp. – Five Star Grout
 - c. W. R. Meadows – 588 Grout
 - d. Substitutions: Section 01 6000 – Product Requirements.

2.4 JOINT DEVICES AND FILLER MATERIALS

- A. Joint Filler: ASTM D1751; Premolded flexible, lightweight, non-staining, polyethylene, and closed cell; 1/2" inch thick; Deck-O-Foam manufactured by W. R. Meadows or approved equal.
- B. Sealant: ASTM D6690, Type I.

2.5 CONCRETE MIX

- A. Mix and deliver concrete in accordance with ASTM C94.
- B. Concrete mix design shall be per the following schedule:
1. PCC Pavement Patches: Class PP-1 per the requirements of Section 1020 of the Roadway Specifications.
 2. Pavement: Class PV per the requirements of Section 1020 of the Roadway Specifications.
 3. Structures, Sidewalks, Curb and Gutter, and Interior Floor Slabs: Class SI per the requirements of Section 1020 of the Roadway Specifications.
- C. Average Compressive Strength Reduction: Not permitted.
- D. Ready Mixed Concrete: Mix and deliver concrete in accordance with ASTM C94/C94M and ASTM C685/C685M.
- E. Heat of hydration shall be controlled in accordance with Section 1020.15 of the Roadway Specifications. Revise the first paragraph of Section 1020.15 to read: "The contractor shall comply with all of the following requirements related to the control of heat or hydration of concrete structures when the least dimension of a wall, or slab, or footing exceeds 35-1/2 inches.
- F. Provide concrete to the following criteria:

<u>Unit</u>	<u>Measurement</u>
For Structures: Compressive Strength (28 day)	4000 psi
For Sidewalk, Pavement, Curb & Gutter, Building floor slabs on aggregate fill (28 day)	3500 psi

- G. Use accelerating admixtures in cold weather only when approved by Engineer. Use of admixtures will not relax cold weather placement requirements.
- H. Use set retarding admixtures during hot weather only when approved by Engineer.
- I. The addition of reinforcing fibers for slabs on grade shall be at a rate recommended by the manufacturer to act as a replacement for temperature and shrinkage reinforcement in each slab.
- J. Add air entraining agent to normal weight concrete mix for work exposed to exterior.
- K. Workability: Concrete shall have a workability such that it will fill the forms without voids or honeycombs with proper ventilation without permitting materials to separate or excess water to collect on the surface.
- L. Concrete Temperatures: Temperatures for concrete placement shall be in accordance with Section 1020.14 of the Roadway Specifications.
 - 1. Maintain concrete temperature above 50° F for minimum of 7 days following placement.

2.6 MEMBRANE CURING COMPOUND

- A. ASTM C309 Type I, acrylic type, clear, containing a minimum 18 percent solids.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01 3000 – Administrative Requirements: Coordination and project conditions.
- B. Verify requirements for concrete cover over reinforcements.
- C. Verify anchors, seats, plates, reinforcement and other items to be cast into concrete are accurately placed, positioned securely, and will not interfere with placing concrete.

3.2 PREPARATION

- A. Prepare previously placed concrete by cleaning with steel brush and applying bonding agent. Remove laitance, coatings, and unsound materials. Remove concrete splatter from reinforcing bars.
- B. In locations where new concrete is doweled to existing work, drill holes in existing concrete, insert steel dowels and pack solid with non-shrink grout.
- C. Remove debris and ice from formwork, reinforcement, and concrete substrates.

- D. Remove water from areas receiving concrete before concrete is placed.

3.3 PLACING CONCRETE

- A. Place concrete in accordance with ACI 301, ACI 318, and ACI 350.
- B. Notify testing laboratory and Engineer minimum 24 hours prior to commencement of operations.
- C. Ensure reinforcement, inserts, embedded parts, formed expansion and contraction joints, and all other pre-placed items are not disturbed during concrete placement.
- D. Install vapor retarder under interior slabs on grade in accordance with ASTM E1643. Lap joints minimum 6 inches and seal watertight by taping edges and ends.
- E. Repair vapor retarder damaged during placement of concrete reinforcing. Repair with vapor retarder material; lap over damaged areas minimum 6 inches and seal watertight.
- F. Separate slabs on grade from vertical surfaces with joint filler.
- G. Place joint filler in floor slab pattern placement sequence. Set top to required elevations. Secure to resist movement by wet concrete.
- H. Extend joint filler from bottom of slab to within ½ inch of finished slab surface. Conform to finish joint sealer requirements.
- I. Apply sealants in joint devices.
- J. Deposit concrete at final position. Prevent segregation of mix.
- K. Place concrete in continuous operation for each panel or section determined by predetermined joints. Provide adequate numbers of conveyors or pumping devices to ensure cold joints do not occur.
- L. Consolidate concrete.
- M. Maintain records of concrete placement. Record date, location, quantity, air temperature, and test samples taken.
- N. Place concrete continuously between predetermined expansion, control, and construction joints. Provide adequate numbers of conveyors or pumping devices to ensure cold joints do not occur.
- O. Do not interrupt successive placement; do not permit cold joints to occur.
- P. The consistency of concrete must be plastic and cohesive, not fluid, yet sufficiently soft to flow freely to fill the crevices. Work around reinforcement without excessive puddling or spading and without permitting materials to segregate, or free water to collect on the surfaces.
- Q. Concrete not placed within 90 minutes of initial mix will be rejected.

- R. Concrete from its point of release to mixers, hoppers, or conveyances, shall not be permitted to drop more than 5 feet. Deposit concrete directly into conveyances and directly from conveyances to final points of deposit. Sufficient transportation equipment in good working order shall be on hand before work begins. All conveying equipment shall be clean and kept clean during concreting operations. Take every possible precaution to prevent separation or loss of ingredients.
- S. Deposit concrete in wall forms in layers not greater than 24 inches in depth. Each layer shall be compacted before succeeding layer is placed. No water or foreign materials shall be left in forms during concrete placement.
- T. Consolidation of concrete shall conform to ACI 309. Place concrete as near as possible to final position to prevent segregation. Do not use vibrators to transport concrete within forms. Consolidate concrete in walls, columns, beams and slabs or joists construction thicker than 8 inches with internal vibrators (8000 to 12000 V.P.M.). Slabs less than 8 inches thick may be consolidated with internal vibrators (9000 to 13500 V.P.M.) or vibrating screeds supported on forms, screed boards, boards or rails, approved by the Structural Engineer. Supplement vibration by forking or hand spading along surface adjacent to forms and construction joints.
- U. Retempering of concrete will not be permitted. Concrete that has obtained its initial set shall be discarded.
- V. At exterior concrete surfaces, except slabs, strip forms and cut tie-wires to depth of 3/4 inch. Dampen tie holes and all honeycombed areas with clean water and patch flush with patching mortar. Add one part bonding agent to three parts clean water and mix with patching mortar. Mix and apply heavy first coat at two pounds per square yard. Apply second brush coat at same rate after finish has set. When finish coat has set, float it to uniform texture with a sponge float.
- W. Saw cut joints in slabs on grade within 24 hours after placing. Use 3/16 inch thick blade, cut into 1/3 depth of slab thickness.
- X. Screed floors and slabs on grade level, maintaining surface flatness of maximum 1/8 inch in 10 ft.

3.4 CONCRETE FINISHING

- A. Provide formed concrete surfaces to be left exposed (concrete walls, columns, beams, and joists) with smooth rubbed finish. Rubbing shall be performed with a stone specifically designed for rubbing concrete. The use of power tools and/or the use of a burlap sack for rubbing are not acceptable. Rubbing shall be performed to the approval of the Engineer. Rubbing shall extend 6 inches below the finished grade of exterior exposed walls or for the full height of interior walls.
- B. Sidewalks, stairs, and curb and gutter shall receive a light broom finish perpendicular to the direction of traffic.
- C. Pavements and driveways shall receive a heavy broom finish perpendicular to the direction of traffic.
- D. Building interior slabs shall receive a smooth, steel troweled finish.

- E. In areas with drains, maintain floor elevation at walls; pitch surfaces uniformly to drains as indicated on Drawings.

3.5 CURING AND PROTECTION

- A. Immediately after placement, protect concrete from premature drying, excessively hot or cold temperatures, and mechanical injury.
- B. Maintain concrete with minimal moisture loss at relatively constant temperature for period necessary for hydration of cement and hardening of concrete.
- C. Protect exposed surfaces from premature drying.
- D. Protect freshly placed concrete against wash by rain.
- E. Protect concrete surface from drying for seven (7) continuous days after placement, including weekends and holidays (3 days if Type III Portland cement is used); alternate cycles of wetting and drying not permitted.
- F. All floor areas and foundation walls shall receive two (2) coats of membrane curing compound; comply with manufacturer's instructions in accordance with Section 2.6 above.
- G. At end of water cure period, before allowing concrete to dry, rinse and flush surface to remove reaction products.
- H. Protect freshly placed concrete from all traffic, including Contractor's vehicles, until 100% of design strength is attained.
- I. Do not allow flowing water to contact concrete while it is in a plastic state. Do not allow flowing water to contact formwork edges or joints.
- J. Concrete other than structures shall be protected from low air temperatures in accordance with Section 1020.13(c) of the Roadway Specifications.
- K. Concrete structures shall be protected from low air temperatures in accordance with Section 1020.13(d) of the Roadway Specifications with the exception that only protection Methods I or II will be permitted for vertical elements (walls or columns) or slabs supported above grade.

3.6 FIELD QUALITY CONTROL

- A. Section 01 4000 – Quality Requirements and Section 01 7000 – Execution and Closeout Requirements: Field inspecting, testing, adjusting, and balancing.
- B. Field inspection and testing will be performed by Owner's testing laboratory in accordance with ACI 318 and ACI 350.
- C. Provide free access to Work and cooperate with appointed firm.

- D. Submit proposed mix design of each class of concrete to inspection and testing firm for review prior to commencement of Work.
- E. Concrete Inspections:
 - 1. Continuous Placement Inspection: Inspect for proper installation procedures.
 - 2. Periodic Curing Inspection: Inspect for specified curing temperature and procedures.
- F. Strength Test Samples:
 - 1. Sampling Procedures: ASTM C172.
 - 2. Cylinder Molding and Curing Procedures: ASTM C31/C31M, cylinder specimens, standard cured.
 - 3. Sample concrete and make one set of three cylinders for every 50 cu yds or less of each class of concrete placed each day.
 - 4. When volume of concrete for any class of concrete would provide less than 5 sets of cylinders, take samples from five randomly selected batches, or from every batch when less than 5 batches are used.
 - 5. Make one additional cylinder during cold weather concreting, and field cure.
- G. Field Testing:
 - 1. Slump Test Method: ASTM C143/C143M.
 - 2. Air Content of Freshly Mixed Concrete: ASTM C231/C231M.
 - 3. Concrete Temperature

3.7 PATCHING

- A. Allow Engineer to inspect concrete surfaces immediately upon removal of forms.
- B. Excessive honeycomb or embedded debris in concrete is not acceptable. Notify Engineer upon discovery.
- C. Patch imperfections as directed by Engineer.

3.8 DEFECTIVE CONCRETE

- A. Defective Concrete: Concrete not conforming to required lines, details, dimensions, tolerances or specified requirements.
- B. Repair or replacement of defective concrete will be determined by Engineer.
- C. Do not patch, fill, touch-up, repair, or replace exposed concrete except upon express direction of Engineer for each individual area.

END OF SECTION

SECTION 04 0513 - MASONRY MORTARING

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes: Mortar for masonry.
- B. Related Requirements:
 - 1. Section 04 2013 – Single-Wythe Unit Masonry: Installation of mortar.
 - 2. Section 04 2723 – Cavity Wall Unit Masonry: Installation of mortar.

1.2 REFERENCE STANDARDS

- A. American Concrete Institute:
 - 1. ACI 530/530.1 – Building Code Requirements and Specification for Masonry Structures.
- B. ASTM International:
 - 1. ASTM C5 – Standard Specification for Quicklime for Structural Purposes.
 - 2. ASTM C91 – Standard Specification for Masonry Cement.
 - 3. ASTM C144 – Standard Specification for Aggregate for Masonry Mortar.
 - 4. ASTM C150 – Standard Specification for Portland Cement.
 - 5. ASTM C199 – Standard Test Method for Pier Test for Refractory Mortars.
 - 6. ASTM C206 – Standard Specification for Finishing Hydrated Lime.
 - 7. ASTM C270 – Standard Specification for Mortar for Unit Masonry.
 - 8. ASTM C387 – Standard Specification for Packaged, Dry, Combined Materials for Concrete and High Strength Mortar.
 - 9. ASTM C780 – Standard Test Method for Preconstruction and Construction Evaluation of Mortars for Plain and Reinforced Unit Masonry.
 - 10. ASTM C1142 – Standard Specification for Extended Life Mortar for Unit Masonry.
 - 11. ASTM C1314 – Standard Test Method for Compressive Strength of Masonry Prisms.
 - 12. ASTM C1329 – Standard Specification for Mortar Cement.
 - 13. ASTM C1357 – Standard Test Methods for Evaluating Masonry Bond Strength.

1.3 SUBMITTALS

- A. Section 01 3300 – Submittal Procedures: Requirements for submittals.
- B. Samples: Submit two samples of mortar, illustrating mortar color and color range.
- C. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
- D. Design Data: Submit required environmental conditions, admixture limitations, and design mix.
- E. Test and Evaluation Reports:
 - 1. Indicate compliance of component mortar materials to requirements of ASTM C270.

F. Field Quality-Control Submittals: Indicate results of Contractor-furnished tests and inspections.

1.4 QUALITY ASSURANCE

A. Comply with ACI 530/530.1.

1.5 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this Section with minimum three years' documented experience.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Section 01 6000 – Product Requirements: Requirements for transporting, handling, storing, and protecting products.
- B. Inspection: Accept materials on Site in manufacturer's original packaging and inspect for damage.
- C. Store materials according to manufacturer instructions.
- D. Protection:
 - 1. Protect materials from moisture and dust by storing in clean, dry location remote from construction operations areas.
 - 2. Provide additional protection according to manufacturer instructions.

1.7 AMBIENT CONDITIONS

- A. Section 01 5000 – Temporary Facilities and Controls: Requirements for ambient condition control facilities for product storage and installation.
- B. Cold Weather Requirements: Comply with ACI 530/530.1 if ambient temperature or temperature of masonry units is less than 40 degrees F.
- C. Hot Weather Requirements: Comply with ACI 530/530.1 if ambient temperature is greater than 100 degrees F or ambient temperature is greater than 90 degrees F with wind velocity greater than 8 mph.

PART 2 PRODUCTS

2.1 MORTAR

- A. Portland Cement/Lime per ASTM C270, Type M.
 - 1. Color: Gray.
- B. Water: Clean and potable.
- C. Mortar Color:
 - 1. Description: Mineral oxide pigment.

2. Color: To match masonry.
3. Calcium Chloride: Not allowed.

2.2 MIXES

A. Mortar Mixes:

1. Mortar for Structural Masonry: Comply with ASTM C270, Type M using proportion specification.
2. Mortar for Non-Structural Masonry: Comply with ASTM C270, Type M using proportion specification.

PART 3 EXECUTION

3.1 PREPARATION

A. Section 01 7000 - Execution and Closeout Requirements: Requirements for installation preparation.

B. Mortar Mixing:

1. Thoroughly mix mortar ingredients according to ASTM C270 in quantities needed for immediate use.
2. Achieve uniformly damp sand immediately before mixing process.
3. Retemper only within two hours of mixing.

3.2 INSTALLATION

A. According to ACI 530/530.1.

3.3 FIELD QUALITY CONTROL

A. Section 01 4000 – Quality Requirements: Requirements for inspecting and testing.

B. Establish mortar mix according to ASTM C270.

END OF SECTION

SECTION 04 0516 - MASONRY GROUTING

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes: Grout for masonry.
- B. Related Requirements:
 - 1. Section 04 2013 – Single-Wythe Unit Masonry: Installation of grout.
 - 2. Section 04 2723 – Cavity Wall Unit Masonry: Installation of grout.

1.2 UNIT PRICE - MEASUREMENT AND PAYMENT

- A. Section 01 2000 – Price and Payment Procedures: Contract Sum/Price modification procedures.
- B. Grout Materials:
 - 1. Basis of Payment: Includes grout materials and preparation ready for placement.
- C. Grout in Place – Brick and Concrete Masonry Unit:
 - 1. Basis of Payment: Includes grout placement, tooled.

1.3 REFERENCE STANDARDS

- A. American Concrete Institute:
 - 1. ACI 530/530.1 – Building Code Requirements and Specification for Masonry Structures.
- B. ASTM International:
 - 1. ASTM C94 – Standard Specification for Ready-Mixed Concrete. ASTM C143 - Standard Test Method for Slump of Hydraulic-Cement Concrete.
 - 2. ASTM C150 – Standard Specification for Portland Cement.
 - 3. ASTM C150M – Standard Specification for Portland Cement.
 - 4. ASTM C404 – Standard Specification for Aggregates for Masonry Grout.
 - 5. ASTM C476 – Standard Specification for Grout for Masonry.
 - 6. ASTM C595 – Standard Specification for Blended Hydraulic Cements.
 - 7. ASTM C618 – Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete.
 - 8. ASTM C1019 – Standard Test Method for Sampling and Testing Grout.
 - 9. ASTM C1157 – Standard Performance Specification for Hydraulic Cement.
 - 10. ASTM C1314 – Standard Test Method for Compressive Strength of Masonry Prisms.

1.4 SUBMITTALS

- A. Section 01 3300 – Submittal Procedures: Requirements for submittals.
- B. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

- C. Test and Evaluation Reports: Submit compliance with grout property requirements according to ASTM C476, component grout materials according to ASTM C476, and test and evaluation reports according to ASTM C1019.
- D. Field Quality-Control Submittals: Indicate results of Contractor-furnished tests and inspections.

1.5 QUALITY ASSURANCE

- A. Perform Work according to ACI 530/530.1.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Section 01 6000 – Product Requirements: Requirements for transporting, handling, storing, and protecting products.
- B. Inspection: Accept materials on Site in manufacturer's original packaging and inspect for damage.
- C. Store materials according to manufacturer instructions.
- D. Protection:
 - 1. Protect materials from moisture and dust by storing in clean, dry location remote from construction operations areas.
 - 2. Provide additional protection according to manufacturer instructions.

1.7 AMBIENT CONDITIONS

- A. Section 01 5000 – Temporary Facilities and Controls: Requirements for ambient condition control facilities for product storage and installation.
- B. Cold Weather Requirements: According to ACI 530/530.1 if ambient temperature or temperature of masonry units is less than 40 degrees F.
- C. Hot Weather Requirements: According to ACI 530/530.1 if ambient temperature is greater than 100 degrees F or if ambient temperature is greater than 90 degrees F with wind velocity greater than 8 mph.

PART 2 PRODUCTS

2.1 MASONRY GROUT

2.2 MATERIALS

- A. Portland Cement: Comply with ASTM C150, Type I.
- B. Grout Aggregate: Comply with ASTM C404, fine and coarse.
- C. Water: Clean and potable.

D. Calcium Chloride: Not allowed.

2.3 MIXES

A. Grout:

1. Grout for Non-Structural Masonry:
 - a. Compressive Strength: 2,000 psi at 28 days.
 - b. Slump: 8 to 11 inches.
 - c. Mixing: According to ASTM C476, fine, coarse.
2. Grout for Structural Masonry:
 - a. Compressive Strength: 2,000 psi at 28 days.
 - b. Slump: 8 to 11 inches.
 - c. Mixing: According to ASTM C476, fine, coarse.
3. Application:
 - a. Coarse Grout: Grouting spaces with minimum 4-inch dimension in each direction.
 - b. Fine Grout: Grouting other spaces.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01 7000 – Execution and Closeout Requirements: Requirements for installation examination.
- B. Request inspection of spaces to be grouted.

3.2 INSTALLATION

- A. Mixing:
 1. Mix grout according to ASTM C94, as modified to use ingredients complying with ASTM C476.
- B. Comply with ACI 530/530.1.

3.3 FIELD QUALITY CONTROL

- A. Section 01 4000 – Quality Requirements: Requirements for inspecting and testing.
- B. Testing:
 1. Mix: Comply with ASTM C1019 for compressive strength, and comply with ASTM C143 for slump.
 2. Compressive Strength of Mortar, Grout, and Masonry: Comply with Unit Strength Method per ACI 530.1.

END OF SECTION

SECTION 04 2013 - SINGLE-WYTHE UNIT MASONRY

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Concrete masonry units.
 - 2. Prefaced unit masonry (split-face).
 - 3. Reinforcement, anchorage, and accessories.

1.2 SUBMITTALS

- A. Section 01 3300 – Submittal Procedures: Requirements for submittals.
- B. Product Data:
 - 1. Submit data for prefaced masonry units, fabricated wire and deformed bar reinforcement, anchors, mortar, and other accessories.
 - 2. Indicate initial rate of absorption for CMU units.
 - 3. Indicate compressive strengths of masonry units.
- C. Samples:
 - 1. Submit one sample of prefaced split face units to illustrate color, texture, and extremes of color range.

1.3 MAINTENANCE MATERIAL SUBMITTALS

- A. Extra Stock Materials: 25 of each size, color, and type of prefaced units used on this project..

1.4 QUALITY ASSURANCE

- A. Perform Work according to ACI 530/530.1 – Building Code Requirements and Specification for Masonry Structures and Related Commentaries.

1.5 QUALIFICATIONS

- A. Installer: Company specializing in performing Work of this Section with minimum five years' experience.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Inspection: Accept prefaced units on-Site. Inspect for damage.

1.7 AMBIENT CONDITIONS

- A. Do not store reinforcing material directly on ground. Use blocking and other methods to prevent rust on accessories prior to installation.

- B. Cold Weather Requirements: According to ACI 530.1 when ambient temperature or temperature of masonry units is less than 40 degrees F.
- C. Hot Weather Requirements: According to ACI 530.1 when ambient temperature is greater than 100 degrees F or ambient temperature is greater than 90 degrees F with wind velocity greater than 8 mph.

1.8 EXISTING CONDITIONS

- A. Field Measurements: Verify field measurements prior to fabrication. Indicate field measurements on Shop Drawings.

PART 2 PRODUCTS

2.1 PERFORMANCE AND DESIGN REQUIREMENTS

- A. Concrete Masonry Compressive Strength (f'm): 1,350 psi; determined by unit strength method.
 - 1. CMU: 1900 psi minimum net area compressive strength.

2.2 SINGLE-WYTHER UNIT MASONRY

- A. Manufacturers:
 - 1. Northfield Block Co.
 - 2. Substitutions: Permitted.

2.3 CONCRETE MASONRY UNITS

- A. Hollow Load-Bearing CMU: ASTM C90, split-face masonry and standard block units; normal weight.
 - 1. General: Provide shapes for lintels, corners, jambs, sash, control joints, headers, bonding, and other special conditions.
 - 2. Provide bull-nose units at all window sills, window jambs, and door jambs.
 - 3. Size and Shape: Normal modular size 8 inch by 8 inch by 16 inch.
 - 4. Maximum Absorption: 7.5%
 - 5. Units shall be manufactured in one continuous run to achieve color consistency.
 - 6. All units shall be manufactured with chamfered edge to ensure a straight break on the face shell of the unit.
 - 7. Units shall be a minimum of 90 days old when delivered, with manufacturer's certification as verification.
 - 8. Fluted block shall be split face, eight flute (8 x 8 x 16).
 - 9. Colors: Color 1 and Color 2 shall be selected by the Owner from a minimum of 16 standard split face product samples provided by manufacturer.

2.4 ACCESSORIES

- A. Single-Wythe Joint Reinforcement: ASTM A951; truss or ladder type; steel; 0.188-inch-diameter side rods with 0.148-inch-diameter cross ties; mill galvanized.

- B. Reinforcing Steel: ASTM A615, 60 ksi yield grade, plain billet bars, uncoated finish.
- C. Mortar:
 - 1. Portland Cement – Lime Mix: Packaged blend of Portland Cement complying with ASTM C270, Type M.
 - 2. Color to match surrounding block as approved by Engineer.
- D. Grout: Conform to the requirements of ASTM C476 and ACI 530.1/ASCE 6 compressive strength of grout shall equal or exceed 2000 psi.
- E. Self-Stick SBS-Type Flashing: Composite sheet 40 mil thick; 38-mil-thick self-adhesive rubberized asphalt bonded to 2-mil-thick high-density polyethylene film.
- F. Preformed Control Joints: Rubber material. Furnish with corner and T-accessories, cement-fused joints. Profile as indicated.
- G. Joint Filler: Closed cell polyurethane; oversized 50 percent to joint width; self-expanding; 1/2 inch wide by maximum lengths.
- H. Building Paper: ASTM D226; Type II, No. 30 unperforated asphalt felt.
- I. Weeps: Preformed plastic tubes, hollow or cotton rope.
- J. Cleaning Solution: Non-acidic, not harmful to masonry Work or adjacent materials.
- K. Steel Lintels: Sizes as indicated on Drawings; ASTM A992.

2.5 SOURCE QUALITY CONTROL

- A. Testing: Test brick efflorescence according to ASTM C67. Brick rated greater than "slightly effloresced" is not acceptable.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that:
 - 1. Field conditions are acceptable and are ready to receive Work.
 - 2. Items provided by other Sections of Work are properly sized and located.
 - 3. Built-in items are in proper location and ready for roughing into masonry support.

3.2 PREPARATION

- A. Direct and coordinate placement of metal anchors supplied to other Sections.
- B. Furnish temporary bracing during installation of masonry Work. Maintain in place until building structure provides permanent support.

3.3 INSTALLATION

A. Coursing of CMU:

1. Bond: Running.
2. Coursing: One unit and one mortar joint to equal 8 inches.
3. Mortar Joints: Concave.

B. Placing and Bonding:

1. Lay solid masonry units in full bed of mortar, with full head joints.
2. Lay hollow masonry units with face shell bedding on head and bed joints.
3. Buttering corners of joints and excessive furrowing of mortar joints are not permitted.
4. Remove excess mortar as Work progresses.
5. Interlock intersections and external corners.
6. Do not shift or tap masonry units after mortar has achieved initial set. Where adjustment is required, remove mortar and replace.
7. Perform Site cutting of masonry units with proper tools to assure straight, clean, unchipped edges. Prevent broken masonry unit corners or edges.
8. Cut mortar joints flush where bitumen dampproofing is applied.
9. Isolate masonry from vertical structural framing members with movement joint as indicated.

C. Weeps: Furnish weeps at 24 inches o.c. horizontally above through-wall flashing, above shelf angles, and at bottom of walls.

D. Joint Reinforcement and Anchorage:

1. Install horizontal joint reinforcement 16 inches o.c.
2. Place masonry joint reinforcement in first and second horizontal joint above and below openings. Extend minimum 16 inches each side of opening.
3. Place joint reinforcement continuous in first and second joint below top of walls.
4. Lap joint reinforcement ends minimum 6 inches.

E. Masonry Flashings:

1. Extend flashings horizontally at foundation walls, above ledge or shelf angles and lintels, under parapet caps, at bottom of walls, and turn down on outside face to form drip.
2. Lap end joints minimum 6 inches and seal watertight.
3. Turn flashing, fold, and seal at corners, bends, and interruptions.

F. Lintels:

1. Install loose steel lintels as scheduled.
2. Install reinforced unit masonry lintels over miscellaneous openings less than 12 inches wide where lintels are not scheduled or indicated.
3. Do not splice reinforcing bars.
4. Support and secure reinforcing bars from displacement.
5. Place and consolidate grout fill without displacing reinforcing.
6. Allow masonry lintels to attain specified strength before removing temporary supports.
7. Maintain minimum 8 inch bearing on each side of opening unless longer bearing is specified on Drawings.

G. Grouted Components:

1. Reinforce bond beams and pilasters as indicated. Maintain minimum of 1-inch clearance from masonry core surfaces.
 2. Lap splices bar diameters as required by code. Discuss and receive approval from Engineer.
 3. Support and secure reinforcing bars from displacement.
 4. Place and consolidate grout fill without displacing reinforcing.
 5. At bearing locations, fill masonry cores with grout for minimum distance indicated in Drawings on both sides of opening.
- H. Reinforced Masonry:
1. Lay masonry units with cells vertically aligned, clear of mortar, and unobstructed.
 2. Place reinforcement bars as indicated.
 3. Splice reinforcement as indicated.
 4. Support and secure reinforcement from displacement.
 5. Place and consolidate grout fill without displacing reinforcing.
 6. Place grout according to ACI 530.1 Specification for Masonry Structures.
- I. Control Joints:
1. Install control joints at the following maximum spacings, unless otherwise indicated on Drawings:
 - a. Exterior Walls: As indicated on Drawings.
 - b. Interior Walls: 30 feet o.c.
 - c. At changes in wall height.
 2. Do not continue horizontal joint reinforcement through control joints.
 3. Install preformed control joint device in continuous lengths. Seal butt and corner joints.
- J. Expansion Joints:
1. Form expansion joints as indicated.
 2. Do not continue horizontal joint reinforcement through expansion joints.
- K. Built-in Work:
1. As Work progresses, install built-in metal door frames, fabricated metal frames, metal window frames, wood nailing strips, anchor bolts, plates, electrical boxes, and other items to be built in the Work and furnished by other Sections.
 2. Install built-in items plumb and level.
 3. Bed anchors of metal door frames in adjacent mortar joints. Fill frame voids solid with grout or mortar. Fill adjacent masonry cores with grout, minimum 12 inches from framed openings, or as indicated in lintel details.
 4. Do not build in materials subject to deterioration.
- L. Cutting and Fitting:
1. Cut and fit for chases, pipes, conduit, sleeves, and grounds. Coordinate with other Sections of Work to provide correct size, shape, and location.
 2. Obtain Engineer approval prior to cutting or fitting masonry Work not indicated or where appearance or strength of masonry Work may be impaired.

3.4 TOLERANCES

- A. Maximum Variation from Alignment of Columns and Pilasters: 1/4 inch.

- B. Maximum Variation from Unit to Adjacent Unit: 1/16 inch.
- C. Maximum Variation from Plane of Wall: 1/4 inch in 10 feet and 1/2 inch in 20 feet or more.
- D. Maximum Variation from Plumb: 1/4 inch per story non-cumulative; 1/2 inch in two stories or more.
- E. Maximum Variation from Level Coursing: 1/8 inch in 3 feet and 1/4 inch in 10 feet; 1/2 inch in 30 feet.
- F. Maximum Variation of Joint Thickness: 1/8 inch in 3 feet.
- G. Maximum Variation from Cross Sectional Thickness of Walls: 1/4 inch.
- H. Maximum Variation for Steel Reinforcement:
 - 1. Install reinforcement within the tolerances specified in ACI 530.1.
 - 2. Plus or minus 1/2 inch when distance from centerline of steel to opposite face of masonry is 8 inches or less.
 - 3. Plus or minus 1 inch when distance is between 8 and 24 inches.
 - 4. Plus or minus 1-1/4 inch when distance is greater than 24 inches.
 - 5. Plus or minus 2 inches from location along face of wall.

3.5 FIELD QUALITY CONTROL

- A. CMU: Test each type according to ASTM C140.
- B. Prism Tests: Test compressive strength of completed reinforced masonry according to ASTM C1314.

3.6 CLEANING

- A. Clean soiled surfaces with cleaning solution. Coordinate with Work of specified water repellent or surface coating.

3.7 PROTECTION

- A. Protect tops of masonry Work with waterproof coverings secured in place without damaging masonry. Provide coverings where masonry is exposed to weather when Work is not in progress. Maintain protection on tops of completed exterior walls until installation of permanent waterproof cap materials.

SECTION 05 1200 - STRUCTURAL STEEL FRAMING

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Structural shapes.
 - 2. Channels and angles.
 - 3. Structural pipe.
 - 4. Structural plates.
 - 5. Bolts, connectors, and anchors.
 - 6. Grout.

1.2 SUBMITTALS

- A. Section 01 3300 – Submittal Procedures: Requirements for submittals.
- B. Shop Drawings:
 - 1. Indicate profiles, sizes, spacing, locations of structural members, openings, attachments, and bolts.
 - 2. Connections.
 - 3. Indicate welded connections with AWS A2.4 welding symbols, and indicate net weld lengths.
- C. Welders Certificates: Certify welders employed on the Work, verifying AWS qualification within previous 12 months.

1.3 QUALITY ASSURANCE

- A. Perform Work according to following:
 - 1. Structural Steel: AISC 360.
 - 2. Architecturally Exposed Structural Steel: AISC 303, Section 10.
 - 3. High-Strength Bolted Connections: RCSC - Specification for Structural Joints Using ASTM A325 or ASTM A490 Bolts.

1.4 QUALIFICATIONS

- A. Fabricator:
 - 1. Company specializing in fabricating products specified in this Section with minimum three years' documented experience with following current AISC Certification:
 - a. Standard Steel Building Structures (STD).
 - b. Conventional Steel Building Structures (SBD).
- B. Erector:
 - 1. Company specializing in performing Work of this Section with minimum three years' documented experience with following current AISC Certification:
 - a. Certified Steel Erector (CSE).

- C. Shop Painter:
 - 1. Company specializing in performing Work of this Section with minimum three years' documented experience with following current AISC Certification:
 - a. Sophisticated Paint Endorsement - Enclosed (P1).
 - b. Sophisticated Paint Endorsement - Covered (P2).
- D. Welders and Welding Procedures: AWS D1.1 qualified within previous 12 months.

PART 2 PRODUCTS

2.1 STRUCTURAL STEEL

- A. Channels and Angles: ASTM A36/A36M. Free of defects impairing strength, durability or appearance.
- B. Steel Pipe: ASTM A53, Type E or S, Grade B.
- C. Steel W Shapes: ASTM A992.

2.2 BOLTS, CONNECTORS, AND ANCHORS

- A. Bolts: Heavy-hex, structural type, ASTM A325.
- B. Nuts: ASTM A563; heavy hex type.
 - 1. Finish: Plain.
- C. Washers: ASTM F436; circular.
 - 1. Finish: Plain.
- D. Shear Connectors: ASTM A108; Grade 65, headed, unfinished and in accordance with AWS D1.1; Type B.
- E. Anchor Rods: ASTM F1554, Grade 36.
 - 1. Shape: Straight.
 - 2. Plate Washers: ASTM A36/A36M.
- F. Threaded Rods: ASTM F1554, Grade 36.
 - 1. Finish: Unfinished:

2.3 WELDING MATERIALS

- A. Welding Materials: AWS D1.1; type required for materials being welded.
 - 1. Use E70 electrodes.

2.4 FABRICATION

- A. Place shear stud connectors as indicated on Drawings.

- B. Continuously seal joined membranes by intermittent welds and plastic filler OR continuous welds (as indicated in the structural details). Grind exposed welds smooth.
- C. Fabricate connections for bolt, nut, and washer connectors.

2.5 FINISHES

- A. Prepare structural component surfaces according with SSPC SP10 or SP11.
- B. Shop-prime structural steel members. Do not prime surfaces that will be part of a slip critical connection.

2.6 ACCESSORIES

- A. Grout: Non-shrink type, pre-mixed compound consisting of non-metallic aggregate, cement, water reducing and plasticizing additives, capable of developing minimum compressive strength of 7,000 psi at 28 days.
- B. Shop Primer:
 - 1. Type: SSPC Paint 15, Type 1, red oxide, 10-99 Tnemec primer or Rustoleum Number 5769 primer or approved equal.
 - 2. Thoroughly clean structural steel, removing all loose mill scale, grease, dirt, and foreign matte by scraping or sandblasting.
 - 3. Apply the specified paint to a dry film thickness not less than 2.5 dry mils.
- C. Touchup Primer: Match shop primer.

2.7 SOURCE QUALITY CONTROL

- A. Section 01 4000 – Quality Requirements: Testing, inspection and analysis requirements.
- B. Shop test bolted and welded connections as specified for field quality control tests.
- C. When fabricator is approved by authorities having jurisdiction, submit certificate of compliance indicating Work performed at fabricator's facility conforms to Contract Documents.
 - 1. Specified shop tests are not required for Work performed by approved fabricator.

PART 3 EXECUTION

3.1 SURFACE CONDITIONS

- A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the work. Do not proceed until satisfactory conditions are correct.
- B. Verify elevations of concrete and masonry bearing surfaces and locations of anchor rods, bearing plates and other embedments with steel erector present, for compliance with requirements.

3.2 ERECTION

A. Surveys:

1. Establish permanent benchmarks necessary for accurate erection of structural steel.
2. Check elevations of concrete surfaces, and locations of anchor bolts and similar times, before erection proceeds.

B. Temporary shoring and bracing:

1. Provide temporary shoring and bracing members with connections of sufficient strength to bear imposed loads.
2. Provide temporary guy lines to achieve proper alignment of the structure as erection proceeds.
3. Remove temporary connections and members when permanent members are in place and final connections are made.

C. Anchor bolts:

1. Install anchor bolts and other connectors required for securing structural steel to adjacent work.
2. Provide templates and other devices as needed for pre-setting bolts and other anchors to accurate locations.
3. Where anchor bolts are imbedded in the cast-in-place concrete, it shall be the Contractor's responsibility to ensure that anchor bolts are installed precisely in locations as will be required to receive proposed equipment. No burning of baseplate holes will be allowed to compensate for poor anchor bolt alignment.
4. Install nuts on anchor bolts snug tight – do not torque.

D. Setting bases and bearing plates:

1. Clean concrete bearing surfaces free from bond-reducing materials, and then roughen to improve bond to surface.
2. Clean the bottom surface of base and bearing plates.
3. Set loose and attached base plates and bearing plates for structural members using wedges and other adjusting devices.
4. Tighten anchor bolts after supported members have been positioned and plumbed.
5. Do not remove wedges or shims, but if protruding, cut off flush with the edge of the base or bearing plate prior to packing with grout.
6. Pack grout solidly between bearing surfaces and bases or plates to assure that no voids remain.
7. Finish exposed surfaces, protect installed materials, and allow to cure in strict compliance with the manufacturer's recommendations as approved by the Engineer.

E. Grout installation:

1. Shim bearing plates and equipment supports to proper elevation, and snug-tighten anchor bolts.
2. Fill void under bearing surface with grout; install and pack grout to remove air pockets.
3. Moist-cure grout.
4. Remove forms after grout is set; trim grout edges to form smooth surface, splay 45 degrees.
5. Tighten anchor bolts after grout has cured for a minimum of three days.

F. Field assembly:

1. Set structural frames accurately to the lines and elevations indicated.
 2. Align and adjust the members forming part of a complete frame or structure before fastening permanently.
 3. Clean the bearing surfaces and other surfaces which will be in permanent contact before assembly.
 4. Adjust as required to compensate for discrepancies in elevation and alignment.
 5. Level and plumb individual members of the structure within specified AISC tolerances.
 6. Establish required leveling and plumbing measurements on the mean operating temperatures of the structure, making allowances for the difference between temperature at time of erection and the mean temperature at which the structure will be then completed and in service.
 7. Comply with AISC specifications for bearing, adequacy of temporary connections, alignment, and removal of paint on surfaces adjacent to welds.
- G. Gas cutting:
1. Do not use gas cutting torches for correcting fabricating errors in structural framing, except on secondary members where acceptable to the Engineer.
 2. When gas cutting is permitted, finish the gas cut section to a sheared appearance acceptable to the Engineer.

