MASTER METER AND BOOSTER PUMP ADDITION

WAYNE COMMUNITY COLLEGE

Project Manual

November 6, 2025

Engineer:
Timmons Group
5410 Trinity Rd., Suite 102
Raleigh, NC 27607

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Project Number 70141

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NC Division of Water Infrastructure MBE/WBE (DBE) Compliance Supplement

Instructions

(This package combines the various aspects of State of NC HUB program requirements and Federal DBE requirements into a single compliance supplement in order to eliminate redundancy and ambiguity)

Item	What to do with it
Good Faith Efforts Form	Provided by all bidders to be responsive Only low bidder's form is submitted to the State
Table A (Summary of firms on job)	Provided by all bidders to be responsive Only low bidder's form is submitted to the State
Table B (per item being subbed)	Provided by low bidder if SRF project or SRP/SEL* that obtains less than 10% M/WBE utilization (see page 2)
Provide documentation of anything you did that is mentioned later in this supplement	- Proof of trade paper advertisement - Printouts of DBE sources used - Solicitation emails and/or letters
~~Additional Forms for SRF Projects~~ (these forms are currently not applicable)	
~~6100-3 (per M/WBE firm)~~	~~Provided by low bidder if SRF project~~
~~6100-2~~	~~Distributed to M/WBE firms if SRF project~~
~~Subs submit concerns on 6100-2 forms to:~~	~~**Michael Pigram**~~ ~~**Region 4, Atlanta Federal Center**~~ ~~**61 Forsyth Street**~~ ~~**Atlanta, GA 30303-8960**~~

NOTES on this Compliance Supplement

Verifiable Goals

- **EPA MBE/WBE participation goals:** MBE 10.9%
WBE 10.4%

These are goals that the State reports against and are not quotas. *The good faith efforts must be adhered to and all forms provided regardless of what percentage utilization is achieved.*

- **State of NC MBE/WBE participation goal:** 10% (combined)

Table B is not required for SRP and SEL projects if you achieve 10% utilization.

DBE (MBE or WBE) Certification

In order for a firm to count towards the goals, a firm must be properly certified. Table A and Table B both provide spaces to note who certified the firm. The North Carolina Department of Administration and North Carolina Department of Transportation are the most common certifications we see listed. Division of Water Infrastructure staff verify all certifications listed.

For SRF projects, please note the EPA's six Good Faith Efforts found in 40 CFR 33
Filling out the Good Faith Efforts Form and providing Table B (if subcontracting is achieved) constitutes compliance with EPA's six good faith efforts.

(1) Ensure MBE/WBEs are made aware of contracting opportunities to the fullest extent practicable through outreach and recruitment activities. For Indian Tribal, State and local Government recipients, this will include placing MBE/WBEs on solicitation lists and soliciting them whenever they are potential sources.
(2) Make information of forthcoming opportunities available to MBE/WBEs and arrange time for contracts and establish delivery schedules, where requirements permit, in a way that encourages and facilitates participation by DBEs in the competitive process. This includes, whenever possible, posting solicitations for bids or proposals for a minimum of 30 calendar days before the bid or proposal closing date.
(3) Consider in the contracting process whether firms competing for large contracts could subcontract with MBE/WBEs. For Indian Tribal, State and local Government recipients, this will include dividing total requirements when economically feasible into smaller tasks or quantities in order to increase opportunities for participation by MBE/WBEs in the competitive process.
(4) Encourage contracting with a consortium of MBE/WBEs when a contract is too large for one of these firms to handle individually.
(5) Use the services and assistance of the SBA and the MBDA.
(6) If the prime contractor awards subcontracts, require the prime contractor to take the steps in subparagraphs (1)-(5) of this section.

Pertinent State of North Carolina Administrative Code Regarding M/WBE Compliance. The provisions in this Compliance Supplement constitute compliance with the Rules below.

Owner Requirements	01 NCAC 30I .0306
Contractor Requirements	01 NCAC 30I .0308

Resources

Some sources for identifying MBE/WBE (DBE) firms

- https://www.ips.state.nc.us/vendor/SearchVendor.aspx (NCDOA)
- https://www.ebs.nc.gov/VendorDirectory/default.html (NCDOT)
- http://dsbs.sba.gov/dsbs/search/dsp_dsbs.cfm (US SBA)

Some sources for finding minority trade papers for potential solicitation advertisements and Federal advertising options

- http://web.sba.gov/subnet/ (US SBA Subnet advertising website)
- https://www.mbda.gov/ (US Dept. of Commerce)
- https://ncadmin.nc.gov/businesses/hub (NC HUB Office)

Good Faith Efforts Form

Attempts to provide subcontracting opportunities for MBE/WBE firms.

Per 01 NCAC 30I .0101, 50 points must be claimed below by the bidder.
(This is identical to State of NC Affidavit A)

☐ **1 – (10 pts)** Contacted minority businesses that reasonably could have been expected to submit a quote and that were known to the contractor, or available on State or local government maintained lists, at least 10 days before the bid date and notified them of the nature and scope of the work to be performed.

☐ **2 --(10 pts)** Made the construction plans, specifications and requirements available for review by prospective minority businesses, or providing these documents to them at least 10 days before the bids are due.

☐ **3** – **(15 pts)** Broken down or combined elements of work into economically feasible units to facilitate minority participation.

☐ **4 – (10 pts)** Worked with minority trade, community, or contractor organizations identified by the Office of Historically Underutilized Businesses and included in the bid documents that provide assistance in recruitment of minority businesses.

☐ **5** – **(10 pts)** Attended prebid meetings scheduled by the public owner.

☐ **6** – **(20 pts)** Provided assistance in getting required bonding or insurance or provided alternatives to bonding or insurance for subcontractors.

☐ **7 – (15 pts)** Negotiated in good faith with interested minority businesses and did not reject them as unqualified without sound reasons based on their capabilities. Any rejection of a minority business based on lack of qualification should have the reasons documented in writing.

☐ **8** – **(25 pts)** Provided assistance to an otherwise qualified minority business in need of equipment, loan capital, lines of credit, or joint pay agreements to secure loans, supplies, or letters of credit, including waiving credit that is ordinarily required. Assisted minority businesses in obtaining the same unit pricing with the bidder's suppliers in order to help minority businesses in establishing credit.

☐ **9** – **(20 pts)** Negotiated joint venture and partnership arrangements with minority businesses in order to increase opportunities for minority business participation on a public construction or repair project when possible.

☐ **10** - **(20 pts)** Provided quick pay agreements and policies to enable minority contractors and suppliers to meet cash-flow demands.

Results of Good Faith Efforts Undertaken *(you must check one box below)*

☐ No subcontractors are being used for this contracted work. Fill out Table A listing only the Prime Contractor. (This statement takes the place of State of NC Affidavit B)

☐ Subcontractors are being used. Fill out Table A and B for each trade**. Each Table B lists 3.**

☐ Subcontractors are being used. If any Table B has fewer than 3 solicitations you must also advertise in an M/WBE trade paper and indicate what source of M/WBE firms you used (*must list at least one)*. Some possible papers and sources of M/WBE firms are listed in the Instructions of this Supplement.

Name of the Trade Paper: _____

Submit proof of advertisement with package

M/WBE Sources: Source:_____ Source:_____

Submit printouts from M/WBE source(s)

Certification Statement and Affidavit of Contractor.
The below affidavit constitutes compliance with 01NCAC 30I .0308(7)(a) and (b) and takes the place of State of North Carolina Affidavits C and D.

I have read the information in this compliance supplement and all information provided to the State in this package is accurate and true to the extent of my knowledge including the calculated percentages and the good faith efforts presented herein.

_____ _____

Prime Contractor Company Name (Print) Prime Contractor Representative (Sign & Date)

SEAL

State of_____, County of _____

Subscribed and sworn to before me this _____day of _____ 20____

Notary Public _____

My Commission Expires_____

Certification of Project Owner/Funding Applicant

_____ _____

Funding Applicant (City, Town etc) Applicant Authorized Representative (Sign & Date)

_____

Division of Water Infrastructure Project Number

Table A: Prime Contractor and list of selected subcontractors

List Prime and ALL of the selected subcontractors (both DBE's and non-DBE's) being used on the project. Each Trade listed on this sheet should have a completed Table B: Subcontract Solicitation List showing the DBE firms contacted and given opportunities to bid.

Company Name (list prime first then subs)	Company Address and Phone	Trade (Above) and Price (Below)	MBE or WBE and certifying agency if applicable	(State use only) Listed in EPLS as Debarred?
		$		
		$		
		$		
		$		

Calculate M/WBE utilization as a percent (00.00%) of the prime contract. Limited to 100% even if the Prime is a DBE.

MBE and WBE subs total	**$**	
Prime Contract Price	**$**	_____%

Note: Table A substitutes for both the State of NC "Identification of Minority Participation" form and EPA Form 6100-4.

Table B: Subcontract Solicitation List

Table B is required if:

1) Project is Federally funded (**SRF**) OR;
2) Project is a State Reserve Project or State Emergency Loan (**SRP or SEL**) and Utilization % on Table A is less than 10%
3)

Trade: _____(enter the trade being solicited, paving, hauling etc.)

List the firm being used on the project first. If three MBE or WBE firms are not listed, additional information must be provided showing advertisements and/or sources used to identify MBE/WBE subs.

Use as many of these sheets as are necessary to cover every trade being subbed out.

Company Name	Company Address and Phone	MBE or WBE and certifying agency if applicable.	How was this firm contacted (email, letter, phone) and what was the result of the solicitation?*

*Must submit copies of emails or letters. If phone calls were made this sheet can serve as documentation of calls.

MBE/WBE (DBE) – Change or Add a Subcontractor Form

According to EPA guidance on 40 CFR 33.302

If a DBE subcontractor fails to complete work under the subcontract for any reason, the recipient must require the prime contractor to employ the six good faith efforts described in §33.301 if soliciting a replacement subcontractor.

Please provide the information below **if the subcontracted work in question was included in previously submitted good faith efforts documentation**:

Prime Contractor:			
Subcontracted work:			
Previous Subcontractor:			
Reason this firm did not complete the work:			
New subcontractor and DBE status:	☐MBE	☐WBE	☐N/A

If this is a new trade being subcontracted, or was not documented in the original Project Bid Information submittal to the State then good faith efforts to solicit a DBE firm must be documented. As the original DBE instructions indicate, please provide a Table B from those original instructions, showing all the DBE firms contacted to perform this work. If three (3) firms are not listed on Table B, then additionally you must submit proof of an advertisement in a minority trade paper and evidence that there were not three reasonably available firms in the work area. The EPA provides in 33.301(a) that good faith efforts are to be carried out "…to the fullest extent practicable…". If solicitations were not carried out due to being impracticable, please attach this explanation to this form.

Please follow the steps below for new subcontracted work:

Indicate the new trade being subcontracted:			
Indicate the firm being used and DBE status:	☐MBE	☐WBE	☐N/A
Attach Table B			

(For State Use) Is this sub debarred?	☐Yes	☐No

Project Owner/Applicant: _____

Project Number: _____

Signature of Prime Contractor's Representative: _____

ADVERTISEMENT FOR BIDS

Wayne Community College
WAYNE COUNTY, NORTH CAROLINA
Master Meter and Booster Pump Addition

General Notice

Wayne Community College (Owner) is requesting Bids for the construction of the following Project:

Master Meter and Booster Pump Addition
70141

Bids for the construction of the Project will be received at **Wayne Community College, Dogwood Building – Cashiers Office, 3000 Wayne Memorial Drive Goldsboro, NC 27534** until **1:30 PM (local time) on December 8, 2025**. Please note that any bids hand delivered between 1:30 PM – 2 PM on the bid opening date (12/08/25) should be delivered to the Walnut Building, room #104. At **2 PM** (local time), the Bids received will be **publicly** opened and read.

The Project includes the following Work:

This project includes the addition of a master meter, master back flow preventer, and packaged domestic and fire booster pump system and shelter. This addition also includes an extension of approximately 250 LF of water main off of Wayne Community College Entrance Drive, an addition of nine, 10-inch isolation valves, installation of a bypass check valve and vault, connection of the packaged booster system to existing power, site/pavement repairs, implementation of required erosion and sediment control measures, installation and maintenance of traffic control, and the connection to existing private water main.

Bids are requested for the following Contract: **Master Meter and Booster Pump Addition/70141**

The Project has an expected duration of **180** days.