3.3 PAINTING

- A. Secure all required approvals of welds and connections prior to application of field primer.
- B. Notify the Engineer when the work of this Section is ready to receive primer.
- C. Prime coat structural steel and fittings, except galvanized items, which will not be enclosed or concealed in the finished work.
1. Prepare surfaces by removing loose rust, loose mill scale, and spatter, slag, and flux deposits.
 2. Clean steel in accordance with Steel Structures Painting Council SP-3, "Power Tool Cleaning."
 3. After erection, clean spots and surfaces where paint has been removed, damaged, or burned off, and clean field bolts and other field connections not concealed in the finished work.
 4. Remove dirt, oil, and grease.
 5. Apply a spot coat of the approved primer.
 6. Do not apply paint to wet, damp, oily, or improperly prepared surfaces.
 7. Spray apply the primer, filling joints and corners, and covering surfaces with a smooth, unbroken film of at least 2.5 dry mils thickness.
- D. Finish coat per Section 09 9000 – Painting and Coating.

SECTION 05 5200 - METAL RAILINGS AND HANDRAILS

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Aluminum pipe railings, balusters, fittings and toe kicks.

1.2 SUBMITTALS

- A. Section 01 3300 – Submittal Procedures: Requirements for submittals.
- B. Shop Drawings: Indicate profiles, sizes, connection attachments, anchorage, size and type of fasteners, and accessories.
- C. Samples: Submit one 6-inch-long sample of handrail. Submit one sample of elbow, tee, wall bracket, escutcheon, and end stop.
- D. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

1.3 QUALITY ASSURANCE

- A. Perform Work for structural aluminum according to AA ADM 1.
- B. Perform Work of this Section according to ASTM E985.
- C. Finish joints according to NOMMA Guideline 1.

1.4 QUALIFICATIONS

- A. Fabricator: Company specializing in fabricating products specified in this Section with minimum three years' documented experience.
- B. Erector: Company specializing in performing Work of this Section with minimum three years' documented experience.

1.5 EXISTING CONDITIONS

- A. Field Measurements: Verify field measurements prior to fabrication. Indicate field measurements on Shop Drawings.

1.6 DELIVERY, STORAGE AND HANDLING

- A. Deliver materials to the job site in good condition and properly protected against damage to finished surfaces.
- B. Storage on site:

1. Store material in a location and in a manner to avoid damage. Stacking shall be done in a way that will prevent bending.
 2. Store material in a clean, dry location away from uncured concrete and masonry. Cover with waterproof paper, tarpaulin, or polyethylene sheeting in a manner that will permit circulation of air inside the covering.
- C. Keep handling on site to a minimum. Exercise particular care to avoid damage to finishes or material.

PART 2 PRODUCTS

2.1 PERFORMANCE AND DESIGN CRITERIA

- A. Design handrail, guardrail, and attachments to resist forces as required by ASTM E985 code. Apply loads non-simultaneously to produce maximum stresses.
1. Guard Top Rail and Handrail Concentrated Load: 200 lb. applied at any point in any direction.
 2. Guard Top Rail Uniform Load: 50 plf, applied in any direction.
 3. Intermediate Rails, Panels, and Baluster Concentrated Load: 50 lb. applied to 1 sq. ft. area.
- B. Thermal Movements: Allow for thermal movement resulting from the following maximum change (range) in ambient temperature in engineering, fabricating, and installing of joints, overstressing of components and connections, and other detrimental effects. Base engineering calculations on actual surface temperatures of materials due to both solar heat gain and nighttime sky heat loss.
1. Temperature Change (Range): 120 degree F ambient; 180 degree F material surfaces.
- C. Control of Corrosion: Prevent galvanic action and other forms of corrosion by insulating metals and other materials from direct contact with incompatible materials.

2.2 MATERIALS

- A. Aluminum Railing System:
1. Rails and Posts: 1-1/2 inch diameter, extruded tubing conforming to ASTM B241.
 2. Fittings: Elbows, T-shapes, wall brackets, escutcheons; aluminum.
 3. Mounting: Brackets and flanges; prepare backing plate for mounting in wall construction.
 4. Splice Connectors: Concealed spigot; aluminum.
 5. Exposed Fasteners: Flush countersunk screws or bolts; consistent with design of railing.
 6. Aluminum Surfaces: AAMA A41 anodized, prepared with pretreatment, anodized to clear color.
 7. Apply one coat of bituminous paint to concealed aluminum surfaces in contact with cementitious or dissimilar materials.

2.3 FABRICATION

- A. Fit and shop-assemble components in largest practical sizes for delivery to Site.

- B. Fabricate components with joints tightly fitted and secured. Furnish spigots and sleeves to accommodate Site assembly and installation.
- C. Form simple and compound curves by bending pipe in jigs to produce uniform curvature for each repetitive configuration required; maintain cylindrical cross section of pipe throughout entire bend without buckling, twisting, cracking, or otherwise deforming exposed surfaces of pipe.
- D. Exposed Mechanical Fastenings: Flush countersunk screws or bolts; unobtrusively located; consistent with design of component, except where specifically noted otherwise.
- E. Supply components required for anchorage of fabrications. Fabricate anchors and related components of same material and finish as fabrication, except where specifically noted otherwise.
- F. Exterior Components: Continuously seal joined pieces by continuous welds. Drill condensate drainage holes at bottom of members at locations not encouraging water intrusion.
- G. Interior Components: Continuously seal joined pieces by continuous welds.
- H. Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush, and hairline. Ease exposed edges to small uniform radius.
- I. Accurately form components to suit stairs and landings, to each other and to building structure.
- J. Accommodate expansion and contraction of members and building movement without damage to connections or members.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that field conditions are acceptable and are ready to receive Work.
- B. Verify that concealed blocking and reinforcement are installed and correctly located to receive wall-mounted handrails.

3.2 PREPARATION

- A. Supply items required to be cast into concrete and embedded in masonry with setting templates to appropriate Sections.

3.3 INSTALLATION

- A. Install components plumb and level, accurately fitted, free from distortion or defects.
- B. Anchor railings to structure with anchors, plates, angles and other shapes as required. Core drilling and embedding in concrete is not allowed.

- C. Conceal bolts and screws whenever possible. Where not concealed, use flush countersunk fastenings.
- D. Assemble with spigots and sleeves to accommodate tight joints and secure installation.

3.4 TOLERANCES

- A. Maximum Variation from Plumb: 1/4 inch per story, noncumulative.
- B. Maximum Offset from Alignment: 1/4 inch.
- C. Maximum Out-of-Position: 1/4 inch.

END OF SECTION

SECTION 05 5300 - METAL GRATINGS

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Formed floor and stair tread gratings.

1.2 COORDINATION

- A. Section 01 3000 – Administrative Requirements: Requirements for coordination.

1.3 SUBMITTALS

- A. Section 01 3300 – Submittal Procedures: Requirements for submittals.
- B. Product Data: Submit span and deflection tables.
- C. Shop Drawings: Indicate details of gratings, plates, component supports, anchorages, openings, perimeter construction details, and tolerances. Indicate welded connections using standard AWS A2.4 welding symbols. Indicate net weld lengths.
- D. Samples: Submit one sample, 6 by 6 inch, illustrating surface finish, color, and texture.
- E. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
- F. Delegated Design Submittals: Submit signed and sealed Shop Drawings with design calculations and assumptions for gratings.
- G. Manufacturer's Instructions: Submit special requirements of openings, perimeter framing, and embedments, and standard installation details.

1.4 QUALIFICATIONS

- A. Licensed Professional: Structural Engineer experienced in design of specified Work and licensed in State of Illinois.

1.5 EXISTING CONDITIONS

- A. Field Measurements: Verify field measurements prior to fabrication. Indicate field measurements on Shop Drawings.

PART 2 PRODUCTS

2.1 PERFORMANCE AND DESIGN CRITERIA

- A. Design Live (Pedestrian) Load: Uniform load of 100 lb./sq. ft. minimum; concentrated load of 500 lb. and distributed over a 1 square foot area.
- B. Maximum Allowable Deflection under Live Load: 1/240 of span; size components for single span, in no case greater than 1/4" under 100 psf uniform load.
- C. Maximum Fiber Stress: 12,000 psi

2.2 GRATINGS AND FLOOR PLATES

- A. Manufacturer List:
 - 1. BarnettBates Corporation
 - 2. McNichols Company
 - 3. Ohio Gratings, Inc.
 - 4. Substitutions: Section 01 6000 – Product Requirements.

2.3 MATERIALS

- A. Bearing Bars and Banding: ASTM B221, Alloy 6063T6 extruded aluminum alloy.
- B. Crossbars: ASTM B211, Alloy 6063-T1
- C. Welding Materials: Type as required for materials being welded.

2.4 FABRICATION

- A. Fabricate grates to accommodate design loads.
- B. Mechanically clinch joints of intersecting metal sections.
- C. Fabricate support framing for openings.
- D. Top Surface: Flush.
- E. Removability: Fabricate pieces in weights no larger than 50 lbs.

2.5 FINISHES

- A. Clean surfaces of rust, scale, grease, and foreign matter prior to finishing.
- B. Aluminum: Clear anodized, NAAMM, AA-M12C22A41 finish.

2.6 ACCESSORIES

- A. Fasteners and Saddle Clips: Stainless steel or aluminum for holding grating down

- B. Perimeter Closure: Same material as grating.
- C. Aluminum angle frame with optional anchors. Provide protection from dissimilar materials.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Prior to grating installation, Contractor shall inspect supports for correct size, layout and alignment. Any inconsistencies between Contract Drawings and supporting structure deemed detrimental to grating placement shall be reported in writing to the Engineer prior to grating placement.

3.2 INSTALLATION

- A. Install grating in accordance with shop drawings and standard installation clearances as recommended by NAAMM Metal Bar Grating Manual.
- B. Cutting, Fitting and Placement:
 - 1. Perform all cutting and fitting required for installation. Grating shall be placed such that cross bars align.
 - 2. Wherever grating is pierced by pipes, ducts and structural members, cut openings neatly and accurately to size and weld a rectangular band bar of the same height and material as bearing bars.
 - 3. Cutouts for circular obstructions are to be at least 2" larger in diameter than the obstruction. Cutouts for all piping 4" or less shall be made in the field.
 - 4. All rectangular cutouts are to be made in the next bearing bar beyond the penetration with a clearance not to exceed bearing bar spacing.
 - 5. Utilize standard panel widths wherever possible.
- C. Protection of Aluminum from Dissimilar Materials:
 - 1. Where aluminum surfaces come into contact with dissimilar metals, surfaces shall be kept from direct contact by painting the dissimilar metal with one coat of bituminous paint or other approved insulating material.
 - 2. Where aluminum surfaces come into contact with dissimilar materials such as concrete, masonry or lime mortar, exposed aluminum surfaces shall be painted with one coat of bituminous paint or other approved insulating material.

3.3 TOLERANCES

- A. Conform to NAAMM MBG 531.
- B. Maximum Space Between Adjacent Sections: 1/4 inch.
- C. Maximum Variation from Top Surface Plane of Adjacent Sections: 1/8 inch.

END OF SECTION

SECTION 06 1000 - ROUGH CARPENTRY

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Structural roof framing.
 - 2. Roof sheathing.
 - 3. Preservative treatment of wood.
 - 4. Miscellaneous framing and sheathing.

1.2 SUBMITTALS

- A. Section 01 3300 – Submittal Procedures: Requirements for submittals.
- B. Product Data: Submit technical data on water resistive barrier sheathing, wood preservative materials, and application instructions. Include data on air/moisture infiltration protection based on testing according to referencing standards.

1.3 QUALITY ASSURANCE

- A. Perform Work according to the following:
 - 1. Lumber Grading Agency: Certified by DOC PS 20.
 - 2. Wood Structural Panel Grading Agency: Certified by APA - The Engineered Wood Association.
 - 3. Lumber: DOC PS 20.
 - 4. Wood Structural Panels: DOC PS 1 or PS 2.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Section 01 6000 – Product Requirements: Requirements for transporting, handling, storing and protecting products.
- B. Outdoor Storage: Comply with manufacturer's recommendations.
 - 1. Set panel bundles on supports to keep off ground.
 - 2. Cover panels loosely with waterproof protective material.
 - 3. Anchor covers on top of stack, but keep away from sides and bottom to assure adequate air circulation.
 - 4. When high moisture conditions exist, cut banding on panel stack to prevent edge damage.

PART 2 PRODUCTS

2.1 ENGINEERED WOOD PRODUCTS

- A. Engineered Wood Products:

1. Manufactured with an exterior-type adhesive according to ASTM D2559.
2. Evaluated and monitored according to ASTM D5456.

B. Types:

1. Laminated-Veneer Lumber: Structural composite lumber made from wood veneers with grain primarily parallel to member lengths.

2.2 LUMBER MATERIALS

A. Lumber Grading Rules: Comply with SPIB.

B. Framing and Studs:

1. Species: Southern pine
2. Grade: Minimum No. 2 grade
3. Moisture Content: Maximum 19%

2.3 SHEATHING MATERIALS

A. Manufacturers:

1. Drywood Products
2. Huber Engineered Woods, Zip System Products.
3. Substitutions: Section 01 6000 – Product Requirements.

B. Roof Sheathing: 5/8" thick (min.)

1. Wood Structural Panel Roof Sheathing: oriented strand board; Min. Span Rating 40/20; Exposure Durability 1. With factory laminated integral water resistive barrier.
 - a. Air Leakage: Maximum .0072 cfm/sq. ft. infiltration at a pressure differential of 1.57 psf.
 - b. Perm Rating: 12-16
 - c. Exposure Rating: Minimum 90 days

C. Telephone and Electrical Panel Boards: APA plywood.

1. Size and thickness as required by telephone and electrical panel manufacturers.
2. Minimum 3/4" thickness and 6" larger than panels.

2.4 FACTORY WOOD TREATMENT

A. Wood Preservative (Pressure Treatment): AWP A U1, commodity specification A-sawn products of F-wood composites using waterborne ACQ or SBX preservative.

2.5 ACCESSORIES

A. Fasteners and Anchors:

1. Fasteners: ASTM A153, hot-dip galvanized steel for high-humidity and treated wood locations, unfinished steel elsewhere.
2. Nails and Staples: ASTM F1667.
3. Anchors: Toggle bolt type for anchorage to hollow masonry. Expansion shield and lag bolt type for anchorage to solid masonry or concrete. Bolt or ballistic fastener for anchorage to steel.

- B. Self-Adhering Seam and Flashing Tape: Pressure-sensitive, self-adhering, cold-applied, proprietary seam tape consisting of polyolefin film with acrylic adhesive.
1. Thickness: 0.012 inch.
 2. Width: 6 inch.

PART 3 EXECUTION

3.1 APPLICATION

A. Framing:

1. Carefully select all members. Select individual pieces so that knots and defects will not interfere with placement of bolts, when nailing or making connections. Discard defective pieces.
2. Set structural members level and plumb, in correct position.
3. Fasten framing according to applicable code.
4. Make provisions for erection loads and for sufficient temporary bracing to maintain structure safe, plumb, and in alignment until completion of erection and installation of permanent bracing.
5. Place horizontal members crown side up.
6. Construct load-bearing framing and curb members full length without splices.
7. Double members at openings over 24 inches wide. Space short studs over and under opening to stud spacing.
8. Coordinate installation of glue-laminated structural units and prefabricated wood trusses.
9. Curb roof openings except where prefabricated curbs are provided. Form corners by alternating lapping side members.
10. Coordinate curb installation with installation of decking and support of deck openings.

B. Sheathing:

1. Do not use materials with defects that impair quality of sheathing or pieces that are too small to use with minimum number of joints or optimum joint arrangement.
2. Cut panels at penetrations, edges, and other obstructions of work; fit tightly against abutting construction unless otherwise indicated.
3. Securely attach to substrate by fastening as indicated.
 - a. Use common wire 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. Install fasteners without splitting wood.
4. Coordinate wall and roof sheathing installation with flashing and joint-sealant installation so these materials are installed in sequence and manner that prevent exterior moisture from passing through completed assembly.

C. Wood Structural Panel Installation:

1. General: Comply with applicable recommendations in APA Form No. E30, "Engineered Wood Construction Guide," for types of structural-use panels and applications indicated.
2. Fastening Methods: Fasten panels as indicated below:
 - a. Wall and Roof Sheathing
 - 1) Nail to wood framing.
 - 2) Screw to cold-formed metal framing.
 - 3) Space panels 1/8 inch apart at edges and ends.

- 4) Install fasteners 3/8 inch to 1/2 inch from panel edges.
- 5) Space fasteners to satisfy IBC 2018 Table 2304.10-1.

D. Sheathing Joint Treatment

1. Seal sheathing joints according to sheathing manufacturer's written instructions.
 - a. Apply seam tape to joints between sheathing panels.
 - b. Utilize tape gun or hard rubber roller provided by manufacturer to ensure tape is completely adhered to substrates.

E. Flexible Flashing Installation

1. Apply flexible flashing where indicated to comply with manufacturer's written instructions.
 - a. After flashing has been applied, roll surfaces with a hard rubber to ensure that flashing is completely adhered to substrates.
 - b. Width for Flexible Flashing: 6 inch.

3.2 TOLERANCES

- A. Framing and Furring Members to Receive a Finished Wall or Ceiling: Align finish surface to vary not more than 1/8 inch from a theoretical plane or surfaces of the room or space.
- B. Other Framing Members: 1/4 inch from indicated position, maximum.

END OF SECTION

SECTION 06 1753 - SHOP-FABRICATED WOOD TRUSSES

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes shop fabricated wood trusses for roof framing; bridging, bracing, and anchorage.

1.2 SYSTEM DESCRIPTION

- A. Design Roof Live Load: 30 lbs/sq ft.
- B. Design Roof Dead Load: 10 lbs/sq ft Top Chord, 10 lbs/sq ft Bottom chord, and self weight of truss.
- C. Design Wind Load: As calculated in accordance with ASCE 7-10 with 120 mph basic wind speed, exposure C.
- D. Snow Load: In accordance with ASCE 7-10 with a ground snow load of 25 psf and $C_E = 1.0$, Importance Factor = 1.1.
- E. Deflection Limit: 1/240 of span for TOTAL load. 1/360 for live load, snow load, or wind load when considered separately.
- F. Additional loads as indicated on Drawings.

1.3 SUBMITTALS

- A. Section 01 3300 – Submittal Procedures: Submittal procedures.
- B. Shop Drawings: Indicate sizes and spacing of trusses and associated components, web and chord sizes, plate sizes, fastener descriptions and spacings, loads and truss cambers, and framed openings. Submit design calculations which shall include end reactions for each load combination analyzed. Calculations and shop drawings shall be signed and sealed by an Illinois licensed Structural Engineer.
- C. Product Data: Submit truss configurations, bearing and anchor details, bridging and bracing, and other details as required.

1.4 QUALITY ASSURANCE

- A. Perform Work as follows:
 - 1. Lumber Grading: Certified by DOC PS 20.
 - 2. Plywood Grading Agency: Certified by APA/EWA.
 - 3. Lumber: Comply with DOC PS 20.
 - 4. Wood Structural Panels: DOC PS 1 or DOC PS 2.

- B. Truss Design, Fabrication, and Installation: Comply with TPI 1.

1.5 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this Section with minimum 3 years' documented experience.
- B. Design trusses under direct supervision of Structural Engineer experienced in design of this Work and licensed in State of Illinois.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Section 01 6000 – Product Requirements: Product storage and handling requirements.
- B. Store truss depth in vertical position resting on intermittent bearing pads.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers:
 - 1. Alpine Engineered Products, Inc.
 - 2. Fox River Components, Inc.
 - 3. MiTek Industries, Inc.
 - 4. Substitutions: Section 01 6000 – Product Requirements.

2.2 MATERIALS

- A. Lumber Grading Rules: SPIB.
- B. Wood Members: Single top and bottom chord, 19 percent maximum and 7 percent minimum moisture content. Finger scarfing permitted.
- C. Steel Plate Connectors: TPI 1, Section 6; hot dip galvanized; die stamped with integral teeth.

2.3 ACCESSORIES

- A. Wood Blocking and Framing for Openings: In accordance with Section 06 1000.
- B. Fasteners and Anchors:
 - 1. Fasteners: ASTM A153/A153M, hot dipped galvanized steel for high humidity and treated wood locations, unfinished steel elsewhere.
 - 2. Nails and Staples: ASTM F1667.

2.4 FABRICATION

- A. Fabricate trusses to achieve structural requirements specified.

- B. Fabricate bottom chord extensions as indicated on Drawings.
- C. Frame special sized openings in web framing as indicated on Drawings.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01 3000 – Administrative Requirements: Coordination and project conditions.
- B. Verify that supports and openings are ready to receive trusses.

3.2 PREPARATION

- A. Coordinate placement of end connections specified on Drawings.

3.3 ERECTION

- A. Set members level and plumb, in correct position.
- B. Make provisions for erection load, and for sufficient temporary bracing to maintain structure plumb, and in alignment until completion of erection and installation of permanent bracing.
- C. Do not field cut or alter structural members without approval of the Engineer.
- D. Place headers and supports to frame openings.
- E. Frame openings between trusses with lumber in accordance with Section 06 1000 – Rough Carpentry.
- F. Coordinate placement of sheathing with Work of this Section and Section 06 1000 – Rough Carpentry.

3.4 ERECTION TOLERANCES

- A. Section 01 4000 – Quality Requirements: Tolerances.
- B. Framing Members: 1/2 inch maximum, from indicated position.

3.5 SCHEDULES

- A. Upper Roof: 24" on center maximum spacing.
- B. Decrease spacing as needed adjacent to openings or to support additional loads indicated on the Drawings.

END OF SECTION

SECTION 07 2116 – BLANKET INSULATION

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes batt insulation in ceiling construction; and batt insulation for filling perimeter window and door shim spaces, vapor barrier, for all building structures.

1.2 SUBMITTALS

- A. Section 01 3300 – Submittal Procedures. Requirements for submittals.
- B. Product Data: Submit data on product characteristics, performance criteria, limitations.

PART 2 PRODUCTS

2.1 BATT INSULATION

- A. Batt Insulation: ASTM C665; preformed mineral fiber blanket; friction fit, conforming to the following:
 - 1. Thermal Resistance: R of 3 per inch minimum
 - 2. Facing: Unfaced.

2.2 VAPOR BARRIER

- A. Black polyethylene film for above grade application, 6 mil thick.
- B. Staples: Steel wire; galvanized; type and size to suit application.
- C. Tape: Polyethylene self-adhering type, 2 inch wide.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01 3000 – Administrative Requirements: Coordination and project conditions.
- B. Verify substrate, adjacent materials, and insulation are dry and ready to receive insulation.

3.2 INSTALLATION

- A. Install in ceiling spaces without gaps or voids. Do not compress insulation.
- B. Trim insulation neatly to fit spaces. Insulate miscellaneous gaps and voids.

- C. Fit insulation tight in spaces and tight to exterior side of mechanical and electrical services within plane of insulation.
- D. Wood Framing: Place vapor retarder on warm side of insulation by stapling at 6 inches oc. Lap and seal sheet retarder joints over member face.
- E. Extend vapor retarder tight to full perimeter of adjacent window and door frames and other items interrupting plane of membrane. Tape seal in place.

3.3 SCHEDULES

- A. Ceiling Insulation: R38 unfaced, separate 6 mil vapor barrier.

END OF SECTION

SECTION 07 3113 – ASPHALT SHINGLES

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes:
 - 1. Asphalt shingles.
 - 2. Ice dam membrane.
 - 3. Underlayment.
 - 4. Valley protection.
 - 5. Attic ventilators.
 - 6. Metal flashings and accessories.

1.2 SUBMITTALS

- A. Product Data: Provide manufacturer's printed product information indicating material characteristics, performance criteria and product limitations.
- B. Manufacturer's Installation Instructions: Provide published instructions that indicate preparation required and installation procedures.
- C. Certificate of Compliance: Provide Certificate of Compliance from an independent laboratory indicating that the asphalt fiberglass shingles made in normal production meet or exceed the requirements of the following:
 - 1. ASTM E 108/UL 790 Class A Fire Resistance
 - 2. ASTM D 3161/D 7158/UL 997 Wind Resistance.
 - 3. ASTM D 3462.
- D. Shop Drawings: Indicate specially configured metal flashing, jointing methods and locations, fastening methods and locations, and installation details as required by project conditions indicated.
- E. Submit two sample boards with 4" x 4" (min.) samples of each standard color indicating color range and finish texture/pattern.

1.3 QUALITY ASSURANCE

- A. Installer Minimum Qualifications: Installer shall be licensed or otherwise authorized by all federal, state and local authorities to install all products specified in this Section. Installer shall perform work in accordance with NRCA Roofing and Waterproofing Manual. Work shall be acceptable to the asphalt shingle manufacturer.
- B. Pre-Installation Meeting – Conduct a pre-installation meeting at the site prior to commencing work of this Section. Require attendance of entities directly concerned with roof installation. Agenda will include:
 - 1. Installation methods and manufacturer's requirements and recommendations.
 - 2. Safety procedures.

3. Coordination with installation of other work.
4. Availability of roofing materials.
5. Provide two (2) bundles of extra shingles of each color specified.
6. Preparation and approval of substrate and penetrations through roof.
7. Other items related to successful execution of work.
8. Product Compliance – Verify that products conform with all requirements specified.

C. Maintain one copy of manufacturer's application instructions on the project site.

1.4 DELIVERY, STORAGE AND HANDLING

- A. Store products in manufacturer's unopened packaging until ready for installation.
- B. Store and dispose of solvent-based materials and materials used with solvent-based materials in accordance with requirements of Authorities Having Jurisdiction.
- C. Deliver shingles to site in manufacturer's unopened labeled bundles. Promptly verify quantities and conditions. Immediately remove damaged products from site.

1.5 PROJECT ENVIRONMENTAL CONDITIONS

- A. Anticipate and observe environmental conditions (temperature, humidity and moisture) within limits recommended by manufacturer for optimum results. Do not install products under environment conditions outside manufacturer's limits.
- B. Take special care when applying waterproofing shingle underlayment and shingles when ambient or wind chill temperature is below 45 degrees F. Tack in place if it does not adhere immediately to the deck.

1.6 WARRANTY

- A. Manufacturer's Warranty: Furnish shingle manufacturer's warranty for the product.
 1. Lifetime limited warranty.
- B. Warranty Supplement: Provide manufacturer's supplemental warranty to cover labor and materials in the event of a material defect for the following period after completion of application of shingles:
 1. First Ten Years material and labor cost for repair or replacement and tear off.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. GAF/ELK Corp.
- B. Certainteed Corp. – "Landmark Series".
- C. Owens-Corning Corp.

2.2 ASPHALT FIBERGLASS SHINGLES

- A. GAF Timberline HDZ: Conforming to ASTM D 3018 Type I – Self-Sealing, UL Certification of ASTM D 3462, ASTM D 3161/UL 997 130-mph Wind Resistance and UL Class A Fire Resistance, glass fiber mat base, ceramically colored/UV resistant mineral surface granules across entire face of shingle; stain guard; algae-resistance; two piece laminate shingle or approved equal.
- B. Color: As selected by Engineer/Owner from manufacturer's standards.

2.3 SHEET MATERIALS

- A. Eaves Protection: GAF "Weather Watch" or approved equal; ASTM D1970 sheet barrier of self-adhering rubberized asphalt membrane shingle underlayment having internal reinforcement and "split" back plastic release film; provide material warranty equal in duration to that of shingles being applied.
- B. Underlayment: GAF Deck-Armor, ASTM D 4869, ASTM D226, Spunbound Polypropylene, 16 perms (water vapor transmission).

2.4 FLASHING MATERIALS

- A. Sheet Flashing: ASTM A361/A361M; 26 Gauge steel with minimum G115/Z350 galvanized coating.

2.5 ACCESSORIES

- A. Nails: Standard round wire type roofing nails, corrosion resistant; hot-dipped zinc-coated steel, aluminum or chromated steel; minimum 3/8" head diameter; minimum 11 or 16 gage shank diameter; shank to be sufficient length to penetrate through the roof sheathing or 3/4 inch into solid wood, plywood or non-veneer wood decking.
- B. Asphalt Roofing Cement: ASTM D 4586, Type I or II.

2.6 FLASHING FABRICATION

- A. Form flashing to profiles indicated on Drawings and to protect roofing materials from physical damage and shed water.
- B. Form sections square and accurate to profile, in maximum possible lengths, free from distortion or defects detrimental to appearance or performance.
- C. Form eave edge flashing to extend 2" minimum onto roof and 1/4" minimum below sheathing.
- D. Hem exposed edges of flashing 1/4" minimum on underside.
- E. Apply bituminous paint on concealed surfaces of flashing.

2.7 ATTIC VENTILATION

- A. (See Drawings.)

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that roof penetrations and plumbing stacks are in place and flashed to deck surfaces.
- B. Verify deck surfaces are dry and free of ridges, warps or voids.
- C. Verify roof openings are correctly framed.

3.2 ROOF DECK PREPARATION

- A. Follow shingle manufacturer's recommendations for acceptable roof deck material.
- B. Broom clean deck surfaces under eave protection and underlayment prior to their application.

3.3 INSTALLATION – EAVE ICE DAM PROTECTION

- A. Place eave edge and gable metal edge flashing tight with fascia boards. Weather-lap joints 2 inches. Secure flange with nails spaced 8 inches on center.
- B. Apply waterproofing shingle underlayment as eave protection in accordance with manufacturer's instructions.
- C. Extend eave protection membrane minimum 24 inches up slope beyond interior face of exterior wall.

3.4 INSTALLATION – PROTECTIVE UNDERLAYMENT

- A. Roof Slopes 4:12 or Greater: Install one layer of asphalt felt shingle underlayment perpendicular to slope of roof and lap minimum 4 inches over eave protection.
- B. Weather-lap and seal watertight with asphalt roofing cement items projecting through or mounted on roof.

3.5 INSTALLATION – VALLEY PROTECTION

- A. For "closed-cut," "woven," and "open" valleys, first place one ply of waterproofing underlayment, minimum 36 inches wide, centered over valleys. Lap joints minimum of 6 inches. Follow instructions of shingle and waterproofing membrane manufacturer.

3.6 INSTALLATION – METAL FLASHING

- A. Weather-lap joints minimum 2 inches.

- B. Seal work projecting through or mounted on roof with asphalt roofing cement and make weather tight.

3.7 INSTALLATION – ASPHALT SHINGLES

- A. Install shingles in accordance with manufacturer's instructions for product type and application specified.

3.8 FIELD QUALITY CONTROL

- A. Visual inspection of the work will be provided by the Engineer. If conditions are unacceptable, Engineer will notify Contractor and unacceptable work must be corrected before work can continue.

3.9 PROTECTION OF FINISHED WORK

- A. Do not permit traffic over finished roof surface.

END OF SECTION

SECTION 07 7123 – MANUFACTURED GUTTERS AND DOWNSPOUTS

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes pre-finished aluminum gutters and downspouts.
 - 1. Provide downspout boots.

1.2 DESIGN REQUIREMENTS

- A. Conform to SMACNA Manual for sizing components for rainfall intensity determined by storm occurrence of 1 in 10 years.

1.3 SUBMITTALS

- A. Section 01 3300 – Submittal Procedures: Submittal procedures.
- B. Shop Drawings: Indicate locations, configurations, jointing methods, fastening methods, locations, and installation details.
- C. Product Data: Submit data on manufactured components, materials, and finishes.

1.4 QUALITY ASSURANCE

- A. Perform Work in accordance with SMACNA Manual.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Section 01 6000 – Product Requirements: Product storage and handling requirements.
- B. Stack material to prevent twisting, bending, and abrasion, and to provide ventilation. Slope to drain.
- C. Prevent contact with materials during storage capable of causing discoloration, staining, or damage.

1.6 COORDINATION

- A. Section 01 3000 – Administrative Requirements: Coordination and project conditions.
- B. Coordinate Work with downspout discharge pipe inlet.

1.7 WARRANTY

- A. Furnish five-year manufacturer warranty for gutter and downspout finishes.

PART 2 PRODUCTS

2.1 GUTTERS AND DOWNSPOUTS

A. Product Description:

1. Gutters: Sheet metal; minimum 6K profile.
2. Downspouts: Sheet metal; SMACNA rectangular profile, min. 3" x 4".
3. Concrete Splash Pads.

2.2 COMPONENTS

- #### A. Pre-Finished Aluminum Sheet: ASTM B209, manufacturer's standard alloy and temper for specified finish; 0.032 inch thick; plain finish shop pre-coated with PVDF (polyvinylidene fluoride) coating; color as selected from manufacturer's standard color.

2.3 ACCESSORIES

- #### A. Anchors and Supports: Profiled to suit gutters and downspouts.
1. Anchoring Devices: In accordance with SMACNA requirements.
 2. Gutter Supports: Concealed brackets.
 3. Downspout Supports: Concealed brackets.

- #### B. Fasteners: Same material and finish as gutters and downspouts.

- #### C. Protective Backing Paint: FS TT-C-494, bituminous.

2.4 FABRICATION

- #### A. Form gutters and downspouts of profiles and sizes indicated.

- #### B. Fabricate with required connection pieces.

- #### C. Form sections to shape as indicated on Drawings, square, and accurate in size, in maximum possible lengths, free of distortion or defects detrimental to appearance or performance. Provide expansion joints in extended gutter lengths as required.

- #### D. Hem exposed edges of metal.

2.5 FACTORY FINISHING

- #### A. PVDF (polyvinylidene fluoride) coating: Multiple coat, thermally cured, fluoropolymer system conforming to AAMA 2604.

- #### B. Primer Coat: Finish concealed side of metal sheets with primer compatible with finish system, as recommended by finish system manufacturer.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01 3000 – Administrative Requirements: Coordination and project conditions.
- B. Verify surfaces are ready to receive gutters and downspouts.

3.2 PREPARATION

- A. Paint concealed metal surfaces and surfaces in contact with dissimilar metals with protective backing paint to minimum dry film thickness of 15 mil.

3.3 INSTALLATION

- A. Sheet Metal: Joint lengths with formed seams sealed watertight. Flash and seal gutters to downspouts and accessories.
- B. Slope gutters to drain.
- C. Provide concrete splash pads at each outfall.

END OF SECTION

SECTION 07 9000 – JOINT PROTECTION

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes sealants and joint backing, precompressed foam sealers, hollow gaskets, and accessories.

1.2 SUBMITTALS

- A. Section 01 3300 – Submittal Procedures: Requirements for submittals.
- B. Product Data: Submit data indicating sealant chemical characteristics, performance criteria, substrate preparation, limitations, and color availability.
- C. Samples: Submit one sample board illustrating sealant colors for selection. Provide a minimum of eight (8) colors.
- D. Manufacturer's Installation Instructions: Submit special procedures, surface preparation, and perimeter conditions requiring special attention.
- E. Warranty: Include coverage for installed sealants and accessories failing to achieve airtight seal, watertight seal, exhibit loss of adhesion or cohesion, and sealants which do not cure.

1.3 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this Section with minimum five years' experience, and approved by manufacturer.

1.4 ENVIRONMENTAL REQUIREMENTS

- A. Section 01 6000 – Product Requirements.
 - 1. Maintain temperature and humidity recommended by sealant manufacturer during and after installation.

1.5 WARRANTY

- A. Provide manufacturer's five year standard material warranty.
- B. Include coverage for replacement of sealant materials which fail to achieve watertight seal, exhibit loss of adhesion or cohesion, or do not cure, provided sealant has been installed per manufacturer's recommendations.

PART 2 PRODUCTS

2.1 JOINT SEALERS

- A. Manufacturers:
 - 1. Sonneborn
 - 2. Tremco
 - 3. Dow Corning Corp.
 - 4. Sika Corp.
 - 5. Substitutions: Section 01 6000 – Product Requirements.
- B. Products Description:
 - 1. Sealant – Non-sag Polyurethane Sealant: ASTM C920, Grade NS, Class 35, Uses NT, M; single component, chemical curing, non-staining, non-bleeding.
 - a. Size: Width and depth as recommended by manufacturer to achieve specified warranty.
 - b. Color: Colors as selected by Owner.
 - c. Movement Capability: Plus and minus 25 percent.
 - d. Service Temperature Range: -40 to 180 degrees F.
 - e. Shore A Hardness Range: 20 to 35.

2.2 EXPANSION JOINT FILLER

- A. Performance Based Specifications: Expansion joint filler shall be flexible, lightweight, non-staining, polyethylene, and closed cell. It shall be a chemical-resistant, ultraviolet stable, non-absorbent, low density, compressible foam and have the following requirements:
 - 1. Density, ASTM D1751: 2.0 lbs/cu. ft.
 - 2. Compression, ASTM D3575
 - a. 10% Deflection: 10 psi
 - b. 80% Deflection: 125 psi
 - 3. Tensile Strength, ASTM D3575: 55 psi
 - 4. Water Absorption, ASTM D3575: 0.5% vol. maximum
 - 5. Temperature Stability: -40 to 160 degrees F.
 - 6. Size and Shape: As indicated on Drawings.
 - 7. Applications: As indicated on Drawings.

2.3 ACCESSORIES

- A. Primer: Non-staining type, recommended by sealant manufacturer to suit application.
- B. Joint Cleaner: Non-corrosive and non-staining type, recommended by sealant manufacturer; compatible with joint forming materials.
- C. Joint Backing: Round foam rod compatible with sealant; oversized 30 to 50 percent larger than joint width.
- D. Bond Breaker: Pressure sensitive tape recommended by sealant manufacturer to suit application.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01 3000 – Administrative Requirements: Coordination and project conditions.
- B. Verify substrate surfaces and joint openings are ready to receive work.
- C. Verify joint backing and release tapes are compatible with sealant.

3.2 PREPARATION

- A. Remove loose materials and foreign matter impairing adhesion of sealant.
- B. Clean and prime joints.
- C. Perform preparation in accordance with ASTM C1193.
- D. Protect elements surrounding Work of this Section from damage or disfiguration.

3.3 INSTALLATION

- A. Perform installation in accordance with ASTM C1193.
- B. Measure joint dimensions and size joint backers to achieve width-to-depth ratio, neck dimension, and surface bond area as recommended by manufacturer, except where specific dimensions are indicated.
- C. Install bond breaker where joint backing is not used.
- D. Install sealant free of air pockets, foreign embedded matter, ridges, and sags.
- E. Apply sealant within recommended application temperature ranges. Consult manufacturer when sealant cannot be applied within these temperature ranges.
- F. Tool joints concave.
- G. Precompressed Joint Filler: Do not stretch; avoid joints except at corners, ends, and intersections; install with face flush adjoining surface.

3.4 CLEANING

- A. Section 01 7000 – Execution and Closeout Requirements.
- B. Clean adjacent soiled surfaces.

3.5 PROTECTION OF INSTALLED CONSTRUCTION

- A. Protect sealants until cured.

SECTION 08 1342 –FRP DOORS AND FRAMES

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Flush Fiberglass (FRP) entrance doors with urethane foam filled insulation.

1.2 SUBMITTALS

- A. Section 01 3300 – Submittal Procedures: requirements for submittals.
- B. For each type of door and frame indicated, include door designation, type, level and model, material descriptions, core description, construction details, label compliance, sound and fire resistance rating (if applicable) and finishes.
- C. Shop Drawings – Within 30 calendar days after the Contractor has received the Owner’s “Notice to Proceed” submit:
 - 1. Elevations of each door design.
 - 2. Details of door including vertical and horizontal edge details.
 - 3. Frame details for each frame type including dimensioned profiles.
 - 4. Details and locations of reinforcement and preparation for hardware.
 - 5. Details of each different wall opening condition.
 - 6. Details of anchorages, accessories, joints and connections.
 - 7. Coordination of glazing, frames and stops with glass and glazing requirements.
 - 8. Manufacturer’s specifications and other data needed to prove compliance with specified requirements.
 - 9. Manufacturer’s recommended installation procedure which, when approved, shall be the actual installation procedures used on this work.
- D. Door Schedule: Use same reference designations indicated on Drawings in preparing schedule for doors and frames.

1.3 QUALITY ASSURANCE

- A. Door and Frame Standard: Comply with ANSI A250.8, unless more stringent requirements are indicated.
- B. Installer Qualifications: An installer which has had successful experience with installation of the same or similar units required for this project and other projects of similar size and scope.
- C. Manufacturer Qualifications: A Manufacturer capable of fabricating aluminum – framed flush entrance doors and storefronts that meet or exceed performance requirements indicated and of these documents.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Deliver Doors and Frames: Properly wrapped or crated to provide protection during transit and job storage. Provide additional protection to prevent damage to finish of factory-finished doors and frames.
- B. Inspect doors and frames on delivery for damage, and notify shipper and supplier if damage is found. Minor damages may be repaired, provided refinished items match new work and are acceptable to Engineer. Remove and replace damaged items that cannot be repaired as directed.
- C. Store doors and frames at building site protected and under cover.

1.5 COORDINATION

- A. Section 01 3000 – Administrative Requirements: Requirements for coordination.
- B. Coordinate Work with door opening construction, door frame, and door hardware installation.

PART 2 PRODUCTS

2.1 FIBERGLASS (FRP) DOORS

- A. Manufacturers:
 - 1. Subject to compliance requirements. Provide products by one of the following:
 - a. Kawneer Company, Inc.
 - b. Substitutions: Allowed, subject to approval prior to bid date.
 - 2. Door Style: Flushline; Vertical Stile 5"; Top Rail 5"; and Bottom Rail 5".
 - 3. The door face sheet shall be sandstone textured fiberglass reinforced polyester (FRP) 0.090" thick.
 - 4. Vision lites shall be aluminum framed vision lites.
 - 5. Glass for vision lites to be 2" thick insulated laminated safety glass.
 - 6. Glazing gaskets shall be either EPDM elastomeric extrusions or a thermoplastic elastomer.
- B. MATERIALS
 - 1. Aluminum Extrusions: Alloy and temper recommended by aluminum-framed flush entrance doors manufacturer for strength, corrosion, resistance, and application of required finish and not less than 0.090" wall thickness at any location for the main frame and sash members.
 - 2. Aluminum-Framed Flush Entrance Door Core: Shall be froth-in-place urethane foam at 5.0 lb/cu. ft. density, R-value: minimum 9; U-value = 0.11, and shall have "0" O.D.P. = "Zero" Ozone Depletion Potential and contains no CFC's or HCFC's.
 - 3. Fasteners: Aluminum, non-magnetic stainless steel or other materials to be non-corrosive and compatible with aluminum-framed flush entrance door members, trim hardware, anchors, and other components.
 - 4. Anchors, Clips, and Accessories: Aluminum, non-magnetic stainless steel, or zinc-coated steel or iron complying with ASTM B633 for SC 3 severe service conditions or other suitable zinc coating; provide sufficient strength to withstand design pressure indicated.
 - 5. Reinforcing Members: Aluminum, non-magnetic stainless steel, or nickel/chrome-plated steel complying with ASTM B456 for Type SC 3 severe service conditions, or zinc-coated

steel or iron complying with ASTM B633 for SC 3 severe service conditions or other suitable zinc coating; provide sufficient strength to withstand design pressure indicated.

C. FRAMING SYSTEM

1. Storefront Entrance Framing Non-Thermal: Trifab 450, 4-1/2" deep with 1-3/4" sightline.
2. Reinforcements: Manufacturer's standard high-strength aluminum with non-staining, non-ferrous shims for aligning system components.
3. Fasteners and Accessories: Manufacturer's standard corrosion-resistant, non-staining, non-bleeding fasteners and accessories compatible with adjacent materials. Where exposed, shall be stainless steel.
4. Perimeter Anchors: When steel anchors are used, provide insulation between steel material and aluminum material to prevent galvanic action. Anchors for masonry walls to be of the wire type. Floor anchors to be provided at each jamb. Except on weather-stripped frames, punch the stop for three (3) silencers on a single door and two (2) on double door frames.

D. GLAZING

1. Glazing: As specified in Section 08 8000 and as indicated on the Door Schedule on the Drawings.

E. HARDWARE

1. Hardware shall be as indicated on the Door Hardware Schedule on the Drawings.

F. FABRICATION

1. Fabricate aluminum-framed flush entrance doors in sizes indicated. Include a complete system for assembling components and anchoring doors.
2. Fabricate aluminum-framed flush entrance doors that are reglazable, when vision lites are used, without dismantling perimeter framing.
 - a. Door corner construction shall consist of mitered corners with angle alignment blocks secured with 3/8" full-width galvanized steel tie rods.
 - b. Accurately fit and secure joints and corner. Make joints hairline in appearance.
 - c. Face sheets shall lap and interlock with stile and rails to create a hollow cavity for the froth-in-place urethane core.
 - d. Prepare components with internal reinforcement for door hardware.
 - e. Arrange fasteners and attachments to conceal from view.
3. Weather Stripping: Provide weather stripping locked into extruded grooves in door panels or frames as indicated on manufacturer's drawings and details.

G. FINISHES, GENERAL

1. Comply with AAMA-AFPA "Anodic Finishes/Painted Aluminum" for recommendations for applying designating finishes.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify opening sizes and tolerance are acceptable.

3.2 INSTALLATION

- A. Install doors and frames in accordance with manufacturer's requirements.
- B. Frames:
 - 1. Prior to installation, all frames must be checked for rack, twist, and out of square conditions.
 - 2. Place frames prior to enclosing walls and ceilings. Set frames accurately in position, plumbed and braced securely until permanent anchors are set. Remove shipping bar spreader and insert a wood spreader cut to the opening width, notched to clear the stops.
 - 3. Comply with Drawings, shop drawings, and manufacturer's written instructions for installing frames.
 - 4. Set sill threshold in bed of approved sealant for weather tight construction.
 - 5. Separate aluminum and other corrosive surfaces from sources of corrosion or electrolytical action at points of contact with other materials.
- C. Doors:
 - 1. Install doors plumb and in true alignment in a prepared opening and fasten them to achieve the maximum operational effectiveness and appearance.
 - 2. Proper door clearance must be maintained in accordance with SDI-110.
 - 3. Where necessary, only metal hinge shims are accessible to maintain clearances.
 - 4. "Installation Guide for Doors and Hardware" published by DHI is recommended for further details.
- D. Hardware must be applied in accordance with hardware manufacturer's templates and instructions.

3.3 ADJUST AND CLEAN

- A. Check and re-adjust operating finish hardware items in hollow metal work just prior to final inspection. Leave work in complete and proper condition.

3.4 SCHEDULES

- A. After installation, copies of the door schedules are to be given to the Owner when the building is accepted.

END OF SECTION

SECTION 08 3323 – OVERHEAD COILING DOORS

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes overhead coiling door, operating hardware, electric operation.
 - 1. Provide wiring from electric circuit disconnect to door operator to control station.

1.2 SYSTEM DESCRIPTION

- A. Electric Operation: Electric motor operated unit with manual override in case of power failure.

1.3 DESIGN REQUIREMENTS

- A. Wind Loads: Design door assembly to withstand wind/suction load of 20 psf, with maximum deflection of $L/120$, and without damage to door or assembly components, in conformance with ASTM E330.
- B. Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories, Inc., as suitable for purpose specified.
- C. Operation: Design door assembly, including operator, to operate for not less than 20,000 cycles.

1.4 SUBMITTALS

- A. Section 01 3300 – Submittal Procedures: Requirements for submittals.
- B. Shop Drawings: Indicate pertinent dimensioning, anchorage methods, hardware locations, and installation details.
- C. Product Data: Submit general construction, component connections and details, wiring diagram and electrical equipment.
- D. Samples: Submit two door slats, 12 x 12 inch in size illustrating operation, shape, color and finish texture.
- E. Manufacturer's Installation Instructions: Indicate installation sequence and procedures, and adjustment and alignment procedures.

1.5 CLOSEOUT SUBMITTALS

- A. Section 01 7000 – Execution and Closeout Requirements.
- B. Operation and Maintenance Data: Submit lubrication requirements and frequency, and periodic adjustments required.

1.6 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this Section with minimum three years' experience.
- B. Installer: Company specializing in performing work of this Section with minimum three years' experience.

PART 2 PRODUCTS

2.1 OVERHEAD COILING DOORS

- A. Manufacturers:
 - 1. Overhead Door Co., Inc. (Model 625)
 - 2. Raynor – Duracoil Door
 - 3. Substitutions: Section 01 6000 – Product Requirements.

2.2 COMPONENTS

- A. Curtain: Conform to following:
 - 1. Steel Slats: Interlocking, flat, minimum 20 gage of ASTM A653/A653M steel, minimum galvanized coating designation G90 coating class.
 - a. Type: Sandwich slat construction with manufacturer's standard insulated core with minimum 3/4" thickness and minimum R-value of 6.
 - b. Nominal Slat Size: as required by required length.
 - c. Slat Ends: Each slat fitted with end locks to act as wearing surface in guides and to prevent lateral movement.
 - d. Curtain Bottom: Fitted with angles, channels, or tubes to provide reinforcement and positive contact with floor in closed position.
- B. Guides: Minimum 3/16 inch; galvanized steel conforming to ASTM A653/A653M, minimum galvanized coating designation G90 coating class.
 - 1. Furnish continuous angles of profile to retain door in place with snap-on trim; mounting brackets of same material.
- C. Roller Shaft Counterbalance: Steel pipe and helical steel spring system, capable of producing torque sufficient to ensure smooth operation of curtain from any position and capable of holding position at mid-travel; with adjustable spring tension.
- D. Hood Enclosure: Square shape, minimum 24 gage galvanized steel; internally reinforced to maintain rigidity and shape, with external seal to minimize heat loss between leading edge of hood and curtain.
- E. Hardware:
 - 1. Handle: Inside side mounted, adjustable keeper, spring activated latch bar with feature to keep in locked or retracted position; interior handle.
 - 2. Weatherstripping (Exterior Assemblies): Moisture and rot proof, resilient type for complete weathertight installation.

F. Manual Operation: Chain hoist.

2.3 SHOP FINISHING

A. Curtain Slats: Precoated paint finish, manufacturer's standard type; color as selected.

B. Steel Guides and Hood Enclosure: Precoated paint finish, manufacturer's standard type; color as selected.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify opening sizes, tolerances and conditions are acceptable.

3.2 INSTALLATION

A. Use anchorage devices to securely fasten assembly to wall construction and building framing without distortion or stress.

B. Securely and rigidly brace components suspended from structure. Secure guides to structural members only.

C. Fit and align assembly including hardware; level and plumb, to provide smooth operation.

D. Coordinate installation of sealants and backing materials at frame perimeter as specified in Section 07 9000 – Joint Protection.

E. Install perimeter trim and closures.

3.3 ERECTION TOLERANCES

A. Maintain dimensional tolerances and alignment with adjacent work.

B. Maximum Variance from Plumb: 1/16 inch.

C. Maximum Variation from Level: 1/16 inch.

D. Longitudinal or Diagonal Warp: Plus or minus 1/8 inch per 10 ft straight edge

3.4 ADJUSTING

A. Section 01 7000 – Execution and Closeout Requirements.

B. Adjust door, hardware and operating assemblies for smooth and noiseless operation.

3.5 CLEANING

A. Section 01 7000 – Execution and Closeout Requirements.

- B. Clean door and components.
- C. Remove labels and visible markings.

END OF SECTION

SECTION 08 5113 – ALUMINUM WINDOWS

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes: Extruded aluminum window system and accessories.

1.2 SUBMITTALS

- A. Section 01 3300 – Submittal Procedures: Requirements for submittals.
- B. Product Data: Submit component dimensions, anchorage and fasteners, glass, internal drainage, and typical details.
- C. Shop Drawings: Indicate opening dimensions, framed opening tolerances, affected related Work; and installation requirements.
- D. Manufacturer's Certificates: Certify Product performance rating by independent third party such as AAMA, CAWM, or NFRC as meeting or exceed specified requirements.

1.3 QUALITY ASSURANCE

- A. Perform Work in accordance with the following:
 - 1. Aluminum Windows: Fabricate window assemblies in accordance with AAMA 101 for types of windows required.
 - 2. Insulated Glass: Fabricate insulated glass units in accordance with GANA Glazing Manual.
 - 3. Safety Glass: Conform to CPSC 16 CFR 1201 and applicable codes.

1.4 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing commercial aluminum windows with minimum three years' experience.
- B. Installer: Company specializing in installation of commercial aluminum windows with minimum three years' experience.

1.5 DELIVERY, STORAGE, AND PROTECTION

- A. Section 01 6000 – Product Requirements: Requirements for transporting, handling, storing, and protecting products.
- B. Handle Work of this Section in accordance with AAMA MCWM-1 – Curtain Wall Manual #10.
- C. Protect factory-finished aluminum surfaces with wrapping or strippable coating. Do not use adhesive papers or sprayed coatings that bond when exposed to sunlight or weather.

1.6 AMBIENT CONDITIONS

- A. Do not install glazing materials when ambient temperature is less than 40 degrees F.
- B. Maintain this minimum temperature during and after installation of glazing materials.

1.7 WARRANTY

- A. Furnish five year manufacturer warranty for insulated glass units from seal failure, interpane dusting or misting, and replacement of same.
- B. Warranty: Include coverage for degradation of color finish.

PART 2 PRODUCTS

2.1 ALUMINUM WINDOWS

- A. Manufacturers:
 - 1. Kawneer Series 451T framing system with 8225TL System Isolock (thermally broken) 2-1/4 inch frame depth, project-out windows.
 - 2. EFCO Corporation Series S403 framing system with Type 2700 (thermally broken) 2 inch frame depth, project-out windows.
 - 3. Substitutions: Accepted. Prior approval must be given before bid process is completed.
- B. Product Description: Aluminum windows thermally broken; sill flashings. Including perimeter trims, stools, accessories, shims, anchors and perimeter sealing.
 - 1. Glazing: Type 2; see Section 08 8000 – Glazing.
- C. Window Configuration: F-fixed/operable (See Drawings).
- D. Performance / Design Criteria:
 - 1. Primary Performance Requirements: Aluminum windows to meet the minimum.
 - 2. Wind-Borne Debris Loads: Design and size glass to withstand the following loads:
 - a. ASTM E1886 and ASTM E1996; large missile impact test.
 - b. Small missile impact test.
 - 3. Wind Load Deflection: In accordance with AAMA 101 with full recovery of glazing materials.
 - 4. Assembly: To accommodate, without damage to components or deterioration of seals, movement between window and perimeter framing, deflection of lintel.
 - 5. System Internal Drainage: Drain water entering joints, condensation occurring in glazing channels, and migrating moisture occurring within system, to exterior by weep drainage network.
 - 6. Air Infiltration: Limit air infiltration through assembly to 0.3 cfm/sf of wall area, measured at reference differential pressure across assembly of 1.57 psf when tested in accordance with ASTM E283.
 - 7. Thermal Performance:
 - a. Comply with ICC International Energy Conservation Code for climate zone in which the project is located.

2.2 COMPONENTS

- A. Extruded Aluminum: ASTM B221
- B. Insulating Glass: see Section 08 8000 – Glazing.

2.3 FABRICATION

- A. Fabricate components with minimum clearances and shim spacing around perimeter of assembly, yet enabling installation and dynamic movement of perimeter seal.
- B. Accurately fit and secure joints and corners. Make joints flush, hairline and weatherproof.
- C. Prepare components to receive anchor devices. Fabricate anchors.
- D. Arrange fasteners and attachments to ensure concealment from view.

2.4 FINISHES

- A. Finish Coatings: Conform to AAMA 611.
- B. Exterior Surfaces: Clear anodized.
- C. Interior Surfaces: Clear anodized.
- D. Clear Anodized Aluminum Surfaces: AA-M12C2A41 non-specular as fabricated mechanical finish, medium matte chemical finish, and Architectural Class I 0.7 mils clear anodized coating.
- E. Apply coat of bituminous paint on concealed aluminum surfaces in contact with cementitious or dissimilar materials.

2.5 ACCESSORIES

- A. Fasteners and Anchors: Stainless steel.
- B. Bituminous Paint: Fibered asphaltic type.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01 7000 – Execution and Closeout Requirements.
- B. Verify wall openings and adjoining air and vapor seal materials are ready to receive work of this Section.

3.2 INSTALLATION

- A. Attach window frame and shims to perimeter opening to accommodate construction tolerances and other irregularities.
- B. Align window plumb and level, free of warp or twist. Maintain dimensional tolerances and alignment with adjacent work.
- C. Install sill and sill end angles.
- D. Install thermal isolation where components penetrate or disrupt building insulation. Pack fibrous insulation in shim spaces at perimeter of assembly to maintain continuity of thermal barrier.
- E. Coordinate attachment and seal of perimeter air barrier and vapor retarder materials.

3.3 TOLERANCES

- A. Maximum Variation from Level or Plumb: 1/16 inch every 3 ft non-cumulative or 1/8 inch per 10 ft. whichever is less.

3.4 FIELD QUALITY CONTROL

- A. Section 01 7000 – Execution and Closeout Requirements.
- B. Inspection to monitor quality of installation and glazing.

3.5 CLEANING

- A. Section 01 7000 – Execution and Closeout Requirements.
- B. Remove protective material from factory-finished aluminum surfaces.
- C. Wash surfaces by method recommended and acceptable to sealant and window manufacturer; rinse and wipe surfaces clean.
- D. Remove excess sealant by moderate use of mineral spirits or other solvent acceptable to sealant and window manufacturer.

END OF SECTION

SECTION 08 7100 – DOOR HARDWARE

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes door hardware for steel doors and related accessories.

1.2 SUBMITTALS

- A. Section 01 3300 – Submittal Procedures: Requirements for submittals.
- B. Shop Drawings:
 - 1. Indicate locations and mounting heights of each type of hardware, schedules, catalog cuts.
 - 2. Submit manufacturer's parts lists.
- C. Samples:
 - 1. Submit one sample illustrating style, color, and finish, as indicated on the Drawings.
- D. Manufacturer's Installation Instructions: Submit special procedures, and perimeter conditions requiring special attention.

1.3 CLOSEOUT SUBMITTALS

- A. Section 01 7000 – Execution and Closeout Requirements.
- B. Project Record Documents: Record actual locations of installed cylinders and their master key code.
- C. Operation and Maintenance Data: Submit data on operating hardware, lubrication requirements, and inspection procedures related to preventative maintenance.
- D. Keys: Deliver with identifying tags to Owner by security shipment direct from hardware supplier.

1.4 QUALITY ASSURANCE

- A. Perform Work in accordance with the following requirements:
 - 1. ANSI A156 series.
 - 2. UL 305.

1.5 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this Section with minimum three years' experience.
- B. Hardware Supplier: Company specializing in supply commercial door hardware with minimum three years' experience.

C. Hardware Supplier Personnel: Employ qualified person to assist in Work of this Section.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Section 01 6000 – Product Requirements: Product storage and handling requirements.
- B. Package hardware items individually with necessary fasteners, instructions, and installation templates, when necessary; label and identify each package with door opening code to match hardware schedule.

1.7 COORDINATION

- A. Section 01 3000 – Administrative Requirements: Coordination and project conditions.
- B. Coordinate work with other directly affected sections involving manufacture or fabrication of internal reinforcement for door hardware and recessed items.
 - 1. Provide templates or actual hardware as required to ensure proper preparation of doors and frames.
- C. Sequence installation to accommodate required utility connections.
- D. Coordinate Owner's keying requirements during course of Work.

1.8 WARRANTY

- A. Furnish five year manufacturer warranty for locksets and door closers.

1.9 MAINTENANCE MATERIALS

- A. Furnish special wrenches and tools applicable for each different and for each special hardware component.

PART 2 PRODUCTS

2.1 COMPONENTS

- A. General Hardware Requirements: When not specifically indicated, comply with applicable ANSI A156 standard for type of hardware required. Furnish each type of hardware with accessories as required for applications indicated and for complete, finished, operational doors.
 - 1. Templates: Furnish templates or physical hardware items to door and frame manufacturers sufficiently in advance to avoid delay in Work.
 - 2. Reinforcing Units: Furnished by door and frame manufacturers; coordinated by hardware supplier or hardware manufacturer.
 - 3. Fasteners: Furnish as recommended by hardware manufacturer and as required to secure hardware.
 - a. Finish: Match hardware item being fastened.
- B. Substitutions permitted per Section 01 6000 – Product Requirements.

- C. Hinges: ANSI A156.1, full mortise type.
1. Number: Furnish minimum three hinges for each door leaf.
 2. Size and Weight: 4-1/2 inch x 4-1/2 inch, heavy weight ball bearing.
 3. Pins: Furnish non-ferrous hinges with non-removable pins (NRP) at exterior and locked outswinging doors, non-rising pins at interior doors.
 4. Finish: As selected by Owner.
 5. Acceptable Manufacturers:
 - a. Bommer Industries, Inc. BB5006
 - b. Hager Companies BB1199
 - c. McKinney Products Company T4A3386
 - d. Stanley Hardware FBB199
- D. Mortise Locksets: Typical 2-3/4 inch backset. Furnish standard strikes with extended lips.
1. Locksets: Grade 1
 2. Finish: As selected by Owner.
 3. Acceptable Manufacturers:
 - a. DORMA Architectural Hardware ML Series
 - b. Schlage Locks L9000 Series
 - c. Sargent Lock Co. 8200 Series
- E. Exit Devices: ANSI A156.3, Grade 1 rim type. Standard strikes with extended lips.
1. Types: Suitable for doors requiring exit devices.
 2. Finish: As selected by Owner.
 3. Acceptable Manufacturers:
 - a. DORMA Architectural Hardware 9000 Series
 - b. Precision Hardware 2000 Series
 - c. Sargent Lock Co. 9900 Series
 - d. Von Duprin, Inc. 98 Series
- F. Key Cylinders: ANSI A156.5, Grade 1, interchangeable core type cylinders.
1. Keying: Key to Owner's existing keying system.
- G. Closers: ANSI A156.4 modern type with cover, surface-mounted closers; full rack and pinion type with steel spring and non-freezing hydraulic fluid.
1. Adjustability: Furnish controls for regulating closing, latching, speeds, and back checking.
 2. Arms: Type to suit individual condition.
 3. Location: Mount closers on inside of exterior doors, room side of interior doors typical; mount on pull side of other doors.
 4. Operating Pressure: Maximum operating pressure as follows:
 - a. Interior Doors: Maximum 5 pounds.
 - b. Exterior Doors: Maximum 8.5 pounds.
 5. Acceptable Manufacturers:
 - a. DORMA Architectural Hardware 8600 Series
 - b. LCN Closers 1460 Series
 - c. Sargent Manufacturing 1400 Series
- H. Weatherstripping:
1. Acceptable Manufacturers:
 - a. Hager Company 878

- b. K. N. Crowder W-18
- c. National Guard Products 134N
- d. Pemko Manufacturing 319_R

I. Door Bottom:

- 1. Acceptable Manufacturers:
 - a. Hager Company 778
 - b. K. N. Crowder CT-745
 - c. National Guard Products 19V
 - d. Pemko Manufacturing 216_

J. Threshold: ADA compliant

- 1. Acceptable Manufacturers:
 - a. Hager Company 513
 - b. K. N. Crowder CT-65
 - c. Pemko Manufacturing 1665_
 - d. Reese S803

K. Locking Bolt: Concealed, provide one at top and bottom of inactive leaf of double door with dustproof strike.

- 1. Acceptable Manufacturers:
 - a. Hager Company 282, 280
 - b. Hiawatha, Inc. 3780F, 382
 - c. Ives FB457, DP2
 - d. Rockwood Manufacturing 550, 570

L. Wall Stop: Wall mounted, concave rubber.

- 1. Acceptable Manufacturers:
 - a. Hager Company
 - b. Hiawatha, Inc.
 - c. Ives WS407CCV
 - d. Rockwood Manufacturing 403

M. Astragal: T-shaped, with weather seal

- 1. Acceptable Manufacturers:
 - a. National Guard Products
 - b. Pemko Manufacturing 355_S
 - c. Reese

2.2 ACCESSORIES

A. Lock Trim: Furnish levers with escutcheon plate as selected from manufacturer's full range of levers.

- 1. Finish as selected by Owner.

B. Through Bolts: Do not permit through bolts and grommet nuts on door faces in occupied areas unless no alternative is possible.

2.3 FINISHING

- A. Finishes: As selected from manufacturer's standard finish chart.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01 3000 – Administrative Requirements: Coordination and project conditions.
- B. Verify doors and frames are ready to receive door hardware and dimensions are as indicated on shop drawings.

3.2 INSTALLATION

- A. Coordinate mounting heights with door and frame manufacturers. Use templates provided by hardware item manufacturer.

3.3 ADJUSTING

- A. Adjust hardware for smooth operation.

3.4 PROTECTION OF INSTALLED CONSTRUCTION

- A. Do not permit adjacent work to damage hardware or hardware finish.

END OF SECTION

THIS PAGE LEFT

BLANK INTENTIONALLY

SECTION 08 8000 – GLAZING

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes:
 - 1. Glass glazing for doors and windows.
 - 2. Glass glazing materials and installation requirements are included in this Section for other sections referring this Section.

1.2 SUBMITTALS

- A. Section 01 3300 – Submittal Procedures: Requirements for submittals.
- B. Shop Drawings:
 - 1. Indicate sizes, layout, thicknesses, and loading conditions for glass.
- C. Product Data:
 - 1. Glass: Provide structural, physical, and thermal and solar optical performance characteristics, size limitations, and special handling or installation requirements.
 - 2. Glazing Sealants, Compounds and Accessories: Provide chemical, functional, and environmental characteristics, limitations, special application requirements. Identify available colors where exposed.
- D. Samples:
 - 1. Glass: Submit one sample, illustrating each glass unit and coloration.

1.3 QUALITY ASSURANCE

- A. Perform Work in accordance with GANA Glazing Manual, GANA Sealant Manual for glazing installation methods.

1.4 QUALIFICATIONS

- A. Installer: Company specializing in performing Work of this Section with minimum four years' experience approved by manufacturer.

1.5 ENVIRONMENTAL REQUIREMENTS

- A. Do not install glazing when ambient temperature is less than 50 degrees F.
- B. Maintain minimum ambient temperature before, during and 24 hours after installation of glazing compounds.

1.6 WARRANTY

- A. Furnish five year warranty to include coverage for sealed glass units from seal failure, interpane dusting or misting, and replacement of same.

PART 2 PRODUCTS

2.1 INSULATING GLASS PRODUCTS

- A. Insulating Glass Manufacturers:
 - 1. Arch Aluminum & Glass Co., Inc.
 - 2. Guardian Industries Corp; SunGuard
 - 3. Oldcastle Building Envelope
 - 4. Pilkington North America
 - 5. PPG Industries, Inc.
 - 6. Substitutions: Section 01 6000 – Product Requirements.
- B. Insulating Glass: ASTM E2190 certified by Insulating Glass Manufacturers Alliance; with glass elastomer edge seal; place reflective film within unit: purge interpane space with dry air.
 - 1. Total Unit Thickness: 1 inch.
 - 2. Insulating Glass Unit Edge Seal Construction: Aluminum, bend and soldered corners.
- C. Type 1, Double Pane Insulating Glass:
 - 1. Total Unit Thickness: 1 inch.
 - a. Each Lite: 1/4" glass, tempered/annealed as required
 - 2. U-Factor Winter: 0.28
 - 3. Solar Heat Gain Coefficient: 0.35
 - 4. UV Transmittance: 9%
 - 5. Visible Light Transmittance: 34%
 - 6. Solar Transmittance: 26%
 - 7. Reflectance Inside: 30%
 - 8. Reflectance Outside: 13%

2.2 LAMINATED GLASS

- A. Comply with ASTM C1172 for kinds of laminated glass indicated on Drawings.
- B. Interlayer Material: Polyvinyl Butyral sheets or cured resin.
- C. Total Unit Thickness: 1 inch.
 - 1. Each lite 1/4" thick (outside).
 - 2. Each lite 1/4" tempered safety (inside) clear.
 - 3. Interspace content: Argon.

2.3 GLAZING ACCESSORIES

- A. Setting Blocks: Elastomeric material recommended by glass manufacturer.

- B. Spacer Shims: Elastomeric material recommended by glass manufacturer.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01 3000 – Administrative Requirements: Coordination and project conditions.
- B. Verify openings for glazing are correctly sized and within acceptable tolerance.
- C. Verify surfaces of glazing channels or recesses are clean, free of obstructions impeding moisture movement, weeps are clear, and ready to receive glazing.

3.2 PREPARATION

- A. Clean contact surfaces with solvent and wipe dry.
- B. Seal porous glazing channels or recesses with substrate compatible primer or sealer.
- C. Prime surfaces scheduled to receive sealant.

3.3 INSTALLATION

- A. Perform installation in accordance with GANA Glazing Manual.
 - 1. Glazing Sealants: Comply with ASTM C1193.
- B. Exterior Dry Method (Gasket Glazing):
 - 1. Cut glazing gasket to length; install on glazing pane. Seal corners by butting tape and sealing junctions with compatible butyl sealant.
 - 2. Place setting blocks at ¼ points with edge block no more than 6 inches from corners.
 - 3. Rest glazing on setting blocks and push against fixed stop with sufficient pressure to attain full contact.
 - 4. Install removable stops without displacing glazing spline. Exert pressure for full continuous contact.

3.4 MANUFACTURER'S FIELD SERVICES

- A. Glas and glazing product manufacturers to provide field surveillance of installation.
- B. Monitor and report installation procedures, and unacceptable conditions.

3.5 CLEANING

- A. Section 01 7000 – Execution and Closeout Requirements.

END OF SECTION

SECTION 09 7001 – DECORATIVE QUARTZ EPOXY FLOORING SYSTEM

PART 1 GENERAL

1.1 RELATED WORK SPECIFIED ELSEWHERE

- A. Cast-In-Place Concrete: Section 03 3000.
- B. Painting: Section 09 9000.

1.2 QUALITY ASSURANCE

- A. Acceptance Sample:
 - 1. A minimum of four (4) one foot square mock up samples of the specified flooring system shall be prepared showing a representative sample of colors and slip resistance. Color and amount of skid resistant additive shall be approved by the Owner.
 - 2. The installed flooring system shall duplicate the acceptance sample in thicknesses of each respective film layer, color, texture and degree of overall appearance and finish.
- B. The finished floor coating shall be uniform in color, texture and appearance. All edges that terminate at walls, floor discontinuities and other embedded items shall be sharp, uniform and cosmetically acceptable with no thick or ragged edge. The Contractor shall work out an acceptable masking technique to ensure the acceptable finish of all edges.
- C. Reference Standards:
 - 1. ACI 308 - Standard Practice for Curing Concrete.
 - 2. ACI 302.R1-80 - Guide for Concrete Floor and Slab Construction.
 - 3. United States Department of Agriculture Acceptance.
- D. Contractor Prequalification Requirements:
 - 1. Each bidder for this project shall be a rep-qualified and "Approved Applicator" at the time of bid submittal with 5 years minimum experience.
 - 2. Each approved applicator shall have been pre-qualified in all phases of surface preparation and application of the specified floor coating system.

1.3 SUBMITTALS

- A. Acceptance Sample: the acceptance sample shall be a one foot square sample of Tnemec flooring system applied to hardboard or similar backing for rigidity and handling.
- B. Manufacturer's Literature: Descriptive data and specific recommendations for initiating, mixing, application and curing.
- C. Manufacturer's Material Safety Data Sheets (MSDS) for each respective product being used.

1.4 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. All material shall be delivered in original manufacturer's sealed containers with all pertinent labels intact and legible.
- B. Store materials in protected areas at a temperature between 70° F and 90° F.
- C. Follow all manufacturer's specific instructions and prudent safety practices for storage and handling.

1.5 JOB CONDITIONS

- A. The material, air and surface temperatures shall be in the range of 70° F to 85° F during application and cure.
- B. The relative humidity in the specific location of the application shall be less than 85% and the surface temperature shall be at least 5° F above the dew point.
- C. The surfaces to be coated shall have been prepared as specified in Section 3.2 – Surface Preparation.
- D. Protect all adjacent surfaces not to be coated with masking and covers.

PART 2 PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Tnemec Company Inc., 6800 Corporate Drive, Kansas City, MO 64120-1372; (800) 863-6221. Distributed by Righter Group, Inc., 187 Ballardvale St., Suite A190, Wilmington, MA 01887; (800) 533-3003.
- B. Approved equal.

2.2 APPROVED MATERIALS

- A. Tnemec Series 222 Deco-Tread Epoxy Flooring System with 4" rolled radius integral cove base.
 - 1. Saturating Prime Coat: Tnemec Series 201 Epoxoprime 100% Solids Epoxy Primer/Sealer.
 - 2. Intermediate Coat: Tnemec Series 222 Deco-Tread 100% Solids Epoxy with colored quartz broadcast, x 2 to achieve 1/8" thickness.
 - 3. Grout Coat: Tnemec Series 222 Deco-Tread or Series 284 Deco-Clear 100% Solids Clear Epoxy.
 - 4. Topcoat: Tnemec Series 284 or 285 Deco-Clear 100% Solids Clear Epoxy.
 - 5. Skid Resistant Additive: Tnemec Series 211 Glass Bead.

2.3 MATERIAL PREPARATION

- A. Mix all material in strict accordance with the manufacturer's specific instructions and procedures for the respective material being used.

- B. Pot life and cure times are very short; mix only enough product to satisfy immediate application requirements.

PART 3 EXECUTION

3.1 PRE-WORK INSPECTION

- A. Examine all surfaces to be coated with these materials and report any conditions that adversely affect the appearance or performance of the coating systems and which cannot be put into acceptable condition by the preparatory work specified in Paragraph 3.2.
- B. Do not proceed with surface preparation and application until the surface is acceptable or authorization to proceed is given by the Engineer.
- C. Ensure that floor drains, proximate equipment and any other items sensitive to dust and contamination are properly and adequately masked and protected.

3.2 SURFACE PREPARATION

- A. General:
 - 1. Initially, dislodge dirt, mortar, spatter and other dry surface accumulations and contamination by scraping, brushing, sweeping, vacuuming or compressed air blow-down.
 - 2. Surfaces that are heavily contaminated with petroleum or other process products shall be cleaned with the appropriate degreaser, detergent or other effective cleaner/surfactant followed by thoroughly rinsing with fresh water to remove the accumulation prior to mechanical cleaning efforts. Mechanical cleaning will not remove such deposits, but will only drive them deeper.
 - 3. All concrete floor surfaces shall be visibly dry, especially in cracks and other deep surface discontinuities, prior to commencing mechanical cleaning and preparation.
- B. Mechanical Surface Preparation and Cleaning:
 - 1. All accessible concrete floor surfaces shall be mechanically cleaned using a "BlastTrac" method or approved equivalent. All surface and embedded accumulations of paint, toppings, hardened concrete layers, laitance, power trowel finishes and other similar surface characteristics shall be removed leaving a bare concrete surface having a minimum profile of 30 mils and exposing the upper facades on concrete aggregate. (Reference SSPC-SP13/NACE 6, ICRI CSP 3-5)
 - 2. Floor areas that are inaccessible to the cleaning machine shall be mechanically abraded to the specified degree of cleanliness, soundness and profile using vertical disc scarifiers, starwheel scarifiers, grinders, needle guns or other suitable effective equipment.
 - 3. Cracks in the floor 3/16" and wider, shall be routed out to a minimum 1/2" deep v-groove of sound concrete and filled with materials recommended by the manufacturer. Other significant surface discontinuities such as holes, pits, depressions and exposed aggregate area shall be filled with similar materials.
 - 4. Allow the surface to dry or force dry with heat and circulating air to ensure that all surface, especially discontinuities, are visibly dry.
 - 5. All concrete floor terminations and leading edges shall be saw-cut and chiseled down to 1/4" to 1/2" as to avoid feathered edge terminations. This includes drains, construction and

expansion joints and all leading edges of concrete floor where they meet dissimilar materials.

3.3 APPLICATION

- A. Floor – (Screening Building and Upper Level Blower Building)
 - 1. This application shall consist of applying the Primer/Intermediate/Sealer, allowing time for cure, and then applying the topcoats in the sequence and film thicknesses as specified herein below and in Paragraph 3.6.
 - 2. Open only the containers of components to be used in each specific application. Refer to manufacturer's data sheets for pot life/temperature relationship to determine size of batches to mix.
 - 3. Pour the mix onto the floor surface, flat squeegee and backroll to form a uniform, continuous film, ensuring that all crevices, cracks and other surface discontinuities have been saturated and coated.
 - 4. Allow for the Primer/Sealer to cure.
 - 5. Our intermediate resin onto floor, spread with 40 mil notched squeegee and backroll. Broadcast color quartz to rejection. Allow to cure, sweep and repeat process to achieve approximately 1/8" thick intermediate coat.
 - 6. After full cure, sweep, vacuum and apply grout coat. When fully cured, apply top coat.

3.4 INSPECTION

- A. Request acceptance of the Primer/Intermediate coats before application of the Topcoat commences.
- B. All work that is not acceptable to the Engineer or Owner must be corrected before consideration of final acceptance.

3.5 CLEAN-UP

- 1. Remove any material spatters and other material that is not where it should be. Remove masking and covers, taking care not to contaminate surrounding areas.
- 2. Repair any damage that should arise from either the application effort or from the clean-up effort.

3.6 COATING SCHEDULE

- A. Primer/Sealer Coat:
 - 1. Tnemec Series 201 Epoxoprime or Series 222 Deco-Tread Resin 100% Solids Epoxy primer/sealer saturation at 150-200 sq. ft. per gallon. DFT of 8 mils.
- B. Intermediate Coats:
 - 1. Tnemec Series 222 Deco-Tread 100% Solids Epoxy at 1/8" with color quartz covering 100% of surface.
- C. Grout/Topcoat:
 - 1. Grout Coat: Tnemec Series 222 Deco-Tread or Series 284 Deco-Clear 100% Solids Epoxy at 80 sq. ft. per gallon.

2. Top Coat: Tnemec Series 284 or 285 Enviro Glaze Clear, 100% Solids Epoxy at 300-350 sq. ft. per gallon.
- D. Glass Bead Additive
1. Tnemec Series 211 Glass Bead at 2-4 ounces per mixed gallon.

END OF SECTION

SECTION 09 9000 - PAINTING AND COATING

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes
 - 1. Surface preparation.
 - 2. Field application of paints and other coatings.