Obtaining the Bidding Documents

The Issuing Office for the Bidding Documents is:

Timmons Group
5410 Trinity Road, Suite 102
Raleigh, NC 27607

Prospective Bidders may obtain or examine the Bidding Documents at the Issuing Office on Monday through Friday between the hours of **9:00 AM and 5:00 PM** and may obtain copies of the Bidding Documents from the Issuing Office as described below. Partial sets of Bidding Documents will not be available from the Issuing Office. Neither Owner nor Engineer will be responsible for full or partial sets of Bidding Documents, including addenda, if any, obtained from sources other than the Issuing Office.

Bidding Documents may be purchased from the Issuing Office during the hours indicated above. Cost does not include shipping charges. Upon Issuing Office's receipt of payment, printed Bidding Documents or electronic documents on compact disk will be sent via the prospective Bidder's delivery service. The shipping charge amount will depend on the shipping method chosen. Bidding Documents are available for purchase in the following formats:

Format	Cost
Bidding Documents (including Full-Size Drawings) – CASH OR CHECK ONLY	$30
Bidding Documents (including Half-Size Drawings) – CASH OR CHECK ONLY	$20
Thumb Drive containing Bidding Documents in portable document format (PDF)	$0
Instructions to download Bidding Documents in portable document format (PDF)	$0

Pre-bid Conference

A pre-bid conference for the Project will be held on **November 19, 2025** at **10 AM** at **Wayne Community College, 3000 Wayne Memorial Drive Goldsboro, NC 27534 in the Walnut Building, Room #104.** Attendance at the pre-bid conference is **highly encouraged but not required.**

Instructions to Bidders.

For all further requirements regarding bid submittal, qualifications, procedures, and contract award, refer to the Instructions to Bidders that are included in the Bidding Documents.

This Advertisement is issued by:

Owner: **Wayne Community College**
By: **Derek Hunter**
Title: **Vice President, Operations**
Date: **11/10/2025**

INSTRUCTIONS TO BIDDERS FOR CONSTRUCTION CONTRACT

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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 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.

2.04 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.

2.05 *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 **compatible with Bluebeam Revu Version 20.0.20** 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 To demonstrate Bidder's qualifications to perform the Work, after submitting its Bid and within **29** days of Owner's request, Bidder must submit the following information:

A. Written evidence establishing its qualifications such as financial data, previous experience, and present commitments.

B. A written statement that Bidder is authorized to do business in the state where the Project is located, or a written certification that Bidder will obtain such authority prior to the Effective Date of the Contract.

C. Subcontractor and Supplier qualification information.

D. Other required information regarding qualifications.

3.02 Bidder is to submit the following information with its Bid to demonstrate Bidder's qualifications to perform the Work:

A. Bidder's state or other contractor license number, if applicable.

3.03 A Bidder's failure to submit required qualification information within the times indicated may disqualify Bidder from receiving an award of the Contract.

3.04 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 **non-mandatory** pre-bid conference will be held at the time and location indicated in the Advertisement or invitation to bid. Representatives of Owner and Engineer will be present to discuss the Project. **Bidders are encouraged to attend and participate in the conference; however, attendance at this conference is not required to submit a Bid.**

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 identify the following regarding existing conditions at or adjacent to the Site:

a. Those reports 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 identified and established in the Supplementary Conditions. 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 do not identify Technical Data, the default definition of Technical Data set forth in Article 1 of the General Conditions will apply.

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. In addition to the documents regarding existing Site conditions referred to in Paragraph 5.02.A, the following other documents relating to conditions at or adjacent to the Site are known to Owner and made available to Bidders for reference:

N/A - None

B. Owner has not verified the contents of these other Site-related documents, and Bidder may not rely on the accuracy of any data or information in such documents. Bidder is responsible for any interpretation or conclusion Bidder draws from the other Site-related documents.

C. The other Site-related documents are not part of the Contract Documents.

D. Bidders are encouraged to review the other Site-related documents, but Bidders will not be held accountable for any data or information in such documents. The requirement to review and take responsibility for documentary Site information is limited to information in (1) the Contract Documents and (2) the Technical Data.

E. No other Site-related documents are available.

5.04 *Site Visit and Testing by Bidders*

A. 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 scheduled following the pre-bid conference. Maps to the Site will be available at the pre-Bid conference.

C. A Site visit is scheduled for **November 19, 2025 at 10:00 AM at Wayne Community College 3000 Wayne Memorial Drive Goldsboro, NC 27534**. 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 contact for visiting the Site: **Derek Hunter, mdhunter@waynecc.edu, 919-739-7020**. 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.

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) 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 the Engineer in writing by 5pm on December 1, 2025. Contact information and submittal procedures for such questions are as follows:

A. **Chris Petree, PE, chris.petree@timmons.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 **five (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. **Bid security must be at least 5% of the Bidder's maximum Bid price.**

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 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 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:

A. **N/A**

11.02 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.

11.03 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.

11.05 – The Contractor shall not award work to Subcontractor(s) in excess of the limits stated in SC 7.07A.

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 address and state of incorporation must be shown. The corporate seal must be affixed and attested by the corporate secretary or an assistant corporate secretary.

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 *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.

13.02 *Allowances*

A. For cash allowances the Bid price must include such amounts as the Bidder deems proper for Contractor's overhead, costs, profit, and other expenses on account of cash allowances, if any, named in the Contract Documents, in accordance with Paragraph 13.02.B of the General Conditions.

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.

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.

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.

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.

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. In the comparison of Bids, alternates will be applied in the same order of priority as listed in the Bid Form. To determine the Bid prices for purposes of comparison, Owner will announce to all bidders a "Base Bid plus alternates" budget after receiving all Bids, but prior to opening them. For comparison purposes alternates will be accepted, following the order of priority established in the Bid Form, until doing so would cause the budget to be exceeded. After determination of the Successful Bidder based on this comparative process and on the responsiveness, responsibility, and other factors set forth in these Instructions, the award may be made to said Successful Bidder on its base Bid and any combination of its additive alternate Bids for which Owner determines funds will be available at the time of award.

C. 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.

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.

BID BOND (DAMAGES FORM)

Bidder	**Surety**
Name: **[Full formal name of Bidder]** Address *(principal place of business)*: **[Address of Bidder's principal place of business]**	Name: **[Full formal name of Surety]** Address *(principal place of business)*: **[Address of Surety's principal place of business]**
Owner	**Bid**
Name: **Wayne Community College** Address *(principal place of business)*: **3000 Wayne Memorial Drive** **Goldsboro, NC 27534**	Project *(name and location)*: **Master Meter and Booster Pump Addition** **Wayne Community College Entrance Drive** **Goldsboro, NC 27534** Bid Due Date: **December 8, 2025**
Bond	
Bond Amount: **5% of Bid Amount** Date of Bond: **[Date]**	

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
_____ *(Full formal name of Bidder)*	_____ *(Full formal name of Surety) (corporate seal)*
By: _____ *(Signature)*	By: _____ *(Signature) (Attach Power of Attorney)*
Name: _____ *(Printed or typed)*	Name: _____ *(Printed or typed)*
Title: _____	Title: _____
Attest: _____ *(Signature)*	Attest: _____ *(Signature)*
Name: _____ *(Printed or typed)*	Name: _____ *(Printed or typed)*
Title: _____	Title: _____

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.

1. Bidder and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors, and assigns to pay to Owner upon default of Bidder any difference between the total amount of Bidder's Bid and the total amount of the Bid of the next lowest, responsible Bidder that submitted a responsive Bid, as determined by Owner, for the work required by the Contract Documents, provided that:

    1.1. If there is no such next Bidder, and Owner does not abandon the Project, then Bidder and Surety shall pay to Owner the bond amount set forth on the face of this Bond, and

    1.2. In no event will Bidder's and Surety's obligation hereunder exceed the bond amount set forth on the face of this Bond.

    1.3. Recovery 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 will not in the aggregate exceed 120 days from 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 must 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.

ARTICLE 1—GENERAL INFORMATION

1.01 Provide contact information for the Business:

Legal Name of Business:			
Corporate Office			
Name:		Phone number:	
Title:		Email address:	
Business address of corporate office:			
Local Office			
Name:		Phone number:	
Title:		Email address:	
Business address of local office:			

1.02 Provide information on the Business's organizational structure:

Form of Business:	☐ Sole Proprietorship ☐ Partnership ☐ Corporation		
☐ Limited Liability Company ☐ Joint Venture comprised of the following companies:			
	1.		
	2.		
	3.		
Provide a separate Qualification Statement for each Joint Venturer.			
Date Business was formed:		State in which Business was formed:	
Is this Business authorized to operate in the Project location?		☐ Yes ☐ No ☐ Pending	

1.03 Identify all businesses that own Business in whole or in part (25% or greater), or that are wholly or partly (25% or greater) owned by Business:

Name of business:		Affiliation:	
Address:			
Name of business:		Affiliation:	
Address:			
Name of business:		Affiliation:	
Address:			

1.04 Provide information regarding the Business's officers, partners, and limits of authority.

Name:		Title:	
Authorized to sign contracts: ☐ Yes ☐ No		Limit of Authority:	$
Name:		Title:	
Authorized to sign contracts: ☐ Yes ☐ No		Limit of Authority:	$
Name:		Title:	
Authorized to sign contracts: ☐ Yes ☐ No		Limit of Authority:	$
Name:		Title:	

ARTICLE 2—LICENSING

2.01 Provide information regarding licensure for Business:

Name of License:			
Licensing Agency:			
License No:		Expiration Date:	
Name of License:			
Licensing Agency:			
License No:		Expiration Date:	

ARTICLE 3—DIVERSE BUSINESS CERTIFICATIONS

3.01 Provide information regarding Business's Diverse Business Certification, if any. Provide evidence of current certification.

Certification	Certifying Agency	Certification Date
☐ Disadvantaged Business Enterprise		
☐ Minority Business Enterprise		
☐ Woman-Owned Business Enterprise		
☐ Small Business Enterprise		
☐ Disabled Business Enterprise		
☐ Veteran-Owned Business Enterprise		
☐ Service-Disabled Veteran-Owned Business		
☐ HUBZone Business (Historically Underutilized) Business		
☐ Other		
☐ None		

ARTICLE 4—SAFETY

4.01 Provide information regarding Business's safety organization and safety performance.

Name of Business's Safety Officer:		
Safety Certifications		
Certification Name	Issuing Agency	Expiration

4.02 Provide Worker's Compensation Insurance Experience Modification Rate (EMR), Total Recordable Frequency Rate (TRFR) for incidents, and Total Number of Recorded Manhours (MH) for the last 3 years and the EMR, TRFR, and MH history for the last 3 years of any proposed Subcontractor(s) that will provide Work valued at 10% or more of the Contract Price. Provide documentation of the EMR history for Business and Subcontractor(s).

Year									
Company	EMR	TRFR	MH	EMR	TRFR	MH	EMR	TRFR	MH

ARTICLE 5—FINANCIAL

5.01 Provide information regarding the Business's financial stability. Provide the most recent audited financial statement, and if such audited financial statement is not current, also provide the most current financial statement.

Financial Institution:		
Business address:		
Date of Business's most recent financial statement:		☐ Attached
Date of Business's most recent audited financial statement:		☐ Attached
Financial indicators from the most recent financial statement		
Contractor's Current Ratio (Current Assets ÷ Current Liabilities)		
Contractor's Quick Ratio ((Cash and Cash Equivalents + Accounts Receivable + Short Term Investments) ÷ Current Liabilities)		

ARTICLE 6—SURETY INFORMATION

6.01 Provide information regarding the surety company that will issue required bonds on behalf of the Business, including but not limited to performance and payment bonds.

Surety Name:			
Surety is a corporation organized and existing under the laws of the state of:			
Is surety authorized to provide surety bonds in the Project location?	☐ Yes ☐ No		
Is surety listed in "Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies" published in Department Circular 570 (as amended) by the Bureau of the Fiscal Service, U.S. Department of the Treasury? ☐ Yes ☐ No			
Mailing Address (principal place of business):			
Physical Address (principal place of business):			
Phone (main):		Phone (claims):	

ARTICLE 7—INSURANCE

7.01 Provide information regarding Business's insurance company(s), including but not limited to its Commercial General Liability carrier. Provide information for each provider.