1.2 DEFINITIONS

- A. Conform to ASTM D16 for interpretation of terms used in this Section.

1.3 SUBMITTALS

- A. Section 01 3300 – Submittal Procedures: Requirements for submittals.
- B. Submittals for Review:
 - 1. Product Data: Provide product data on all finishing products.
 - 2. Samples:
 - a. Submit one paper chip sample in size sufficient to accurately illustrate range of available colors for each surface finishing product scheduled.
- C. Submittals for Information:
 - 1. Manufacturer's Instructions: Indicate special surface preparation procedures and substrate conditions requiring special attention.
- D. Submittals at Project Closeout:
 - 1. Maintenance Data: Submit data on cleaning, touch-up, and repair of painted and coated surfaces.

1.4 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this Section with minimum five years' experience.
- B. Applicator Qualifications: Company specializing in performing the work of this Section with minimum five years' experience.

1.5 DELIVERY, STORAGE, AND PROTECTION

- A. Deliver products to site in sealed and labeled containers; inspect to verify acceptability.
- B. Container Label: Include manufacturer's name, type of paint, brand name, lot number, brand code, coverage, surface preparation, drying time, cleanup requirements, color designation, and instructions for mixing and reducing.

- C. Paint Materials: Store at minimum ambient temperature of 45 degrees F and a maximum of 90 degrees F, in ventilated area, and as required by manufacturer's instructions.

1.6 ENVIRONMENTAL REQUIREMENTS

- A. Do not apply materials when surface and ambient temperatures are outside the temperature ranges required by the paint product manufacturer.
- B. Do not apply exterior coatings during rain or snow, or when relative humidity is outside the humidity ranges required by the paint product manufacturer.
- C. Minimum Application Temperatures for Latex Paints: 45 degrees F for interiors; 50 degrees F for exterior.

1.7 EXTRA MATERIALS

- A. Supply one gallon of each color and type; store where directed.
- B. Label each container with color, type, texture, and room locations, in addition to the manufacturer's label.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Tnemec, Inc.
- B. Substitutions: 01 2500 – Substitution Procedures and 01 6000 – Product Requirements.

2.2 MATERIALS

- A. Coatings: Ready mixed, except field-catalyzed coatings. Prepare pigments:
 - 1. To a soft paste consistency, capable of being readily and uniformly dispersed to a homogeneous coating.
 - 2. For good flow and brushing properties.
 - 3. Capable of drying or curing free of streaks or sags.
- B. Accessory Materials: Linseed oil, shellac, turpentine, paint thinners and other materials not specifically indicated but required to achieve the finishes specified; commercial quality.
- C. Patching Materials: Latex filler.
- D. Fastener Head Cover Materials: Latex filler.

2.3 GENERAL FINISHES

Note: The following schedule lists the paints and paint products of the Tnemec Company of North Kansas City, Missouri unless specifically noted otherwise. Manufacturer and products listed

are for reference and establishment of quality. Equal products by other listed acceptable manufacturers may be used.

Note: All film surfaces may be measured at the option of the Engineer by use on an Elcometer. Any deficiencies found in the mil thickness shall be corrected by additional coating at the cost of the applicator.

- A. Interior Concrete Block
 - 1. First Coat: 1 coat Series N69 Hi-Build Epoxoline II at spreading rate of 75 to 100 square feet per gallon.
 - 2. Finish Coats: 2 coats Series N69 Hi-Build Epoxoline II at 5.0-6.0 dry mils per coat. Total thickness to be 10-12 mils.
- B. Interior Concrete Walls and Ceiling
 - 1. Prime Coat: Series N69 Hi-Build Epoxoline II applied at 4 mils DFT.
 - 2. Finish Coat: Series N69 Hi-Build Epoxoline II applied at 4 mils DFT.
- C. Piping, Valves, and Equipment (Non-Immersion, with or without existing primer).
 - 1. Prime Coat: Tnemec Series 1 Omnithane applied at 3 mils DFT.
 - 2. Finish Coat: Tnemec Series 1074U Endura-Shield II applied at 4 mils DFT.
- D. PVC – (Non-Immersion)
 - 1. Prime Coat: Tnemec Series N69 Hi-Build Epoxoline II applied at 3 mils.
 - 2. Finish Coat: Tnemec Series 1074U Endura-Shield II applied at 3 mils DFT.
- E. Steel – (Non-Immersion, excluding piping and valves)
 - 1. Prime Coat: Tnemec Series 1 Omnithane applied at 3 mils DFT.
 - 2. Finish Coat: Tnemec Series 1074U Endura-Shield II applied at 4 mils DFT.
- F. Steel – (Immersion, including piping and valves)
 - 1. Prime Coat: Tnemec Series 446-1222 Perma-Shield MCU applied at 7-9 mils DFT.
 - 2. Finish Coat: Tnemec Series 446-1221 Perma-Shield MCU applied at 7-9 mils DFT.
- G. Field touch-up of hot dipped galvanized steel
 - 1. Series 90G-1K97 Tneme-Zinc.
- H. Interior Ductwork
 - 1. Prime Coat: Tnemec Series 115-color Uni-Bond DF applied at 3 dry mils.
 - 2. Finish Coat: Tnemec Series 1029-color Enduratone applied at 2.5 dry mils.

PART 3 EXECUTION

2.4 EXAMINATION

- A. Verify that surfaces are ready to receive Work as instructed by the product manufacturer.
- B. Examine surfaces scheduled to be finished prior to commencement of Work. Report any condition that may potentially affect proper application.

- C. Beginning of installation means acceptance of existing conditions.

2.5 PREPARATION

- A. Surface Appurtenances: Remove or mask electrical plates, hardware, light fixture trim, escutcheons, and fittings prior to preparing surfaces or finishing.
- B. Surfaces: Correct defects and clean surfaces, which affect Work of this Section. Remove or repair existing coatings that exhibit surface defects.
- C. Marks: Seal with shellac those that may bleed through surface finishes.
- D. Impervious Surfaces: Follow manufacturer's instructions. Remove mildew by scrubbing with solution of tetra-sodium or tri-sodium phosphate and bleach. Rinse with clean water and allow surface to dry.
- E. Concrete and Unit Masonry Surfaces Scheduled to Receive Paint Finish: Follow manufacturer's instructions. Remove dirt, loose mortar, scale, salt or alkali powder, and other foreign matter. Remove oil and grease with a solution of tri-sodium phosphate; rinse well and allow to dry. Remove stains caused by weathering of corroding metals with a solution of sodium metasilicate after thoroughly wetting with water. Allow to dry.
- F. Shop Primed Steel Surfaces: Follow manufacturer's instructions. Sand and scrape to remove loose primer and rust. Feather edges to make touch-up patches inconspicuous. Clean surfaces with solvent. Prime bare steel surfaces.
- G. Interior Wood Items Scheduled to Receive Transparent Finish: Follow manufacturer's instructions. Wipe off dust and grit prior to sealing, seal knots, pitch streaks, and sappy sections with sealer. Fill nail holes and cracks after sealer has dried; sand lightly between coats.

2.6 APPLICATION

- A. Apply products in accordance with manufacturer's instructions.
- B. Paint equipment and piping accessories, supports, brackets, specialties, valves and similar items not specifically mentioned in the schedule the same color as the principal assembly with which each is associated.
- C. Do not apply finishes to surfaces that are not dry. Allow applied coats to dry before next coat is applied.
- D. Apply each coat to uniform appearance. Apply each coat of paint slightly darker than preceding coat unless otherwise approved.
- E. Protect adjacent surfaces with protective coverings; mask name plates, hardware, valve stems and similar items; keep valve stems free from paint at all times; clean up spilled or spattered paint immediately.

- F. Lay drop cloths to protect floors and other surfaces from spatter and droppings. Protect all fixed equipment and remove the canopies of light fixtures and cover and protect from injury.
- G. Sand wood and metal surfaces lightly between coats as required to achieve required finish.
- H. Vacuum clean surfaces of loose particles. Use tack cloth to remove dust and particles just prior to applying next coat.
- I. The use of any temporary heating or housing to obtain suitable temperatures for painting must be approved by the Engineer. Systems which result in excessive filmy deposits on metal surfaces will not be approved.
- J. Contractor shall advise paint company prior to the first field application of epoxy type paints, so that paint company representatives can meet with the painters on the site and instruct them in the proper procedures and practices for apply epoxy paints.

2.7 CLEANING

- A. Collect waste material, which may constitute a fire hazard, place in closed metal containers, and remove daily from site.

2.8 PIPING COLOR IDENTIFICATION SYSTEM (TNEMEC EQUIVALENT)

Note: All piping shall be labeled with contents every 10 feet. Labels shall be stenciled on the piping with contrasting color.

- A. Recommended WWTP Pipe Identification Color Coding:
 - 1. Compressed Air – Dark Green (91GN Balsam)
 - 2. Natural Gas – Orange (04SF Safety Orange)
 - 3. Other Lines – Light Grey (32GR Light Gray)
 - 4. Hoists/Trolleys or Bollards – Yellow (02SF Safety Yellow)
 - 5. Valve Handles – Black (35GR Black)
 - 6. Non-Potable Water Lines – Blue with Yellow bands at 30” spacing (28 BL Pond Blue and 025F Safety Yellow)
 - 7. Alum – 04SF Tangerine Orange/Safety

END OF SECTION

SECTION 11 8000 - SUPERVISORY CONTROL AND DATA ACQUISITION SYSTEM (SCADA) SUMMARY

PART 1 GENERAL

1.1 PROJECT DESCRIPTION

A. Description of Work

1. The work to be accomplished under this section shall consist of furnishing the equipment necessary for a complete automatic control and monitoring system to function as specified herein and as shown on the drawings. The system integrator shall furnish a completely integrated all solid-state Supervisory Control and Data Acquisition (SCADA) system. It shall be the system integrator's responsibility to supply a system that is compatible with existing Micro-Comm equipment, new equipment supplied by others as part of this contract, and equipment supplied in other contracts. The integrator will need to reprogram existing EWWTP Micro-Comm M655 unit and existing SCADAview CSX HMI for the additional equipment in this project. The complete system shall be designed, fabricated, programmed, tested, started up, and warranted by a single supplier to insure a single source of responsibility.

B. Scope of Work

1. This section covers additions to the SCADA System for the East Wastewater Treatment Plant. This work includes a new Control Panel located in the Alum Building, New network panel located in the Blower Building and a New Network panel located in the UV Building.
2. The following items will be required:
 - a. Lab Building:
 - 1) SCADAview CSX HMI Software modifications to include monitoring and control of new UV System and new Alum equipment.
 - b. Headworks Building:
 - 1) Main WWTP M655 PLC modifications to include monitoring and control of new UV System and new Alum equipment.
 - c. New Alum Building:
 - 1) New Factory built and tested PLC Panel assembly capable of communicating to the existing Micro-Comm WWTP PLC and SCADAview CSX HMI. Panel to include fiber patch panel and Managed Ethernet Switch.
 - 2) Ethernet PLC with the following I/O:
 - a) 4 Relay Outputs
 - b) 8 Discrete Inputs
 - c) 4 Analog Inputs
 - d) 2 Analog Outputs
 - e) New LCD & Keypad Display
 - f) New Fiber Patch Panel
 - g) New Managed Ethernet Switch with Copper and Fiber ports
 - h) 120Vac/12Vdc Power structure with 12hr battery back-up
 - d. Blower Building:
 - 1) New Factory built and tested Network Panel assembly. Panel to include fiber patch panel and Managed Ethernet Switch, including:
 - a) New Fiber Patch Panel

- b) New Managed Ethernet Switch with Copper and Fiber ports
 - c) 120Vac/12Vdc Power structure with 12hr battery back-up
 - e. UV Building:
 - 1) New Factory built and tested Network Panel assembly. Panel to include fiber patch panel and Managed Ethernet Switch, including:
 - a) New Fiber Patch Panel
 - b) New Managed Ethernet Switch with Copper and Fiber ports
 - c) 120Vac/12Vdc Power structure with 12hr battery back-up
- C. General/Electrical Contractor Shall Supply
 - 1. All equipment required in other sections of the specifications.
 - 2. All labor for installation of the system.
- D. System Integrator Shall Supply:
 - 1. Engineering submittal and shop drawings prior to installation.
 - 2. All user licenses and fees for software supplied in this system with licenses in the name of the owner. Upgrade support fees for ALL software shall be included for duration of specified warranty.
 - 3. Operation and maintenance manuals, as detailed in this section.
 - 4. All start-up labor and services, as required for equipment specified in this section.
 - 5. Operator training as detailed in this section.
- E. Owner Shall Supply:
 - 1. Access and easements as needed for all sites.
 - 2. 120VAC power at all sites.
 - 3. Pressure sensing taps for all sensing points in the system.
 - 4. Meter pits for sensing tank levels or line pressures in the system.

1.2 QUALITY ASSURANCE

- A. Manufacturer's Qualifications
 - 1. The system specified herein shall be the product of a manufacturer who can demonstrate at least ten (10) years of satisfactory experience in furnishing and installing comparable control systems for water and wastewater installations.
 - 2. The manufacturer of this system shall maintain a 24-hour available inventory of all replaceable modules to assure the Owner of prompt maintenance service and a single source of responsibility. The manufacturer shall certify this to the Engineer in writing at the time of bidder pre-qualification.
- B. Pre-bid Approval
 - 1. The approved systems integrator for this project is:
 - a. Micro-Comm, Inc. Olathe, Kansas
(Contact information: Jeremy Martens Phone: 816-213-2134)
 - b. Engineer approved Equal.
- C. Other integrators desiring to bid this project must seek pre-bid approval by providing a submittal (14) days prior to the bid date. Submissions that fail to include a complete submittal as detailed shall be deemed unresponsive.

- D. The Consulting Engineer and the Owner shall be the sole judge as to whether the alternate equipment is considered an approved equal. Approval of an alternate system by the Engineer will not relieve the alternate system of strict adherence to these specifications.
- E. The pre-bid submittal shall include the following:
1. An installation list with the names and phone numbers of both the Owner and Consulting Engineer for at least ten projects of similar size and complexity.
 2. A "statement of compliance" detailing paragraph by paragraph the bidder's compliance to these specifications.
 3. Block diagrams for the various sites in the proposed system showing the selected pieces of hardware equipment to be used.
 4. Sample electrical drawings for typical sites proposed in this contract.
 5. A product performance data sheet shall be included for each hardware component in the system (i.e., programmable controllers, power supplies, time delays and relays, and the various sensors required) and each software component (programming & configuration software and operator display console software).
 6. Communications diagram for the entire system showing normal CTU-RTU communications paths and Peer-to-Peer back-up communications paths.
- F. Approval Agencies
1. The control system and its components shall comply with all applicable requirements of the following: **System Integrators supplying panels or components that do not meet these requirements are NOT approved to bid.**
 - a. **International Society of Automation (ISA) for instrumentation**
 - b. **National Electrical Code (NEC) Compliance for both National & Local Standards**
 - c. **Firm shall be a member of the Control System Integrators Association (CSIA) of North America, and provide a copy of their membership.**
 - d. **Underwriters Laboratories, Inc.**
 - 1) UL508 for Programmable Controllers. The Programmable Logic Controllers (PLCs) and Input/Output devices shall be UL listed for use in and Industrial Control Panel per UL508 per UL Category NRAQ.
 - 2) UL508A for Industrial Control Panels. The System Integrator shall be a UL508A listed manufacturer for Industrial Control Panels per UL Category NITW. All control panels shall have an interior mounted label that has the name, address, phone number, and UL 508A file number of the Control Panel Manufacturer. All control panels shall have affixed to the panel a UL 508A serial numbered "UL Listed Enclosed Industrial Control Panel" label prior to shipment. Control Panel(s) without the affixed UL 508A "serial numbered" label shall be rejected and sent back to the Contractor's factory.
 - 3) National Electrical Manufacturers Association (NEMA)
 - 4) 250, Enclosures for Electrical Equipment (1000 Volts maximum)
 - 5) ICS, Industrial Control & Systems
 - e. **Federal Communications Commission (FCC)**
 - f. **The System Integrator must maintain insurance throughout the course of the design and construction administration meeting the following minimum levels:**
 - 1) Commercial General Liability Insurance, including coverage for premises and operations, products and completed operations, independent contractors, and contractual liability. Such insurance shall be no less than \$1,000,000 per occurrence and \$2,000,000 in the aggregate.

- 2) Automobile Liability Insurance for all owned, hired and on-owned automobiles in the minimum amount of \$1,000,000 per occurrence.
- 3) Professional Liability Insurance of \$1,000,000 per claim.

1.3 SUBMITTALS:

- A. Complete submittal shall be provided to the engineer for approval prior to equipment fabrication. The submittal data shall include the following:
 1. Product Data - Provide product data sheets for each instrument and component supplied in the system. The data sheets shall show the component name as used on reference drawings, manufacturer's model number or other product designator, input and output characteristics, scale or ranges selected, electrical or mechanical requirements, and materials compatibility.
 2. Shop Drawings - Provide drawings for each panel showing the wiring diagrams for control circuits and interconnections of all components. The drawings shall include wiring diagrams for all remote devices connected to the panel.
 3. Panel Layout Drawings - A front panel and sub-panel layout shall be included as part of each control panel drawing. Components shall be clearly labeled on the drawing.
 4. Installation Drawings - Typical installation drawings applicable to each site in the system shall be included.
 5. Operator Interface Software - The submittal shall include a generic but detailed technical description of the Operator's Interface Software as proposed for this system including:
 - a. Sample text screens and menus.
 - b. Sample graphics screens.
 - c. Sample report logs and printed graphs.

1.4 MAINTENANCE INFORMATION

- A. Maintenance Data Manuals
 1. Submit maintenance manuals and "as built" drawings on all items supplied with the system. The manuals and drawings are to be bound into one or more books as needed. In addition to "as built" engineering submittal data and drawings, the manual shall include trouble shooting guides and maintenance and calibration data for all adjustable items.

1.5 JOB CONDITIONS

- A. All instruments and equipment shall be designed to operate under the environmental conditions where they are to perform their service. The equipment shall be designed to handle lightning and transient voltages as normal environmental hazards. The environmental conditions are as follows:
 1. Outdoor - The equipment will be exposed to direct sunlight, dust, rain, snow, ambient temperatures from -20 to +120 degrees F, relative humidity of 10 to 100 percent, and other natural outdoor conditions. The installations shall be hardened to withstand normal vandalism.
 2. Indoor - The equipment will be capable of operating in ambient temperatures of +32 to +130 degrees F and relative humidity of 20 to 100 percent.

1.6 DELIVERY, STORAGE, & HANDLING

- A. All items shall be stored in a dry sheltered place, not exposed to the outside elements, until ready for installation. All items shall be handled with appropriate care to avoid damage during transport and installation.

1.7 SEQUENCING & SCHEDULING

- A. Coordination
 - 1. The Systems Integrator shall coordinate with other electrical and mechanical work including wires/cables, raceways, electrical boxes and fittings, controls supplied by others, and existing controls, to properly interface installation and commissioning of the control system.
- B. Sequence
 - 1. Sequence installation and start-up work with other trades to minimize downtime and to minimize the possibility of damage and soiling during the remainder of the construction period.

1.8 DISTRIBUTED CONTROL OPERATION

- A. General
 - 1. The control system shall use "Programmable Logic Controllers" (PLCs) at all locations in the system as detailed later in these specifications. Each site in the system shall have a unique digital address. The Central Processing Units (CPUs) and Input/Output (I/O) cards used in each of the PLCs shall all be identical, fully interchangeable without reprogramming by the operator. The PLCs shall be "self-initializing" and "self restoring" so that operator intervention is not required after power interruptions, transients from lightning storms, or component changes.
- B. Distributed Control Software Features
 - 1. The CTU-RTU control must continue to work if the HMI turns off or fails. The control algorithms shall have the ability to integrate both hardware and software operator inputs (i.e., ODC setpoints and selector switch inputs) along with hardware inputs at the remote sites (i.e., remote Hand/Off/Auto selector switches, etc.) into a unified cohesive automatic control system.
 - 2. The control system shall provide for multiple levels of control such that a single point of failure shall not render the control system in-operative:
 - a. In the event of an ODC failure, the PLC at the CTU shall continue to poll all of the RTUs to collect data and provide supervisory control.
 - b. In the event of PLC failure at the CTU, the individual RTUs shall turn off the controlling items at the sites.
 - 3. The system shall automatically revert to the next higher level of control as communications or equipment failures are repaired.
- C. Standard Control Software Features
 - 1. The supplied software shall not be a one-of-a-kind system, but rather a comprehensively designed software platform that provides a number of built in features that monitor local & remote inputs combined with standard software algorithms to provide an integrated system as follows:

- a. Monitor local Hand/Off/Automatic (HOA) selector switch positions (i.e., on existing pump control panels) and integrate the switch position into the control logic such that a HOA in HAND or OFF shall be considered by the control system as 'un-available'.
- b. Provide for High Discharge Cut-off and Low Suction Cut-off control of pumps from locally entered set points at RTUs equipped with suction and discharge pressure transmitters and/or from existing pressure switches.
- c. Provide automatic Pressure/Flow pump staging operation of pumps of different sizes (including variable speed pumps) from local discharge pressure and discharge flow inputs in a closed-loop system. The pumps shall be up-staged on decreasing discharge pressure and down-staged on decreasing flow rate. The control shall include PID (Proportional Integral Derivative) loop control of variable speed pumps mixed with constant speed pumps for the various stages required.
- d. Provide "Compound Loop" PID control of final devices (i.e., chemical feeders) from multiple inputs (i.e., flow rate and a chemical process analyzer, such as chlorine residual).

PART 2 PRODUCTS

2.1 PROGRAMMABLE LOGIC CONTROLLERS & LOCAL I/O EQUIPMENT

A. General

1. Industrial Programmable Logic Controllers (PLCs) shall be used at all locations. The PLCs shall have an operational range of 0-60degC and 5-95% relative humidity. The PLCs shall all be from the same family of controllers, scalable from very small to very large applications, and programmed from identical programming software used for all processors. The PLCs shall be readily available on and directly purchasable online from the manufacture's WEB page. The PLCs shall be Allen-Bradley CompactLogix 5069 series, Motorola Moscad or Micro-Comm M1600 Series controllers, no exceptions.

B. Construction

1. The PLC shall use modular construction. The base unit shall be composed of the power supply, CPU, communications modules, and basic inputs and outputs (I/O). The unit shall have expandable inputs and outputs using a "rack-less" DIN rail mount design and capable of supporting local I/O (via an integrated high-performance serial I/O bus) and remote I/O via an industrial serial bus. All terminations shall use removable, NEMA-style "finger-safe" terminal blocks so that individual modules may be removed without disturbing adjacent modules.
2. The PLC shall be capable of being powered from AC, DC, or solar sources. DC and solar powered PLCs shall have an integral battery charging circuit that protects the external battery from over and under voltage conditions and provides automatic charging of the battery after power failures. The back-up power supply shall be either 12VDC with 24VDC DC/DC converter or 24VDC with a 12VDC DC/DC converter to run the 12VDC radio and 24VDC to power external sensors from a single battery source. Series tapped 24VDC batteries for 12VDC will not be allowed. Back-up batteries shall be rechargeable sealed lead-acid type batteries as manufactured by PowerSonic or equal. The back-up battery shall provide for 24 hours of back-up operation at water tower remote units and 3 hours at all other sites.

3. The PLC shall have a minimum of two (2) communications ports. The first shall be used primarily for CTU-RTU and RTU-RTU communications. It shall support baud rates of 110-19,200 baud and have a plug-in standard 25pin or 9pin sub-D connector that provides a full RS232 interface and radio modem interface. The second communications port shall provide programming, operator front panel interface, multiple PLC interconnect and other local communications. It shall support baud rates of 110-19,200 baud and have a 9-pin sub-D interface. The communications ports shall include LED's to show the status of all control lines. The PLC shall also optionally support Ethernet communications as detailed in the specifications.
4. The PLC shall utilize a rack-less design and provide for sufficient installed and configured spare inputs and outputs (I/O) to meet the site requirements as detailed and provide for 25% spares of each type. The unit shall have a minimum of (4) discrete (relay) outputs, (8) discrete inputs (DI), (4) analog inputs (AI), and (2) analog outputs (AO). The analog inputs shall provide for sensor excitation with separate fuses for each input. The fuses may be the self-resetting type. All input and output connections to the PLC shall be via Nema "finger-safe" plug-in terminal blocks.
5. The PLC shall support both local and remote I/O. Input/Output cards shall be mounted on a DIN rail channel. The PLC inputs, outputs, and operator interface shall be as follows:
 - a. DISCRETE OUTPUTS - The discrete outputs shall be isolated relay outputs rated at 5.0A continuous @ 240VAC. LEDs on the front of the PLC base unit or expansion module shall indicate the status of each output point. Interposing relays shall be provided if the voltage or current of the external load on a contact exceed the 5.0A 240VAC ratings. Each output shall be provided with operator settable software ON and OFF time delays.
 - b. DISCRETE INPUTS - The discrete inputs shall be optically isolated and provide for 24VDC excitation to remote sensors and switches. Each input shall be separately fused or current limited such that accidental grounding shall not render the other inputs non-functional. LEDs on the front of the input module shall indicate the status of each input point.
 - c. ANALOG INPUTS - The analog inputs shall provide filtered and scalable analog to digital conversion of input signals. The analog inputs shall be switch selectable from 0-5VDC to 0-20mADC and provide a minimum of 0.3% resolution and 0.5% accuracy over the temperature range of 0-70degrees C. The PLC shall provide separately fused 24VDC excitations to the remote sensors.
 - d. ANALOG OUTPUTS - The analog outputs shall provide a 4-20mA isolated signal to other panels and devices as specified.
 - e. PULSE INPUTS - The high-speed counter/pulse inputs shall provide for pulse rates up to 1KHz direct from flow meter transmitter heads without interposing equipment. The pulse input shall include fused 12VDC excitation to the meter transmitter.
 - f. POWER SUPPLY - Each PLC assembly shall include an integral power supply. Power supplies shall be designed for 12VDC or 24VDC input power and suitable for use in battery back-up operations. DC/DC converters shall be required to insure that both the 12VDC and 24VDC are regulated separately from the common source.
 - g. KEYPAD & DISPLAY UNIT - The optional keypad & display unit shall have a 4x20-backlighted LCD display to display the status of all local inputs and the tank level of the associated control water tower level. The 5x5 keypad shall provide for operator input of set points and timer settings. The operator interface shall be menu driven and provide for dedicated keys for cursor position and input functions. The operator interface shall

provide for up to 50 screens of data display. The keypad & display unit shall be supplied and mounted on the front of the PLC enclosure if detailed in the specific PLC I/O requirement list. The keypad & display unit shall maintain the Nema 4 rating of the PLC enclosure.

- h. INDUSTRIAL HMI FRONT PANEL TOUCH-SCREEN DISPLAY UNIT - The HMI Front Panel Touch Screen Display Unit shall have a 19.5" (1920x1080 native resolution) diagonal backlit Color Active Matrix Display with Graphical Touch-Screen interface. The display shall have either a capacitive or 5-wire resistive touch-screen with a touch accuracy of 2mm. The unit shall have a "runtime" version of the SCADA HMI software installed in the Main HMI Computer. The unit shall have a minimum of 4GB of RAM memory, 100GB HDD, serial communications port, parallel printer port, and a Gigabit Ethernet port. The operator interface shall be graphical and provide for display of all data monitored and operator input of setpoints and operating commands in the SCADA system. The Graphical Touch-screen unit shall be supplied and mounted on the front of the PLC enclosure if detailed in the specific PLC I/O requirement list. The unit shall maintain the Nema 4 rating of the PLC enclosure. *Refer to Appendix for specific front panel display requirements.*

C. Enclosures

- 1. The remote unit enclosures for indoor mounting shall meet all the requirements for NEMA Type 12 enclosures. The enclosures body shall be made of a minimum 14 gauge steel with continuously welded seams and be furnished with external mounting feet. The enclosure door shall be made of a minimum 16 gauge steel with have a 14 gauge steel hinge. Enclosures larger than 16x14 shall have a rolled lip on 3 sides of the door for added strength. The door opening shall have a rolled edge on 4 sides to protect the door gasket. The door gasket shall be heavy neoprene and attached to the door with oil resistant adhesive. Sub-panels shall be 14-gauge steel for 16x14 enclosures and 12 gauge for larger enclosures. The enclosure finish shall be gray polyester powder coating inside and out over phosphatized surfaces. The subpanels shall be finished in white. Nema 12 enclosures shall be Hoffman "CH" or "CONCEPT" wall mount enclosures.
- 2. Remote site installations requiring equipment to be mounted outside shall have a lockable NEMA 3R enclosure or NEMA 4X. The NEMA 3R enclosure shall be constructed of 14 gauge galvanized steel, with a drip shield top and seams free sides front and back, and a stainless steel hinge pin. The enclosure finish shall be gray polyester powder coating inside and out over phosphatized surfaces. The NEMA 3R enclosure shall be Hoffman Bulletin A-3. The enclosures shall be made of molded fiberglass polyester or Polycarbonate and be furnished with external mounting feet. The door shall have a seamless foam-in-place gasket and corrosion-resistant hinge pin and bails. Sub-panels shall be 14-gauge steel for 16x14 enclosures and 12 gauge for larger enclosures. The enclosure finish shall be a light gray inside and out. The subpanels shall be finished in white. Nema type 4X enclosures shall be Hoffman "Fiberglass Hinged Cover" or equal. Refer to Appendix for specific enclosure requirements. *Refer to Appendix for special input and output control requirements.*

D. Local Control Functions

- 1. In general, the PLC shall be programmed to provide generic control functions as detailed earlier and to work in concert with the CTU. The integrator shall be responsible to meet with the owner and the engineer to develop the automatic control strategy required for the system. *Refer to Appendix for special input and output control requirements.*

2.2 INSTRUMENTATION & ACCESSORIES

A. General

1. All items in the control system (electronic cards, power supplies, radios, time delays, relays, etc.) shall be of plug-in construction, make use of a plug-in wiring harness, use plug-in terminal blocks, and be interchangeable without recalibration. To insure field repair-ability by non-technical personnel, equipment that must be un-wired for replacement will not be accepted.
2. The following instrumentation devices and techniques shall be used as specifically called for in the RTU and CTU input/output sections of this specification.

B. Power Supplies

1. The DC power supplies shall provide $\pm 0.1\%$ line and load regulation with $\pm 10\%$ input variations. They shall have a temperature coefficient of $\pm 0.02\%$ per degree C.
2. The input/output isolation shall be 100 Mohms DC (900Volts AC) with output transient response of 50 microseconds maximum.
3. The power supplies shall be sized to operate the remote unit equipment with or without the back-up battery in place. Power Supplies shall be a Meanwell DR Series, Sola SLS, Allen-Bradley 1606-XLE.

C. Battery Back-up Operation

1. The remote units indicated shall be supplied with battery back-up operation. The rechargeable batteries shall be the sealed solid gelled electrolyte types, designed for float or standby service. Unless noted otherwise in the RTU descriptions, batteries shall be sized to maintain 24-hour service at water tower remotes and 3 hour service at pump stations and other remotes.
2. The remote shall include a charging module to recharge the battery when power is resumed, maintain the charge between outages, and provide a low voltage cut-off to protect the battery from excessive discharge during prolonged outages. All discrete, analog, and pulse inputs (i.e. switch closures, pressure, level, flows, etc.) shall continue to function on battery back up. Batteries shall be Globe Gel/Cell or approved equal. Battery back-up shall be Allen-Bradley 1606-XLS, APC series, or MC-M3.

D. Level Ultrasonic

1. Each ultrasonic level monitoring system shall include one ultrasonic level sensor and an "intelligent" transmitter. The ultrasonic level monitoring system shall be required to monitor the level of liquids as shown on the Drawings and/or specified herein. Location of the sensor and transmitters shall be as shown on the Drawings and/or as specified.
2. For outdoor installation, the use of approved watertight conduit hub/glands shall be required. Tank mounting applications shall include mounting flange adapter supplied by the manufacturer, which is compatible with the process liquid and the tank flange connection. Sensor mounting thread shall be 1-inch NPT. Channel or wall mounting applications shall include mounting bracket supplied by the manufacturer and constructed of Type 316 stainless steel material.
3. The level sensor shall be unaffected by moisture droplets on the transducer face and operate on the ultrasonic echo ranging principle. Sensor accuracy shall be a minimum of 0.25 percent of level measurement range and include integral temperature compensation with an accuracy of 0.01 percent per DegC. Resolution shall be at least 0.1 percent of full range or 0.08 inches, whichever is greater.

4. The transmitter shall be programmable with a LCD display, which shall have the capability to display a minimum of four (4) characters at one time, and shall be shielded from direct sunlight. The transmitter shall compensate for temperature and air density. The controller shall be capable of performing the following functions: level monitor, both linear and nonlinear level to flow relationships, volumetric, level signals and alarms. Output level signal shall be linear, isolated 4-20mA DC. Power requirement for the transmitter shall be 120 VAC, 60 Hertz. The units shall have a NEMA 4X stainless steel or nonmetallic enclosure.
 5. Ultrasonic level measurement system shall be Prosonic FMU40 by Endress & Hauser or approved equal.
- E. Fiber Optic Patch Panel
1. Provide panel for maintenance and cross-connecting of optical fiber cables. Panel shall be constructed of 18 AWG steel or 11 gauge aluminum minimum and shall be cabinet mounted. Each panel shall provide multi-mode adapters as type SC connectors. Provide dust cover for unused adapters. The rear of each panel shall have a cable management tray with removable cover, incoming cable strain-relief and routing guides.
- F. Managed Industrial Ethernet Switch
1. Provide a fully managed industrial Ethernet switch housed in a rugged industrial metal enclosure. Switch will include eight 10/100Base TX RJ-45 Ports, two 100BaseFX Ports, SC Style, ESD and surge protection diodes on all ports and Auto sensing 10/100Base TX. Switch requires a DIN-Rail mount enclosure. Switch will support SNMP v3, rapid spanning tree protocol and Web based management.
 2. Acceptable Ethernet switch manufacturer are N-Tron 708FX or approved equal.

PART 3 EXECUTION

3.1 EQUIPMENT EXAMINATION

- A. The control system shall be completely tested prior to shipment. The entire control system shall be "Burned In" at the factory for a period of at least 20 days. The component equipment shall be computer tested and temperature cycled at zero degrees and at fifty degrees centigrade.

3.2 SYSTEM START-UP

- A. The manufacturer shall supply "Factory" personnel for start-up service as needed to insure satisfactory operation. Subsequent trips to the job site to correct defects shall be made at no charge to the Owner during the warranty period.

3.3 TRAINING

- A. The system manufacturer shall supply "factory" personnel to conduct two separate on-site training sessions, totaling a minimum of three days of training.
- B. The initial training session shall be conducted during start-up as needed until the Owner and Engineer are satisfied that the operators are comfortable with the operation and maintenance of the system. Training shall be done on site with the owner's personnel.

- C. Three to six months after the Owner commencing system operation, the system manufacturer shall supply "factory" personnel to conduct follow-up training of the Owner's personnel. The follow-up training shall be conducted on-site and consist of reviewing the operation and maintenance of the system. The Owner shall be contacted a minimum of two weeks in advance, prior to scheduling the training session to allow proper coordination.

3.4 SUBSTANTIAL COMPLETION

- A. The Engineer will grant substantial completion only after completion of the start-up and initial training phase of the project. The Engineer shall make an inspection of the system to determine the status of completion. Substantial completion will be awarded only when the system is providing usable service to the Owner. If the system is commissioned in phases, the Contractor may request substantial completion for the completed phases.

3.5 ACCEPTANCE TEST

- A. After start-up and debugging of the entire system has been completed, the system manufacturer shall notify the Engineer that he is ready to begin the 60-day acceptance test. The system must run continuously for 60 consecutive calendar days. During this period, all system functions shall be exercised in automatic control, including all levels of back-up control. During the initial phase of the acceptance test, the multiple levels of control and radio path pad shall be demonstrated to the Owner as follows:
 - 1. Primary level control shall be demonstrated by allowing the operators to manually initiate remote device operation and observing the automatic operation by comparing trend charts to operator entered stop/start values.
 - 2. Secondary level control shall be demonstrated by turning off the ODC and verifying that each automatic control loop continues to function by monitoring operation with a passive monitor.
 - 3. Third level control shall be demonstrated by turning off the CTU radio and verifying that the RTUs continue automatic operation and communications between RTUs by monitoring one full cycle of automatic operation using a passive monitor.
 - 4. The fourth level of control shall be demonstrated by placing selected RTUs in back-up pressure mode and monitoring tower levels to observe one full pumping cycle.
- B. Any level test or system interruption and accompanying component, subsystem, or program failure shall be logged for cause of failure, as well as the time of occurrence and the duration of each failure.
- C. The Owner's representative shall classify failures as either major or minor. A minor failure would be a small, non-critical component failure that is corrected by the operators. This occurrence shall be logged but shall not be grounds for non-acceptance unless the same or similar failure occurs repeatedly (more than two such failures of similar components). A major failure shall be considered to have occurred when a component, subsystem, or program fault causes a halt in the operation of any portion of the system and/or when a "factory" technician's work is required to make a repair or to reinitiate operation of the system.
- D. A major failure shall cause termination of the 60-day acceptance test. When the causes of a major failure have been corrected, a new 60-day acceptance test shall be started. Final Acceptance of the control system shall not occur until satisfactory completion of this 60-day test.

- E. The manufacturer shall provide "factory" personnel who shall be on site and conduct the initial system exercise portion of the testing. The manufacturer shall be responsible for maintaining a checklist type test report wherein each function is checked-off and initialed by the Owner's representative as it is demonstrated. During the remainder of the 60-day acceptance test, the manufacturer shall provide 24-hour response to calls from the owner in order to correct any failure.

3.6 WARRANTY/SUPPORT PROGRAM

- A. The control system manufacturer shall supply a FIVE (5) year parts and labor warranty and comprehensive support program for all items and software supplied under this section (except as noted below). Power surges and lightning damage shall be included as part of the warranty.
- B. The warranty shall begin from the time of "substantial completion" as issued by the engineer. The manufacturer shall provide a 24-hour response to calls from the Owner. The manufacturer, at his discretion, may dispatch replacement parts to the Owner by next-day delivery service for field replacement by the Owner. Any damage to the control system caused by the actions of the Owner in attempting these field replacements shall be the sole responsibility of the manufacturer. If, during the warranty period, satisfactory field repair cannot be attained by field replacement of parts by the Owner, the manufacturer shall dispatch "factory" personnel to the job site to complete repairs at no cost to the Owner. Systems integrator shall dispatch field technician in a timely manner NOT to exceed 5 working days from time of first attempt to fix the problem by means listed above.
- C. All PLC software and HMI software development files shall be provided to End user on thumb drive with AS BUILT software versions of what actually was installed in each PLC. All software shall contain commented code.
- D. The support program shall begin from the time of "substantial completion" as issued by the engineer. The support program shall include free updating of all software as needed and providing free phone support from the integrator throughout the warranty period.
- E. The ODC Computer System Unit, keyboard, CRT display, printer, and associated UPS (and Portable Operator Display Console if specified in this contract) shall be covered by a one (1) year warranty beginning with "substantial completion". Lightning damage shall be included as part of the warranty on these components.
- F. Flow meters, control valves, process analyzers (i.e., turbidity, chlorine, pH, etc) supplied, as part of this contract shall be covered by a one (1) year warranty beginning with "substantial completion".

END OF SECTION

SECTION 26 0943 – FIBER OPTIC NETWORK

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. General Instrumentation and Control
- B. Definitions, Symbols, Definitions and Abbreviations: All symbols, definitions and engineering unit abbreviations utilized shall conform to IEEE 100-84, S50.1 and S51.1, where applicable.
- C. System Description

1.2 PATENTS

- A. If the manufacturer is required or desires to use any design, device, material, or process covered by letter, patent, or copyright, the manufacturer shall provide for such use by suitable legal agreement with the patentee or owner, and the prices bid hereunder shall, without exception, indemnify and save the Owner and Engineer from any and all claims for infringement by reason of the use of any such patented design, device, material or process, or any trademark or copyright used in connection with any equipment to be furnished hereunder.

1.3 SUBMITTALS

- A. Product Data: Installation Details
 - 1. The Contractor shall submit to the Engineer, for approval, Shop Drawings of the equipment to be installed to meet the Specifications. The Drawings shall be supported by notes or written directions as required to fully define the installation.
 - 2. The submission shall be made as soon as feasible after award of the Contract, and in any event, shall be submitted and approval obtained before installation of the equipment. The Contractor shall furnish the Engineer with six (6) copies of the submission.
 - 3. The information required on the Shop Drawings shall include, but is not necessarily limited to, the following:
 - a. Full and complete Specifications covering the equipment proposed to be furnished.
 - b. Detail Drawings showing plan, network connections and elevation dimensions of the equipment proposed to be furnished.
 - c. Guarantees of performance of the equipment proposed to be furnished.
 - d. Nearest location of factory maintenance and service facilities that will be available to service the equipment offered.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Storage and Protection: Delivery, storage, and handling shall be in accordance with manufacturer's recommendation and other sections herein.

PART 2 PRODUCTS

2.1 FIBER OPTIC CONNECTIONS

- A. All fiber optic connectors shall be type SC. All connectors on equipment and cables shall be fully compatible.
- B. Number cables and connect each cable to its numbered port on the indicated switch.

2.2 12-STRAND ALL ENVIRONMENT MULTI-MODE FIBER OPTIC CABLE

- A. Fiber optic cable shall be industrial grade, extended performance. The cable shall consist of 12 fibers with 62.5-micron core and 125-micron cladding and shall be suitable for multimode operation at 850 and 1300 nanometers. Acceptable losses for multimode fiber lengths with connector pairs at each end shall not be greater than 3.75 dB/km at 850 nm at 1.5dB/kM at 1300nm. Cable shall be rated for installation in harsh environments such as direct burial, aerial lashing, and conduit and pathways that are subject to wide temperature variations. Cable shall comply with ANSI/TIA/EIA-568-B including all addendums for fiber optic cable performance specifications.
- B. The cable shall be suitable for the installation as certified by the fiber optic interface manufacturer and proven by test results. Fiber optic cable shall be supplied in continuous lengths between patch panels. Cable shall be as manufactured by Phoenix Digital or Optical Cable Corporation or Siecor or Lucent or Berk-Tek or equal.

2.3 24-PORT FIELD FIBER OPTIC PATCH PANEL / TERMINATION PANEL

- A. Patch panel shall be provided by integrator and shall be a wall mountable enclosure specifically designed for fiber optic cable termination and distribution. Cabinet shall be constructed of metal and shall include cable strain relief and radius limiting, buffer tube fan-out kits, space for a splice tray holder, and capacity for 24 SC connectors.
- B. Install patch panel in control panel. Terminate into SC connectors the two fibers required at each location. Terminate and jumper each fiber that continues on to another location.
- C. Provide Corning WCH-02P or Siemon or equal.

2.4 FIBER OPTIC PATCH CORDS

- A. Fiber optic patch cords shall be duplex SC to SC cords with two tight buffered 62.5/125 multimode strands. Patch cords must comply with ANSI/EIA/TIA standards. Provide Ortronics or Lucent or Amp or Molex Premise or NORDX/CDT or Panduit or Siemon or equal.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Provide and install fiber optic cable, connectors, transceivers and converters, network cable, connectors, hubs and network switches to interconnect the PLC's. Fiber optic materials and equipment shall be installed, tested, and terminated by experienced fiber optic system personnel.
- B. Cable shall be carefully installed and professionally terminated. Submit credentials and a sample of fiber termination technician. All terminations shall be compatible with the terminal and communicating equipment. Fiber optic cable shall be installed in underground conduit. Network cable shall be installed in interior locations in conduit.
- C. Fiber optic splices are not desired or permitted except in unavoidable circumstances. In the event of fiber optic cable damage exterior splices shall be made in handholes at no additional cost to the Owner and at the contractor's risk. The losses due to the splice shall not exceed 0.2dB per mechanical splice. No more than 1 set of splices shall be allowed in a run. The Contractor shall protect exposed ends of cable during construction. Network cable shall not be spliced.
- D. All required splicing materials shall be included with fiber optic cable and shall meet the requirements of the terminal and communicating devices, transceivers and media converters and the fiber optical cable manufacture's specifications.
- E. Fiber Optic Cable with connectors on each fiber strand shall be coiled in each Control Panel with 5 feet minimum slack ready for immediate use.
- F. Cable Testing: The fiber optic cable shall be tested at the factory and at the job site before and after installation. Provide docket or shipment report with attenuation test results to the engineer prior to installation. These tests shall be signed, dated and immediately transmitted to the Engineer. Category 5 cable shall be third party verified to TIA/EIA 568-A Category 5.
- G. OTDR Tests: This test shall utilize an OTDR test instrument with signature trace printout capability and shall document the end-to-end attenuation for fiber, connectors and mechanical splices (if any).
- H. Post installation test: Following installation of fiber cable and termination of all strands submit results of on-site attenuation test of each terminated fiber strand. Test shall be performed with an OTDR test instrument with printout capability. Test each terminated Category 5 cable with 100MHz test set.
- I. All cable with attenuation results lower than acceptable limits shall be removed and replaced at no additional cost to the Owner.
- J. Fiber optic and network devices installation: Modems and connecting cables shall be preconfigured at the factory for the application. No modem field settings, programming or adapters shall be required.
- K. Fiber Optic Cable Installation: Fiber optic cable installation and termination shall be accomplished by technicians skilled and experienced in the type work indicated. Experience shall

include 5 years of installation experience with proper training in use of the tools and equipment recommended by the fiber optic cable manufacturer for installation and termination in an approved manner. The installer shall have test equipment available to demonstrate that the completed installation complies with the specified bandwidth and transmission parameters. A licensed electrical or specialty controls contractor in the State of Illinois shall perform this work.

3.2 DEMONSTRATION

- A. System Demonstration and Final Acceptance Test:
 - 1. The Contractor shall conduct a 10 day Final Acceptance test of the completed installation. The test shall start after the Engineer has received marked record (as-built) drawings from the Contractor and when directed by the Owner/Engineer.
 - 2. The system shall operate with 100 percent reliability during the test period. Failure of hardware shall require repair or remedy of the defect to the satisfaction of the Engineer within a two hour period. If the problem cannot be repaired in this time, the test shall be aborted and restarted after the problem is corrected and when directed by the Owner/Engineer. Restarting and satisfactory completion of the test shall be conducted at no additional cost to the Owner.
 - 3. The Contractor shall complete the Operations and Maintenance Manuals including all updated documentation of programmable devices to the satisfaction of the Engineer.
 - 4. The Contractor will be allowed two attempts at successfully completing the Final Acceptance Test. After that time, the Contractor will become responsible to reimburse the Owner for liquidated damages.
- B. Service: Manufacturers shall provide as part of the equipment cost sufficient days of service by a factory-trained service engineer specifically trained on the type equipment herein specified to assist the Contractor during installation and start-up. The service time shall be sufficient to place the units in satisfactory service and instruct the Owner's personnel in proper operation and maintenance of the equipment.
- C. Maintenance Instruction: Operating and maintenance instructions, along with a separate parts list, shall be furnished in three (3) copies to the Owner. Operating instructions shall also incorporate a functional description of the system, including the system schematics which reflect "as-built" modifications. Maintenance requirements particular to the system shall be clearly defined, along with calibration and test procedures.
- D. Warranty: All equipment and workmanship furnished under this contract shall be guaranteed to be free of defects in materials and workmanship for a period of one (1) year from and after the date of final acceptance of the work by the Owner, and any such defects which appear within the stipulated guaranty period shall be repaired, replaced or made good without charge. This guarantee shall include the capacity and integrated performance of the component's parts.

END OF SECTION

SECTION 26 1000 - ELECTRICAL

PART 1 GENERAL

1.1 SUMMARY

A. Work Included:

1. These Electrical Specifications cover the providing of a complete electrical system of proper voltage, capacity, and location, from the point of electric service to the various loads as shown herein on the accompanying Drawings. The labor, materials, equipment, appliances, and services necessary to accomplish in compliance with the Contract Documents all electrical work required by this project shall be provided by the Contractor.
2. Accomplishing of the electrical work shall include furnishing and installing of all necessary wiring to provide lighting, heating, cooling, and ventilating as required; all necessary power wiring and outlets as required; all power wiring of mechanical equipment requiring an electrical connection; all necessary communications and control wiring for electrical and mechanical equipment as required, or as shown on the Drawings or enumerated in these specifications.
3. The Contractor shall familiarize himself with existing conditions via an on-site inspection of the site and building(s), which familiarization is to be accomplished prior to bidding.

B. Scope:

1. It is the intention of the specifications and the related portions of the accompanying Drawings to cause all systems indicated to be furnished complete, in every respect, to include furnishing and installing all equipment needed and usually furnished in connection with such a system, whether specifically mentioned or not, except such parts as are specifically excluded.
2. The Drawings showing the arrangement of the buildings and electrical equipment with wiring interlineation, figures, and details shall be considered as part of and illustrating these specifications.
3. The Drawings are not intended to show all details or any special construction which may be found necessary as work progresses. Any work necessary, due to such lack of such detail, shall be done by the Contractor at no extra cost to the Owner.
4. The project space in the Screening Building shall be Class 1, Division 1 spaces. Requirements in these spaces are covered by Specification Section 26 1000, Paragraph 2.4Q.

1.2 QUALITY ASSURANCE

- A. Codes – Materials and Equipment: All materials and equipment shall conform with the most current NEMA, UL, NEC, Local Utility, and Local Electrical Code standards or higher, including subsequent revisions. The reference of articles and clauses of the NEC is for convenience and does not imply that other articles and clauses do not also apply.
- B. Codes – Work: All work shall be in accordance with the current edition and subsequent revisions of the National Electrical Code (NEC) and any other applicable building codes.

- C. Conflicts: In the case of conflict between or among pertinent codes, standards, and regulations, the most stringent requirement shall take precedence and govern over the remaining requirements.
- D. Warranty: Unless otherwise noted, the Contractor's warranty shall be in accordance with the General Conditions for a time period of one year from the date of final acceptance.

1.3 SUBMITTALS

- A. Section 01 3300 – Submittal Procedures: Requirements for submittals.
- B. Product Data: Within 35 calendar days after the Contractor has received Owner's "Notice to Proceed," the Contractor shall either submit six sets of shop drawings (paper copies) or PDF files for each item for approval by the Engineer for all apparatus and accessories, and cuts for specialties, proposed to be furnished and installed under the Contract. This submittal shall include, but not be limited to:
 - 1. Materials 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. Shop drawings showing general layout, installation, materials, finishes, construction and assembly, and wiring and clearances between equipment proposed to be furnished and a building structure.
 - 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.
- C. Manuals:
 - 1. Upon completion of this portion of the work, and as a condition of its acceptance, deliver to the Engineer three copies of operation and maintenance manuals compiled in accordance with the provisions of Section 01 7000 , and containing, in addition to other prescribed data:
 - a. The single-line electrical wiring diagram for each piece of electrical equipment.
 - b. Sequence of operation of the controls.
 - c. Operating instructions including complete details, adjustments, and instructions relating to the controls of the equipment.
 - d. Parts lists.
 - e. Lubrication requirements.
 - f. Maintenance requirements of all equipment furnished under this Section.
 - 2. The enumerated operating and maintenance instructions for the electrical equipment furnished under this Section shall be grouped by major item and bound together in one folder before submitting to the Engineer.

1.4 PRODUCT HANDLING

- A. Delivery and Storage: Materials delivered to the job site shall be properly marked, with markings corresponding to those shown on the approved shop drawings, to identify the location for which they are intended. Materials shall be stored in a manner to maintain identification and prevent damage, off the ground, using pallets or other supports, in a dry location, off walkways and other locations where damage may occur, and to prevent easy access for inspection.

- B. Protection: The Contractor shall protect all electrical materials scheduled to remain and shall replace items which are damaged during construction.

PART 2 PRODUCTS

2.1 ASSOCIATED ELECTRICAL EQUIPMENT TO BE FURNISHED WITH MECHANICAL

- A. Mechanical equipment such as electric valves, pumps, and other similar equipment that is being supplied by a manufacturer as a “package” item, shall comply with these Electrical Specifications.
- B. All items furnished as “package” items shall also include all associated electrical motors and/or loads, electrical controls, panels, limit switches, alarms and other miscellaneous electrical equipment unless otherwise indicated in these specifications or on the related portion of the accompanying Drawings. The only items that would not normally be supplied as a part of the “package” would be the electrical service to the equipment and all necessary conduit, wiring and installation which would be provided by the Contractor.
- C. It shall be the Contractor’s responsibility to furnish all equipment, material and labor that is not furnished as a part of said “package” and is required to provide a complete and operable installation. No additional expense shall be incurred by the Owner due to any misunderstandings between the Contractor and supplier.

2.2 GROUNDING MATERIALS

- A. Ground rods shall be 3/4” diameter by 10 foot minimum length, copper clad steel.
- B. Electrode clamps shall be suitable for connecting up to 1/0 AWG copper stranded conductor.
- C. All grounding materials shall be UL-approved.

2.3 DISTRIBUTION EQUIPMENT

- A. All distribution equipment including disconnects, switchboards, and/or distribution panels will be complete with wired protective devices, accessories, and enclosed in cabinets as indicated.
- B. Distribution equipment shall be of the dead-front type and provide protection for individual circuits as specified or according to NEC Article 240.

2.4 WIRE, CONDUIT, AND WIRING DEVICES

- A. All conductors, insulation qualities, size, and current capacities shall, as a minimum, conform to NEC Article 310 and Chapter 9.
- B. Unless otherwise shown on the related portions of the accompanying Drawings, all power and control wires shall be new code wires type “THWN” or “THHN”.

- C. No wire smaller than #12 B and S gauge shall be used for power wiring. Control wiring may be #14 or #16.
- D. All wires shall be 98% conductivity, copper wire. All devices receiving stranded wire shall be designed for stranded wire terminations.
- E. Communications wire shall be 4 to 20 ma, shielded, twisted pair, #9463 as manufactured by Belden Wire and Cable of Richmond, IN or equal or as detailed on the Drawings.
- F. Heavy wall RGS shall be used for all exposed conduit, interior and exterior. Underground conduit shall be RNC. Conduit in lab/office building may be EMT, including above ceilings. Conduit for primary service entrance is called out on Drawings.
- G. Conduit shall be NEC approved, have a minimum size as determined by the code, be no smaller than 3/4" in diameter and conform to NEC Article 300.
- H. All conduit on masonry walls or for major plant equipment may be installed exposed, unless noted otherwise. All other conduit must be installed concealed for general lighting, receptacles, and basic equipment installation.
- I. Conduit fittings shall be oblong forms. Pull or junction boxes shall be provided where necessary to facilitate installation of conductors and to support vertical runs of conductors, which support shall be in accordance with the NEC.
- J. All wiring devices consisting of junction boxes, pull boxes, outlet boxes, wire-ways duct, plug-in buss duct, receptacles and switches shall conform to the NEC Articles 370 and 380 as applicable, unless specified higher in the Contract Documents.
- K. Switches for the control of the lighting fixtures shall be Bryant, Hubbell, General Electric, or equal. Switches shall have ivory handles.
- L. Plug receptacles shall be Bryant, Hubbell, General Electric, or equal with an ivory color. Ground fault circuit interrupting "GFCI" receptacles shall be Bryant, Challenger, or equal.
- M. Outlet boxes used with RGS conduit shall be FS type for switches and plug receptacles and 4" round cast type for lighting outlets, all with blank or special cast corners and gaskets as required.
- N. Plates for switches, receptacles, and other outlets shall be ivory.
- O. Interior devices shall be installed in an enclosure rated NEMA 1 as a minimum, unless specified higher on the Contract Documents.
- P. Exterior devices shall be completely weatherproofed, encased in an enclosure rated NEMA 3R or 4, an enclosure providing a greater degree of protection or an enclosure as specified. Switches and receptacles shall be of the weatherproof type, with cap provided and installed.
- Q. In designated spaces, conduit fixtures, switches, and all other items, not mentioned but required for complete installation of electrical system, shall be as required for a Class I, Division I location in accordance with NEC Article 500.

- R. Where forward and reverse contactors are required, they shall be both mechanically and electrically interlocked to prevent simultaneous operation. The electrical interlock shall be permissive.

2.5 LIGHTS

- A. Light fixtures shall, as a minimum, be listed by Underwriter's Laboratories, Inc.
- B. All lights shall be LED
- C. Interior: Interior light fixtures shall meet the requirements of damp locations. They shall be complete with lamps and ready to operate. LED fixtures shall be 40K. All fixtures shall be UL-approved.
- D. Exterior: Exterior lights including fixtures, hardware, and controls shall be as shown in the Lighting Fixtures, shall be UL-approved for operating outside, and are to be supplied with lamps, ready to operate.
- E. Light fixtures in hazardous areas shall be rated for use in those areas.

2.6 NAMEPLATES

- A. Nameplates are required on all major pieces of equipment, including but not limited to: generators, automatic transfer switches, motor starters, control panels, transformers, variable frequency drives, distribution panel boards, power and lighting panels, disconnect switches, and motor control centers including all unit compartments with their miscellaneous controls therein. Nameplates shall be phenolic with white letters on a black background.

PART 3 EXECUTION

3.1 INTRODUCTION

- A. To the extent indicated, the wire and conduit size, the type and capacity of control equipment, special appurtenances, lights and fixtures, and any special installation requirements shall be as defined, scheduled, or shown. Locations shown on panel boards, motors, outlets, fixtures, transformers and other equipment are approximate. The single-line wiring diagram, if included, indicates motor sizes and types of controls.
- B. It should be noted that on all small motors, the sizes indicated are approximate only. Final sizes must be determined from the actual equipment purchased, and breakers or fused disconnects, starters, conduit, and wire must be supplied at no extra compensation for the motor sizes actually installed.

3.2 EXISTING UTILITIES

- A. The Contractor shall be responsible for verifying the location of existing utilities indicated on the related portions of the accompanying Drawings and for determining the location of existing utilities not shown. Where unmarked utility lines, underground obstructions or piping may be

uncovered on the premises, the Contractor shall notify the utility company having jurisdiction thereof, take all necessary measures to prevent interruption of services that may be damaged or interrupted through the Contractor's own negligence, and be responsible for immediate repair and/or restoration at his expense. Buried utilities shown on the Drawings are for information only, and not guaranteed to be accurate.

3.3 PROJECT CONDITIONS

- A. If existing conditions prohibit installation or installation as shown on the related portions of the accompanying Drawings, the Contractor shall contact the Engineer for a solution.

3.4 COOPERATION

- A. During construction, the Contractor shall confer with other contractors whose work may affect the work under this Section, and make arrangements or changes to avoid interference or improper operation of the system.
- B. All electrical equipment furnished by other trades shall have manufacturer's instructions provided and shall be checked by the Contractor performing the electrical work as to their suitability for the particular installation before proceeding with installation or wiring of them.

The Contractor shall consult the Contract Documents and specifications of trades providing the equipment and controls for control wiring diagrams and shall refer to their shop drawings, in order to become familiar with equipment, type and operation, their location, and extent of work required for installing, wiring, and connecting them.

3.5 PROTECTION OF COMPLETED WORK

- A. The Contractor shall protect the work completed, and repair it or replace it if damage should occur. Equipment and materials installed prior to the painting of a room shall be protected against paint damage. Equipment and materials installed shall be clean, inside and out, prior to acceptance of work by the Engineer.

3.6 STARTUP OF SYSTEMS

- A. Equipment manufacturers shall supply the services of qualified technical personnel during startup or for preliminary adjustments of equipment. There shall be no limit with regard to amount of time required by the startup technician to complete startup procedures. Startup shall be considered as being complete only when all equipment is operating to the satisfaction of the Engineer and the Owner. Services of said technicians shall also be supplied as needed after startup in the event of equipment failure or malfunction during the warranty period and also for instruction of operating personnel in the use of equipment. Startup must be completed before the expiration of working days specified in the Contract Documents.
- B. If in the opinion of the Engineer or the Owner, based on performance, a particular technician is not totally qualified in the area of work involved, the equipment manufacturer shall provide the services of a more qualified technician.

- C. It shall be the Contractor's responsibility to coordinate the efforts of all technical personnel involved in the startup of a particular system.
- D. Startups shall be scheduled at times that are convenient for the Owner and the Engineer and shall interfere with normal plant operations as little as possible.

3.7 TESTING AND INSPECTION

- A. The Contractor shall provide test equipment, temporary wiring, labor and materials required to perform necessary testing. Six copies of all test results, including a list of the persons present for the testing, shall be submitted to the Engineer.
- B. The Contractor shall provide a licensed electrician or a registered professional electrical engineer to inspect and certify in writing to the Engineer that the complete electrical system complies with the Drawings and specifications and the latest issue of the National Electric Code.
- C. Upon completion of the entire electrical system and once all wires and cables are in place and connected, the system shall be tested for the following:
 - 1. Open-phase (hot) wires, open neutral and open ground.
 - 2. Reverse polarity and reverse-phase (hot) and ground.
 - 3. Grounded or shorted phase (hot) wires.
 - 4. Grounds and crosses between control wiring conductors.
 - 5. Proper operation of all connected devices.
- D. All work shall be performed in a good workmanlike manner as judged by the Engineer.
- E. The Contractor shall correct all deficiencies or problems found prior to making application for final payment.

3.8 FINAL INSPECTION

- A. After all construction is completed and the system is ready for operation and the Engineer has been provided with a signed copy of the test data and a certification that all required tests are complete and the system is ready for use, the Contractor shall contact and notify the Engineer that the project is ready for final inspection. The Engineer will inspect the project within five working days of this notification. The job shall not be considered complete until the Engineer has approved all work as acceptable and complete.

3.9 INSTALLATION/ERECTION

- A. All electrical equipment and conduit, including accessories and appurtenances, shall be installed straight, true, level, plumb, and either parallel to or at right angles with the building, except as stated herein or as shown on the related portions of the accompanying Drawings and with verbal confirmation from the Engineer at the time of installation.
- B. Listed or labeled equipment shall be installed and in accordance with instructions included in the listing or labeling.

- C. Every precaution has been taken to ensure that the related portions of the accompanying Drawings do comply with these specifications. If the Contractor feels some item or items may not comply with these specifications, the Contractor shall notify the Engineer for a solution.

3.10 ANCHORS

- A. The electrical equipment shall be firmly attached to the structure using anchors, screws, and/or hangers, which are UL-listed for the use intended. The use of the tie wire, metal stripping and other non-UL-listed equipment for electrical use shall not be permitted.
- B. Anchors used in structural steel shall have location and type approved by the Engineer prior to installation (to prevent structural damage from occurring).

3.11 CIRCUIT LABELING

- A. The Contractor shall affix printed labels to the inside of all load centers and panels and these labels shall identify each circuit number and load description of the circuit loads.
- B. Circuits and ratings shall be identified on all protective devices or on the inside of the device cover, including fused disconnects and fuse blocks with fuse size and type included.
- C. All wire shall be tagged at all junction points.
- D. Circuit labels shall be protected by a clear plastic covering, clear varnish coating, or transparent mending tape.

3.12 GROUNDING

- A. Provide grounding for the entire electric installation. The following are included as requiring grounding: electric service, its equipment and enclosures, conduits and enclosures, neutral or identified conductor of any interior wiring system, main switchboards, power and lighting panel boards, control centers, and non-current carrying parts of motors, starter, controllers, instrument cases, light fixtures, outdoor light fixtures and all equipment in hazardous locations.
- B. All locations where ground rods are necessary, at least two ground rods shall be installed. They shall be spaced a minimum of eight feet apart from each other, and shall be as close to the electric entrance point of the building or site service entrance point as practical. The top of the ground rods shall be embedded to a depth of at least six inches below finished grade.
- C. Any necessary ground rods, clamps, and ground rod electrode conductors at their connections, shall be protected by a 3/16" minimum coating of silicon sealant.

3.13 EQUIPMENT FOR DISTRIBUTION

- A. Color coded wiring shall be installed to match that provided by the various manufacturers of the distribution equipment.

3.14 CONTROL EQUIPMENT

- A. Install the control equipment, to consist of control centers or starters, contactors, fused disconnects or breakers, accessories and appurtenances, and remote control and automatic devices to provide control as indicated.
- B. In cases where starters are furnished as an integral part of motor-operated equipment, only fused disconnects or circuit breakers will constitute the control equipment. Factory and site assembled control equipment will be installed and wired to conform with NEC Article 384 to perform as designed in a convenient, orderly, and accessible location for further maintenance and testing. Provide room for future additions where space is available.

3.15 WIRING

- A. Equipment and Controls: The Contractor shall provide conduit, wiring, and connect motors and other electrically-operated equipment as specified in the Contract Documents. He shall also install and provide support for and connect and starters, other control devices, and control panels furnished for such motors and equipment, complete all circuits, tag all junction points, test operation, leave in satisfactory operating condition, and meet the other requirements of these specifications.
- B. Interior: Interior wiring shall include electrical conduits, conductors, wiring devices, supports, other materials, and the installations, required to distribute electric current from distribution centers for all purposes as indicated and specified.
- C. Exterior: Exterior wiring shall include overhead and underground electrical conductors, wiring devices, supports, other materials, and the installations required to distribute electric current between centers where apparatus will be exposed to outdoor weather conditions.
- D. The installation of all conductors shall conform, as a minimum, to NEC Article 310 and Chapter 9.
- E. Installation of underground wires shall be accomplished in accordance with the National Electric Code and requirements of the local utility company. All underground electric shall have two foot minimum cover.
- F. All conduit runs as indicated are diagrammatic and exact routing of conduit shall suit job conditions. Conduit installation shall conform to NEC Article 300.
- G. All empty conduits as specified shall be installed, tested, and proved to be clear of at least 85% of the inside diameter of the conduit size, capped, and a drawing of the route submitted to the Engineer.
- H. Exterior conduit runs shall be installed sloping away from all junction and pull boxes and free of all moisture, watertight, and protected to eliminate any possible mechanical damage.
- I. Unless otherwise shown on the related portions of the accompanying Drawings, switches shall be mounted approximately four feet above the floor.

- J. Switches shall be placed in gang boxes at locations where more than one switch is necessary.
- K. All receptacles shall be mounted at heights shown on the Drawings.
- L. Ground fault circuit interrupting "GFCI" receptacles shall be installed in accordance with NEC and shall, as a minimum, be the most upstream receptacle device installed in a circuit.

3.16 LIGHTING

- A. The Contractor shall install lighting fixtures in the sizes and types as shown in the Contract Documents. Fixtures shall be completely wired and lamped with the lamps as shown in the Lighting Schedule and details of the accompanying Drawings.
- B. Interior: Interior lighting shall be installed in a manner to meet the requirements of damp locations. In addition, the installation shall include providing surface mounting and grounding according to the manufacturer's directions, utilizing silicone sealant where necessary, allowing three days curing time of any sealant inside a fixture before closing it, properly covering all holes in fixture bases per UL and NEC, and preventing entry by mud wasps in a reasonably practical manner.
- C. Exterior: Exterior lighting shall meet the requirements as indicated for interior lighting, and additionally shall be accomplished in accordance with the details as shown on the accompanying Drawings.

3.17 SIGNAL AND ALARM SYSTEMS

- A. All signals and alarms as specified and furnished with equipment will be wired and installed as required to perform the function specified.
- B. The Contractor shall install in accordance with the manufacturer's instructions all wiring, conduit, and outlet boxes required for the completion of the signal and alarm systems.
- C. All wiring shall be in conduit and of the same approved type as used for electric light and power wiring, and shall meet the requirements of all applicable codes.
- D. As a minimum, the sizes of the different wires shall be those specified by the manufacturer. All wires shall be tagged at all junction points and shall test free from grounds or crosses between conductors.
- E. Final connections between equipment and the wiring system shall be made under direct supervision of a representative of the manufacturer.

END OF SECTION

SECTION 31 0513 - SOILS FOR EARTHWORK

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Subsoil materials.
 - 2. Topsoil materials.

1.2 SUBMITTALS

- A. Section 01 3300 – Submittal Procedures: Requirements for submittals.
- B. Materials Source: Submit name of imported materials source.
- C. Manufacturer's Certificate: Certify products meet or exceed specified requirements and Report of Soils Exploration.

PART 2 PRODUCTS

2.1 SUBSOIL MATERIALS

- A. Subsoil Type:
 - 1. Select or local borrow.
 - 2. Graded.
 - 3. Free of lumps larger than 2 inches, rocks larger than 2 inches, and debris.
 - 4. Inorganic silty clays conforming to ASTM D2487 Group Symbol CL.
 - 5. Granular soils conforming to ASTM D2487 Group Symbol SM.

2.2 TOPSOIL MATERIALS

- A. Topsoil Type: Conforming to Section 1081.06 of the Roadway Specifications.
 - 1. Select.
 - 2. Graded.
 - 3. Free of roots, rocks larger than ¼ inch, subsoil, debris, large weeds and foreign matter

2.3 SOURCE QUALITY CONTROL

- A. Section 01 4000 – Quality Requirements: Testing and analysis of soil material.
- B. Testing and Analysis of Subsoil Material: Perform in accordance with ASTM D698 and ASTM D1557.
- C. Testing and Analysis of Topsoil Material: Perform in accordance with ASTM D698 and ASTM D1557.
- D. When tests indicate materials do not meet specified requirements, change material and retest.
- E. Furnish materials of each type from same source throughout the Work.

PART 3 EXECUTION

3.1 EXCAVATION

- A. Excavate subsoil and topsoil from areas designated. Strip topsoil to full depth of topsoil in designated areas.
- B. Stockpile excavated material meeting requirements for subsoil materials and topsoil materials.
- C. Remove excess excavated materials, subsoil, and topsoil not intended for reuse, from site. Coordinate location with Owner.
- D. Remove excavated materials not meeting requirements for subsoil materials and topsoil materials from site.

3.2 STOCKPILING

- A. Stockpile materials on site at locations designated by Engineer.
- B. Stockpile in sufficient quantities to meet Project schedule and requirements.
- C. Separate differing materials with dividers or stockpile apart to prevent mixing.
- D. Stockpile topsoil 8 feet high, maximum, and protect from erosion.
- E. Prevent intermixing of soil types or contamination.
- F. Direct surface water away from stockpile site to prevent erosion or deterioration of materials.
- G. Stockpile unsuitable or hazardous materials on impervious material and cover to prevent erosion and leaching, until disposed of.

3.3 STOCKPILE CLEANUP

- A. Remove stockpile, leave area in clean and neat condition. Grade Site surface to prevent free standing surface water.

END OF SECTION

SECTION 31 0516 - AGGREGATES FOR EARTHWORK

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Coarse aggregate materials.
 - 2. Fine aggregate materials.

PART 2 PRODUCTS

2.1 COARSE AGGREGATE MATERIALS

- A. Coarse Aggregate Type CA-6 or CA-7: Crushed stone conforming to Section 1004 of the Roadway Specifications.

2.2 FINE AGGREGATE MATERIALS

- A. Fine Aggregate Type FA-6: Sand conforming to Section 1003 of the Roadway Specifications.

2.3 SOURCE QUALITY CONTROL

- A. Section 01 4000 – Quality Requirements: Testing and inspection services.
- B. Testing and analysis shall be performed in accordance with ASTM D1557, ASTM D4318, and ASTM C136.
- C. When tests indicate materials do not meet specified requirements, change material and retest.
- D. Provide materials of each type from same source throughout the Work.
- E. Aggregate material must be from an IDOT-approved source.

PART 3 EXECUTION

3.1 EXCAVATION

- A. Stockpile excavated material meeting requirements for coarse aggregate materials and fine aggregate materials.
- B. Remove excess excavated materials, coarse aggregate materials and fine aggregate materials not intended for reuse, from site.
- C. Remove excavated materials not meeting requirements for coarse aggregate materials and fine aggregate materials from site.

3.2 STOCKPILING

- A. Stockpile materials on site at locations designated by Engineer.
- B. Stockpile in sufficient quantities to meet Project schedule and requirements.
- C. Separate different aggregate materials with dividers or stockpile individually to prevent mixing.
- D. Direct surface water away from stockpile site to prevent erosion or deterioration of materials.
- E. Stockpile unsuitable materials on impervious material and cover to prevent erosion and leaching, until disposed of.

3.3 STOCKPILE CLEANUP

- A. Remove stockpile, leave area in clean and neat condition. Grade site surface to prevent free standing surface water.

END OF SECTION

SECTION 31 1000 - SITE CLEARING

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Removing surface debris.

1.2 QUALITY ASSURANCE

- A. Conform to applicable code for environmental requirements, disposal of debris, and burning debris on site.
- B. Perform Work in accordance with municipal and State of Illinois standard.

PART 2 PRODUCTS

2.1 MATERIALS

- A. None in this Section.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01 3000 – Administrative Requirements: Verification of existing conditions before starting work.

3.2 PREPARATION

- A. Call JULIE not less than three working days before performing Work.
 - 1. Request underground utilities to be located and marked within and surrounding construction areas.

3.3 PROTECTION

- A. Locate, identify, and protect utilities indicated to remain, from damage.
- B. Protect trees, plant growth, and features designed to remain, as final landscaping as specified in Section 01 5000 – Temporary Facilities and Controls.
- C. Protect bench marks, and survey control points, from damage or displacement.

3.4 CLEARING

- A. Clear areas required for access to site and execution of Work.

- B. Clear undergrowth and deadwood, without disturbing subsoil.

3.5 REMOVAL

- A. Continuously clean up and remove waste materials from site. Do not allow materials to accumulate on site.
- B. Do not burn or bury materials on site. Leave site in clean condition.

END OF SECTION

SECTION 31 2213 - ROUGH GRADING

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Excavating topsoil.
 - 2. Excavating subsoil.
 - 3. Cutting, grading, filling, rough contouring, compacting, site for Site structures, building pads, pavement and sidewalks.

1.2 SUBMITTALS

- A. Section 01 3300 – Submittal Procedures: Requirements for submittals.
- B. Samples: Submit, in air-tight containers, an adequate quantity of the fill material to testing laboratory.
- C. Materials Source: Submit name of imported materials suppliers.
- D. Manufacturer's Certificate: Certify products meet or exceed specified requirements.
- E. Source for the cohesive structural fill along with material sample.

1.3 QUALITY ASSURANCE

- A. Perform Work in accordance with ASTM C136, ASTM D2419, and ASTM D2434.
- B. Perform Work in accordance with the Roadway Specifications.

PART 2 PRODUCTS – N/A

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01 3000 – Administrative Requirements: Verification of existing conditions before starting work.
- B. Verify survey bench mark and intended elevations for the Work are as indicated on Drawings.

3.2 PREPARATION

- A. Call JULIE not less than three working days before performing Work.
 - 1. Request underground utilities to be located and marked within and surrounding construction areas.

- B. Identify required lines, levels, contours, and datum.
- C. Notify utility company to remove and relocate utilities.
- D. Protect utilities indicated to remain from damage.
- E. Protect plant life, lawns, rock outcropping and other features remaining as portion of final landscaping.
- F. Protect bench marks, survey control points, existing structures, fences, sidewalks, paving, and curbs from excavating equipment and vehicular traffic.

3.3 SUBSOIL EXCAVATION

- A. Excavate subsoil from areas to be further excavated, re-landscaped, or re-graded marked areas.
- B. Do not excavate wet subsoil or excavate and process wet material to obtain optimum moisture content.
- C. When excavating through roots, perform Work by hand and cut roots with sharp axe.
- D. Remove excess subsoil not intended for reuse, from site.
- E. Stockpile subsoil in area designated on site and protect from erosion.
- F. Stockpile excavated material in area designed on site in accordance with Section 31 0513 – Soils for Earthwork.
- G. Benching Slopes: Horizontally bench existing slopes greater than 1:4 to key placed fill material to slope to provide firm bearing.
- H. Stability: Replace damaged or displaced subsoil as specified for fill.

3.4 TOPSOIL

- A. Excavate and stockpile topsoil for re-use on site.

3.5 FILLING

- A. Prior to any filling activity, the existing ground shall be scarified.
- B. Fill areas to contours and elevations with unfrozen materials.
- C. Place fill material in continuous layers and compact in accordance with schedule at end of this section. Fill layers not to exceed 12 inches in thickness.
- D. Maintain optimum moisture content of fill materials to attain required compaction density.
- E. Slope grade away from building minimum 2 percent slope for minimum distance of 10 ft, unless noted otherwise.

- F. Make grade changes gradual. Blend slope into level areas.
- G. Install Work in accordance with the Roadway Specifications.

3.6 TOLERANCES

- A. Section 01 4000 – Quality Requirements: Tolerances
- B. Top Surface of Subgrade: Plus or minus 1/10 foot from required elevation.

3.7 FIELD QUALITY CONTROL

- A. Section 01 4000 – Quality Requirements: Field inspecting, testing, adjusting, and balancing.
- B. Perform laboratory material tests in accordance with ASTM D698.
- C. Perform in place compaction tests in accordance with the following:
 - 1. Density Tests: ASTM D2922.
 - 2. Moisture Tests: ASTM D3017.
- D. When tests indicate Work does not meet specified requirements, remove Work, replace and retest.
- E. One compaction test shall be performed for every two feet of fill with a minimum of one test if the fill is less than 2 feet.

3.8 SCHEDULES

- A. Cohesive Structural Fill:
 - 1. Fill Location: To be used beneath all building foundations and building slabs from existing ground level to bottom of aggregate base. Material shall also be used within 45° bearing splay of all foundations from existing ground level to bottom of appropriate base of footing or foundation.
 - 2. Fill Type: Conforming to ASTM D2487 Group Symbol CL containing less than 40% silt or granular materials.
 - 3. Compact uniformly to minimum 98 percent of maximum density as determined by the Standard Proctor test ASTM D698.
- B. Subsoil Fill:
 - 1. Fill Type: As specified in Section 31 0513 – Soils for Earthwork.
 - 2. Compact uniformly to minimum 95 percent of maximum density as determined by the Modified Proctor test ASTM D1557.
- C. Topsoil Fill:
 - 1. Fill Type: As specified in Section 31 0513 – Soils for Earthwork.
 - 2. Compact uniformly to minimum 90 percent of maximum density as determined by the Modified Proctor test ASTM D1557.

END OF SECTION

SECTION 31 2316 - EXCAVATION

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Excavating for Site structures.
 - 2. Excavating for landscaping.