Name of insurance provider, and type of policy (CLE, auto, etc.):			
Insurance Provider		Type of Policy (Coverage Provided)	
Are providers licensed or authorized to issue policies in the Project location?		☐ Yes ☐ No	
Does provider have an A.M. Best Rating of A-VII or better?		☐ Yes ☐ No	
Mailing Address (principal place of business):			
Physical Address (principal place of business):			
Phone (main):		Phone (claims):	

ARTICLE 8—CONSTRUCTION EXPERIENCE

8.01 Provide information that will identify the overall size and capacity of the Business.

Average number of current full-time employees:	
Estimate of revenue for the current year:	
Estimate of revenue for the previous year:	

8.02 Provide information regarding the Business's previous contracting experience.

Years of experience with projects like the proposed project:				
As a general contractor:		As a joint venturer:		
Has Business, or a predecessor in interest, or an affiliate identified in Paragraph 1.03:				
Been disqualified as a bidder by any local, state, or federal agency within the last 5 years? ☐ Yes ☐ No				
Been barred from contracting by any local, state, or federal agency within the last 5 years? ☐ Yes ☐ No				
Been released from a bid in the past 5 years? ☐ Yes ☐ No				
Defaulted on a project or failed to complete any contract awarded to it? ☐ Yes ☐ No				
Refused to construct or refused to provide materials defined in the contract documents or in a change order? ☐ Yes ☐ No				
Been a party to any currently pending litigation or arbitration? ☐ Yes ☐ No				
Provide full details in a separate attachment if the response to any of these questions is Yes.				

8.03 List all projects currently under contract in Schedule A and provide indicated information.

8.04 List a minimum of three and a maximum of six projects completed in the last 5 years in Schedule B and provide indicated information to demonstrate the Business's experience with projects similar in type and cost of construction.

8.05 In Schedule C, provide information on key individuals whom Business intends to assign to the Project. Provide resumes for those individuals included in Schedule C. Key individuals include the Project Manager, Project Superintendent, Quality Manager, and Safety Manager. Resumes may be provided for Business's key leaders as well.

ARTICLE 9—REQUIRED ATTACHMENTS

9.01 Provide the following information with the Statement of Qualifications:

A. If Business is a Joint Venture, separate Qualifications Statements for each Joint Venturer, as required in Paragraph 1.02.

B. Diverse Business Certifications if required by Paragraph 3.01.

C. Certification of Business's safety performance if required by Paragraph 4.02.

D. Financial statements as required by Paragraph 5.01.

E. Attachments providing additional information as required by Paragraph 8.02.

F. Schedule A (Current Projects) as required by Paragraph 8.03.

G. Schedule B (Previous Experience with Similar Projects) as required by Paragraph 8.04.

H. Schedule C (Key Individuals) and resumes for the key individuals listed, as required by Paragraph 8.05.

I. Additional items as pertinent.

This Statement of Qualifications is offered by:

Business: _____
(typed or printed name of organization)

By: _____
(individual's signature)

Name: _____
(typed or printed)

Title: _____
(typed or printed)

Date: _____
(date signed)

(If Business is a corporation, a partnership, or a joint venture, attach evidence of authority to sign.)

Attest: _____
(individual's signature)

Name: _____
(typed or printed)

Title: _____
(typed or printed)

Address for giving notices:

_____

_____

_____

Designated Representative:

Name: _____
(typed or printed)

Title: _____
(typed or printed)

Address:

_____

_____

_____

Phone: _____

Email: _____

Schedule A—Current Projects

Name of Organization					
Project Owner			Project Name		
General Description of Project					
Project Cost			Date Project		
Key Project Personnel	Project Manager	Project Superintendent		Safety Manager	Quality Control Manager
Name					
Reference Contact Information (listing names indicates approval to contacting the names individuals as a reference)					
	Name	Title/Position	Organization	Telephone	Email
Owner					
Designer					
Construction Manager					

Project Owner			Project Name		
General Description of Project					
Project Cost			Date Project		
Key Project Personnel	Project Manager	Project Superintendent		Safety Manager	Quality Control Manager
Name					
Reference Contact Information (listing names indicates approval to contacting the names individuals as a reference)					
	Name	Title/Position	Organization	Telephone	Email
Owner					
Designer					
Construction Manager					

Project Owner			Project Name		
General Description of Project					
Project Cost			Date Project		
Key Project Personnel	Project Manager	Project Superintendent		Safety Manager	Quality Control Manager
Name					
Reference Contact Information (listing names indicates approval to contacting the names individuals as a reference)					
	Name	Title/Position	Organization	Telephone	Email
Owner					
Designer					
Construction Manager					

Schedule B—Previous Experience with Similar Projects

Name of Organization				
Project Owner		Project Name		
General Description of Project				
Project Cost		Date Project		
Key Project Personnel	Project Manager	Project Superintendent	Safety Manager	Quality Control Manager
Name				

Reference Contact Information (listing names indicates approval to contacting the names individuals as a reference)

	Name	Title/Position	Organization	Telephone	Email
Owner					
Designer					
Construction Manager					

Project Owner		Project Name		
General Description of Project				
Project Cost		Date Project		
Key Project Personnel	Project Manager	Project Superintendent	Safety Manager	Quality Control Manager
Name				

Reference Contact Information (listing names indicates approval to contacting the names individuals as a reference)

	Name	Title/Position	Organization	Telephone	Email
Owner					
Designer					
Construction Manager					

Project Owner		Project Name		
General Description of Project				
Project Cost		Date Project		
Key Project Personnel	Project Manager	Project Superintendent	Safety Manager	Quality Control Manager
Name				

Reference Contact Information (listing names indicates approval to contacting the names individuals as a reference)

	Name	Title/Position	Organization	Telephone	Email
Owner					
Designer					
Construction Manager					

Schedule B—Previous Experience with Similar Projects

Name of Organization				
Project Owner		Project Name		
General Description of Project				
Project Cost		Date Project		
Key Project Personnel	Project Manager	Project Superintendent	Safety Manager	Quality Control Manager
Name				

Reference Contact Information (listing names indicates approval to contacting the names individuals as a reference)

	Name	Title/Position	Organization	Telephone	Email
Owner					
Designer					
Construction Manager					

Project Owner		Project Name		
General Description of Project				
Project Cost		Date Project		
Key Project Personnel	Project Manager	Project Superintendent	Safety Manager	Quality Control Manager
Name				

Reference Contact Information (listing names indicates approval to contacting the names individuals as a reference)

	Name	Title/Position	Organization	Telephone	Email
Owner					
Designer					
Construction Manager					

Project Owner		Project Name		
General Description of Project				
Project Cost		Date Project		
Key Project Personnel	Project Manager	Project Superintendent	Safety Manager	Quality Control Manager
Name				

Reference Contact Information (listing names indicates approval to contacting the names individuals as a reference)

	Name	Title/Position	Organization	Telephone	Email
Owner					
Designer					
Construction Manager					

Schedule C—Key Individuals

Project Manager			
Name of individual			
Years of experience as project manager			
Years of experience with this organization			
Number of similar projects as project manager			
Number of similar projects in other positions			
Current Project Assignments			
Name of assignment		Percent of time used for this project	Estimated project completion date
Reference Contact Information (listing names indicates approval to contact named individuals as a reference)			
Name		Name	
Title/Position		Title/Position	
Organization		Organization	
Telephone		Telephone	
Email		Email	
Project		Project	
Candidate's role on project		Candidate's role on project	

Project Superintendent			
Name of individual			
Years of experience as project superintendent			
Years of experience with this organization			
Number of similar projects as project superintendent			
Number of similar projects in other positions			
Current Project Assignments			
Name of assignment		Percent of time used for this project	Estimated project completion date
Reference Contact Information (listing names indicates approval to contact named individuals as a reference)			
Name		Name	
Title/Position		Title/Position	
Organization		Organization	
Telephone		Telephone	
Email		Email	
Project		Project	
Candidate's role on project		Candidate's role on project	

Safety Manager			
Name of individual			
Years of experience as project manager			
Years of experience with this organization			
Number of similar projects as project manager			
Number of similar projects in other positions			
Current Project Assignments			
Name of assignment		Percent of time used for this project	Estimated project completion date
Reference Contact Information (listing names indicates approval to contact named individuals as a reference)			
Name		Name	
Title/Position		Title/Position	
Organization		Organization	
Telephone		Telephone	
Email		Email	
Project		Project	
Candidate's role on project		Candidate's role on project	

Quality Control Manager			
Name of individual			
Years of experience as project superintendent			
Years of experience with this organization			
Number of similar projects as project superintendent			
Number of similar projects in other positions			
Current Project Assignments			
Name of assignment		Percent of time used for this project	Estimated project completion date
Reference Contact Information (listing names indicates approval to contact named individuals as a reference)			
Name		Name	
Title/Position		Title/Position	
Organization		Organization	
Telephone		Telephone	
Email		Email	
Project		Project	
Candidate's role on project		Candidate's role on project	

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

This Agreement is by and between **Wayne Community College** ("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: *This project includes the addition of a master meter, master back flow preventer, and packaged domestic and fire booster pump system and shelter. This addition also includes an extension of approximately 250 LF of water main off of Wayne Community College Entrance Drive, an addition of nine, 10-inch isolation valves, installation of a bypass check valve and vault, connection of the packaged booster system to existing power, site/pavement repairs, implementation of required erosion and sediment control measures, installation and maintenance of traffic control, and the connection to existing private water main.*

ARTICLE 2—THE PROJECT

2.01 The project, of which the work under the contract documents is a part, is generally described as follows: *This project includes the addition of a master meter, master back flow preventer, and packaged domestic and fire booster pump system and shelter. This addition also includes an extension of approximately 250 LF of water main off of Wayne Community College Entrance Drive, an addition of nine, 10-inch isolation valves, installation of a bypass check valve and vault, connection of the packaged booster system to existing power, site/pavement repairs, implementation of required erosion and sediment control measures, installation and maintenance of traffic control, and the connection to existing private water main.*

ARTICLE 3—ENGINEER

3.01 The Owner has retained **Timmons Group** ("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 Substantial Completion and completion and readiness for final payment as stated in the Contract Documents are of the essence of the Contract.

4.03 *Contract Times: Days*

A. The Work will be substantially complete within **150** 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 **180** days after the date when the Contract Times commence to run.

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 $**250** 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 $**250** for each day that expires after such time until the Work is completed and ready for final payment.

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.

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 $**[number]**.

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**
				$	$
				$	$
				$	$
				$	$
				$	$
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. Total of Lump Sum Amount and Unit Price Work (subject to final Unit Price adjustment) $**[number]**.

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 **25th** 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.

a. **95** percent of the value of the Work completed (with the balance being retainage).

b. **95** percent of cost of materials and equipment not incorporated in the Work (with the balance being retainage).

B. Upon Substantial Completion **of the entire construction to be provided under the construction Contract Documents**, Owner shall pay an amount sufficient to increase total payments to Contractor to **100** percent of the Work completed, less such amounts set off by Owner pursuant to Paragraph 15.01.E of the General Conditions, and less **200** 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 **18** 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 (copy of list attached).
6. Drawings listed on the attached sheet index.
8. Addenda (numbers **[number]** to **[number]**, 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.
    e. Warranty Bond, if any.

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.

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), or in the Supplementary Conditions.

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

This Agreement will be effective on **[indicate date on which Contract becomes effective]** (which is the Effective Date of the Contract).

Owner:	Contractor:
_____	_____
(typed or printed name of organization)	*(typed or printed name of organization)*
By: _____	By: _____
(individual's signature)	*(individual's signature)*
Date: _____	Date: _____
(date signed)	*(date signed)*
Name: _____	Name: _____
(typed or printed)	*(typed or printed)*
Title: _____	Title: _____
(typed or printed)	*(typed or printed)*
	*(If **[Type of Entity]** is a corporation, a partnership, or a joint venture, attach evidence of authority to sign.)*
Attest: _____	Attest: _____
(individual's signature)	*(individual's signature)*
Title: _____	Title: _____
(typed or printed)	*(typed or printed)*
Address for giving notices:	Address for giving notices:
_____	_____
_____	_____
_____	_____
Designated Representative:	Designated Representative:
Name: _____	Name: _____
(typed or printed)	*(typed or printed)*
Title: _____	Title: _____
(typed or printed)	*(typed or printed)*
Address:	Address:
_____	_____
_____	_____
_____	_____
Phone: _____	Phone: _____
Email: _____	Email: _____
*(If **[Type of Entity]** is a corporation, attach evidence of authority to sign. If **[Type of Entity]** is a public body, attach evidence of authority to sign and resolution or other documents authorizing execution of this Agreement.)*	License No.: _____
	(where applicable)
	State: _____

NOTICE TO PROCEED

Owner:	Wayne Community College	Owner's Project No.:	
Engineer:	Timmons Group	Engineer's Project No.:	70141
Contractor:		Contractor's Project No.:	
Project:	Master Meter and Booster Pump Addition		
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:

> The number of days to achieve Substantial Completion is **150** from the date stated above for the commencement of the Contract Times, resulting in a date for Substantial Completion of **[date, calculated from commencement date above]**; and the number of days to achieve readiness for final payment is **365** from the commencement date of the Contract Times, resulting in a date for readiness for final payment of **[date, calculated from commencement date above]**.