1.2 SUBMITTALS

- A. Section 01 3300 – Submittal Procedures: Requirements for submittals:
- B. Excavation Protection Plan: Describe sheeting, shoring, and bracing materials and installation required to protect excavations and adjacent structures and property; include structural calculations to support plan.
- C. Shop Drawings: Indicate soil densification grid for each size and configuration footing requiring soils densification.

1.3 QUALITY ASSURANCE

- A. Prepare excavation protection plan under direct supervision of professional engineer experienced in design of this Work and licensed in State of Illinois.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

3.1 PREPARATION

- A. Call JULIE not less than three working days before performing Work.
 - 1. Request underground utilities to be located and marked within and surrounding construction areas.
- B. Identify required lines, levels, contours, and datum.
- C. Notify utility company to remove and relocate utilities.
- D. Protect utilities indicated to remain from damage.
- E. Protect plant life, lawns, rock outcroppings, and other features remaining as portion of final landscaping.

- F. Protect bench marks, survey control points, existing structures, fences, sidewalks, paving, and curbs from excavating equipment and vehicular traffic.

3.2 EXCAVATION

- A. Excavate subsoil to accommodate building foundations, slabs-on-grade, paving and Site structures, construction operations, and landscaping.
- B. Compact disturbed load bearing soil in direct contact with foundations to original bearing capacity; perform compaction according to Section 31 2323 - Fill and Section 31 2317 - Trenching.
- C. Slope banks with machine to angle of repose or less until shored.
- D. Do not interfere with 45-degree bearing splay of foundations.
- E. Grade top perimeter of excavation to prevent surface water from draining into excavation.
- F. Trim excavation. Remove loose matter.
- G. Remove lumped subsoil, boulders, and rock. Remove larger material as specified in Section 31 2323 - Fill.
- H. Notify Engineer of unexpected subsurface conditions.
- I. Correct areas over excavated or where unsuitable material is removed with CA-7 material. No fines.
- J. Remove excess and unsuitable material from Site.
- K. Repair or replace items indicated to remain damaged by excavation.

3.3 FIELD QUALITY CONTROL

- A. Section 01 4000 – Quality Requirements: Field inspecting, testing, adjusting, and balancing.
- B. Request inspection of excavation and controlled fill operations according to applicable code.
- C. Request visual inspection of bearing surfaces by Engineer and inspection agency before installing subsequent Work.

3.4 PROTECTION

- A. Prevent displacement or loose soil from falling into excavation; maintain soil stability.
- B. Protect bottom of excavations and soil adjacent to and beneath foundation from freezing.
- C. Protect structures, utilities and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earth operations.

SECTION 31 2317 - TRENCHING

1.1 SUMMARY

A. Section Includes:

1. Excavating trenches for site piping and utilities from 5 feet outside building to utility service.
2. Compacted fill from top of utility bedding to subgrade elevations.
3. Backfilling and compaction.

1.2 DEFINITIONS

1. Utility: Any buried pipe, duct, conduit, or cable.

1.3 Submittals

- #### A. None required.

1.4 QUALITY ASSURANCE

- #### A. Perform Work in accordance with the Roadway Specifications and the Water & Sewer Specifications.
- #### B. Maintain one copy of each document on site.

1.5 FIELD MEASUREMENTS

- #### A. Verify field measurements prior to fabrication.

1.6 COORDINATION

- #### A. Section 01 3000 – Administrative Requirements: Coordination and project conditions.
- #### B. Verify Work associated with lower elevation utilities is complete before placing higher elevation utilities.

PART 2 PRODUCTS

2.1 FILL MATERIALS

- #### A. Initial Backfill and Trench Backfill: CA-7 coarse aggregate as described in Section 31 0516 – Aggregates for Earthwork. Aggregate for trench backfill shall be crushed, washed, angular, limestone with 6% max deleterious material. “PEA GRAVEL” AND “BUCKSHOT” ARE NOT ACCEPTABLE.
- #### B. Bedding and Haunching: FA-6 fine aggregate as described in Section 31 03516 – Aggregates for Earthwork. Aggregate for bedding and haunching shall be natural bank sand or sand produced via crushing and screening of oversized particles.

- C. Granular Structural Fill: CA-7 coarse aggregate as described in Section 31 0516 – Aggregates for Earthwork. Aggregate for structural fill shall be crushed limestone with 6% max deleterious material. “Breaker rock” is an acceptable alternative.
- D. Granular Fill: CA-6 coarse aggregate as described in Section 31 0516 – Aggregates for Earthwork. Aggregate for granular fill shall be crushed limestone with 6% max deleterious material.
- E. Subsoil Fill: Excavated material as described in Section 31 0513 – Soils for Earthwork.
- F. Concrete: Class SI concrete as described in Section 03 3000 – Cast-in-Place Concrete.

PART 3 EXECUTION

3.1 LINES AND GRADES

- A. Lay pipes to lines and grades indicated on Drawings.
 - 1. Engineer reserves right to make changes in lines, grades, and depths of utilities when changes are required for Project conditions.
- B. Use laser-beam instrument with qualified operator to establish lines and grades.

3.2 PREPARATION

- A. Call JULIE not less than three working days before performing Work.
 - 1. Request underground utilities to be located and marked within and surrounding construction areas.
- B. Identify required lines, levels, contours, and datum locations.
- C. Protect plant life, lawns, and other features remaining as portion of final landscaping.
- D. Protect bench marks, sidewalks, paving, and curbs from excavating equipment and vehicular traffic.
- E. Maintain and protect above and below grade utilities indicated to remain.

3.3 TRENCHING

- A. Excavate subsoil required for site piping and utilities to utility service.
- B. Remove lumped subsoil, boulders, and rock.
- C. Perform excavation within 24 inches of existing utility service in accordance with utility's requirements.
- D. Do not advance open trench more than 200 feet ahead of installed pipe.

- E. Cut trenches sufficiently wide to enable installation and allow inspection. Remove water or materials that interfere with Work.
- F. Excavate bottom of trenches maximum 2 feet wider than outside diameter of pipe.
- G. Excavate trenches to depth indicated on Drawings. Provide uniform and continuous bearing and support for bedding material and utilities.
- H. Do not interfere with 45 degree bearing splay of foundations
- I. When Project conditions permit, slope side walls of excavation starting 2 feet above top of pipe. When side walls cannot be sloped, provide sheeting and shoring to protect excavation as specified in this section.
- J. When subsurface materials at bottom of trench are loose or soft, excavate to greater depth as directed by Engineer until suitable material is encountered.
- K. Cut out soft areas of subgrade not capable of compaction in place. Backfill with CA-7 material and compact to density equal to or greater than requirements for subsequent backfill material.
- L. Trim excavation. Hand trim for bell and spigot pipe joints. Remove loose matter.
- M. Correct areas over excavated with compacted backfill as specified for authorized excavation.
- N. Stockpile subsoil in area designated on site and protect from erosion.

3.4 SHEETING AND SHORING

- A. Sheet, shore, and brace excavations to prevent danger to persons, structures and adjacent properties and to prevent caving, erosion, and loss of surrounding subsoil.
- B. Support trenches more than 4 feet deep excavated through unstable, loose, or soft material. Provide sheeting, shoring, bracing, or other protection to maintain stability of excavation.
- C. Design sheeting and shoring to be removed at completion of excavation work.
- D. Repair damage caused by failure of the sheeting, shoring, or bracing and for settlement of filled excavations or adjacent soil.
- E. Repair damage to new Work from settlement, water or earth pressure or other causes resulting from inadequate sheeting, shoring, or bracing.

3.5 BACKFILLING

- A. Backfill trenches to contours and elevations with unfrozen fill materials.
- B. Systematically backfill to allow maximum time for natural settlement. Do not backfill over porous, wet, frozen, or spongy subgrade surfaces.

- C. Place material in continuous layers as follows:
 - 1. Bedding, Haunching and Initial Backfill: Maximum 8 inches compacted length.
 - 2. Over Excavation: Maximum 8 inches compacted length.
 - 3. Trench Backfill: Maximum 8 inches compacted depth.
- D. Employ placement method that does not disturb or damage foundation perimeter drainage or utilities in trench.
- E. Maintain optimum moisture content of fill materials to attain required compaction density.
- F. Do not leave more than 50 feet of trench open at end of working day.
- G. Protect open trench to prevent danger to Owner or the public.

3.6 TOLERANCES

- A. Section 01 4000 – Quality Requirements: Tolerances.
- B. Top Surface of General Backfilling: Plus or minus 1 inch from required elevations.

3.7 FIELD QUALITY CONTROL

- A. Section 01 4000 – Quality Requirements: Field testing, testing, adjusting, and balancing.
- B. Perform laboratory material tests in accordance with ASTM D1557 (Modified Proctor).
- C. Perform in place compaction tests in accordance with the following:
 - 1. Density Tests: ASTM D2922.
 - 2. Moisture Tests: ASTM D3017.
- D. When tests indicate Work does not meet specified requirements, remove Work, replace, compact, and retest.

3.8 PROTECTION OF FINISHED WORK

- A. Section 01 7000 – Execution and Closeout Requirements: Protecting finished work.
- B. Reshape and re-compact fills subject to vehicular traffic during construction.

3.9 SCHEDULE

- A. Storm, Sanitary and Water Main Piping:
 - 1. Cover pipe and bedding with Fill Type: FA-6, CA-6 or CA-7.
 - 2. Compact uniformly to minimum 95 percent of maximum density in accordance with ASTM D1557 (Modified Proctor).
- B. Duct Bank:
 - 1. Cover duct and bedding with Fill Type FA-6.

2. Compact uniformly to minimum 95 percent of maximum density in accordance with ASTM D1557 (Modified Proctor).

END OF SECTION

SECTION 31 2319 - DEWATERING

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Dewatering system.
 - 2. Surface water control system.
 - 3. System operation and maintenance.
 - 4. Water disposal.

1.2 DEFINITIONS

- A. Dewatering includes the following:
 - 1. Lowering of ground water table and intercepting horizontal water seepage to prevent ground water from entering excavations and trenches.
 - 2. Reducing piezometric pressure within strata to prevent failure or heaving of excavations and trenches.
 - 3. Disposing of removed water.
- B. Surface Water Control: Removal of surface water within open excavations.

1.3 SYSTEM DESCRIPTION

- A. Provide dewatering and surface water control systems to permit Work to be completed on dry and stable subgrade.
- B. Furnish standby equipment stored at Project site and ready for immediate use upon failure of dewatering equipment. This shall include standby diesel generator for backup power and pumps that are critical to the dewatering system.

1.4 PERFORMANCE REQUIREMENTS

- A. Design dewatering systems to:
 - 1. Lower water table within areas of excavation to minimum three (3) feet below bottom of excavation to permit Work to be completed on dry and stable subgrade.
 - 2. Relieve hydrostatic pressures in confined water bearing strata below excavation to eliminate risk of uplift or other instability of excavation.
 - 3. Prevent damage to adjacent properties, buildings, structures, utilities, and facilities from construction operations.
 - 4. Prevent loss of fines, quick condition, or softening of foundation subgrade.
 - 5. Maintain stability of sides and bottoms of excavations and trenches.
- B. Design surface water control systems to:
 - 1. Collect and remove surface water and seepage entering excavation.

1.5 SUBMITTALS

- A. Section 01 3300 – Submittal Procedures: Requirements for submittals.
- B. Shop Drawings:
 - 1. Indicate dewatering system layout, well depths, well screen lengths, dewatering pump locations, pipe sizes and capacities, grades, filter sand gradations, surface water control devices, valves, and water disposal method and location.
 - 2. Indicate primary and standby power system location and capacity.
 - 3. Indicate layout and depth of monitoring wells, piezometers and flow measuring devices for system performance measurement.
 - 4. Include detailed description of dewatering system installation procedures and maintenance of equipment.
 - 5. Include description of emergency procedures to follow when problems arise.
- C. Product Data: Submit data for each of the following:
 - 1. Dewatering Pumps: Indicate sizes, capacities, priming method, motor characteristics.
 - 2. Pumping equipment for control of surface water within excavation.
- D. Design Data: Signed and sealed by professional engineer.
 - 1. Indicate design values, analyses, and calculations to support design.
 - 2. Include description and profile of geology, soil, and groundwater conditions.
- E. Field Reports: Test and monitoring reports as specified in Field Quality Control article.

1.6 CLOSEOUT SUBMITTALS

- A. Section 01 7000 – Execution and Closeout Requirements: Requirements for submittals.
- B. Project Record Documents: Record actual locations and depths of capped wells and piping abandoned in place.

1.7 QUALITY ASSURANCE

- A. Comply with authorities having jurisdiction for the following:
 - 1. Drilling and abandoning of wells used for dewatering systems.
 - 2. Water discharge and disposal from pumping operations.

1.8 QUALIFICATIONS

- A. Installer: Company specializing in performing work of this Section with minimum of 15 years documented experience and responsible for design, operation, and maintenance of dewatering system.
 - 1. Assume sole responsibility for dewatering and surface water control systems and for loss or damage resulting from partial or complete failure of protective measures and settlement or resultant damage caused by ground water control operations.

1.9 SEQUENCING

- A. Section 01 1000 – Summary: Requirements for sequencing.
- B. Sequence work to obtain required permits before start of dewatering operations.
- C. Sequence work to install and test monitoring systems minimum 7 days before testing and operating dewatering systems.
- D. Sequence work to install and test dewatering and surface water control systems minimum 7 days before starting excavation and trenching.

1.10 COORDINATION

- A. Section 01 3000 – Administrative Requirements: Requirements for coordination.
- B. Coordinate work to permit the following construction operations to be completed on dry stable substrate.
 - 1. Excavation for structures specified in Section 31 2316 – Excavation.
 - 2. Trenching for utilities specified in Section 31 2317 – Trenching.

PART 2 PRODUCTS

2.1 DEWATERING EQUIPMENT

- A. Select dewatering equipment to meet specified performance requirements.

2.2 ACCESSORIES

- A. Valves and Fittings: Furnish valves and fittings to isolate each well from header pipe and to prevent loss of pump prime.
- B. Filter Sand: ASTM C33; natural river or bank sand; washed; free of silt, clay, loam, friable or soluble materials, and organic matter; graded to suit well screen.
- C. Grout: Mixture of Portland cement and bentonite clay or sand suitable for sealing abandoned wells and piping.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01 3000 – Administrative Requirements: Verification of existing conditions before starting work.
- B. Conduct additional borings and investigations to supplement subsurface investigations identified in Section 31 0510 – Subsurface Investigation as required to complete dewatering system design.

- C. Call JULIE not less than three working days before performing Work.
 - 1. Request underground utilities to be located and marked within and surrounding construction areas.
- D. Employ licensed land surveyor to provide following documentation:
 - 1. Survey existing adjacent buildings, structures, and improvements for position and elevation of principal elements before and after completion of dewatering operations.

3.2 PREPARATION

- A. Protect existing adjacent buildings, structures, and improvements from damage caused by dewatering operations.

3.3 DEWATERING SYSTEM

- A. Install dewatering system in accordance with shop drawings.
- B. Locate system components to allow continuous dewatering operations without interfering with installation of permanent Work and existing public rights-of-way, sidewalks, and adjacent buildings, structures, and improvements.
- C. Drill wells in sizes and to depth indicated. Provide temporary surface casing when required to stabilize soil while advancing well.
- D. Contractor shall provide dewatering equipment as required to maintain a dry and stable bottom trench for the installation of all sanitary sewer, water main, process piping, foundation excavation, etc.
- E. Dewatering may require the use of well points or wells to lower the water table below the trench or foundation excavation or the use of a sump pump.
- F. Contractor shall furnish, operate and maintain all dewatering equipment including providing electrical service to operate the equipment.
- G. Test well for proper water flow through well screen and pumping rate for dewatering system.
- H. Cover and seal top of well until pump is installed.
- I. Install pumps in accordance with manufacturer's instructions.
- J. Connect pumps to discharge header. Install valves to permit pump isolation.

3.4 SURFACE WATER CONTROL SYSTEM

- A. Provide ditches, berms, and other devices to divert and drain surface water from excavation area as specified in Section 31 2500 – Erosion and Sedimentation Controls.
- B. Divert surface water and seepage water within excavation areas into sumps and pump water into drainage channels in accordance with requirements of agencies having jurisdiction.

- C. Control and remove unanticipated water seepage into excavation.

3.5 SYSTEM OPERATION AND MAINTENANCE

- A. Operate dewatering system continuously until backfilling is complete.
- B. Provide supervision of dewatering system by personnel skilled in operation, maintenance, and replacement of system components.
- C. Conduct daily observation of dewatering system and monitoring system. Make required repairs and perform scheduled maintenance.
- D. Fill fuel tanks before tanks reach 25 percent capacity.
- E. Start emergency generators at least twice each week to check operating condition.
- F. When dewatering system cannot control water within excavation, notify Engineer and stop excavation work.
 - 1. Supplement or modify dewatering system and provide other remedial measures to control water within excavation.
 - 2. Demonstrate dewatering system operation complies with performance requirements before resuming excavation operations.
- G. Modify dewatering and surface water control systems when operation causes or threatens to cause damage to new construction, existing site improvements, adjacent property, or adjacent water wells.
- H. Correct unanticipated pressure conditions affecting dewatering system performance.
- I. Do not discontinue dewatering operations without Engineer's approval.

3.6 WATER DISPOSAL

- A. Discharge water into area drainage.
- B. Provide erosion control for the water discharge.

3.7 SYSTEM REMOVAL

- A. Remove dewatering and surface water control systems after dewatering operations are discontinued.
- B. Abandon dewatering wells in accordance with the Illinois Department of Public Health requirements.
- C. Repair damage caused by dewatering and surface water controls systems or resulting from failure of systems to protect property.

3.8 FIELD QUALITY CONTROL

- A. Section 01 4000 – Quality Requirements: Field inspecting, testing, adjusting, and balancing.
- B. After dewatering system is installed, perform pumping test to determine when selected pumping rate lowers water level in well below pump intake. Adjust pump speed, discharge volume, or both to ensure proper operation of each pump.
 - 1. Ground water elevation.
- C. Monitor ground water discharge for sand content. Sample and test water from each well weekly for sand content. Maximum permitted sand content 5 parts per million.
- D. Survey existing adjacent buildings, structures, and improvements to detect movement in comparison to original elevations during dewatering operations.
 - 1. Notify Engineer immediately of measured movement.
- E. Submit initial installation reports including the following:
 - 1. Installation and development reports for well points and pumps.
 - 2. Test reports of monitoring well water analysis.
 - 3. Initial dewatering flow rates.
- F. Submit weekly monitoring reports including the following:
 - 1. Dewatering flow rates.
 - 2. Test reports of discharge water analysis.
 - 3. Maintenance records for dewatering and surface water control systems.

END OF SECTION

SECTION 31 2323 - FILL

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Backfilling Site structures to subgrade elevations.
 - 2. Fill under paving.
 - 3. Fill for over-excavation.
 - 4. Flowable fill under building foundation.

1.2 SUBMITTALS

- A. Section 01 3300 – Submittal Procedures: Requirements for submittals.
- B. Samples: Submit, in air-tight containers, an adequate quantity of the material sample for laboratory testing.
- C. Materials Source: Submit name of imported fill materials and suppliers.
- D. Gradation Report: Submit aggregate gradation report demonstrating aggregates meet IDOT requirements.
- E. Submit laboratory testing results for maximum dry density for aggregate ballast.
- F. Mix Design: Submit mix design for flowable fill (CLSM).

1.3 QUALITY ASSURANCE

- A. Perform Work according to the Roadway Specifications.

PART 2 PRODUCTS

2.1 FILL MATERIALS

- A. Subsoil Fill: As specified in Section 31 0513 – Soils for Earthwork.
- B. Granular Structural Fill: CA-6 and CA-7.
- C. Cohesive Structural Fill: As specified in Section 31 2213 – Rough Grading.
- D. Granular Fill: FA-6, CA-6 and CA-7 as specified in Section 31 0516 – Aggregate for Earthwork. Granular materials excavated from the site structures will be acceptable as long as it doesn't contain a significant amount of clay and silts.
- E. Flowable Fill (Controlled Low Strength Material – CLSM): As specified in Article 1019 of the Roadway Specifications.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01 3000 – Administrative Requirements: Coordination and project conditions.
- B. Verify subdrainage, dampproofing, or waterproofing installation has been inspected.
- C. Verify underground tanks are anchored to their own foundations to avoid flotation after backfilling.
- D. Verify structural ability of unsupported walls to support loads imposed by fill.

3.2 PREPARATION

- A. Compact subgrade to density requirements for subsequent backfill materials.
- B. Cut out soft areas of subgrade not capable of compaction in place. Backfill with granular fill and compact to density equal to or greater than requirements for subsequent fill material.
- C. Scarify subgrade surface to depth of 2 inches.
- D. Proof roll to identify soft spots; fill and compact to density equal to or greater than requirements for subsequent fill material.

3.3 BACKFILLING

- A. Backfill areas to contours and elevations with unfrozen materials.
- B. Systematically backfill to allow maximum time for natural settlement. Do not backfill over porous, wet, frozen or spongy subgrade surfaces.
- C. Place fill material and compact in continuous layers as follows:
 - 1. Subsoil Fill: Maximum 9 inch loose lift depth for cohesive soils and 12 inch loose lift depth for granular soils and compacted.
 - 2. Structural Fill: Maximum 12 inch loose lift depth and compacted.
 - 3. Granular Fill: Maximum 12 inch loose lift depth and compacted.
 - 4. Where area to be filled is inaccessible to compaction equipment such as below the bottom pile-supported slab, use flowable fill (CLSM) and consolidate in a manner to fill all voids.
- D. Employ placement method that does not disturb or damage other Work.
- E. Maintain optimum moisture content of backfill materials to attain required compaction density.
- F. When approved by Engineer, backfill against supported foundation walls. Do not backfill against unsupported foundation walls.
- G. When approved by Engineer, backfill simultaneously on each side of unsupported foundation walls until supports are in place.

- H. Slope grade away from building minimum 2 percent slope for minimum distance of 10 feet, unless noted otherwise.
- I. Make gradual grade changes. Blend slope into level areas.
- J. Remove surplus backfill materials from Site.
- K. Leave fill material stockpile areas free of excess fill materials.

3.4 TOLERANCES

- A. Section 01 4000 – Quality Requirements: Tolerance.
- B. Top Surface of Backfilling within Building Areas: Plus or minus 1/4 inch from required elevations.
- C. Top Surface of Backfilling under Paved Areas: Plus or minus 1/4 inch from required elevations.
- D. Top Surface of General Backfilling: Plus or minus 1 inch from required elevations.

3.5 FIELD QUALITY CONTROL

- A. Section 01 4000 – Quality Requirements: Field inspecting, testing, adjusting, and balancing.
- B. Perform laboratory material tests in accordance with ASTM D698.
- C. Perform in place compaction tests according to following:
 - 1. Density Tests: ASTM D6938.
 - 2. Moisture Tests: ASTM D6938.
- D. When tests indicate Work does not meet specified requirements, remove Work, replace, and retest.
- E. Frequency of Tests: As recommended in the Report of Soils Exploration and by a geotechnical consultant.
- F. Proof roll compacted fill surfaces under slabs-on-grade, paving.

3.6 PROTECTION OF FINISHED WORK

- A. Section 01 7000 – Execution and Closeout Requirements: Protecting finished work.
- B. Reshape and re-compact fills subjected to vehicular traffic.

3.7 SCHEDULE

- A. Interior Slab-On-Grade:

1. Fill Type: Cohesive structural fill, construct to the bottom of the aggregate base for slab-on-grade, 8 inch loose lifts, compacted to 100 percent of the Standard Proctor maximum density.
 2. Aggregate Base: IDOT Gradation CA-6 compacted to 100 percent Standard Proctor maximum density.
- B. Exterior Side of Foundation Walls:
1. Fill Type: ~~CA-16~~ **CA-6, 7, or 12**, 10 inches below the finished grade elevation, 12 inch thickness per lift, compact uniformly to 98 percent of the Standard Proctor maximum density.
- C. Underground Tanks or Building Floor Slabs:
1. Subgrade Fill Type: IDOT Gradation CA-6, 12 inch thickness, vibratory compaction to 98% of its Standard Proctor maximum density.
- D. Fill under Grass Areas:
1. Fill Type: Subsoil fill as required in Section 31 0513 – Soils for Earthwork, to 12 inches below finish grade, compact uniformly to 98 percent Standard Proctor maximum density.
- E. Fill under Aggregate Entrance and Sidewalk:
1. Fill Type: ~~CA-16~~ **CA-6, 7, or 12**, 10 inches below the finished grade elevation, 12 inch thickness per lift, compact uniformly to 98 percent of the Standard Proctor maximum density.
- F. Fill to Correct Over-Excavation:
1. Fill Type: CA-6. Vibratory compaction.

END OF SECTION

SECTION 31 2500 - EROSION AND SEDIMENTATION CONTROLS

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Silt fence.
 - 2. Culvert inlet protection – silt fence.
 - 3. Dewatering.
 - 4. Dust control.
 - 5. Temporary concrete washout facility.
 - 6. Erosion control blanket.
 - 7. Site stabilization.
 - 8. Field quality control.
 - 9. Cleaning.
 - 10. Protection.

1.2 SUBMITTALS

- A. Section 01 3300 – Submittal Procedures: Requirements for submittals.

1.3 CLOSEOUT SUBMITTALS

- A. Section 01 7000 – Execution and Closeout Requirements: Requirements for submittals.

1.4 QUALITY ASSURANCE

- A. Perform Work in accordance with requirements of all related Sections.
- B. Perform Work in accordance with the Illinois Urban Manual.
- C. Maintain one copy of each document on site.

1.5 PRE-INSTALLATION MEETINGS

- A. Section 01 3000 – Administrative Requirements: Pre-installation meeting.
- B. Convene minimum one week prior to commencing work of this Section.

1.6 ENVIRONMENTAL REQUIREMENTS.

- A. Section 01 6000 – Product Requirements: Environmental conditions affecting products on site.

PART 2 PRODUCTS

2.1 ROCK, GEOTEXTILES, AGGREGATE, AND OTHER REQUIRED MATERIALS

- A. Furnish materials in accordance with the Illinois Urban Manual.

2.2 PLANTING MATERIALS

- A. Seeding and Soil Supplements: Class 2 mix, as specified in the Roadway Specifications. Fertilize as specified in the Roadway Specifications.
- B. Heavy Duty Erosion Control Blanket: Knitted straw mat as specified in the Roadway Specifications.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01 3000 – Administrative Requirements: Verification of existing conditions before starting work.
- B. Verify compacted subgrade granular base, stabilized soil is acceptable and ready to support devices and imposed loads.
- C. Verify gradients and elevations are correct.

3.2 SILT FENCE

- A. In accordance with Standard Drawing IUM-620 and Code 920 of the Illinois Urban Manual.

3.3 CULVERT INLET PROTECTION – SILT FENCE

- A. In accordance with Standard Drawing IL-508SF and Code 808 of the Illinois Urban Manual.

3.4 DEWATERING

- A. In accordance with Code 813 of the Illinois Urban Manual.

3.5 DUST CONTROL

- A. In accordance with Code 825 of the Illinois Urban Manual.
- B. If water is used to control dust, the Contractor shall apply as needed or as directed by the Engineer or Owner.

3.6 TEMPORARY CONCRETE WASHOUT FACILITY

- A. In accordance with Code 954 and Standard Drawing IUM-654SB, IUM-654BW or IUM-654ET, Contractor's choice, of the Illinois Urban Manual.

3.7 EROSION CONTROL BLANKET

- A. In accordance with Standard Drawing IUM-530 and Code 830 of the Illinois Urban Manual.

3.8 SITE STABILIZATION

- A. Incorporate erosion control devices indicated on the Drawings or described herein into the Project at the earliest practicable time.
- B. Construct, stabilize and activate erosion controls before site disturbance within tributary areas of those controls.
- C. Stockpile and waste pile heights shall not exceed 35 feet. Slope stockpile sides at 2:1 or flatter.
- D. Stabilize any disturbed area of affected erosion control devices on which activity has ceased and which will remain exposed for more than 20 days.
 - 1. During non-germinating periods, apply mulch at recommended rates.
 - 2. Stabilize disturbed areas which are not at finished grade and which will be disturbed within one year in accordance with Section 32 9219 – Seeding at 50 percent of permanent application rate with no topsoil.
 - 3. Stabilize disturbed areas which are either at finished grade or will not be disturbed within one year in accordance with Section 32 9219 – Seeding.
- E. Stabilize diversion channels, sediment traps, and stockpiles immediately.

3.9 FIELD QUALITY CONTROL

- A. Section 01 4000 – Quality Requirements and Section 01 7000 – Execution Requirements: Field inspecting, testing, adjusting and balancing.

3.10 CLEANING

- A. Section 01 7000 – Execution Requirements: Requirements for cleaning.
- B. When sediment accumulation in sedimentation structures has reached a point one-third depth of sediment structure or device, remove and dispose of sediment.
- C. Do not damage structure or device during cleaning operations.
- D. Do not permit sediment to erode into construction or site areas or natural waterways.
- E. Clean channels when depth of sediment reaches approximately one half channel depth.

3.11 PROTECTION

- A. Section 01 7000 – Execution Requirements: Requirements for protecting finished Work.

3.12 POLLUTION CONTROL

- A. Provide methods, means, and facilities to prevent contamination of soil, water, and atmosphere from discharge of noxious, toxic substances, and pollutants produced by construction operations.

END OF SECTION

SECTION 32 1123 - AGGREGATE BASE AND SURFACE COURSES

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Aggregate base course.
 - 2. Aggregate surface courses

1.2 SUBMITTALS

- A. Section 01 3300 – Submittal Procedures: Requirements for submittals.
- B. Materials Source: Submit name of aggregate materials suppliers.
- C. Gradation Report: Submit gradation report confirming aggregates meet IDOT criteria.

1.3 QUALITY ASSURANCE

- A. Furnish each aggregate material from single source throughout the Work.
- B. Perform Work in accordance with these Specifications and the Roadway Specifications.
- C. Maintain one copy of each document on site.

PART 2 PRODUCT

2.1 AGGREGATE MATERIALS

- A. Aggregate for Base and Surface Courses: CA-6 coarse aggregate per Section 1004 of the Roadway Specifications. Aggregate for base and surface courses shall be crushed, angular limestone with 6% maximum deleterious material.

2.2 EXAMINATION

- A. Section 01 3000 – Administrative Requirements: Verification of existing conditions before starting work.
- B. Verify compacted substrate is dry and ready to support paving and imposed loads.
 - 1. Proof roll substrate with a loaded tandem with a minimum of two perpendicular passes to identify soft spots.
 - 2. Remove soft substrate and replace with CA-2 coarse aggregate.
- C. Verify substrate has been inspected, gradients and elevations are correct.

2.3 PREPARATION

- A. Correct irregularities in substrate gradient and elevation by scarifying, reshaping, and re-compacting.
- B. Do not place fill on soft, muddy, or frozen surfaces.
- C. Prepare subgrade in accordance with Article 351.04 of the Roadway Specifications.

2.4 AGGREGATE PLACEMENT

- A. Place aggregate in equal thickness layers to total compacted thickness as indicated on Drawings.
 - 1. Maximum Layer Compacted Thickness: 8 inches.
 - 2. Minimum Layer Compacted Thickness: 4 inches.
- B. Roller compact aggregate to 100 percent maximum density in accordance with the AASHTO T99 (Method C)/ASTM D698.
- C. Level and contour surfaces to elevations, profiles, and gradients indicated.
- D. Add small quantities of fine aggregate to coarse aggregate when required to assist compaction.
- E. Maintain optimum moisture content of fill materials to attain specified compaction density.
- F. Use mechanical tamping equipment in areas inaccessible to compaction equipment.
- G. Comply with the requirements of Articles 311, 351, and 402 of the Roadway Specifications.

2.5 TOLERANCES

- A. Section 01 4000 – Quality Requirements: Tolerances.
- B. Maximum Variation From Flat Surface: 1/4 inch measured with 10 foot straight edge.
- C. Maximum Variation From Thickness: 1/4 inch.
- D. Maximum Variation From Elevation: 1/4 inch.

2.6 FIELD QUALITY CONTROL

- A. Section 01 4000 – Quality Requirements: Field inspecting, testing, adjusting, and balancing.
- B. Compaction testing will be performed in accordance with AASHTO T310.
- C. When tests indicate Work does not meet specified requirements, remove Work, replace and retest.
- D. Frequency of Tests: One test per layer of compacted aggregate.

2.7 COMPACTION

- A. Roller compact all aggregate to a minimum of 100 percent maximum density in accordance with AASHTO T99 (Method C)/ASTM D698 unless otherwise indicated in the Drawings or in these Specifications.

END OF SECTION

**THIS PAGE LEFT
BLANK INTENTIONALLY**

SECTION 32 9119 - LANDSCAPE GRADING

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes: Final grade topsoil for finish landscaping.

PART 2 PRODUCTS

2.1 MATERIAL

- A. Topsoil: Topsoil material shall be fertile agricultural soil, typical for locality, capable of sustaining vigorous plant growth, taken from drained site, free of subsoil, clay or impurities, plants, weeds and roots and shall be approved by the Engineer and in accordance with Section 211 of the Roadway Specifications.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01 3000 – Administrative Requirements: Verification of existing conditions before starting work.
- B. Verify building and trench backfilling have been inspected.
- C. Verify substrate base has been contoured and compacted.

3.2 PREPARATION

- A. Protect landscaping and other features remaining as final Work.
- B. Protect new and existing structures, fences, sidewalks, utilities, paving, etc.

3.3 SUBSTRATE PREPARATION

- A. Eliminate uneven areas and low spots.
- B. Remove debris, roots, branches, stones, in excess of 1/4 in size. Remove contaminated subsoil.
- C. Scarify surface to depth of 3 inches where topsoil is scheduled. Scarify in areas where equipment used for hauling and spreading topsoil has compacted subsoil.

3.4 PLACING TOPSOIL

- A. Place topsoil in areas where seeding is required to nominal depth of 8 inches. Place topsoil during dry weather.

- B. Fine grade topsoil to eliminate rough or low areas. Maintain profiles and contour of subgrade.
- C. Remove roots, weeds, rocks, and foreign material while spreading.
- D. Manually spread topsoil close to building to prevent damage.
- E. Lightly roll placed topsoil.
- F. Remove surplus subsoil and topsoil from Site.
- G. Lightly compact placed topsoil.
- H. Leave stockpile area and Site clean and raked, ready to receive landscaping.

3.5 TOLERANCES

- A. Top of Topsoil: Plus or minus 1/2 inch.

3.6 PROTECTION OF INSTALLED WORK

- A. Prohibit construction traffic over topsoil.

3.7 SCHEDULES

- A. Compacted topsoil thicknesses:
 - 1. Seeded Grass: 8 inches.

END OF SECTION

SECTION 32 9219 - SEEDING

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Fertilizing.
 - 2. Seeding.
 - 3. Hydroseeding.
 - 4. Mulching.
 - 5. Maintenance.

1.2 DEFINITIONS

- A. Weeds: Vegetative species other than specified species to be established in given area.
- B. Disturbed Area: Any area within or near the project limits which incurs a visible loss of vegetative cover as a result of the work of this contract, whether caused by Contractor, subcontractors, Engineer, City personnel, or the actions of pedestrians or motorists maneuvering around the worksite for any reason. Also includes any existing paved areas that are scheduled to be removed and replaced with grass.

1.3 SUBMITTALS

- A. Section 01 3300 – Submittal Procedures: Requirements for submittals.
- B. Product Data: Submit data for seed mix, fertilizer, mulch, and other accessories.

1.4 CLOSEOUT SUBMITTALS

- A. Section 01 7000 – Execution and Closeout Requirements: Requirements for submittals.
- B. Operation and Maintenance Data: Include maintenance instructions, cutting method and maximum grass height; types, application frequency, and recommended coverage of fertilizer.

1.5 QUALITY ASSURANCE

- A. Provide seed mixture in containers showing percentage of seed mix, germination percentage, inert matter percentage, weed percentage, year of production, net weight, date of packaging, and location of packaging.
- B. Perform Work according to these Specifications and the Roadway Specifications.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Section 01 6000 – Product Requirements: Product storage and handling requirements.

- B. Deliver grass seed mixture in sealed containers. Seed in damaged packaging is not acceptable.
- C. Deliver fertilizer in waterproof bags showing weight, chemical analysis, and name of manufacturer.

1.7 MAINTENANCE SERVICE

- A. Maintain seeded areas immediately after placement until grass is well established and exhibits vigorous growing condition.

PART 2 PRODUCTS

2.1 SEED MIXTURE

- A. Furnish seeding materials in accordance with Sections 250 and 1081 of the Roadway Specifications. Seed mixture shall be Class 1 Lawn Mixture.

2.2 ACCESSORIES

- A. Mulching Material:
 - 1. Furnish materials in accordance with Sections 251 and 1081 of the Roadway Specifications. Mulch shall be applied using Method 2, Procedure 2 or Method 3.
 - 2. Straw shall be oat or wheat straw, free from weeds, foreign material detrimental to plant life, and dry. Hay or chopped cornstalks are not acceptable.
 - 3. Hydraulic mulch shall be virgin or recycled wood cellulose fiber, chip form, free of growth or germination-inhibiting ingredients.
- B. Fertilizer:
 - 1. Furnish materials in accordance with Section 250 and 1081 of the Roadway Specifications.
 - 2. Commercial grade; recommended for grass; to the following proportions: 1/3 nitrogen fertilizer nutrients, 1/3 phosphorus fertilizer nutrients; and 1/3 potassium fertilizer nutrients.
- C. Water: Clean, fresh and free of substances or matter capable of inhibiting vigorous growth of grass.
- D. Erosion Fabric:
 - 1. Furnish materials in accordance with Section 251 and 1081 of the Roadway Specifications.
 - 2. Erosion fabric shall be excelsior blanket, or Engineer approved equal.

PART 3 EXECUTION

Apply seed, fertilizer and mulch to all disturbed areas as defined in Section 1.2 per the following:

3.1 EXAMINATION

- A. Section 01 3000 – Administrative Requirements: Verification of existing conditions before starting work.
- B. Verify prepared soil base is ready to receive Work of this Section.

3.2 FERTILIZING

- A. Apply fertilizer at application rate of 270 lb/acre (90 lb/acre of each fertilizer nutrient).
- B. Apply after smooth raking of topsoil and prior to roller compaction.
- C. Do not apply fertilizer at same time or with same machine used to apply seed.
- D. Mix fertilizer thoroughly into upper 2 inches of topsoil.
- E. Lightly water soil to aid dissipation of fertilizer. Irrigate top level of soil uniformly.

3.3 SEEDING

- A. Apply seed at rates specified in Section 250 of the Roadway Specifications. Place seed evenly in two intersecting directions. Rake in lightly.
- B. Do not seed areas in excess of that which can be mulched on same day.
- C. Planting Season: April through October. Seed shall not be placed between June 15th and August 31st without Engineer's approval.
- D. Do not sow immediately following rain, when ground is too dry, or when winds are over 12 mph.
- E. Roll seeded area with roller not exceeding 112 lb/linear ft.
- F. Immediately following seeding and compacting, apply mulch in accordance with Section 251 of the Roadway Specifications.
- G. Mulch shall be applied using Method 2, Procedure 2 or Method 3.
- H. Apply water with fine spray immediately after each area has been mulched. Saturate to 4 inches of soil.
- I. Maintain clear of shrubs and trees.

3.4 SEED PROTECTION

- A. Cover seeded slopes where grade is 4 to 1 or greater and ditch slopes and bottoms with erosion control blanket. Roll fabric onto slopes without stretching or pulling. Mulch will not be required in areas where erosion control blanket is placed.
- B. Lay fabric smoothly on surface, bury top end of each section in 6 inch deep excavated topsoil trench. Overlap edges and ends of adjacent rolls minimum 12 inches. Backfill trench and rake smooth, level with adjacent soil.
- C. Secure outside edges and overlaps at 36 inch intervals with stakes or staples.
- D. Lightly dress slopes with topsoil to ensure close contact between fabric and soil.
- E. At sides of ditches, lay fabric laps in direction of water flow. Lap ends and edges minimum 6 inches.

3.5 MAINTENANCE

- A. Water to prevent grass and soil from drying out.
- B. Roll surface to remove minor depressions or irregularities.
- C. Control growth of weeds. Apply herbicides. Remedy damage resulting from improper use of herbicides.
- D. Immediately reseed areas showing bare spots.
- E. Repair washouts or gullies.
- F. Protect seeded areas with warning signs during maintenance period.

END OF SECTION

SECTION 33 0513 – MANHOLES AND STRUCTURES

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Monolithic concrete manholes and structures with transition to cover frame, covers, anchorage, and accessories.
 - 2. Modular precast concrete manhole and structures with tongue-and-groove joints with transition to cover frame, covers, anchorage, and accessories.
 - 3. Bedding and cover materials.

1.2 DESIGN REQUIREMENTS

- A. Equivalent strength: Based on structural design of reinforced concrete as outlined in ACI 318.
- B. Design of Lifting Devices for Precast Components: In accordance with ASTM C913.
- C. Design of Joints for Precast Components: In accordance with ASTM C913; maximum leakage of 0.025 gallons per hour per foot of joint at 3 feet of head.

1.3 SUBMITTALS

- A. Section 01 3300 – Submittal Procedures: Requirements for submittals.
- B. Shop Drawings: Indicate manhole and structure locations, elevations, piping sizes and elevations of penetrations.
- C. Product Data: Submit cover and frame construction, features, configuration, and dimensions.

1.4 QUALITY ASSURANCE

- A. Perform Work in accordance with the requirements of this Section and Water and Sewer Specifications.
- B. Maintain one copy of each document on site.

1.5 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this Section with minimum five years' documented experience.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Section 01 6000 – Product Requirements: Product storage and handling requirements.

- B. Comply with precast concrete manufacturer's instructions for unloading, storing, and moving precast manholes and structures.
- C. Store precast concrete manholes and structures to prevent damage to Owner's property or other public or private property. Repair property damaged from materials storage.
- D. Mark each precast structure by indentation or waterproof paint showing date of manufacture, manufacturer, and identifying symbols and numbers shown on Drawings to indicate its intended use.

1.7 ENVIRONMENTAL REQUIREMENTS

- A. Section 01 6000 – Product Requirements.
- B. Maintain materials and surrounding air temperature to minimum 50 degrees F prior to, during, and 48 hours after completion of masonry work.
- C. Cold Weather Requirements: ACI 530.

PART 2 PRODUCTS

2.1 MANHOLES AND STRUCTURES

- A. Manufacturers:
 - 1. Welch Brothers
 - 2. Norwalk Tank Company
 - 3. Leman Precast
 - 4. Concrete Specialties Co.
 - 5. GP Concrete, Inc.
 - 6. Substitutions: Section 01 6000 – Product Requirements.
- B. Manhole and Structure Sections: Reinforced precast concrete in accordance with ASTM C478 with gaskets in accordance with ASTM C443.
 - 1. Joints for Precast Manholes and Structures: In accordance with ASTM C913; maximum leakage of 0.025 gallons per hour per foot of joint at three feet of head. Joints shall be tongue-and-groove type.
 - 2. Cone Top Section: Eccentric type.
 - 3. Foundation Slab: Precast concrete poured monolithically with manhole barrel section.
 - 4. Flat Top Slab: Provide as vertical depth requires. Shall have a two foot diameter opening when castings will be set directly on top of the slab. Shall have a four foot diameter opening when barrel sections shall be set directly on the slab.

2.2 FRAMES AND COVERS

- A. Manufacturers:
 - 1. Neenah Foundry Co.
 - 2. East-Jordan Iron Works Co.
 - 3. Substitutions: Section 01 6000 – Product Requirements.

- B. Product Description: ASTM A48/A48M, Class 30B; Cast iron construction.
 - 1. Sanitary sewer manhole castings: American-made, heavy duty frame, machined flat bearing surface, and removable lid. Lid shall be a closed lid with pick holes, self-sealing gasket, and lid marked "SANITARY."
 - 2. Sanitary sewer manhole castings:
 - a. Neenah Model R-1404-AUB or EJ1020APT 1050Z1PT Manhole Frame with Bolted and Gasketed Solid Lid, Heavy Duty, with anchor holes.
 - b. Where Drawings indicate bolt-down lid not required, use Neenah Model R1713, or EJ 1020 AGS 1050Z.

2.3 ACCESSORIES

- A. Manhole and Structure Steps: Formed polypropylene rungs; 3/4 inch diameter; 12 inches wide; 16 inches on center vertically. Formed integral with manhole sections.
- B. Sanitary Manhole Chimney Seal: External type; constructed out of EPDM rubber with a minimum thickness of 60 mil; width at required minimum 7 inches; "C" shaped mechanical upper compression band. Shall be "SURSEAL" type as manufactured by Mar Mac Construction Products, or equal. The use of external type seal with flat slab top shall not be permitted unless the flat slab top has an integrally cast curb around opening of a height of 2 inches minimum.
- C. Sanitary Manhole Chimney Seal: Internal type; rubber sleeve 8-3/8 inches wide, minimum with two 1-3/4 inch stainless steel expansion bands as manufactured by Cretex, or approved equal.
- D. Sanitary Manhole Joint Seals: Reference paragraph 3.4.E of this Section.
- E. Sanitary Manhole, Pipe to Manhole Connector: In accordance with ASTM C923; flexible, rubber compression type connectors; cast into the manhole section. Reference paragraph 3.4.H of this Section.
- F. Manhole and Structure Joint Sealants:
 - 1. Preformed Joint Sealants: In accordance with ASTM C990.
 - 2. Elastomeric Joint Sealants: In accordance with ASTM C920.

2.4 BEDDING AND COVER MATERIALS

- A. Bedding: CA-7 coarse aggregate or FA-6 fine aggregate as specified in Section 31 2317.
- B. Aggregate Backfill: Trench backfill, CA-7 coarse aggregate or FA-6 fine aggregate as specified in Section 31 2317 – Trenching, in areas to be paved or within two feet of paved area.
- C. Soil Backfill from Above Pipe to 6" Below Finish Grade: Excavated subsoil with no rocks over 6 inches in diameter, frozen earth or foreign matter in areas to be seeded. Reference Section 31 0513 – Soils for Earthwork and Section 31 2317 – Trenching.
- D. The Contractor shall strictly follow the manufacturer's backfilling directions and shall use materials in accordance with those directions.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01 3000 – Administrative Requirements: Verification of existing conditions before starting work.
- B. Verify items provided by other sections of Work are properly sized and located.
- C. Verify built-in items are in proper location, and ready for roughing into Work.
- D. Verify correct size of manhole and structure excavation.

3.2 PREPARATION

- A. Coordinate placement of inlet and outlet pipe or duct sleeves required by other sections.
- B. Do not install manholes and structures where site conditions induce loads exceeding structural capacity of manholes or structures.
- C. Inspect precast concrete manholes and structures immediately prior to placement in excavation to verify manholes and structures are internally clean and free from damage. Remove and replace damaged units.

3.3 INSTALLATION – GENERAL

- A. Excavation and Backfill:
 - 1. Excavate for manholes and structures in accordance with Section 31 2316 – Excavation in location and to depth shown. Provide clearance around sidewalls of manhole or structure for construction operations and granular backfill.
 - 2. When groundwater is encountered, prevent accumulation of water in excavations in accordance with Section 31 2319 – Dewatering. Place manholes or structures in dry trench.
 - 3. Where possibility exists of watertight manhole or structure becoming buoyant in flooded excavation, anchor manhole or structure to avoid flotation.
- B. Place manhole sections plumb and level, trim to correct elevation.
- C. Install manholes and structures supported at proper grade and alignment on crushed stone bedding and as shown on Drawings.
- D. Backfill excavations for manholes and structures in accordance with Section 31 0516 – Aggregates for Earthwork, Section 31 2317 – Trenching, and the Drawings.
- E. Grout base of shaft sections to achieve slope to exit piping. Trowel smooth. Contour to form continuous drainage channel.

3.4 PRECAST CONCRETE MANHOLE AND STRUCTURE INSTALLATION

- A. Lift precast manholes and structures at lifting points designated by manufacturer.

- B. When lowering manholes and structures into excavations and joining pipe to units, take precautions to ensure interior of pipeline and manhole or structure remains clean.
- C. Set precast manholes and structures bearing firmly and fully on crushed stone bedding.
- D. Assemble multi-section manholes and structures by lowering each section into excavation. Lower, set level, and firmly position base section before placing additional sections.
- E. Joint Sealants: All joints in precast sections shall be sealed by application of Ram-Nek RN 103 joint sealant butyl rope (3/4 inch thickness min.) applied to both the shoulder and ledge to form continuous seal for full perimeter of precast structure. In addition, the Contractor shall apply to each joint a Press Seal Corporation EZ-Wrap 12 inch butyl joint wrap applied in accordance with the manufacturer's recommendations.
- F. Remove foreign materials from joint surfaces and verify sealing materials are placed properly. Maintain alignment between sections by using guide devices affixed to lower section.
- G. Verify manholes and structures installed to satisfy required alignment and grade.
- H. Pipe Connections for Field-Created Opening in Structure: Install grouting ring (A-Lok or Press-Seal Gasket Corporation WS Waterstop or approved equal) and seal with non-shrink concrete grout, as indicated on Drawings.
- I. Cut pipe to finish flush with interior of manhole or structure.
- J. Grout base of shaft sections to achieve slope to exit piping. Trowel smooth. Contour to form continuous drainage channel.

3.5 FIELD QUALITY CONTROL

- A. Section 01 4000 – Quality Requirements and Section 01 7000 – Execution Requirements: Field inspecting, testing, adjusting, and balancing.
- B. Sanitary manholes shall be vacuum tested in accordance with the Water and Sewer Specifications.
- C. In all cases, maintain sewer/water separation in accordance with the Water and Sewer Specifications.

END OF SECTION

SECTION 33 2617 – DEWATERING LIFT STATION

PART 1 GENERAL

1.1 SUMMARY

- A. The Contractor shall furnish and install an automatic duplex pump system with all needed equipment to provide a complete and operational system.

1.2 DESCRIPTION OF SYSTEM

- A. The principal items of equipment shall include submersible pumps, slide away couplings, guide rail system, valves and control panel with floats and alarm monitoring.
- B. Pumps shall be Barnes Model EH1042DS 1 HP 480V/3ph 3450 RPM pumps.

1.3 QUALIFICATIONS

- A. All equipment furnished hereunder shall be the product of one manufacturer experienced in the design and manufacture of pumps designed for use in similar systems. All parts shall be properly stamped for identification and location as shown in the Operation and Maintenance Manuals furnished. Nameplates giving the name of the manufacturer, the rated capacity, head speed and all other pertinent data shall be attached to each basin and pump.
- B. All equipment furnished under this Specification shall be new and unused, shall be the standard product of manufacturer's having a successful record of manufacturing and servicing the equipment and systems specified herein for a minimum of ten (10) years.
- C. Any pump manufacturer not specified, but wishing to be Pre-Bid approved as an acceptable supplier shall submit a complete hydraulic analysis based on the design detailed in the drawings at least fifteen days prior to bid date.
- D. All manufacturers must have been in the business of manufacturing complete pump stations for a minimum of ten years. Manufacturer Representatives, Distributors or Packagers will not be considered as manufacturers. Manufacturer must demonstrate to the satisfaction of the Engineer that the proposed pumping equipment will meet system flows and heads required. In addition, pre-submittal must also demonstrate to the satisfaction of the Engineer that the equipment being proposed meets or exceeds all performance and safety requirements, materials of construction and user benefits of the specified equipment. Only pre-approved pump station manufacturers will be considered. All bids utilizing manufacturers not pre-approved will be considered non-responsive.
- E. The equipment specified shall be a product of a company experienced in the design and manufacture of pumps for the specific use in similar systems. The company shall submit detailed installation and user instructions for its product, submit evidence of an established service program complete with parts and service manuals for the specified product, installation video instructions and complete installation training program. The manufacturer shall supply, on request, a reference and contact list for ten similar size projects of this project.

1.4 SUBMITTALS

- A. After receipt of notice to proceed, the manufacturer shall furnish the Engineer a minimum of five (5) sets of shop drawings of all materials required to establish compliance with the Specifications shall be submitted in accordance with the provisions of the General Conditions and Section 01330 – Submittal Procedures. Submittals shall include at least the following:
 - 1. Certified shop and erection drawings showing all important details of construction and dimensions.
 - 2. Descriptive literature, bulletins, and/or catalogs of the equipment.
 - 3. A list of manufacturer's recommended spare parts with the manufacturer's current price for each item.
 - 4. All submittal data required by the General Conditions.
 - 5. Conditions of product warranty.
 - 6. Complete motor data.
 - 7. Engineering Report of Hydraulic Design.

1.5 OPERATING INSTRUCTIONS

- A. Four (4) copies of an operating and maintenance manual for the pump station shall be furnished to the Owner and one (1) copy to the Engineer prior to completion. The manuals shall be prepared specifically for this installation and shall include all required cuts, drawings, equipment lists, descriptions, etc. that are required to instruct operating and maintenance personnel unfamiliar with such equipment.
- B. A factory service technician or factory trained service technician, who has complete knowledge of proper operation and maintenance, shall be provided for one (1) day onsite to instruct representatives of the Owner and/or individual homeowners on proper operation and maintenance. If there are difficulties in the operation of the equipment due to the manufacturer's design or fabrication, additional service shall be provided at no cost to the Owner.

PART 2 PRODUCT

2.1 MATERIALS AND EQUIPMENT

- A. The pumps and equipment covered by this Section are intended to be standard pumping equipment of proven ability as manufactured by reputable concerns having long experience in the production of such pumps and equipment. The pumps and equipment furnished shall be designed and constructed in accordance with the best practice and methods.
- B. All parts shall be so designed and proportioned as to have liberal strength and stiffness and to be especially adapted for the work to be done. Ample room and facilities shall be provided for inspection, repairs and adjustment.

2.2 PUMP STATION

- A. Piping
 - 1. All pump discharge piping within the wetwell shall be Schedule 80 PVC or ductile iron.

2. The basin shall be equipped with stainless steel guide rail assembly to facilitate removal of the pump(s) from floor level. A stainless steel chain shall be supplied for pump removal. All hangers, fasteners, braces, and other such hardware shall be stainless steel.
- B. Pump Construction
1. Each pump shall be designed as a completely submersible pump. All major pump parts shall be ASTM Class 30 cast iron or better, finished with an epoxy paint system.
 2. All nuts, bolts, and miscellaneous hardware in contact with the pumped material shall be 300 series stainless steel. All gaskets shall be of the compression square ring type eliminating critical slip fits and the possibility of damage during assembly and disassembly associated with sliding "O" ring seal arrangements.
 3. The pump impellor shall be a three vane type with pump out vanes on the backside. The impellor shall be of polypropylene construction and dynamically balanced to ISO G6.3 specifications.
- C. Controls
1. The installing Contractor shall install the new panel as denoted on the design drawings. All necessary conduit from the primary power feed thru the new panel and to the pump and wetwell floats shall be the responsibility of the Contractor.
 2. Thermal magnetic air circuit breakers shall be provided for branch disconnect service and short circuit protection of all motor control and auxiliary circuits.
 3. A PLC shall be provided. The PLC shall allow the operator to automatically alternate the pumps at a duration which he selects. Duration shall be expressed in days.

PART 3 EXECUTION

3.1 START UP SERVICES

- A. The pump manufacturer shall include the cost of a field inspection trip and a startup trip of one day each. The manufacturer shall advise in writing of any irregularities which will void warranty.

3.2 WARRANTY

- A. The manufacturer shall warrant all equipment supplied for a period of one year from the date of acceptance by the Owner.

3.3 EQUIPMENT SUPPLIER

- A. The equipment supplier through the installing contract shall be responsible to provide a minimum of three (3) sets of complete factory authentic submittal data for approval of the Engineer and the Village prior to placing any equipment on order. The successful equipment supplier must demonstrate complete factory authorized service capability via the use of in-house service personnel and provide such service as a normal scope of his business. Further, these services must be available as a 24-hour emergency service every day. The supplier shall visit the job site two times, at six month intervals after start up and provide a complete inspection of the equipment and a written status report. Contact: Ryan Gasvoda at Gasvoda & Associates, Inc., Phone: 708-701-1274.

3.4 SERVICE/WARRANTY

- A. The supplier of the equipment shall demonstrate a complete service capability. He shall be a factory authorized service center with a stock of replacement parts (in inventory) and a repair shop with 24-hour service at his location. He shall have been established in this capacity for a minimum of 10 years.
- B. He shall be authorized by the manufacturer to perform warranty work and his service personnel shall be factory trained.

END OF SECTION

SECTION 33 2618 - SELF-PRIMING DRAIN PUMPS

PART 1 GENERAL

1.1 GENERAL

A. Scope of Work

1. Described by this specification shall be the manufacturer's latest production model for the year solicited and be equipped with all standard equipment in accordance with the manufacturer's pertinent literature. A copy of the literature shall accompany the bid along with any applicable information necessary to verify the unit(s) meet or exceed each of the following specifications. The unit(s) will be delivered complete, assembled accordingly, serviced, and ready for operation.

1.2 DESCRIPTION

- A. The pump(s) shall be horizontal, self-priming centrifugal type, designed specifically for handling raw, unscreened, domestic sanitary sewage. Pumps shall be "GS" Series self-priming pumps provided by Pioneer Pump.
- B. Performance
1. The following conditions of service shall be strictly adhered to:

NUMBER OF UNITS	2
SUCTION FLANGE SIZE, MINIMUM	3"
DISCHARGE FLANGE SIZE, MINIMUM	3"
MAX SOLIDS HANDLING	2.5"
DESIGN FLOW RATE	250 gpm
DESIGN HEAD	40'
EFFICIENCY AT DESIGN, MINIMUM	47%
DESIGN SUCTION LIFT (NEGATIVE) OR SUCTION HEAD (POSITIVE)	4.4'
MINIMUM SHUT-OFF HEAD	80'
MAX NPSHR AT DESIGN	5.5'
MAXIMUM REQUIRED HORSEPOWER AT DESIGN	4.17 hp
MAXIMUM OPERATING SPEED	1310 RPM

1.3 SUBMITTALS:

A. Product Data

1. Submittal shall include pump performance curve, dimensional drawings of the pump end, mechanical seal data, coating information, and any accessory product data sheets.

B. Shop Drawings

1. Dimensional drawings shall include location of suction and discharge connection, suction and discharge connection types, suction and discharge sizes, total length, and dimensions required for design and installation.

1.4 MANUFACTURER'S WARRANTY

- A. The products described in this specification shall be warranted to be free from defects in workmanship and material for a period of 12 months from the date of shipment.

PART 2 PRODUCTS

2.1 PRODUCT DESIGN

- A. Pump: Pump shall be designed for clockwise rotation about the driven end and feature the following design specifications:
 1. Casing
 - a. Casing shall be Cast Iron ASTM A48 Class 30 with integral volute. Casing shall have mounting feet sized to prevent tipping or binding when pump is completely disassembled for maintenance. The fill port cover plate shall incorporate a dual heavy-duty stud design with hand nuts for tightening and loosening. A Buna O-ring shall prevent adhesion of the fill port cover to the casing, and the casing drain plug shall be minimum 1-1/4".
 2. Cover Plate
 - a. Cover plate shall be cast iron ASTM A48 Class 30 and retained by four hand nuts for convenient access to pump interior. The cover plate removal shall provide ample clearance for removal of stoppages without removing suction or discharge piping. The cover plate shall incorporate jack screws for tolerance adjustment, a replaceable wear plate of AISI 1018 material, a pressure relief valve adjustable to 50-200 psi, and an O-ring of Buna material that seals the cover plate to pump casing.
 3. Wear Plate
 - a. Adjustment of impeller face clearance (distance between impeller and wear plate) shall be accomplished by external adjustment and shall require no shims.
 4. Suction Check Valve
 - a. Suction check valve shall be EPDM. Removal or installation of the check valve shall be accomplished through the inspection cover opening, without disturbing the suction piping. Pumps requiring an external check valve / foot valve to assist reprime will not be accepted.
 5. Rotating Assembly: Rotating Assembly which includes impeller, shaft, mechanical shaft seal, lip seals, bearings. Seal plate and bearing housing shall be removable as a single unit without disturbing the pump casing or piping. Design shall incorporate following features:
 - a. Seal Housing
 - 1) Seal housing shall be of cast iron ASTM A48 Class 30 material. A separate oil filled cavity shall provide seal face lubrication.
 - b. Impeller
 - 1) Impeller shall be Ductile Iron ASTM A536 Grade 65-45-12, two-vane, semi-open, non-clog, with integral pump out vanes on the back shroud. Impeller shall thread onto the pump shaft and be secured with a lockscrew and conical washer.
 - c. Shaft

- 1) Shaft shall be 4140 steel.
 - d. Bearing Housing
 - 1) Bearing housing material shall be ASTM A48 Class 30 Gray Iron with heavy duty design to support bearings, shaft, and seal housing. Bearings to be oil lubricated for improved lubrication and heat dissipation. The bearing frame shall include a vent mounted on top of the frame and oil level sight gauge mounted on the side for visual bearing frame oil level indication. The bearing housing shall have external shimless adjustment to adjust clearances between the impeller and wear plate.
 - e. Bearings
 - 1) Bearings shall be anti-friction ball type of proper size and design to withstand all radial and thrust loads expected during normal operation. Bearings shall be oil lubricated from a dedicated reservoir. Pump designs, which use the same oil to lubricate the bearings and shaft seal, shall not be acceptable.
 - f. Seal
 - 1) Single mechanical seal shall be semi-cartridge style with silicon carbide x tungsten carbide faces, 316 and 17-4 stainless steel construction, and fluoroelstomers.
- B. Solids Handling: All internal passages, impeller vanes, and recirculation ports shall pass a 3 inch spherical solid (with the exception of the GS3, which passes a 2.5 inch spherical solid). Smaller internal passages that create a maintenance problem or interfere with priming and pump performance shall not be permitted.
- C. Reprime Performance: Each pump shall be capable of a reprime lift of lift feet while operating at the selected speed and the selected impeller diameter. Reprime lift is defined as the static height from, the liquid level to the pump suction centerline that the pump will prime with adequately sized suction pipe.

2.2 COATINGS

- A. Pumps shall be cleaned prior to painting. Exposed surfaces to be coated with one coat non-lift primer and one coat Pioneer Green (RAL 6005 quick drying alkyd enamel. The finish coat shall be 1.0 to 1.5 MIL dry film thickness (minimum). The factory finish shall allow for over-coating and touch up after final installation.

PART 3 EXECUTION

3.1 INSPECTION

- A. Upon receipt, the product shall be inspected immediately for any damaged or missing parts. Any damage or discrepancy shall be noted in a written claim with the shipper prior to accepting delivery. The manufacturer's representative shall also be notified of the damage or discrepancy.

3.2 INSTALLATION

- A. The package shall be installed in accordance with the Installation, Operations, and Maintenance manual provided by the manufacturer. Power shall be provided from the existing panel. See Drawings.

3.3 FIELD QUALITY CONTROL

- A. The pump shall be tested in the field to ensure the product meets the performance criteria listed in this specification. Tests shall demonstrate that all equipment is safe, acceptable, and in good working condition. All tests performed shall be documented and approved by the manufacturer or manufacturer's approved representative.
- B. The initial training session shall be

END OF SECTION

SECTION 40 0513 – PIPING

PART 1 GENERAL

1.1 SUMMARY

- A. Work included: Provide piping, within plant site where shown on the Drawings, as specified herein, and as needed for a complete and proper installation including, but not necessarily limited to:
 - 1. All process piping and connection of equipment.

1.2 QUALITY ASSURANCE

- A. Codes and regulations:
 - 1. In addition to complying with the specified requirements, comply with pertinent regulations of:
 - a. Local Building Code.
 - b. Illinois Department of Public Health Plumbing Code.
 - c. Water and Sewer Main Specifications.
 - 2. In the event of conflict between or among specified requirements and pertinent regulations, the more stringent requirements will govern when so directed by the Engineer.

1.3 SUBMITTALS

- A. Comply with pertinent provisions of Section 01 3300 – Submittal Procedures.
- B. Product data: Within 30 calendar days after the Contractor has received the Owner's "Notice to Proceed," submit:
 - 1. Materials list of items proposed to be provided under this Section.
 - 2. Manufacturer's specifications, catalog cuts, and other data needed to prove compliance with the specified requirements.
 - 3. Shop drawings and other data as required to indicate method of installing and attaching equipment, except where such details are fully shown on the Drawings.

1.4 PRODUCT HANDLING

- A. Piping and fittings shall be stored according to manufacturer's limitations of stacking, and exposure to sunlight and weather.
- B. Stacked piping shall be covered with a heavy black vinyl tarp, firmly tied into place. Piping shall be fully supported off the ground.
- C. Do not stack other materials on top of stored piping and conduit.
- D. The ends of carrier piping and conduit shall be securely covered, such that moisture, dirt, animals and vermin cannot gain entrance.

PART 2 PRODUCTS

2.1 PIPE AND FITTINGS

A. Ductile Iron:

1. Buried:
 - a. AWWA C151, Class 52 or as shown: mortar lined, asphaltic coating on exterior.
 - b. Fittings shall be mechanical joint.
 - c. Pipe joints shall be push-on style.
2. Plant Piping:
 - a. AWWA C151, Class 52 or as shown: mortar lined, no exterior coating, shop primed for painting per Section 09-9000 - Paints and Coatings.
 - b. Fittings shall be flanged or grooved joints. Grooved joints shall conform to applicable sections of ANSI/AWWA C606/A21.1. Grooved joint fittings and couplings shall be ductile iron conforming to ASTM A395 and A536 or cast iron conforming to ASTM A48. All grooved materials and tools shall be from one manufacturer. Acceptable grooved manufacturers: Victaulic Company of American or Engineer-approved equal.

B. P.V.C.:

1. Buried:
 - a. Gravity Sewers/Drain
 - 1) ASTM D3034, minimum SDR 26.
 - 2) Pipe joints shall be push-on ASTM D3212.
 - b. Pressure Pipe
 - 1) AWWA C900, class as shown or Class 150 if not shown.
 - 2) ASTM D2241, SDR 21, Class 200.
 - 3) Fittings shall be ductile iron mechanical joint.
 - 4) Pipe joints shall be push-on style, ASTM F477.
2. Plant Piping:
 - a. ~~PVC 1120, Schedule 40 or Schedule 80.~~ **PVC**
 - 1) **All PVC Schedule 40 Fittings shall be produced from PVC Type 1 cell classification 12454, conforming to ASTM D 1784. All injection molded PVC Schedule 40 fittings shall be Certified for potable water service by NSF international and manufactured in strict compliance to ASTM D 2466.**
 - 2) **All PVC Schedule 80 pipe and fittings shall be produced from PVC Type 1, cell classification 1254, conforming to ASTM Standard D 1784. All PVC injection molded Schedule 80 fittings and extruded pipe shall be Certified for potable water service by NSF International. All Schedule 80 fittings shall be manufactured in strict compliance to ASTM D 2467 and Schedule 80 pipe shall be manufactured in strict compliance to ASTM D 1785. All PVC flanges shall be designed and manufactured to meet CL 150 bolt pattern per ANSI Standard B16.5 and rated for a maximum internal pressure to 150 psi, non-shock at 73°F.**
 - b. ~~Fittings shall be PVC ASTM D2466 and D2467.~~ **CPVC**
 - 1) **All CPVC Schedule 80 fittings shall be from CPVC materials, cell classification 23447 conforming to ASTM Standard D 1784. All injection molded fittings through 12" shall be manufactured in compliance to ASTM F 439 and all pipe through 16" shall be manufactured in compliance to ASTM F 441. Pipe and fittings shall be Certified by NSF International for use with**

potable water service. All CPVC flanges shall be designed and manufactured to meet CL150 bolt pattern per ANSI Standard B16.5.

C. Steel:

1. Buried:

- a. Black steel pipe, Schedule 40 with welded joints.
- b. Fittings shall be black steel, Schedule 40 with welded joints.
- c. Provide a multi-layer of fusion-bonded epoxy on all pipe and fittings. All field welds and damaged coating shall be painted with factory-supplied coating system compatible with fusion-bonded epoxy.

2. Plant Piping:

- a. Black steel pipe, Schedule 40.
- b. Fittings shall be black steel, Schedule 40 for welded, ~~or~~ threaded joints, or flanged joints. Grooved fittings shall be ductile iron, conforming to ASTM A395, Grade 65-45-15, and A536, Grade 65-45-12; forged steel, conforming to ASTM A234, Grade WPB; or fabricated from carbon steel pipe, conforming to ASTM A43, Grade B mechanically coupled grooved type. Grooved joints shall be mechanically coupled rigid or flexible grooved type with ductile iron housings conforming to ASTM A395, Grade 65-45-15, and A536, Grade 65-45-12, with EPDM pressure responsive synthetic rubber gaskets. Rigid coupling housings shall be cast with offsetting, angle-pattern bolt pads shall be used to provide system rigidity and support and hanging in accordance with ANSI B31.1 and B31.9. Victaulic Style 07. Flexible couplings shall be used in locations where vibration attenuations and stress relief are required. Flexible couplings may be used in lieu of flexible connectors at equipment connections. Three couplings shall be placed in close proximity to the vibration source. Victaulic Style 77.

D. HDPE:

1. Buried:

- a. HDPE Pressure Rating DR11.
- b. Pipe joints shall be Heat Fused ASTM F2620.

2.2 PIPE HANGERS/SUPPORTS

A. Pipe Hangers:

1. Pipe hangers for 6" and smaller pipe shall be Clevis Type hanger, constructed of material compatible with the pipe being supported.
2. Pipes larger than 6" shall not be installed on hanger unless otherwise approved by Engineer.

B. Supports:

1. Pipe supported from floor shall be fabricated steel with angle or pipe section cradle with U-bolt clamps.
2. Pipe racks may be used in areas when pipe is "stacked."

2.3 WALL PENETRATIONS

- A. Any pipe penetration through a concrete wall or floor shall use a wall pipe with appropriate end fittings and integrally cast water stop/thrust wall collar.

2.4 TRACER WIRE

- A. Tracer wire shall be 12 gauge copper, metallurgically bonded to a steel core and covered with a minimum of 30 mil of HDPE as manufactured by Copperhead Industries or approved equal. Make splices using manufacturer-approved connector.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install all pipe, fittings, fixtures and other related items as shown on the Drawings or mentioned in these specifications in strict accordance with the manufacturer's specifications.
- B. Potable water main and non-potable water main shall have tracer wire attached directly on top of pipe and have a warning tape labeled "WATER MAIN BELOW," 18" below final grade. The tracer wire shall be extended to the surface through each valve box and attached to fire hydrants or yard hydrants.
- C. The Contractor shall be responsible for providing the Engineer two sets of drawings showing accurately the location of all underground sewers, drains, water mains, water service, electric conduit and all other underground pipe not mentioned, but installed or encountered as part of this project.
- D. Expansion of welded steel air piping is allowed by the fact that there are bends at sufficient intervals. Buried piping shall not be anchored or blocked to prevent minor movement at these changes of direction.

3.2 TESTING AND ADJUSTING

- A. Provide personnel and equipment, and arrange for and pay the costs of all required tests and inspections required.
- B. Where tests show materials or workmanship to be deficient, replace or repair as necessary, and repeat the tests until the specified standards are achieved.
- C. Adjust the system to optimum standard of operation.
- D. In all cases of potable water line construction, provide disinfection and maintain sewer/water separation in accordance with the Water and Sewer Specifications.

END OF SECTION

SECTION 40 0559 – STOP LOGS

PART 1 GENERAL

1.1 DESCRIPTION

- A. Work included, but not necessarily limited to, furnishing and installing stop logs as specified and shown on the Drawings.

1.2 SUBMITTALS

- A. Section 01 3300 – Submittal Procedures: Requirements for submittals.
- B. Product Data: Within 30 calendar days after the Contractor has received the Owner's "Notice to Proceed," submit:
 - 1. Materials 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. 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.

PART 2 PRODUCTS

2.1 ALUMINUM STOP LOGS

- A. Aluminum stop logs including lifting beams and lifting device shall be of the size and mounting type shown on the Drawings and specified herein. Log and lifting beam design shall be such that the flexural stresses do not exceed 1/5 of ultimate strength of 1/3 of yield strength. Design flexural stress of aluminum shall not exceed 7,000 psi. As manufactured by Golden Gates, Whipps, RW Gate, or approved equal.
 - 1. Materials of Construction:
 - a. Stop Log and Slot Extrusions – Aluminum (6061-T6) (minimum thickness of 1/4 inch).
 - b. Lifting Beam – ASTM A36 Hot Dip Galvanized or ASTM A444.
 - c. Seals – Neoprene D2000 Grade 1BE625.
 - d. Guides – Ultra-High Molecular Weight (UHMW) Polyethylene.
 - e. Hooks & Fasteners – Stainless steel, ASTM A276, Type 304.
 - f. Guide Wheels – Phenolic or polyolefin.
 - 2. Stop Log Panels: Stop log panels shall be in height increments of 6 inches to achieve a total height to the channel floor. Each set of panels must be able to stack to a height of 42 inches. Panels made of two or more extrusions shall be securely welded together to form a unit, and joints shall be made watertight with neoprene seals or seal welding. Each panel shall have two stainless steel hooks to engage the lifting beam. Panel surface must be mill finish. Adequate drainage shall be provided for each log. Stop log panels shall be furnished with

UHMW guide surfaces to eliminate metal-to-metal contact with slots during insertion and removal.

Provide enough panels to be installed in two locations within the lower level screening room.

3. Seals: Seals shall be permanently attached to sides and bottom of each panel. Seal shall be formed all around the waterway channel and between each stop log panel.
4. Sill: Sill constructed from stainless steel plate shall be provided. It shall be adjustable-mounted to provide flat level seal surface prior to grouting. Finish will be mill finish. Alternatively, flat level concrete invert surface may be provided. Flatness shall be within 1/8 inch in 10 foot of length.
5. Slots: Slots shall be one-piece extrusion suitable for embedment or mounting on channel wall surfaces. Surface shall be mill finish. Bottom of frame shall be embedded flush with channel floor.
6. Lifting Beam: Lifting beam shall be gravity-engaged and lanyard-release type suitable for inserting, retrieving, and handling stop log panels. The beam shall be furnished with non-metallic wheels to guide the beam in the stop log slot. The lifting beam may, at the manufacturer's option, be adjustable in widths to accommodate several widths of stop log openings. Beam shall be complete with large center lifting eye and center-guided, galvanized, lanyard-release cable.
7. Lifting Device: The lifting device shall include a metal frame and hand-operated hoist and be designed to accommodate the stop log panels at each location.

The lifting device shall allow one operator to be able to remove stop logs. A free-standing height of "A-Frame" or "Engine-Hoist" style frame to support hand-operated hoist is anticipated.

8. Storage Rack: Provide aluminum wall mounted storage racks so that when not in use all stop log panels will be safely stored out of the way of normal operations.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01 3000 – Administrative Requirements: Verification of existing conditions before starting work.
- B. Verify layout and orientation of gate, slide system, pedestal, and accessories.

3.2 INSTALLATION

- A. Install stop logs and accessories where indicated on Drawings and in accordance with manufacturer's instructions.

3.3 FIELD QUALITY CONTROL

- A. Section 01 4000 – Quality Requirements and Section 01 7000 – Execution Requirements: Field inspecting, testing, adjusting, and balancing.
- B. Equipment Acceptance:
 - 1. Adjust, repair, modify or replace system components that fail to perform as specified and rerun tests. Make final adjustments to equipment under direction of manufacturer's representative.
 - 2. Document adjustments, repairs and replacements in manufacturer's field services certification.

3.4 DEMONSTRATION

- A. Section 01 7000 – Execution Requirements: Requirements for demonstration and training.
- B. Demonstrate equipment operation, routine maintenance, and emergency repair procedures to Owner's personnel.

3.5 WARRANTY

- A. The manufacturer of the stop logs specified in this Section shall guarantee for one year of operation that the equipment shall be free from defects in design, materials and workmanship.
- B. Manufacturer shall, at no cost to the Owner, repair or replace any component that is proven to have failed during the warranty period due to a manufacturing defect.

END OF SECTION

SECTION 43 2140 – DRY PIT SUBMERSIBLE PUMPS

PART 1 GENERAL

1.1 SUMMARY

- A. This section addresses supervision, labor, materials and equipment in the work for furnishing and installing wet-pit and dry-pit submersible solids handling pumps.
- B. General Contractor shall provide all labor, materials, tools, equipment, and incidentals as shown, specified, and required to furnish, install, adjust, and test submersible solids handling pumps as shown on the Plans and as described in these Specifications.
- C. All submersible sewage pumps shall be provided by a single manufacturer.
- D. Pump manufacturer scope of supply:
 - 1. Explosion proof motors
 - 2. Power and sensor cable
 - 3. Bearings
 - 4. Mechanical seals
 - 5. Volutes
 - 6. Impellers
 - 7. Pump Shafts
 - 8. Other pump component parts
 - 9. Vertical suction elbow stand
 - 10. Spare parts
 - 11. Extra materials as specified
 - 12. Technical services
- E. Contractor scope of supply: Provide materials, equipment, appurtenances, and services not supplied as part of the system, including but not limited to
 - 1. Unloading, storing, and protecting equipment at the site in accordance with supplier's recommendations.

1.2 SUBMITTALS

- A. General: Submit in accordance with Section 01 3300.
- B. Action submittals:
 - 1. The manufacturer will supply the standard submittal, consisting of:
 - a. Pump Catalog Data, including a certified performance curve, motor data, and pump dimensional drawing
 - b. Materials of construction list
 - c. Mounting Accessory details
 - d. Access Cover data
 - e. Typical installation drawing
 - f. Electrical schematics and diagrams

- g. Certified copies of test data from factory testing when specified, only after pumps have been ordered and manufactured.

C. Information submittals:

1. Descriptive information on material and equipment furnished
2. Anchorage requirements
3. Installation instructions
4. Manufacturer's certificate of acceptance of installation and testing
5. List of manufacturer's recommended spare parts
6. Installation & Operation Manual with parts list
7. Warranty documents
8. Name and address of factory authorized service facility

D. Closeout submittals:

1. Comply with Section 01 7000, Operation and Maintenance Data.
2. Project record documents: Record actual locations of pumps and appurtenances on the contract drawing, reflecting all post-bid changes.
3. Operations and Maintenance Data: Submit maintenance instructions for equipment and accessories.