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

> **Notify Owner and Fire Department of anticipated date of first equipment and/or material arriving at the site.**

Owner:	**Wayne Community College**
By *(signature)*:	
Name *(printed)*:	
Title:	
Date Issued:	

Contractor:	
By *(signature)*:	
Name *(printed)*:	
Title:	
Date Signed:	

Copy: Engineer

PERFORMANCE BOND

Contractor Name: **[Full formal name of Contractor]** Address *(principal place of business)*: **[Address of Contractor's principal place of business]**	**Surety** Name: **[Full formal name of Surety]** Address *(principal place of business)*: **[Address of Surety's principal place of business]**
Owner Name: **Wayne Community College** Mailing address *(principal place of business)*: **3000 Wayne Memorial Drive** **Goldsboro, NC 27534**	**Contract** Description *(name and location)*: **Master Meter and Booster Pump Addition** **Wayne Community College Entrance Drive** **Goldsboro, NC 27534** Contract Price: **[Amount from Contract]** Effective Date of Contract: **[Date from Contract]**

Bond

Bond Amount: **[Amount]**

Date of Bond: **[Date]**

(Date of Bond cannot be earlier than Effective Date of Contract)

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
_____ *(Full formal name of Contractor)*	_____ *(Full formal name of Surety) (corporate seal)*
By: _____ *(Signature)*	By: _____ *(Signature)(Attach Power of Attorney)*
Name: _____ *(Printed or typed)*	Name: _____ *(Printed or typed)*
Title: _____	Title: _____
Attest: _____ *(Signature)*	Attest: _____ *(Signature)*
Name: _____ *(Printed or typed)*	Name: _____ *(Printed or typed)*
Title: _____	Title: _____

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.

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	**Surety**
Name: **[Full formal name of Contractor]** Address *(principal place of business)*: **[Address of Contractor's principal place of business]**	Name: **[Full formal name of Surety]** Address *(principal place of business)*: **[Address of Surety's principal place of business]**
Owner	**Contract**
Name: **Wayne Community College** Mailing address *(principal place of business)*: **3000 Wayne Memorial Drive** **Goldsboro, NC 27534**	Description *(name and location)*: **Master Meter and Booster Pump Addition** **Wayne Community College Entrance Drive** **Goldsboro, NC 27534** Contract Price: **[Amount, from Contract]** Effective Date of Contract: **[Date, from Contract]**

Bond

Bond Amount: **[Amount]**

Date of Bond: **[Date]**

(Date of Bond cannot be earlier than Effective Date of Contract)

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
_____ *(Full formal name of Contractor)*	_____ *(Full formal name of Surety) (corporate seal)*
By: _____ *(Signature)*	By: _____ *(Signature)(Attach Power of Attorney)*
Name: _____ *(Printed or typed)*	Name: _____ *(Printed or typed)*
Title: _____	Title: _____
Attest: _____ *(Signature)*	Attest: _____ *(Signature)*
Name: _____ *(Printed or typed)*	Name: _____ *(Printed or typed)*
Title: _____	Title: _____

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.

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.**

CERTIFICATE OF SUBSTANTIAL COMPLETION

Owner:	Wayne Community College	Owner's Project No.:	
Engineer:	Timmons Group	Engineer's Project No.:	70141
Contractor:		Contractor's Project No.:	
Project:	Master Meter and Booster Pump Addition		
Contract Name:			

This ☐ Preliminary ☐ Final Certificate of Substantial Completion applies to:

☐ All Work ☐ The following specified portions of the Work:

[Describe the portion of the work for which Certificate of Substantial Completion is issued]

Date of Substantial Completion: **[Enter date, as determined by Engineer]**

The Work to which this Certificate applies has been inspected by authorized representatives of Owner, Contractor, and Engineer, and found to be substantially complete. The Date of Substantial Completion of the Work or portion thereof designated above is hereby established, subject to the provisions of the Contract pertaining to Substantial Completion. The date of Substantial Completion in the final Certificate of Substantial Completion marks the commencement of the contractual correction period and applicable warranties required by the Contract.

A punch list of items to be completed or corrected is attached to this Certificate. This list may not be all-inclusive, and the failure to include any items on such list does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents.

Amendments of contractual responsibilities recorded in this Certificate should be the product of mutual agreement of Owner and Contractor; see Paragraph 15.03.D of the General Conditions.

The responsibilities between Owner and Contractor for security, operation, safety, maintenance, heat, utilities, insurance, and warranties upon Owner's use or occupancy of the Work must be as provided in the Contract, except as amended as follows:

Amendments to Owner's Responsibilities: ☐ None ☐ As follows:

[List amendments to Owner's Responsibilities]

Amendments to Contractor's Responsibilities: ☐ None ☐ As follows:

[List amendments to Contractor's Responsibilities]

The following documents are attached to and made a part of this Certificate:

[List attachments such as punch list; other documents]

This Certificate does not constitute an acceptance of Work not in accordance with the Contract Documents, nor is it a release of Contractor's obligation to complete the Work in accordance with the Contract Documents.

Engineer

By *(signature)*: _____

Name *(printed)*: _____

Title: _____

NOTICE OF ACCEPTABILITY OF WORK

Owner:	Wayne Community College	Owner's Project No.:	
Engineer:	Timmons Group	Engineer's Project No.:	70141
Contractor:		Contractor's Project No.:	
Project:	Master Meter and Booster Pump Addition		
Contract Name:			
Notice Date:	**[Effective Date of the Construction Contract]**		

The Engineer hereby gives notice to the Owner and Contractor that Engineer recommends final payment to Contractor, and that the Work furnished and performed by Contractor under the Construction Contract is acceptable, expressly subject to the provisions of the Construction Contract's Contract Documents ("Contract Documents") and of the Agreement between Owner and Engineer for Professional Services dated **XXXXXXX** ("Owner-Engineer Agreement"). This Notice of Acceptability of Work (Notice) is made expressly subject to the following terms and conditions to which all who receive and rely on said Notice agree:

1. This Notice has been prepared with the skill and care ordinarily used by members of the engineering profession practicing under similar conditions at the same time and in the same locality.
2. This Notice reflects and is an expression of the Engineer's professional opinion.
3. This Notice has been prepared to the best of Engineer's knowledge, information, and belief as of the Notice Date.
4. This Notice is based entirely on and expressly limited by the scope of services Engineer has been employed by Owner to perform or furnish during construction of the Project (including observation of the Contractor's Work) under the Owner-Engineer Agreement, and applies only to facts that are within Engineer's knowledge or could reasonably have been ascertained by Engineer as a result of carrying out the responsibilities specifically assigned to Engineer under such Owner-Engineer Agreement.
5. This Notice is not a guarantee or warranty of Contractor's performance under the Construction Contract, an acceptance of Work that is not in accordance with the Contract Documents, including but not limited to defective Work discovered after final inspection, nor an assumption of responsibility for any failure of Contractor to furnish and perform the Work thereunder in accordance with the Contract Documents, or to otherwise comply with the Contract Documents or the terms of any special guarantees specified therein.
6. This Notice does not relieve Contractor of any surviving obligations under the Construction Contract, and is subject to Owner's reservations of rights with respect to completion and final payment.

Engineer

By *(signature)*: _____

Name *(printed)*: _____

Title: _____

STANDARD GENERAL CONDITIONS OF THE CONSTRUCTION CONTRACT

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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, 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 printed copies of the Contract (including one fully signed counterpart of the Agreement), and one copy in electronic portable document format (PDF). 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 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 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, the cost of all of the following are 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 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 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 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 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, 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, and limitations on the responsibilities thereof will be as provided in the Supplementary Conditions 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.

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. 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, expediters, 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 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;

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 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

These Supplementary Conditions amend or supplement the Standard General Conditions of the Construction Contract, EJCDC® C-700 (2013 Edition). All provisions that are not so amended or supplemented remain in full force and effect.

The terms used in these Supplementary Conditions have the meanings stated in the General Conditions. Additional terms used in these Supplementary Conditions have the meanings stated below, which are applicable to both the singular and plural thereof.

The address system used in these Supplementary Conditions is the same as the address system used in the General Conditions, with the prefix "SC" added thereto.

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ARTICLE 1 – DEFINITIONS AND TERMINOLOGY

SC-1.01 Defined Terms

SC-1.01.A.3 Add the following language to the end of Paragraph 1.01.A.3:

The Application for Payment Form to be used on this Project is EJCDC C-620.

SC-1.01.A.8 Add the following language to the end of Paragraph 1.01.A.8:

The Change Order Form to be used on this Project is EJCDC C-941.

ARTICLE 3 – DOCUMENTS: INTENT, REQUIREMENTS, REUSE

SC-3.01 Intent

SC-3.01 Add the following new paragraphs immediately after Paragraph 3.01.E:

F. It is the intent of the Contract Documents to obtain an operable Project. Equipment, components, systems, etc., therein shall be made operable by the Contractor.

G. The Contract Drawings may be supplemented from time to time with additional Drawings by the Engineer as may be required to illustrate the work or, as the work progresses, with additional Drawings, by the Contractor, subject to the approval of the Engineer. Supplementary Drawings, when issued by the Engineer or by the Contractor, after approval by the Engineer, shall be furnished in sufficient quantity to all those who, in the opinion of the Engineer, are affected by such Drawings.

ARTICLE 4 – COMMENCEMENT AND PROGRESS OF THE WORK

SC-4.05 Delays in Contractor's Progress

SC-4.05.H Add the following new paragraph immediately after Paragraph 4.05.G:

H. Time extensions for weather delays due to rain shall only be considered for above average precipitation. Average precipitation shall be derived from the most recent 30-year average data for the nearest NOAA weather reporting station. Average precipitation shall be the mean number of days of precipitation per month of 0.10 inch or more. The Contract Period shall be extended the number of days of 0.10 inch of precipitation the Contractor could not work that exceed the mean number of days of 0.10 inch of rain on a monthly basis.

ARTICLE 5 – AVAILABILITY OF LANDS; SUBSURFACE AND PHYSICAL CONDITIONS; HAZARDOUS ENVIRONMENTAL CONDITIONS

SC-5.03 Subsurface and Physical Conditions

SC-5.03 Add the following new paragraphs immediately after Paragraph 5.03.B:

C. The following reports of explorations, investigations of existing conditions, and tests of subsurface conditions at or adjacent to the Site are known to Owner:

1. None.

SC-5.05 Underground Facilities

SC-5.05.A.2 Add the following new paragraphs immediately after Paragraph 5.05.A.2.d:

e. following the North Carolina General Statues, Chapter 87, Article 8 Underground Damage Prevention.

f. notifying Owners of underground facilities prior to start of Work.

g. investigating ahead of the Work to verify the existence of Underground Facilities.

h. assuming risks and repairing damage caused by the Work to existing Underground Facilities whether indicated or not in the Contract Documents. Repairs to Underground Facilities shall be done to the satisfaction of the Underground Facility Owner and may require material and methods, which are better than the existing Facility. Underground Facility Owner reserves the right to repair damage by the Contractor to their underground Facilities. If the Owner exercises this right, the Owner's cost of this Work shall be deducted from the money due the Contractor.

i. uncovering Underground Facilities, with that Owners approval, that are located within the Work as necessary for Engineer to determine the requirements for the change in the work.

SC-5.06 Hazardous Environmental Conditions

SC-5.06 Delete Paragraphs 5.06.A and 5.06.B in their entirety and insert the following:

A. No reports or drawings related to Hazardous Environmental Conditions at the Site are known to Owner.

B. Not Used.

SC-5.06.I In the first line, insert “North Carolina” between “by” and “Laws”.

SC-5.06.I Add the following to the end of the paragraph:

The parties understand and acknowledge that no North Carolina case, statute, or Constitutional provision authorizes a local government to indemnify a Contractor and that this contract provision may be unenforceable.