1.3 QUALITY ASSURANCE

A. Warranty

1. The pumps shall come with a 5-year, pro-rated warranty, that begins at the date of shipment from the manufacturer's facility.
2. A 5-year full coverage warranty is available as an option.
3. Include warranty coverage for/against.

1.4 DELIVER, STORAGE, AND HANDLING

A. Comply with provisions of Section 01 7000

1. List the special storage and handling requirements for the products specified, including location and environmental conditions to protect from damage.
2. Store materials to permit easy access for inspection and identification. Keep all materials off the ground, using pallets, platforms, or other supports. Protect steel members and packaged materials from corrosion and deterioration.
3. All parts shall be properly protected so that no damage or deterioration will occur during a prolonged delay from the time of shipment until installation is completed and the unit and equipment are ready for operation.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers Qualifications:

1. Pump(s) shall be manufactured by a company regularly engaged in the manufacture and assembly of similar units for a minimum of (5) years.
2. The pumps shall be assembled and tested in the United States of America.

3. The pumps shall be Barnes Envie model 6XESHDK50044.
4. Contractor will provide Owner with location and description of manufacturer's Service Centers and spare parts stock.
5. Manufacturer shall be certified to ISO 9001 and shall provide a valid certificate upon request.

2.2 PRODUCT DETAILS

A. Service Conditions:

1. The pumps shall be dry run submersible end suction centrifugal solids handling type, installed in a:
 - a. Dry Pit installation, with permanently connected inlet and outlet pipes. The pump will be capable of operating in a continuous, non-submerged condition in a vertical position, or
2. Each pump shall be capable of handling raw, unscreened domestic sewage consisting of water and fibrous materials. The impellers will be capable of passing up to 3" diameter spherical solids. The pumps shall be driven by a Premium Efficient/ IE3 motors capable of operating in a 40° C / 104° F continuously. The motors will be capable of operating continuously when fully submerged, partially submerged, or unsubmerged.
3. Each pump will be capable of the following performance:

Primary Flow	1250	US GPM
Primary Head	42	TDH – Feet
Minimum Hydraulic Efficiency	72	%
Discharge Size	6	In
Suction Size	8	In
Motor Speed	1750	RPM
Motor HP	50	HP
Frequency	60	Hz
Voltage	460	V
Phase	3	ph
Motor Service Factor	1.15	SF

2.3 PUMP AND MOTOR MATERIALS

A. Component Materials

Volute	ASTM A48 Class 30 Cast Iron
Impeller	Standard: ASTM A536, 65-45-12 Ductile Iron
Motor Housing	ASTM A48 Class 35B Cast Iron
Wear Ring	ASTM B505 C95400 Lead Free Bronze
External Hardware	304 Stainless Steel
Lifting Bail	304 Stainless Steel
Shaft	416 Stainless Steel
Cooling Jacket	304 Stainless Steel
Seals	Standard: Carbon/Silicon Carbide/Buna Upper, Silicon

	Carbide/Silicon Carbide/Buna Lower
Coating	Liquid End: Two coats of Axalta Corlar® amidoamine epoxy, 10 mil minimum thickness, in the manufacturer's standard color Motor Cap: Resicoat® R4 Powder Coat Epoxy, in the manufacturer's standard color
Gaskets	Buna-N
O-Rings	Buna-N
Motor Rotor Bars	Die Cast Aluminum
Motor Cooling Liquid	Monopropylene Glycol and Distilled or Deionized Water
Elastomeric plug holding plate	ASTM A48 Class 30 Cast Iron
Cable Entry Housing	ASTM A48 Class 30 Cast Iron
Nameplate	304 Stainless Steel

B. Pump Components

1. The pump end components will be ASTM A48 Class 30 Cast Iron, aside from the impeller. The volute shall be a single piece non-concentric design, with smooth passages of sufficient size to pass solids that may enter through the impeller. The volute shall include a drain port connection. The volute discharge connection shall be a standard 125 lb. flange, slotted to accommodate ANSI or MM ISO Flanges used in sewage applications, and shall be a centerline connection. The suction connection shall be a standard ANSI 125 lb. flange. The volute shall be designed to withstand 1.5x the maximum shutoff head.
2. The impeller will be dynamically balanced to ISO G6.3 specifications, and will be capable of handling solids, fibrous materials, and other matter typically found in raw wastewater. The impeller shall be keyed to the shaft and shall have a taper lock connection. The impeller will be a:
 - a. Dual-vane design with pump out vanes on both sides. The matching volute will include a replaceable volute wear ring at the inlet. Larger models shall utilize an impeller wear ring as well.
3. This design shall allow for a solids handling pump with a dual-vane impeller to be easily upgraded to a chopper pump.
4. The pump and motor shaft will be a solid, continuous piece of 416 stainless steel, keyed and tapered for the matching impeller fit to reduce rotor imbalance and minimize stress risers associated with stepped shafts. Shafts utilizing a coupling or other attachment method will not be acceptable. The shaft will have a maximum allowable deflection of 0.002 inches at the lower mechanical seal during operation.
5. The mechanical seals will be a tandem system, consisting of two totally independent mechanical seals, each with its own single spring system acting in a common direction. The upper seal will have a carbon rotating face and a silicon carbide stationary face and will be located between the coolant chamber and the motor housing. The lower seal will have a silicon carbide rotating face and a silicon carbide stationary face and will be located between the pump and the lubricant chamber. Both seals will have 300 series stainless steel hardware and Buna-N elastomers.
6. Both seals shall be pinned in place to prevent rotation of the stationary seat and shall seal to the pump housing and must operate in a coolant chamber which shall provide superior heat transfer & seal cooling. The coolant must be environmentally safe non-toxic material. The seals must not require routine maintenance or adjustment but should be easily replaced. The

seal shall be commercially available and not a pump manufacturer's proprietary design. Double mechanical seals with a single or double spring and/or cartridge seals will not be accepted.

7. The common pump and motor shaft shall rotate on two bearings. These bearings shall be high quality and commercially available. The bearings will be sealed, permanently grease lubricated for superior lubrication, cooling, and life. The lower bearing shall be of the double row ball type, locked in position to accept radial and axial thrust loads and the upper bearing shall be of the pre-loaded single ball type for radial loads as needed to provide a minimum L10 Life of 50,000 hours at -50% to +50% of BEP.
8. Gaskets except for seal gland and bearing retainer shall be of the angular gland compression O-ring type eliminating critical slip fits and the possibility of damage during service associated with sliding O-ring sealing arrangements. Mating surfaces where watertight sealing is required shall be machined and fitted with O-rings.
9. The exterior of the pump liquid end will be coated per Article 2.4 FINISHES below.
10. The pump shall be equipped with a stainless steel nameplate, located in an easily accessible location. The following data will be included on the nameplate:
 - a. Manufacturer's Name
 - b. Pump Part Number, Model Number and Serial Number
 - c. Motor Horsepower Rating
 - d. Voltage, Phase and Frequency
 - e. Motor Speed
 - f. Motor Service Factor
 - g. Motor Full Load Amps
 - h. Ambient Temperature Rating
 - i. Code Letter
 - j. Pump Weight
 - k. Impeller Diameter
 - l. Motor Insulation Class
11. Spare Parts
 - a. one spare full diameter impeller for each pump model
 - b. one spare set of mechanical seals,
 - c. all gaskets,
 - d. all O-Rings.
 - e. Spare wear rings for each pump model

C. Motor Components

1. The major driver components will be ASTM A48 Class 35B Cast Iron.
2. The motor shall be a squirrel cage induction motor housed in an air filled, watertight enclosure. The motor shall be NEMA Type B. The stator windings shall be insulated with moisture resistant Class H insulation, rated for 180°C (356°F). The motor shall be 460 volts, 60 Hz, 3 phase, and shall have a voltage tolerance of +/- 10% from nominal voltage. The motor shall be designed to run continuously in a 40° (104°F) ambient environment.
3. The stator shall be press fit into the motor housing, for mechanical stability and optimal heat transfer. The use of bolts or pins to secure the stator into the housing will not be acceptable.

4. The motor shall be inverter duty rated, in accordance with NEMA MG-1, Part 31, and shall have a minimum 1.15 service factor. The motor shall be designed for usage in submersible or dry applications, where the motor shall operate fully submerged, partially submerged, or completely unsubmerged. The motor shall continue to operate satisfactorily should the dry pit flood. The motor horsepower shall be non-overloading throughout the entire pump performance curve.
5. The rotor bars shall be die cast cast aluminum with integral cooling fins.
6. The motor will be capable of operating at a maximum submergence depth of 66 ft (20m), and shall be IP68 protection rated.
7. The motor will be IE3 rated in accordance with IEC 60034-30 at nominal voltage and frequency, with testing per CSA C390/IEEE114. The motor will be capable of 15 evenly spaced starts per hour without overheating.
8. The motor shall include a factory installed closed loop cooling system. The cooling system shall be completely self-contained. The cooling liquid shall be a mixture of 30% monopropylene glycol and 70% distilled or deionized water, and shall be circulated between a stainless steel jacket and the cast iron motor housing by a secondary, independent impeller. This secondary impeller shall be mounted directly to the motor shaft between the mechanical seals. The bearing bracket shall act as a heat exchanger to move the heat from the motor to the coolant liquid. The seal plate shall be finned and act as a heat exchanger to move the heat from the coolant to the pumped media. The system shall have at minimum one fill port and one drain port. An external coolant source, a cooling system circulating the pumped media or a design without a cooling system will not be acceptable.

D. Sensors

1. A moisture sensor detection system shall be integrated within the bearing bracket and liquid ingress must trigger an alarm before reaching the bearings. A normally open float sensor with a circuit verification resistor must be installed in the seal leakage chamber to detect presence of liquid. Units sensing moisture within the motor chamber are not considered acceptable. It is recommended to use the pump monitor relay (PMR) installed inside the control panel which will trigger a warning light and shuts the pump down due to ingress of liquid.
2. The motor shall be equipped with thermal sensors:
 - a. Three Phase: Three thermal sensors, one per phase, shall be embedded in the end coil of the stator windings, and wired in series. These sensors shall be used to monitor stator temperatures, in conjunction with an external motor overload protection device and wired to the control panel through the power cable.

E. Cable

1. The pump shall be equipped with 50 ft of a CSA qualified submersible power cable constructed in accordance with Type W guidelines. The power cable will also include the moisture and temperature sensor leads in one common jacket for most models.
 - a. The cable entry system will be Barnes Plug & Play design, consisting of a potted cast iron housing, held in place by stainless steel hardware. The power cord shall be easily removed and replaced. Pumps with power cords that cannot be easily removed or replaced will not be acceptable.
2. The pumps shall be capable of being easily removed and replaced without the removal of the pump power cord from the electrical conduit.

2.4 FINISHES

- A. The exterior of the pump liquid end will be coated with two coats Axalta Corlar ® two-part amidoamine epoxy, with a minimum thickness of 10 mils. The motor cap will be powder coated with Resicoat ® R4 epoxy. Coating of the pump interior to gain hydraulic efficiency will not be accepted.

2.5 ACCESSORIES

- A. For Dry Pit pumps:
 - 1. Vertical Metal Stand: The pump shall be supplied with a vertical mounting accessory, which includes a metal stand, suction elbow with cleanout port, and an adapter plate which allows 360° rotation of the pump discharge. The stand shall be designed to handle the weight of the pump, and the suction elbow shall be designed to withstand 1.5x the maximum shutoff head. Designs that only allow 45° or 90° rotation will not be acceptable.
 - 2. Concrete Adapter: The pump shall be supplied with a vertical mounting accessory, which includes a metal plate, suction elbow with cleanout port, and an adapter plate which allows 360° rotation of the pump discharge. The accessory must be installed on concrete piers, which must be provided by others. The stand shall be designed to handle the weight of the pump, and the suction elbow shall be designed to withstand 1.5x the maximum shutoff head. Designs that only allow 45° or 90° rotation will not be acceptable.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install in accordance with manufacturer's printed instructions.
 - 1. Dry Pit: The pump shall be capable of operating continuously in an unsubmerged condition, in either a vertical or horizontal installation, or
 - 2. Contractor shall complete all piping and supports, make all electrical power and control connections, and install all safety devices and instrumentation prior to equipment start-up.
 - 3. All anchor bolts, nuts, washers, and sleeves shall be Type 316 stainless steel furnished by the contractor and shall be of ample size and strength for the purpose intended
 - 4. See also 2.5 ACCESSORIES above.

3.2 FIELD QUALITY CONTROL

- A. General: Comply with requirements of Section 01 6000.
- B. Factory Tests:
 - 1. The pump manufacturer shall perform a pump performance test to verify hydraulic performance as standard.
 - 2. A hydrostatic test shall be performed on dry pit pumps to verify casting integrity.
 - 3. If certified testing is required, the manufacturer shall offer testing in accordance with Hydraulic Institute Standards 11.6 and 14.6. Additionally, the following tests are also available:
 - a. A check of the motor voltage and frequency

- b. A motor and cable insulation test for moisture content or insulation defects, in accordance with CSA criteria
 - c. Contact the manufacturer for tests not listed here.
 - 4. Each motor shall be dielectric tested to verify the motor insulation integrity.
- C. Manufacturer's Representative
 - 1. Provide manufacturer's representative. The representative shall inspect the equipment, carry out the equipment start-up procedures, and provide training to the operators in how to effectively operate and maintain the equipment. The manufacturer's representative may be an employee of the manufacturer's distributor.
 - 2. Prior to Operational Testing, the Contractor shall have the manufacturer's representative perform the following:
 - 3. Megger test the stator and power cables.
 - 4. Check proper rotation.
 - 5. Check power supply voltage.
 - 6. Measure motor operating load and no-load current.
 - 7. Check level control operation and sequence.
 - 8. During Final Acceptance Testing, the manufacturer's service representative shall review recommended operation and maintenance procedures with the Owner's personnel.
 - 9. The manufacturer's representative shall be present for a period of not less than one (1) day to complete the following:
 - 10. Inspect completed installation
 - 11. Observe equipment testing
 - 12. Observe equipment start-up
 - 13. Instruct operational personnel on equipment operation and maintenance.
- D. Field Tests:
 - 1. After installation, the pumping system shall be field tested using potable water for a minimum of 30 minutes and check for correct direction of rotation in the presence of the manufacturer's representative and the Engineer. The Contractor shall be responsible for providing water and for conveying the water to the site and providing required meter and back-flow prevention check valve assembly. Each pump shall be cycled through the sequence of operation "pump on" as the level rises in the wet well and then "pump off" during draw down. Once each pump has been tested separately, the pumps will be operated in parallel.
 - 2. Each pump shall operate over its intended operating range without undue noise, vibration, or cavitation. The Contractor shall monitor and record vibration at three symmetrically located points on each pump at maximum and minimum speed and supply data to the Owner.
- E. Inspections
 - 1. Upon completion of the installation and on-site testing, and before acceptance by the Owner, the Pump Manufacturer or the authorized Pump Manufacturer's Representative shall submit a written statement that the pump installation has been inspected and is completed in accordance with the manufacturer's recommendations.

3.3 ADJUSTING

- A. Adjust parts for smooth, uniform operation.

3.4 CLEANING

- A. Clean as recommended by manufacturer. Do not use materials or methods which may damage finish (surface) or surrounding construction.

END OF SECTION

SECTION 46 3338 – ALUM CHEMICAL FEED EQUIPMENT

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes the following:
 - 1. Equipment for the addition of a blended phosphate solution to the facility's treated water.

1.2 PERFORMANCE REQUIREMENTS

- A. Deliver alum solution up to minimum of four (4) gallons/hour of continuous operation at rated capacity.

PART 2 PRODUCTS

2.1 DOSING PUMP

- A. Manufacturers:
 - 1. Albin KM2-4-AAE2-1 Peristaltic Pump. Rated for 4.4 GPH against 110 psi max.
 - 2. Albin Duplex Wall Skid Panel with two (2) Pump arrangement Duty/Standby.
 - 3. Substitutions: As approved by the Engineer.
- B. Provide such tubing as required for alum application.
- C. Power requirements: 120-volt, single phase, 60 Hz

2.2 TANK

- A. Manufacturer:
 - 1. Den Hartog/Industries, Inc. 2000 Gal. Alum Chemical Tank to include: 2" PVC Fill Bulkhead Adapter, 2" PVC Level Transducer Bulkhead Adapter, 4" PVC Vent Bulkhead Adapter and 1" PVC Pump Suction with Drop Tube.
 - 2. Substitutions: As approved by the Engineer.
- B. Provide such tubing, valving, and venting as required for alum application.

2.3 LEVEL SENSOR

- A. Manufacturers:
 - 1. One (1) Vegapuls C II Radar Level Transducer with Vegamet Controller Display 115V, 4-20 mA output.
 - 2. Substitutions: As approved by Engineer.
- B. Power requirements: 120-volt, single phase, 60 Hz.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify layout and orientation of equipment, accessories and piping connections.

3.2 INSTALLATION

- A. Install equipment and accessories as indicated on Drawings and in accordance with manufacturer's recommendations.

3.3 FIELD QUALITY CONTROL

- A. Preliminary Leakage Testing: With system under pressure, observe each joint and connection for leaks.
- B. Performance Testing: Test each piece of equipment under design conditions for two to four hours to demonstrate proper functioning and automatic regulation of system; test alarms and signal generation; exercise equipment control and manual override where applicable; demonstrate equipment safety features.
- C. Equipment Acceptance: Adjust, repair, modify or replace components failing to perform as specified and rerun tests; make final adjustments to equipment under direction of manufacturer's representative.

3.4 MANUFACTURER'S FIELD SERVICES

- A. Furnish services of manufacturer's representative experienced in installation of products supplied under this specification for not less than two days at project site for installation inspection and field testing, and instructing Owner's personnel in maintenance of equipment.
- B. Furnish Installation Certificate from equipment manufacturer's representative attesting equipment has been properly installed and is ready for startup and testing.
 - 1. Equipment monitoring and control systems shall be installed by representatives of Gasvoda and Associates, Inc.

END OF SECTION

SECTION 46 6624 – NON-CONTACT ULTRAVIOLET DISINFECTION EQUIPMENT

PART 1 GENERAL

1.1 SUMMARY

- A. Under this Section, the Contractor shall furnish and install a complete low-pressure, high output, two-bank UV disinfection system as described herein. The system shall include, but is not limited to, stainless steel disinfection chambers and associated power and control equipment. The Contractor shall provide the power source, electrical conduit, field wiring, and equipment base supports. The Contractor shall physically install the disinfection chamber and power and control cabinets according to the project specifications and drawings and any additional information provided by the manufacturer during the submittal phase.

1.2 COORDINATION

- A. All equipment supplied under this section shall be furnished or through a single supplier who shall coordinate with the Contractor, the design, fabrication, delivery, installation and testing of the treatment equipment components. The supplier shall have the sole responsibility for the coordination and performance of all components of the treatment equipment with the performance and design criteria specified herein.
- B. The Contractor shall be responsible for coordinating all details of the treatment equipment with other related parts of the Work, including verification that all structures, piping, wiring, and equipment components are compatible. The Contractor shall be responsible for all structural and other alterations in the Work required to accommodate the equipment differing in dimensions or other characteristics from that contemplated in the Contract Drawings or Specifications.

1.3 SUBMITTALS

- A. The equipment manufacturer shall submit the following items:
 - 1. Digital Format of General Arrangement drawings that illustrate the layout of the equipment, equipment weight, principal dimensions with related verifications required for installation including anchorage locations. Other related data including descriptive literature, Electrical Control Drawings, Catalog Cut Sheets for individual components, etc.
 - 2. A list of recommended Spare Parts including any Special Tools required for routine maintenance of the equipment is provided in Section 2.9.
 - 3. Six sets of O & M Manuals including As-Built Drawings of the UV Disinfection System, Controls and Accessories shall be provided in digital format after equipment ship for inclusion in the Close-Out Submittal process.
 - 4. Manufacturer Instructions: Installation requirements, including storage and handling procedures.

1.4 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: Maintenance instructions for equipment and accessories.

1.5 QUALITY ASSURANCE

- A. To assure quality and performance: All equipment furnished under this Section and related sections shall be of a single manufacturer who has been regularly engaged in the design and manufacture of the equipment and demonstrates, to the satisfaction of the Engineer, that the quality is equal to equipment made by those manufacturers specifically named herein. The manufacturer shall have at least 1500 installations of ultraviolet disinfection equipment that has been in successful operation, including at similar installations, for at least six (6) years.
- B. The equipment furnished shall be fabricated, assembled, installed and placed in proper operation condition in full conformity with approved drawings, specifications, engineering data, and/or recommendations furnished by the equipment manufacturer.
- C. Equipment shall be manufactured in the United States by an ultraviolet disinfection supplier that has been regularly active for a minimum of six years.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. General Requirements: In addition to requirements for materials handling and storage as stated in the General Conditions of the Contract; the following applies:
 - 1. Delivery: When transporting materials, equipment, and electrical/electronic components both on site and from Contractor's storage to the site, do so in accordance with recommendations of the Manufacturer.
 - 2. Unloading: When unloading materials, equipment and electrical/electronic components provide any special apparatus as may be required by manufacturers. Handle materials, equipment, and electrical/electronic components in accordance with manufacturer's written instructions.
 - 3. Storage: Store materials, equipment and electrical/electronic components, both on and off site, in accordance with manufacturer's written. Additionally, provide manufacturer's certificates of proper materials, equipment, or machinery storage for the following listed items. Prior to issuance of such certificates, a manufacturer's representative shall visit the site of storage and examine materials, equipment, and electrical/electronic components in actual storage conditions.

1.7 EXISTING CONDITIONS

- A. Field Measurements:
 - 1. Verify field measurements prior to fabrication.
 - 2. Indicate field measurements on Shop Drawings.

1.8 WARRANTY

- A. The manufacturer shall furnish a written warranty that provides for:

1. Full replacement of all defective lamps within the first 9,000 hours of proper operation.
2. Full replacement of components against defects in materials and workmanship for a period of 1 year from date of startup not to exceed 18 months from date of shipment.
3. Full replacement of all defective electronic ballasts that fail within the first five (5) years from delivery under proper operation.
4. All electronic and control circuits for 2 years from date of shipment.
5. Performance as outlined in Section 2.2 – Operating Parameters.

1.9 SYSTEM DESCRIPTION

A. Design Criteria:

1. Peak hydraulic flow: 4.0 MGD
2. Redundancy: 100% @ Avg. Flow
3. Minimum flow: 0 MGD
4. Total Suspended Solids: 30 mg/l
5. Biological Oxygen Demand: 30 mg/l
6. Max head loss: <6.5"
7. UV Transmittance at 254 nm: 65%
8. End Of Lamp Life (EOLL) 0.87
9. Effluent temperature range: 33-85
10. Mean particle size: 30 microns
11. Minimum UV dose: > 30 mJ/cm²
12. Effluent standard to be achieved <200 per 100 ml fecal coliform based on a 30-day geometric mean of daily samples and sampling location immediately downstream of the UV reactor.

B. PERFORMANCE REQUIREMENTS

1. The UV disinfection system will produce an effluent conforming to the discharge requirements at maximum flow of 200/ 100 ml fecal coliform, based as a 30-day Geometric Mean. Grab samples shall be taken in accordance with the US EPA approved laboratory methods.
 - a. The UV system is designed to deliver a minimum UV dose of 30mJ/cm² during peak flows, with effluent having UV Transmission of 65% or greater at end of lamp life (EOLL).
 - b. Supporting documentation from the US EPA UV DIS calculations or manufacturers' bioassay demonstrating that the dose required in the performance section is being met or exceeded. Only bioassay results using MS2 phage or similar bacteria shall be acceptable as a means of determining dosage and validating the calculations. Only the EPA Point Source Summation Method will be acceptable.

C. UNIT DIMENSIONS

Length: 15' 11-1/2"
Width: 5' 11-1/2"
Height: 4' 2"
Location: Outdoor

1. The reactor will be constructed of stainless-steel housing 60 tubes and 168 lamps.
2. The system will be supplied with flow diversion plates for in-channel mounting.
3. The BCC/SCC will be a combined remote enclosure and will be constructed of stainless steel.

1.10 SPARE PARTS

- A. The following spare parts will be provided and will be stored in sturdy label containers.
1. Eight (8) UV lamps
 2. Four (4) Ballasts
 3. One (1) Flow Tube
 4. One (1) Cleaning brush
 5. Two (2) Operator safety kit.

PART 2 PRODUCTS

2.1 EQUIPMENT NAME

- A. GLASCO UV will provide one (1) complete NONCON-5000-7-12 X 60 (2B) - Insert system. The system is designed for 4.0 MGD.

2.2 MATERIALS

- A. UV system shall be anchored via stainless steel fasteners.

2.3 MANUFACTURED UNITS

- A. General
1. All module welded metal components in contact with effluent will be Type 304 stainless steel.
 2. All metal components will be Type 304 stainless steel and be capable of sustaining intermittent pedestrian traffic on the lamp racks.
 3. All wiring exposed or unexposed to UV light within the UV reactor or electrical ballast enclosure will be Teflon™ coated.
 4. All wires connecting the lamps to the ballasts will be enclosed inside the frame of lamp rack and not exposed to the effluent.
 5. The effluent water shall be conveyed through the UV reactor through fluoropolymer tubes.
 6. All wetted components in the UV reactor will be: FEP, 304SS, PVC, ABS or other non-reactive, non-corrosive material.
- B. Bay Array Configuration:
1. The lamp array configuration will be the uniform array with all lamps parallel to each other and to the flow.
 2. The system is designed to avoid any immersion of UV lamps in the Effluent.

3. The UV lamps will be arranged around the outside of the FEP tubes in such a way that each water tube shall have no less than 6 lamps irradiating it.
- C. Inlet/Discharge Flow Distribution:
1. The UV system will have channel bolting patterns.
 2. The UV disinfection system will have flow inlet distribution that distributes wastewater through the FEP tubes.
 3. The UV system will have a 304 Stainless steel channel and will be non-corrosive.
- D. FEP Tube UV Reactor
1. Within the ultraviolet reactor, FEP UV transmitting tubes are arranged in a horizontal and vertical array. These FEP tubes are in a parallel mode and are attached at one end to the inlet flow distributor sheet and to the outlet flow distributor sheet with appropriate leak proof fittings. The FEP tubes will be adequately supported by integral mounting brackets.
 2. In between and around the FEP tubes, lamp rack assemblies will be placed in such a fashion so as to provide uniform and adequate ultraviolet light intensity. The lamp racks slide in and out between and around a row of FEP tube array.
 3. Within the FEP UV reactor, all UV sensitive materials will be protected from the UV light.
 4. The flow path of the wastewater will be through UV transmitting FEP tubes in such a way that it is a minimum of 99% plug flow. The flow of wastewater will be in sufficient turbulent mode; therefore, the Reynold's number in each unit will be greater than 50,000 at peak daily flow. A turbulent flow will be in such a way that it will constantly scour the inner walls of the AFP tube and help prevent scaling or fouling.
 5. The ultraviolet light reactor will be covered from five sides with stainless panels. The sixth side (top) will have access doors. The lamp racks will be accessible through these doors.
 6. The air temperature inside the FEP UV reactor shall be maintained by means of heat exchanger. The control of the lamp temperature shall ensure optimum UV light emissions from the UV lamp. The heat exchanger shall ensure that no outside air or dust can get into the UV reactor and settle on the AFP tubes and UV lamps.
 7. Cooling within the UV reactor shall utilize a series of liquid to air heat exchangers. A closed loop system will be utilized to feed the heat exchangers coils with liquid. The use of plant effluent as feed water to the heat exchangers will not be allowed.
 8. Glycol is the liquid that will be recirculated through the cooling loop. A fill reservoir will be provided to top off the coolant at manufactures recommended interval.
 9. The UV manufacturer shall supply the heat exchangers and associated controls.
 10. The UV Reactor shall consist of two (2) banks.
 11. During the appropriate stage in the treatment process when the flow from the SBR decant has stopped, the FEP tubes will be capable of being empty, and the UV lamps will be able to be turned off. This will be controlled by the UV panel.
- E. UV Lamps:
1. The Ultraviolet Disinfection System will have germicidal UV lamps. These lamps will be located on the lamp rack assemblies. The ultraviolet disinfection lamps will have the following characteristics:
 - a. A low pressure, high output non-amalgam mercury vapor lamp of the hot cathode type.
 - b. The filament shall be of the clamped design, significantly rugged to withstand shock and vibration.

- c. Each lamp will produce at least 90% emissions at the germicidal frequency of 253.4 (254nm) nanometers.
- d. The power consumption will be a maximum of 155 input watts per lamp including ballast losses.
- e. The rated UV output at 253.7 nanometers will be a nominal 50 UV254
- f. UV systems which use proprietary lamps shall not be considered.
- g. The rated UV efficiency shall be a nominal 32% of actual lamp input wattage exclusive of ballast losses.
- h. Watts at 100 hours of operation.
- i. The minimum UV intensity from the lamps will be >400 microwatts/cm² at 1 meter.
- j. Rated lamp life is 14,000 hours
- k. Each lamp shall be single ended. Each lamp will have a nominal arc length of 1400 millimeters.
- l. Each lamp has a minimum length of 1554 mm.
- m. Each lamp will produce no measurable amount of ozone.
- n. Each lamp envelope is made of quartz and is capable of transmitting at 90% of UV light at 254 nm.
- o. UV lamp base will be either ceramic or metallic
- p. Electrical connections will be at one end of the lamp and have 4 pins, dielectrically tested for 2,500 volts.
- q. During periods in the process when there is no effluent flow going through the UV reactor(s) the UV lamps shall be turned off.
- r. UV Lamps shall be available for purchase from non-related parties or OEM's under agreement from the original UV manufacturer

F. UV Lamp Racks

- 1. The UV lamp racks will be placed between rows of the FEP tubes.
- 2. The lamp racks will slide in and out within a track that will be attached to the main frame of the UV reactor.
- 3. The use of cranes, hoists or other mechanical lifting devices is not required.
- 4. The lamp rack assemblies will be made from stainless steel.
- 5. Lamp rack assembly is capable of sustaining intermittent pedestrian traffic on the lamp racks with no damage or deformation.
- 6. There are no quartz sleeves, O rings, Seals or waterproof connections required for installing UV lamps onto the lamp rack assembly.
- 7. Electrical mounting sockets are attached to one end of the lamp rack.
- 8. UV Systems utilizing module mounted ballasts shall not be considered.
- 9. The other end of the rack are slotted holes to slide lamps in and out during installation and removal of lamps.
- 10. Quick power disconnects will allow quick disconnect of the lamp rack assembly to the main power.
- 11. Lamp Racks are removable for service during plant operation without impacting Hydraulic flow or effective disinfection.
- 12. Removing a lamp rack or module does not result in the disruption of the hydraulic flow.
- 13. Ballast required for each lamp rack will be incorporated in the Ballast Control Center.
- 14. The ballast used to energize the UV lamps are high frequency electronic ballasts.

15. The electronic ballasts are rated at 120V-277V + 10% without discernible change of characteristics.
16. The electronics ballast have the following features:
 - a. Power factor greater than or equal to 0.95.
 - b. Electrical conversion efficiency greater than or equal to 90%.
 - c. Ballast will have high frequency phase returns from the UV lamps.
 - d. The ballast operating frequency will be between 40 and 150 KHz.
 - e. The ballast will have a thermal overload protector when ballast skin temperature reaches 75°C.

G. System Control Center (SCC)

The NONCON reactor will have its own free standing System Control Center equipped with a non-proprietary PLC by Allen Bradley. PLC will be an Allen Bradley 1400 with a Weintek cMT3162X 15.6" Operator User Interface.

1. The System will be provided with a PLC and a touch screen OUI.
 - a. LCD Display
 - b. Touch screen keypad
 - c. Status of operation through OUI
 - 1) Lamp status
 - 2) Lamp run time
 - 3) UV output
2. All controls and instrumentation will be housed in a remote NEMA 4xmodified stainless steel enclosure. The enclosure will contain:
 - a. Electronic Data Center
 - b. Contacts for remote alarms and controls to include:
 - 1) Local start of UV
 - 2) Lamp out indicators
 - 3) Low UV alarm
 - 4) Reactor on/off status
 - c. The SCC will provide the following
 - 1) On/OFF status of individual lamps and lamp racks
 - 2) Error status of lamps and sensors
 - 3) Number of operating hours for lamps
 - 4) An advanced signal for lamp service or replacement
 - 5) UV intensity
 - 6) Type and location of the alarm
 - 7) The frequency of alarms shall be counted and stored
 - a) Alarms and historical operating data shall be stored in a removable storage device in comma delineated format.
 - 8) Communication between the UV control panel (SCC) and the plant PLC shall be via CAT6 Ethernet cable.

H. Ballast Control Center (BCC)

1. The NONCON reactor will have its own free standing modified NEMA 4X Ballast Control Center.
2. Each lamp will have a corresponding LED. LED shall be displayed through a window kit. A green LED indicates a functioning lamp, and an extinguished LED means lamp out or other problem such as damaged ballast.

3. Each BCC will track operational hours as a way to remind when lamps require changing (13,000 hours).
 4. Each BCC will have a UV monitoring system that will measure and display UV output on a 0-100% basis.
 5. Each BCC will be provided with 20 feet of cable leading from the NONCON reactor.
 6. 277-480V three phase power to be provided.
 7. The UV System will have temperature control and internal heat management through the use of heat exchangers.
- I. UV Intensity monitor:
- a. One (1) UV intensity sensor will be equipped in each bank with an ultraviolet intensity monitor system.
 - b. The intensity sensors will be placed around a representative FEP tube.
 - c. The UV sensors will sense 253.7 nm UV light and will provide a signal, which will be displayed on the system display panel.
- J. Electrical
1. Each reactor will have a three-way control for allowing OFF, Hand, or Automatic operation of the UV System.
 2. In Hand, provide local control of the UV Reactor at the Local Display.
 3. In Auto, provide automatic system as programmed in the UV system control center to turn lamps on and off based on flow signal from others if available.
 4. Changing between Automatic and Hand operation shall be a smooth transfer without extinguishing lamps.
 5. All incoming system and control power shall be brought into the Electrical Control Panel and routed to appropriate components.
 6. Overall system status:
 - a. Lamp Status
 - 1) Individual Lamp location (Stage, Lamp Rack, Position)
 - a) Lamp On/Off status
 - b) Lamp Life (in elapsed hours)
 - b. Sensor Status
 - 1) Number of active sensors in UV system
 - 2) Type and Value of Sensor
- K. Control Strategy
1. Remote Start: The UV system shall be turned on by the Main Plant's PLC/SCADA system by opening and closing dry contacts. The SBR's supervisory PLC shall be programmed to produce an output (dry contact), 5 minutes before the start of a decant cycle, this contact closure shall be used by the Main Plant's PLC/SCADA system to produce a remote start signal (contact closure) for the UV system. The main Plant's PLC/SCADA shall be programmed to OPEN the dry contact and the end of a decant cycle after effluent stops flowing through the UV reactor. The UV control system shall be programmed to keep the LEAD UV bank operational for 5 minutes after the remote start signal ceases.
 2. Flow Pacing: The UV system shall employ a flow pacing technique with flow rate signals from the plant SCADA system.

3. If the UV bank in LEAD is in major alarm state, the UV control system shall activate the STAND-BY UV Ban.
 4. UV Bank alteration: the alteration of the two UV Banks (DUTY and STAND-BY) shall be performed by the Control system to ensure equalized operating hours for the two UV banks.
- L. Layout and Components
- M. The UV systems shall accept 4-20 mA signals from the plant flow meters and other controls.
1. Number of reactors: 1
 2. Banks per reactor: 2
 3. Modules per bank: 7
 4. Lamps per module: 12
 5. Total lamps: 84 Per Bank, 168 Total
 6. FEP Tubes: 60 running the length of reactor
 7. Radar Level Sensor: 1
 8. Max Length: 15' 11-1/2"
 9. Max Width: 5' 11-1/2"
 10. Max Height: 4' 2"
- N. MANUFACTURER ON-SITE SERVICES
1. A Manufacturer's representative shall as a minimum perform the following tasks:
 - a. Inspect, test and adjust the equipment after installation to verify mechanical, structural and electrical integrity and conformance to the equipment specifications. This task shall be scheduled for two trips requiring a maximum of four days on site.
 - b. Instruct Owner's personnel in the proper operation and maintenance of the equipment.
 - c. Provide additional services at no cost to the owner to correct any operational problems due to the design and/or fabrication of the UV equipment. Any problems with the UV associated with upstream process failures or incorrect use of the equipment will not be covered under this section.

PART 3 EXECUTION

3.1 TIMING

- A. The plant has a disinfection exemption from November 1, to April 30, each year.
- B. The Contractor shall plan and execute all work so as to have the new disinfection equipment installed and ready for operation when the Owner's mandated disinfection season begins on May 1, 2027.

3.2 ELECTRIC AND CONTROLS

- A. Contractor should refer to the Drawings for specific details relative to the electric and control aspects of the work.

3.3 FABRICATION

- A. The UV disinfection system specified herein should be factory assembled, to the largest extent possible, complete with all components specified.

3.4 INSTALLATION

- A. Equipment shall be installed by Contractor in accordance with the manufacturer's recommendations, drawings, and specifications to provide a complete installation.
- B. Installation Responsibilities of the Contractor:
 - 1. Provide UV manufacturer with at least 2 weeks' notice prior to any changes in the installation date previously agreed upon by the Owner.
 - 2. Sufficient space for moving into place and placement of all equipment supplied.
 - 3. Equipment anchoring and grouting including anchor bolts.
 - 4. All required permits.
 - 5. Structural work such as concrete pads, mezzanines for elevating equipment items, discharge channel, building enclosure, and all piping.
 - 6. Interconnecting electrical outside of the UV Skid limits.
 - 7. Connection and sealing of all flange fittings and connections to the adjacent processes.
 - 8. All electrical outside the skid limits and transformers/disconnect switches of the supplied equipment. Equipment electrical supply shall be detailed on the shop drawings.
 - 9. Any hardware or software required to connect to the Owners SCADA control system.
 - 10. Protecting the UV System from damage between the time of delivery and installation.
 - 11. Analytical testing to prove performance shall be samples taken by the Owner and paid for by the Owner.
 - 12. Equipment unloading, moving, and rigging into position.
- C. The Manufacturer shall answer any additional related questions that the Contractor may have, and shall coordinate with the Contractors and his Integrator to insure that system is integrated and operational.

3.5 TESTING

- A. After startup and as part of the equipment certification process, the Owner will submit to the Manufacturer one month of collected data as indicated below. This information shall be used by the Manufacturer to provide feedback to the systems operation.
 - 1. Monthly operator's reports for 30 days following start-up.
 - 2. Daily values for:
 - a. Plant flow (at time sample was collected)
 - b. Number of units in operation
 - c. Power level
 - d. Lamp intensity and/or dose
 - e. Time sample was collected.
 - f. Fecal/E. coli count/100 ml (influent and effluent)
 - g. Transmittance
 - h. TSS

- i. Sample collected by

END OF SECTION