ARTICLE 6 – BONDS AND INSURANCE

SC-6.03 Contractor’s Insurance

SC 6.03 Add the following new paragraph immediately after Paragraph 6.03.J:

K. An authorized representative of the insurance company(ies) shall certify that all of the required insurance coverages and amounts specified hereinafter are provided by the submitted policies. The certification shall be signed by the authorized representatives of the insurance company(ies) and notarized. The authorized representative of the insurance company(ies) shall specifically indicate with the submittal which of the policies submitted fulfill which specific coverage and amounts specified under Article 5.03 of the Supplementary Conditions. The certification statement and correlation shall be furnished and included with the insurance certificates.

L. One (1) copy of each such insurance policy and certificates indicating each type of coverage mentioned, and the correlation between the insurance furnished and that required, shall be filed with each of the Insured.

M. All policies relating to this Contract shall be so written that each of The Insured shall be notified by the carrier of cancellation or change at least thirty (30) days prior to the effective date of such cancellation or change and ten (10) days for non-payment of premium. Renewal certificates covering the renewal of all policies expiring during the life of the Contract shall be filed with each of The Insured not less than thirty (30) days before the expiration of such policies.

N. The insurance carrier shall notify each of The Insured of the filing of any claims within thirty (30) days of the filing of such claim.

O. The limits of liability for the insurance required by Paragraph 6.03 of the General Conditions shall provide coverage for not less than the following amounts or greater where required by Laws and Regulations:

1. Workers' Compensation, and related coverages under Paragraphs 6.03.A.1 and A.2 of the General Conditions:

State:	Statutory
Federal, if applicable (e.g., Longshoreman's):	Statutory
Jones Act coverage, if applicable:	
Bodily injury by accident, each accident	$
Bodily injury by disease, aggregate	$
Employer's Liability:	
Bodily injury, each accident	$ 500,000
Bodily injury by disease, each employee	$ 500,000
Bodily injury/disease aggregate	$ 1,000,000
For work performed in monopolistic states, stop-gap liability coverage shall be endorsed to either the worker's compensation or commercial general liability policy with a minimum limit of: $	
Foreign voluntary worker compensation	Statutory

2. Contractor's Commercial General Liability under Paragraphs 6.03.B and 6.03.C of the General Conditions:

General Aggregate	$ 2,000,000
Products - Completed Operations Aggregate	$ 1,000,000
Personal and Advertising Injury	$ 1,000,000

Each Occurrence (Bodily Injury and Property Damage) $ 1,000,000

3. Automobile Liability under Paragraph 6.03.D. of the General Conditions:

Bodily Injury:

Each person $ 1,000,000

Each accident $ 1,000,000

Property Damage:

Each accident $ 1,000,000

[or]

Combined Single Limit of $ 1,000,000

4. Excess or Umbrella Liability:

Per Occurrence $ 5,000,000

General Aggregate $ 5,000,000

5. Contractor's Pollution Liability:

Each Occurrence $ 2,000,000

General Aggregate $ 2,000,000

☐ If box is checked, Contractor is not required to provide Contractor's Pollution Liability insurance under this Contract

6. Additional Insureds: In addition to Owner and Engineer, include as additional insureds the following:

7. Contractor's Professional Liability:

Each Claim $ 2,000,000

Annual Aggregate $ 2,000,000

ARTICLE 7 – CONTRACTOR'S RESPONSIBILITIES

SC-7.01 Supervision and Superintendence

SC-7.01.C. Add the following new subparagraph immediately after Paragraph 7.01.B:

C. The resident superintendent shall supervise and have authority over all construction crews and subcontractors on site. The resident superintendent shall be on site whenever Work is in progress and shall be responsible for addressing any

construction related issues from the Owner, the Engineer, the RPR, the North Carolina Department of Transportation, the North Carolina Railroad, Duke Energy, and any other right-of-way and utility owners.

SC-7.02 Labor; Working Hours

SC-7.02.B. Add the following new subparagraphs immediately after Paragraph 7.02.B:

1. Regular working hours will be 8:00 AM to 5:00 PM. From the hours of 7:00 AM to 8:00 AM Contractor will be allowed to set up and prepare to perform Work. Form the hours of 5:00 PM to 6:00 PM Contractor will be allowed to move equipment and materials to close-up for the day and prepare for the next day's Work, install and maintain erosion control, and restore and cleanup the site.

SC-7.02 Add the following new paragraphs immediately after Paragraph 7.02.B:

C. If Contractor is permitted by Owner to Work outside regular hours and on weekends and holidays, whether by a contractual provision or by Owner's consent during the course of the Project, Contractor shall be responsible for the cost of any overtime pay or other expense incurred by the Owner for Engineer's services (including those of the Resident Project Representative, if any), Owner's representative, and construction observation services, occasioned by the performance of Work on Saturday, Sunday, any legal holiday, or as overtime on any regular work day. If Contractor is responsible but does not pay, or if the parties are unable to agree as to the amount owed, then Owner may impose a reasonable set-off against payments due under Article 15.

D. The above will not prevent the Contractor from working outside the above time that will not require the inspector to be present. Such work may include; start up, clean up, seeding, painting (after the base surface has been approved by the inspector), and similar items. Contractor shall obtain approval of Work to be performed outside of the above work hours.

E. If Contractor's Work requires inspection as determined by the Owner more than 10 hours in a work day or 40 hours in a work week, Monday through Friday excluding holidays, or on the weekends he shall submit a written request to the Owner five (5) working days prior to the scheduled Work. Contractor shall pay for the Resident Project Representative's time beyond the above hours and at the rate established in the Owner-Engineer Agreement.

F. Contractor shall not be charged for inspector's time for Work specifically identified by the Contract Documents to be performed outside the above Work time or on weekends.

SC-7.04 "Or Equals"

SC-704.A Edit the third sentence of Paragraph A by deleting the following:

~~Unless the specification or description contains or is followed by words reading that no like, equivalent, or "or equal" item or no substitution is permitted,~~

SC-704.C Modify the fourth sentence as follows:

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 Addendum. ~~an approved Shop Drawing or other written communication.~~

SC-7.05 Substitutes

SC-705.A Edit the first sentence of Paragraph A by deleting the following:

~~Unless the specification or description of an item of material or equipment required to be furnished under the Contract Documents contains or is followed by words reading that no substitution is permitted,~~

SC-705.B Modify the fourth sentence as follows:

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 Addendum ~~Field Order or a proposed Change Order accounting for the substitution itself and all related impacts, including changes in Contract Price or Contract Times.~~

SC-7.06 Concerning Subcontractors, Suppliers, and Others

SC-7.06 Add the following new paragraph immediately after Paragraph 7.06.O:

P. The Contractor shall not award work valued at more than fifty percent (50%) of the Contract Price to Subcontractor(s), and the Contractor shall perform at least fifty percent (50%) of the labor with its own forces, unless prior written approval is provided by the Owner.

SC-7.09 Taxes

SC-7.09 Add the following new paragraphs immediately after Paragraph 7.09.A:

B. Owner is exempt from payment of sales and compensating use taxes of the State of North Carolina and of cities and counties thereof on all materials to be incorporated into the Work. Owner's exemption does not apply to construction tools, machinery, equipment, or other property purchased by or leased by Contractor, or to supplies or materials not incorporated into the Work.

C. For the purposes of this section, "sales taxes" shall mean sales and use taxes paid to the State of North Carolina or to local governments in North Carolina.

D. Owner is entitled to a refund from the State of North Carolina for sales taxes. Reimbursable sales tax refunds covers sales and/or use taxes paid on building materials used by contractors and subcontractors in the performance of contracts with churches, orphanages, hospitals not for profit, educational institutions not operated for profit and other charitable or religious institutions or organizations not operated for profit and incorporated cities, towns and counties in this State. The

documentary evidence is to be submitted to the above-named institutions, organizations and governmental units to be included in claims for refunds to be prepared and submitted by them to obtain refunds provided by G.S. 105-164.14 and is to include the purchase of building materials, supplies, fixtures and equipment which become a part of or annexed to buildings or structures being erected, altered or repaired under contracts with such institutions, organizations or governmental units.

E. Contractor shall report sales taxes to Owner so Owner can receive reimbursement.

F. Procedures for Reporting Sales Taxes:

1. Contractor shall furnish Owner documentary evidence showing the materials used and sales tax paid by the Contractor and each of his subcontractors.

2. The documentary evidence shall be the North Carolina Reimbursable Sales and Use Tax Statement (C-627) provided in the Contracting Requirements. This evidence shall consist of a certified statement, by the Contractor and each of his subcontractors individually, showing total purchases of materials from each separate vendor and total sales taxes by each county paid each vendor. The certified statement must show the invoice number(s) covered and inclusive dates of such invoices. State sales tax shall be listed separately from county sales tax. If more than one county is shown, each county shall be listed separately. Invoices shall be provided to substantiate the information on the statement.

3. Materials used from Contractor's or subcontractor's warehouse stock shall be shown in a certified statement at warehouse stock prices.

4. Contractor shall not be required to certify subcontractor's statements.

5. All requests for payment, partial or final, must include a sales tax report submitted in accordance with the procedures outlined above.

SC-7.10 Laws and Regulations

SC-7.10 Delete Paragraph 7.10.B in its entirety and insert the following in its place:

B. If Contractor observes that the Specifications or Drawings are at variance with any Laws or Regulations, he shall give Engineer prompt written notice thereof. 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 arising therefrom. The Contractor shall, at all times, observe and comply with, and shall cause all his agents, employees, and subcontractors to observe and comply with, all Laws or Regulations, 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.

Add the following new paragraphs immediately after Paragraph 7.10.C

D. Contractor shall be responsible for compliance with the terms and requirements of permits, encroachment agreements, and occupancy agreements issued by Federal,

State, and Local regulatory agencies. Compliance with the terms and requirements listed in the permits, encroachment agreements, and occupancy agreements shall be at no additional cost to the Owner. This shall include generating and submitting any reports, designs, certifications, and other documentation that may be required as a condition of the permits, encroachment agreements, and occupancy agreements. All costs for compliance with the terms and requirements of permits, encroachment agreements, and occupancy agreements shall be included in the bid prices of applicable items. Permits, encroachment agreements, and occupancy agreements which have been obtained by the Owner are identified in SC-7.08 - Permits, Encroachment Agreements, and Occupancy Agreements and are included in the Appendices.

E. Notice of Violations

1. Should the Contractor cause the Owner to receive a Notice of Violation from a governmental agency, Contractor shall pay costs associated with Notice of Violation within ten (10) days of receipt of written notification. Costs shall include, but not be limited to:

   a. Fines imposed on the Owner by the agency.

   b. Required legal newspaper publications concerning violation.

   c. Required mailings to customers concerning notification of violation.

   d. Administrative and engineering costs associated with resolving the Notice of Violation.

2. Notice of Violations may include, but not be limited to, the following problems:

   1. Sewage spill.

   2. Inadequate erosion control measures.

   3 Equipment failure during the warranty period.

F. In the event of a sewage spill during construction, Contractor shall take the following steps as a minimum:

1. Take immediate action to contain the spill.

2. Notify the Owner and Engineer within 30 minutes of realizing a spill has occurred.

3. Clean up the spill as directed by the Owner. Contractor shall bare all costs associated with the cleanup.

SC-7.11 Record Documents

SC-7.11 Add the following new paragraph immediately after Paragraph 7.11.A:

B. Contractor shall maintain record documents daily and have the record set of documents available on site throughout the construction period. Should the Engineer or its representative determine the record documents are not maintained satisfactorily and in accordance with these Contract Documents, no approval will be made for subsequent payment requests from the Contractor until the deficiency is corrected to the satisfaction of the Engineer.

SC-7.12 Safety and Protection

SC-7.12 Insert the following after the second sentence of Paragraph 7.12.C:

The following Owner safety programs are applicable to the Work: this project requires the use of cranes and other lifting equipment. The contractor will submit a lift plan for the project detailing applicable safety processes and procedures. Components of a lift plan include, but are not limited to:

- Details of the load;
- Lifting equipment and gears;
- Lifting crew (including their roles and competencies);
- Lifting method;
- Requirements to erect or dismantle lifting equipment (if any);
- Means of communications;
- Physical and environmental conditions;
- Sketch of the lifting zone (showing position of lifting equipment, crew and load); and
- Any other important information (e.g., special precautions).

SC-7.16 Shop Drawings, Samples, and Other Submittals

SC-7.16.D Replace the first sentence with the following:

Submittals shall be transmitted to the Engineer in sufficient time to allow the Engineer fifteen working days for review and processing for pipeline projects and twenty working days for review and processing for pump station and facility projects.

SC-7.17 Contractor's General Warranty and Guarantee

SC-7.17.A Add the following immediately after the first sentence:

All materials or equipment delivered to the site shall be accompanied by certificates, signed by an authorized officer of the supplier, and notarized guaranteeing that the materials or equipment conform to specification requirements. Such certificates shall be immediately turned over to the Engineer. Materials or equipment delivered to the site without such certificates will be subject to rejection.

SC-7.18 Indemnification

SC-7.18.A In the first sentence, insert "civil penalties, fines," after "costs".

Add the following sentence to the end of paragraph 7.18.A:

Nothing in the Contract Documents shall create or give to third parties any claim or right of action against the Contractor, the Owner or the Engineer beyond such as may legally exist irrespective of the Contract."

ARTICLE 9 – OWNER'S RESPONSIBILITIES

SC-9.02 Replacement of Engineer

SC-9.02 Delete Paragraph 9.02 in its entirety and insert the following in its place:

A. Owner may at its discretion appoint an engineer to replace Engineer. The replacement engineer's status under the Contract Documents shall be that of the former Engineer.

ARTICLE 10 – ENGINEER'S STATUS DURING CONSTRUCTION

SC-10.01 Owner's Representative

SC-10.01.A Delete Paragraph 10.01.A in its entirety and insert the following in its place:

A. Engineer will be the Owner's representative during the construction period. His instructions shall be carried out promptly and efficiently.

SC-10.03 Project Representative

SC-10.03 Add the following new paragraphs immediately after Paragraph 10.03.A:

B. The Resident Project Representative (RPR) will be Engineer's representative at the Site, will act as directed by and under the supervision of Engineer, and will confer with Engineer regarding RPR's actions.

1. General: RPR's dealings in matters pertaining to the Work in general shall be with Engineer and Contractor. RPR's dealings with Subcontractors shall only be through or with the full knowledge and approval of Contractor. RPR shall generally communicate with Owner only with the knowledge of and under the direction of Engineer.
2. Conferences and Meetings: Attend meetings with Contractor, such as preconstruction conferences, progress meetings, job conferences, and other Project-related meetings.
3. Liaison:
    a. Serve as Engineer's liaison with Contractor. Working principally through Contractor's authorized representative or designee, assist in providing information regarding the provisions and intent of the Contract Documents.
    b. Assist Engineer in serving as Owner's liaison with Contractor when Contractor's operations affect Owner's on-Site operations.
    c. Assist in obtaining from Owner additional details or information, when required for proper execution of the Work.
4. Interpretation of Contract Documents: Report to Engineer when clarifications and interpretations of the Contract Documents are needed and transmit to Contractor clarifications and interpretations as issued by Engineer.
5. Shop Drawings and Samples: Advise Engineer and Contractor of the commencement of any portion of the Work requiring a Shop Drawing or Sample

submittal for which RPR believes that the submittal has not been approved by Engineer.

6. Modifications: Consider and evaluate Contractor's suggestions for modifications in Drawings or Specifications and report such suggestions, together with RPR's recommendations, if any, to Engineer. Transmit to Contractor in writing decisions as issued by Engineer.

7. Review of Work and Rejection of Defective Work:

    a. Conduct on-Site observations of Contractor's work in progress to assist Engineer in determining if the Work is in general proceeding in accordance with the Contract Documents.

    b. Report to Engineer whenever RPR believes that any part of Contractor's work in progress is defective, will not produce a completed Project that conforms generally to the Contract Documents, or will imperil the integrity of the design concept of the completed Project as a functioning whole as indicated in the Contract Documents, or has been damaged, or does not meet the requirements of any inspection, test or approval required to be made; and advise Engineer of that part of work in progress that RPR believes should be corrected or rejected or should be uncovered for observation, or requires special testing, inspection or approval.

9. Inspections, Tests, and System Start-ups:

    a. Verify that tests, equipment, and systems start-ups and operating and maintenance training are conducted in the presence of appropriate Owner's personnel, and that Contractor maintains adequate records thereof.

    b. Observe, record, and report to Engineer appropriate details relative to the test procedures and systems start-ups.

10. Records:

    a. Prepare a daily report or keep a diary or log book, recording Contractor's hours on the Site, Subcontractors present at the Site, weather conditions, data relative to questions of Change Orders, Field Orders, Work Change Directives, or changed conditions, Site visitors, deliveries of equipment or materials, daily activities, decisions, work accomplished, observations in general, and specific observations in more detail as in the case of observing test procedures; and send copies to Engineer.

    b. Record names, addresses, fax numbers, e-mail addresses, web site locations, and telephone numbers of all Contractors, Subcontractors, and major Suppliers of materials and equipment.

    c. Maintain records for use in preparing Project documentation.

11. Reports:

    a. Furnish to Engineer periodic reports as required of progress of the Work and of Contractor's compliance with the Progress Schedule and schedule of Shop Drawing and Sample submittals.

b. Draft and recommend to Engineer proposed Change Orders, Work Change Directives, and Field Orders. Obtain backup material from Contractor.

c. Immediately notify Engineer of the occurrence of any Site accidents, emergencies, acts of God endangering the Work, force majeure or delay events, damage to property by fire or other causes, or the discovery of any Constituent of Concern or Hazardous Environmental Condition.

12. Payment Requests: Review applications for payment with Contractor for compliance with the established procedure for their submission and forward with recommendations to Engineer, noting particularly the relationship of the payment requested to the Schedule of Values, Work completed, and materials and equipment delivered at the Site but not incorporated in the Work.

13. Certificates, Operation and Maintenance Manuals: During the course of the Work, verify that materials and equipment certificates, operation and maintenance manuals and other data required by the Contract Documents to be assembled and furnished by Contractor are applicable to the items actually installed and in accordance with the Contract Documents, and have these documents delivered to Engineer for review and forwarding to Owner prior to payment for that part of the Work.

14. Completion:

a. Participate in Engineer's visits to the Site to determine Substantial Completion, assist in the determination of Substantial Completion and the preparation of a punch list of items to be completed or corrected.

b. Participate in Engineer's final visit to the Site to determine completion of the Work, in the company of Owner and Contractor, and prepare a final punch list of items to be completed and deficiencies to be remedied.

c. Observe whether all items on the final list have been completed or corrected and make recommendations to Engineer concerning acceptance and issuance of the notice of acceptability of the work.

C. The RPR shall not:

1. Authorize any deviation from the Contract Documents or substitution of materials or equipment (including "or-equal" items).

2. Exceed limitations of Engineer's authority as set forth in the Contract Documents.

3. Undertake any of the responsibilities of Contractor, Subcontractors, or Suppliers.

4. Advise on, issue directions relative to, or assume control over any aspect of the means, methods, techniques, sequences or procedures of Contractor's work.

5. Advise on, issue directions regarding, or assume control over security or safety practices, precautions, and programs in connection with the activities or operations of Owner or Contractor.

6. Participate in specialized field or laboratory tests or inspections conducted off-site by others except as specifically authorized by Engineer.

7. Accept Shop Drawing or Sample submittals from anyone other than Contractor.

8. Authorize Owner to occupy the Project in whole or in part.

ARTICLE 11 – AMENDING THE CONTRACT DOCUMENTS; CHANGES IN THE WORK

SC-11.05 Change of Contract Times

SC 11.05.C Add the following new paragraph immediately after Paragraph 11.05.B:

C. Contract time extensions for weather delays do not entitle Contractor to "extended overhead" recovery.

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

SC-14.02 Tests, Inspections, and Approvals

SC-14.02 Add the following paragraph immediately following paragraph 14.02.F:

G. Owner reserves the right to independently perform at its own expense, laboratory tests on random samples of material or performance tests on equipment delivered to the site. These tests if made will be conducted in accordance with the appropriate referenced standards or Specification requirements. The entire shipment represented by a given sample, samples or piece of equipment may be rejected on the basis of the failure of samples or pieces of equipment to meet specified test requirements. All rejected materials or equipment shall be removed from the site, whether stored or installed in the Work, and the required replacement shall be made, all at no additional cost to Owner.

SC-14.03 Defective Work

SC-14.03 Add the following paragraph immediately following paragraph 14.02.F:

G. At any time during the progress of the Work and up to the date of final acceptance, the Engineer shall have the right to reject any work which does not conform to the requirements of the Contract Documents, even though such work has been previously inspected and paid for. Any omission or failure on the part of the Engineer to disapprove or reject any Work or materials at the time of inspection shall not be construed as an acceptance of any defective work or materials.

SC-14.06 Owner May Stop the Work

SC-14.06 Amend the first sentence of Paragraph 14.06.A by inserting in the third line “or if the Work interferes with the operation of the existing facility," between “….. Contract Documents,” and “then the owner may …..”.

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

SC-15.03 Substantial Completion

SC-15.03.B Amend the first sentence of Paragraph 15.03.B by replacing “Promptly” with “Within a reasonable amount of time”

Add the following new subparagraph to Paragraph 15.03.B:

1. If some or all of the Work has been determined not to be at a point of Substantial Completion and will require re-inspection or re-testing by Engineer, the cost of such re-inspection or re-testing, including the cost of time, travel and living expenses, shall be paid by Contractor to Owner. If Contractor does not pay, or the parties are unable

to agree as to the amount owed, then Owner may impose a reasonable set-off against payments due under Article 15.

SC-15.03.C Amend the first sentence of Paragraph 15.03.C by inserting ", pending approval by the Owner and final approval by the Engineer," after "shall fix the date of Substantial Completion".

ARTICLE 16 – SUSPENSION OF WORK AND TERMINATION

SC-16.01 Owner May Suspend Work

SC-16.01 Add the following paragraph immediately following paragraph 16.01.A:

B. Should the Owner suspend Work due to repeated unsafe Work conducted by the Contractor which is confirmed by subsequent inspection by OSHA, the Contractor shall not be allowed any adjustment in Contract Price or extension of Contract Time attributed to this delay.

SC-16.02 Owner May Terminate for Cause

SC-16.02.A.3 At the end of the first sentence, add the following after "jurisdiction":

", including those governing employee safety."

ARTICLE 17 – FINAL RESOLUTION OF DISPUTES

Add the following new paragraphs immediately after Paragraph 17.01.

SC-17.02 Dispute Resolution Process

A. All matters subject to final resolution under this Article will be decided by mediation in accordance with the "Rules Implementing Mediated Settlement Conferences in North Carolina Public Construction Projects". This agreement to mediate will be specifically governed by and enforceable under the prevailing laws of the State of North Carolina.

SC-17.03 Attorneys' Fees

A. For any matter subject to final resolution under this Article, the prevailing party shall be entitled to an award of its attorneys' fees incurred in the final resolution proceedings, in an equitable amount to be determined in the discretion of the court, arbitrator, arbitration panel, or other arbiter of the matter subject to final resolution, taking into account the parties' initial demand or defense positions in comparison with the final result.

ARTICLE 18 – MISCELLANEOUS

SC-18.01 Giving Notice

B. No oral statement of any person whomever shall in any manner or degree modify or otherwise affect the terms of this Contract. Any notice to the Contractor, from Owner and Engineer, relative to any part of this Contract shall be in writing.

SC-18.07 Controlling Law

SC-18.07.A Delete Paragraph 18.07.A in its entirety and insert the following in its place:

A. This Contract shall be governed by North Carolina law, without regards to its choice of law rules. The venue for any action related to this Contract shall be in the courts of Johnston County.

WORK CHANGE DIRECTIVE NO.: [Number of Work Change Directive]

Owner:	Wayne Community College	Owner's Project No.:	
Engineer:	Timmons Group	Engineer's Project No.:	70141
Contractor:		Contractor's Project No.:	
Project:	Master Meter and Booster Pump Addition		
Contract Name:			
Date Issued:		Effective Date of Work Change Directive:	

Contractor is directed to proceed promptly with the following change(s):

Description:

[Description of the change to the Work]

Attachments:

[List documents related to the change to the Work]

Purpose for the Work Change Directive:

[Describe the purpose for the change to the Work]

Directive to proceed promptly with the Work described herein, prior to agreeing to change in Contract Price and Contract Time, is issued due to:

Notes to User—Check one or both of the following

☐ Non-agreement on pricing of proposed change. ☐ Necessity to proceed for schedule or other reasons.

Estimated Change in Contract Price and Contract Times (non-binding, preliminary):

Contract Price: $ _____ **[increase] [decrease] [not yet estimated]**.

Contract Time: _____ days **[increase] [decrease] [not yet estimated]**.

Basis of estimated change in Contract Price:

☐ Lump Sum ☐ Unit Price ☐ Cost of the Work ☐ Other

	Recommended by Engineer	Authorized by Owner
By:		
Title:		
Date:		

CHANGE ORDER NO.: [Number of Change Order]

Owner:	Wayne Community College	Owner's Project No.:	
Engineer:	Timmons Group	Engineer's Project No.:	70141
Contractor:		Contractor's Project No.:	
Project:	Master Meter and Booster Pump Addition		
Contract Name:			
Date Issued:		Effective Date of Change Order:	

The Contract is modified as follows upon execution of this Change Order:

Description:

[Description of the change]

Attachments:

[List documents related to the change]

Change in Contract Price	**Change in Contract Times [State Contract Times as either a specific date or a number of days]**
Original Contract Price: $ _____	Original Contract Times: Substantial Completion: _____ Ready for final payment: _____
[Increase] [Decrease] from previously approved Change Orders No. 1 to No. **[Number of previous Change Order]**: $ _____	**[Increase] [Decrease]** from previously approved Change Orders No.1 to No. **[Number of previous Change Order]**: Substantial Completion: _____ Ready for final payment: _____
Contract Price prior to this Change Order: $ _____	Contract Times prior to this Change Order: Substantial Completion: _____ Ready for final payment: _____
[Increase] [Decrease] this Change Order: $ _____	**[Increase] [Decrease]** this Change Order: Substantial Completion: _____ Ready for final payment: _____
Contract Price incorporating this Change Order: $ _____	Contract Times with all approved Change Orders: Substantial Completion: _____ Ready for final payment: _____

	Recommended by Engineer (if required)	Accepted by Contractor
By:	_____	_____
Title:	_____	_____
Date:	_____	_____
	Authorized by Owner	Approved by Funding Agency (if applicable)
By:	_____	_____
Title:	_____	_____
Date:	_____	_____

SECTION 01 11 00 – SUMMARY OF WORK

PART 1 GENERAL

1.01 DESCRIPTION

A. This Section includes requirements of a general nature applicable to the Contract.

B. This project includes the addition of a master meter, master back flow preventer, and packaged domestic and fire booster pump system and shelter. This addition also includes: extension of approximately 250 LF of water main off of Wayne Community College Entrance Drive, addition of nine 10-inch isolation valves, installation of a bypass check valve and vault, connection of the packaged booster system to existing power, site/pavement repairs, implementation of required erosion and sediment control measures, installation and maintenance of traffic control, and the connection to existing water main.

1.02 REFERENCE DOCUMENTS

A. Applicable Codes, Specifications, and Standards:

1. All references to codes, specifications, and standards referred to in the Contract Documents shall be the latest edition, amendment and/or revision of such reference standard in effect as of the date of Bid Opening for this Contract.

B. Documents on the Site

1. The Contractor shall maintain, on the site, copies of all appropriate documents including codes, specifications, permits, and reference standards referred to for this project.

1.03 ABBREVIATIONS AND SYMBOLS

AASHTO	American Association of State Highway and Transportation Officials
ACI	American Concrete Institute
ANSI	American National Standards Institute
ASTM	American Society for Testing and Materials
AWWA	American Water Works Association
BOCA	Building Officials Code Administration, Inc.
NACE	National Association of Corrosion Engineers
NEC	National Electrical Code
NOAA	National Oceanic and Atmospheric Administration
OSHA	Occupational Safety and Health Administration

1.04 CONTRACTOR'S RESPONSIBILITIES

A. The Contractor shall, at his own expense, obtain any and all permits and surety required and be responsible for all submittals necessary to obtain said permits required in the Contract Documents.

B. Use of Premises and Off-Site Work

1. Lands by Contractor - Any land and access thereto not furnished by the Owner that the Contractor deems necessary for the work, temporary construction facilities, access and egress, or for storage of materials shall be provided by the Contractor at no cost to the Owner. The Contractor shall confine his apparatus and storage to such additional areas as he may provide at his expense. The Contractor shall obtain permits and written approvals from the appropriate jurisdictional agency and or property owner for use of the premises not furnished as described

above, and all off-site areas which include but are not limited to off-site borrow pits and waste areas. Such permits and approvals must specify treatment of said areas during and at the completion of construction. Copies of all permits and approvals shall be furnished to the Engineer before utilization of the areas.

2. Private and Public Property - The Contractor shall not enter upon private property for any purpose without obtaining written permission from the property owner. Letters of permission from property owners shall be filed with the Engineer prior to entering private property.

C. The Contractor shall not load nor permit any part of any structure to be loaded with weights that could endanger the structure, nor shall he subject any part of the work to stresses or pressures that could endanger it.

D. Public Convenience

1. The Contractor shall, at all times, so conduct his work as to insure the least possible obstruction to traffic and inconvenience to the Owner, the general public, and the businesses and residences in the vicinity of the work, and to insure the protection of persons and property. Fire hydrants on and adjacent to the work shall be kept accessible to firefighting equipment at all times. Temporary provisions shall be made by the Contractor to ensure the use of sidewalks and the proper functioning of all gutters, stormwater systems, drainage ditches, and culverts, etc. such that they shall not be obstructed.

E. Measurements

1. All dimensions shown on existing work and all dimensions required for work that is to connect to existing work shall be verified by the Contractor by actual measurement of the existing work. Any discrepancies between the Contract Documents and the existing conditions shall be referred to the Engineer before any work affected thereby has been completed.

F. Coordination

1. Phases of the construction of the project which involve the temporary interruption of essential services (water, electricity, etc.) shall be scheduled in close consultation with the Owner and Engineer and shall be minimal in duration and not longer than essential to accomplish the purpose for such interruptions. Liaison with the Owner and Engineer in this matter shall be a salient feature of this Contract.

2. The Contractor shall notify the Engineer and the Owner not less than 48 hours in advance of commencing work. The Owner shall be given no less than 48 hours' notice in advance of the time and date of making any connections and will advise the Contractor as to a suitable time and date, which may take place during nights or weekends.

3. The Contractor, at his own expense, shall retain the services of a registered land surveyor to establish the necessary horizontal and vertical control to construct the proposed work in the proper location.

END OF SECTION

SECTION 01 20 00 – MEASUREMENT AND PAYMENT

PART 1 GENERAL

1.01 SUBMITTALS

A. Schedule of Values

B. Application for Payment

C. Final Application for Payment

1.02 SCHEDULE OF VALUES

A. Prepare a separate Schedule of Values for each schedule of Work under the Agreement

B. Upon request of the Engineer, provide documentation to support the accuracy of the Schedule of Values

C. Unit Price Work: Reflect unit price quantity and price breakdown from conformed Bid Form.

D. Lump Sum Work: Reflect Schedule of Values format included in the Bid Form, specified allowances, alternatives, and equipment selected by the Owner, as applicable.

E. An unbalanced or front-end loaded schedule will not be acceptable.

F. Summation of the complete Schedule of Values representing all of the Work shall equal the Contract Price.

1.03 APPLICATION FOR PAYMENT

A. Transmittal Summary Form: Attach one Summary Form with each detailed Application for Payment for each schedule and include Request for Payment of Materials and Equipment on Hand as applicable. Execute certification by authorized office of Contractor.

B. Use the detailed Application for Payment Form.

C. Include accepted Schedule of Values for each schedule or portion of the Work, the unit price breakdown for the Work to be paid on a unit price basis, a listing of Owner-selected equipment, if applicable, and allowances as appropriate.

D. Preparation:

1. Round values to the nearest dollar.
2. List each Change Order executed prior to the date of submission as separate line item. Totals to equal those shown on the Transmittal Summary Form for each schedule as application.
3. Submit Application for Payment Form(s) for each schedule as applicable, and supporting data as may be requested by the Engineer.

1.04 BASIS FOR MEASUREMENT AND PAYMENT

A. Measurement and Payment will be made for only those items included in the Contract Bid Form or Contract Change Order(s) for the Project.

B. Measurement of the various pay items will be made by the Owner or authorized representative. The Contractor shall note those items, which require Owner approval prior to construction. Measurement and payment will not be made for these items unless prior approval has been obtained. Only the items specified in this article, "Measurement and Payment" shall be defined as pay items except as otherwise provided under the terms of the Contract Documents.

C. All Measurement for payment will be for completed Work performed according to Contract Drawings, Specifications, Construction Details and the Bid Form.

D. Payment for any item is full compensation for furnishing all labor, materials and equipment required to acceptably complete the item of the Work. Any Work and material paid for under one item will not be paid for under another item though the Work and material may enter another item.

E. Incidental Items - all items listed below are incidental to the project Work required by the Contract Documents and shall not be measured for payment. The cost of these incidental items shall be included, where deemed appropriate by the Contractor, in Lump Sum or Unit Prices set forth in the Schedule of Bid Prices.

F. Property restoration including replacing signs, mailboxes, landscaping, yard ornamentation, and all other areas and facilities disturbed during construction

G. Additional incidental items required, including:
   1. Site restoration and cleanup
   2. Locating existing utilities
   3. Test pits
   4. Site security
   5. Stakeout and surveying and field engineering
   6. Offsite disposal of excess excavated material
   7. Remobilization and demobilization
   8. Permit acquisition
   9. Stockpiling of existing material for drying and reuse
   10. Seed and fertilizer
   11. Driveway and driveway culvert replacement
   12. All other items required to complete the Work as shown in the Drawings and specified herein, not specifically included for payment under Bid Items noted in this section.

H. The Contractor shall receive and accept the compensation provided in the Bid Form and the Contract as full payment for furnishing all labor, materials, tools, equipment and services for performing all operations necessary to complete the Work under the Contract, and also in full payment for all loss or damages arising from the nature of the Work, or from any discrepancy between the actual quantities of Work and the quantities herein estimated by the Owner, or from action of the elements or from any unforeseen difficulties which may be encountered during the prosecution of the Work until the final acceptance by the Owner.

I. The prices stated in the Bid Form shall include all costs and expenses for taxes, permit fees, labor, equipment, materials, commissions, transportation, patent fees and royalties, labor for handling materials during inspection, together with any and all other costs and expenses for performing and completing the Work as shown on the Contract Drawings and specified herein. The basis of payment for an item at the unit price in the Bid Form shall be in accordance with the description of that item in this section.

J. The Contractor's attention is called to the fact that the quotations for the various items of the Work are intended to establish a total price for completing the Work in its entirety should the Contractor. feel that the cost for any item of work has not been defined by a Bid Form Pay Item; he shall include the cost for that work in some other applicable bid item, so that his proposal for the Work reflects his total price for completing the Work in its entirety.

K. The Owner reserves the right to change the alignment, grade, form, length, dimensions or materials of the Work under the Contract, whenever any conditions or obstructions are met that render the changes desirable or necessary. All such alterations shall be paid for under the total lump sum bid or at a unit price bid for these items of Work, except as follows:
   1. In the case that such alterations make the Work less expensive to the Contractor, a proper deduction shall be made from the contract prices and the Contractor shall have no claim on this account for damages or for anticipated profits on the Work that may be dispensed with.
   2. In the case that such alterations make the Work more expensive to the Contractor, a proper addition shall be made to the contract prices.
   3. The Owner shall determine the value of any such addition or subtraction.
   4. A Change Order shall be prepared for each alteration of the Work. The Change Order shall delineate the specific alteration, any addition or deduction in the contract price and any impacts

to the contract time period. Once approved, the Contractor and the Owner shall sign completed Change Orders. To simplify paperwork, multiple alterations may be included in a single Change Order.

L. The Owner reserves the right to increase or decrease the quantity of material to be furnished or Work to be done under the Contract whenever he deems it advisable or necessary. Such increase or decrease shall in no way violate or invalidate the Contract.

M. For the unit price items included in the bid, the Contractor will be paid for the actual amount of the authorized Work done or material furnished under each item of the bid form, at the unit price bid for that item. In case the quantity of any item is increased; the Contractor shall not be entitled to compensation over and above the unit price bid for each item. In case the quantity is decreased; the Contractor shall have no claim for damages on account of loss of anticipated profits because of such decrease.

N. Except as modified herein, measurement and payment shall be in accordance with the Standard General Conditions.

O. General Measurement and Payment Requirements

P. All Work in Division I - General Requirements shall be considered miscellaneous, temporary, or accessory work. No separate payment will be made for providing miscellaneous, temporary, or accessory work including, but not limited to the Contractor's field office, layout surveys, job signs, sanitary requirements, testing, safety devices, approval and record drawings, water supplies, power, traffic maintenance, waste disposal, watchmen, bond, insurance, videotaping, and requirements of the General Requirements, General Conditions, and Supplementary Conditions. Compensation for all such services, equipment and materials shall be included in the lump sum or unit price of the appropriate bid item.

Q. Mobilization - No separate payment will be made for mobilization. No additional payment will be made for demobilization and remobilization due to shutdowns, suspensions of the Work or for other mobilization activities.

R. Erosion, Sediment and Pollution Control - No separate payment will be made for Erosion, Sediment and Pollution Control. These items will be included in the incidental cost of other Work.

S. Dewatering, Control and Diversion of Water - No separate payment shall be made for Dewatering, Control, and Diversion of Water. These items shall be included in the incidental cost of other Work.

T. Trench Excavation and Backfill - No separate payment shall be made for Trench Excavation and Backfill. All cost for equipment, labor, and materials to perform Excavation and Backfill shall be included in the appropriate bid item as specified herein. Where excavations are made a depth below the sub grade elevations indicated on the Drawings without authorization, the excess excavation shall be filled with bedding stone at no additional expense to the Owner to grade as shown on the plans.

U. Payments during the course of the Work for lump sum items will be made on the basis of percentage of completion of the Work items listed in the Schedule of Values for each lump sum item. The Schedule of Values shall be prepared by the Contractor and submitted to the Owner within 15 days of the execution of the Contract and shall serve as a breakdown of the lump sum bid for the purpose of arriving at a basis for the monthly estimate. The Schedule of Values shall be broken down into categories and each category further broken down into each applicable specification section. The schedule shall add up to 100% of the Lump Sum Bid.

V. The quantities for payment under this Contract shall be determined by actual measurement of the completed items, in place and accepted by the Owner, in accordance with the Standard General Conditions. A representative of the Contractor shall witness all field measurements.

1.05 CONTRACT ITEMS

A. Contract Items include those items which are fully defined in the Contract Drawings and Specifications and anticipated to be required for completion of the Work.

B. Measurement

1. Under this Item, the Contractor shall furnish all labor, materials, equipment, qualified supervision and site dewatering required to perform all other Work as described in the Specifications and Drawings for a lump sum price.

2. The Engineer shall evaluate the Contractors Application for payment and based on the information provided by the Contractor, the Owners Resident and other information to confirm the Contractors estimate of the percentage of the work completed.

C. Payment

1. Payment will be based upon a percentage of the Work complete as per the approved Schedule of Values
2. Progress payments will be made monthly.
3. The date of the Contractor's submission of Application for Payment shall be established at the Preconstruction Conference.

1.06 NONPAYMENT FOR REJECTED OR UNUSED PRODUCTS

A. Payment will not be made for the following:

1. Rejected materials, supplies and or equipment
2. Loading, hauling, and disposing of rejected material, supplies and or equipment
3. Quantities of material wasted or disposed of in manner not called for under the Contract Documents
4. Rejected loads of material, including material rejected after it has been placed for reason of failure of Contractor to conform to the provisions of Contract Documents
5. Material not unloaded from transporting vehicle
6. Defective Work not accepted by the Owner
7. Material remaining on hand after completing the Work

1.07 PARTIAL PAYMENT FOR STORED EQUIPMENT

A. Partial Payment: No partial payment will be made for materials and equipment delivered or stored unless Shop Drawings are acceptable to Engineer.

B. Final Payment: Will be made only for products incorporated into the Work; remaining products, for which partial payments have been made shall revert to Contractor unless otherwise agreed, and partial payments made for those items will be deducted from the final payment.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION 01 25 00 – SUBSTITUTIONS

PART 1 GENERAL

1.01 GENERAL

A. All materials furnished under this contract shall be as specified or required, or in the absence of particular specification shall be the best of their respective kinds, new stock, unused and not deteriorated and all the work contemplated and described shall be done in a good, substantial and workmanlike manner.

B. Wherever in these Specifications or on the plans, the terms ASTM, AWWA, or other such reference Specifications are used, it shall be considered to mean the latest pertinent Specifications at time of Bid.

1.02 PRODUCT SUBSTITUTIONS

A. Equivalents and Substitutes:

1. Whenever materials or equipment are described in the Contract Documents by using a certain brand, make, supplier, manufacturer or by specification, such naming or specification shall be regarded to convey function, design features, general style, type, materials of construction, character and quality of material or equipment serviceability and such other desired essential characteristics. It is not intended to restrict competition among bidders.

2. Unless words are used indicating that no "or equivalent" or "substitution" is allowed, an "equivalent" or "substitute" item may be accepted by the ENGINEER if, in the ENGINEER's judgment, the item meets the criteria set forth in the specification and as further described in the following paragraphs and its use will not increase the Contract Price nor Contract Duration.

3. The CONTRACTOR's written application for the "or equivalent" or substitute item shall provide sufficient information to allow the ENGINEER to determine whether the proposed material or equipment:
   a) will equally perform the functions and achieve the results called for by the general design concept,
   b) is at least of equal materials of construction, quality and necessary essential design features,
   c) is suited to the same use as that named or specified,
   d) conforms substantially to the desired detailed requirements, e.g. durability, strength, appearance, aesthetics (if aesthetics are significant), safety, useful life, reliability, economy of operation and ease of maintenance, evidences a proven record of performance and the availability of local and responsive service,
   e) will not increase Contract Price,
   f) will not increase Contract Duration.

4. The ENGINEER shall not be required to supplement the information supplied by the CONTRACTOR.

5. Each written application shall certify whether or not acceptance of the proposed "or equivalent" or substitute item will require a change in any of the work or any other means and methods indicated in or required by the Contract Documents, or in work performed by the OWNER or others, and whether or not incorporation or use of the proposed item is subject to payment of any license fee or royalty. All variations of the proposed item from the item named or specified shall be identified (operation, materials or construction finish, thickness or gauge of material, dimensions, loads, tolerances, deleted or added features, etc.) and information regarding available maintenance, repair, and replacement services shall be indicated.

6. The application shall contain an itemized estimate of all direct, indirect, and consequential costs that will result from the evaluation and acceptance of the proposed "or equivalent" or substitute item, including but not limited to cost and delays of redesign, or claims of other CONTRACTORs (SUBCONTRACTORs) affected by the proposed item and changes in operating, maintenance, repair, replacement or spare parts costs. The OWNER may require the CONTRACTOR to furnish a list of locations of similar installations that have been in service for at least three (3) years before the date of the application, and any other relevant information/data.

7. The CONTRACTOR shall be responsible for verifying the "or equivalent" or substitute items conform to the Contract Documents, and that all dimensions, arrangement, design and construction details and other features are suited to the specified purpose. If an "or equivalent" or substitute item differs materially from the item named or specified, and that difference was not expressly identified in the CONTRACTOR's written application, or results in changes in the work or in the general design concept, the ENGINEER has authority to require removal and replacement of that "or equivalent" or substitute item. The CONTRACTOR shall be responsible for any delay and all costs resulting from:
   a) Any such removal and replacements of an "or equivalent" or substitute item,
   b) making any "or equivalent" or substitute materials or equipment conform with the Contract Documents, and
   c) implementing any changes in the work and/or in any other work to accommodate the "or equivalent" or substitute item.

8. In the event that an "or equivalent" or substitution is approved, the CONTRACTOR shall waive all claims for additional costs and delays related to the "or equivalent" or substitution which consequently became apparent.

B. CONSTRUCTION METHODS OR PROCEDURES SUBSTITUTION

1. CONTRACTOR may, at his sole cost and expense, submit to the ENGINEER for his consideration a Modification Request to the Contract Documents for a change in equipment, materials, or methods of work than would result in net cost savings to the OWNER. A Modification Request will only be considered that will not compromise the useful life, operational costs, safety, code compliance, project schedule, or design integrity of the system.

2. CONTRACTOR shall submit all Modification Requests to the ENGINEER within ten (10) calendar days after Notice to Proceed with the Contactors proposed net deduct price.

3. Submit number of copies of request for substitution as specified for submittal of Shop Drawings. Submit separate request for each substitution. In addition to requirements in the General Conditions, include in request the following:
   a) Detailed description of proposed method or procedure.
   b) Itemized comparison of the proposed substitution with the specified method or procedure.
   c) Drawings illustrating method or procedure.
   d) Other data required by ENGINEER to establish that proposed substitution is equivalent to specified method or procedure.

4. Engineer/Owner will evaluate the proposal and advise contractor within ten (10) days after receipt of proposal if the proposal is acceptable.

END OF SECTION

SECTION 01 31 00 – COORDINATION

PART 1 GENERAL

1.01 Submittals

A. Informational

1. Statement of Qualifications (SOQ) for Land Surveyor or Civil Engineer.
2. Coordination Plan

1.02 Utility Notification and Coordination

A. The Contractor will coordinate the Work with various utilities within the Project limits. The Contractor will notify applicable utilities prior to commencing work and if damage occurs, or if conflicts, or emergencies arise during execution of the Work.

1.03 Facility Operations

A. Continuous operation of the Owner's facilities is of critical importance. The Contractor shall schedule and conduct activities to enable existing facilities to operate continuously, unless otherwise specified.

B. The Contractor shall perform the Work continuously during critical connections and changeovers, and as required to prevent interruption of the Owner's operations.

C. When necessary, the Contractor shall plan, design, and provide various temporary services, utilities, connections, temporary piping and heating, access, and similar items to maintain continuous operation of the Owner's facility.

D. The Contractor shall not close lines, open or close valves, or take other actions which would affect the operations of the existing systems, except as specifically required by the Contract Documents and after authorization by the Owner and Engineer. Such authorization will be considered within 48 hours after receipt of the Contractor's written request.

E. Relocation of Existing Facilities:

1. During construction, it is expected that minor relocations of Work will be necessary.
2. Provide complete relocation of existing structures and Underground Facilities, including piping, utilities, equipment, structures, electrical conduit, wiring, electrical duct bank, and other necessary items.
3. Use only new materials for relocated facilities. Match materials of existing facility, unless otherwise shown or specified.
4. Perform relocations to minimize downtime of existing facilities.
5. Install new portions of existing facilities in their relocated position prior to removal of existing facilities, unless otherwise accepted by the Engineer.

1.04 Adjacent Facilities and Properties

A. Examination:

1. After the Effective Date of the agreement and before work at the site is started, the Contractor, Engineer, affected property owners, and the facility Owner shall make a thorough examination of the pre-existing conditions including existing buildings, structures and other improvements in vicinity of the Work, as applicable, which could be damaged by the construction operations.

1.05 Reference Points and Surveys

A. Contractor's Responsibilities:

1. Provide additional survey required to layout the Work.
2. Notify the Engineer at least 3 working days in advance of the time when the grade and line to be provided by Owner will be needed.

3. Check and establish exact location of existing facilities prior to construction of new facilities and any connections thereto.
4. In the event of a discrepancy in data or staking provided by the Owner, the Contractor shall request clarification before proceeding with the Work.
5. The Contractor shall retain the services of a Professional Land surveyor or Civil Engineer registered in the State of North Carolina, who shall perform or supervise the engineering and surveying necessary for the construction staking and layout.
6. The Contractor shall maintain a complete and accurate log of the survey Work as it progresses as a Record Document.
7. On request of the Engineer, the Contractor shall submit documentation.
8. The Contractor shall provide competent employee(s), tools, stakes, and other equipment and materials as Engineer may require to:
   a) Establish control points, lines, and easement boundaries.
   b) Check layout, survey and measurement Work performed by others.
   c) Measure quantities for payment purposes.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.01 Cutting Fitting and Patching

A. Cut, fit, adjust, or patch Work and work by others, including excavation and backfill as required, to make the Work complete.

B. Obtain prior written authorization from the Engineer before commencing the Work to cut or otherwise alter:

1. Structural reinforcing steel, structural column or beam, elevated slab, trusses, or other structural member.
2. Weather – or moisture-resistant elements.
3. Efficiency, maintenance, or safety element.

C. Work of others.

1. Refinish surfaces to provide an even finish.
2. Refinish continuous surfaces to nearest intersection.
3. Refinish entire assemblies.
4. Finish restored surfaces to such planes, shapes, and textures that no transition between existing work and Work is evident in finished surfaces.
5. Restore existing work, underground facilities, and surfaces that are to remain in completed Work including concrete-embedded piping, conduit, and other utilities as specified and as shown.
6. Make restorations with new materials and appropriate methods as specified for new Work of similar nature; if not specified, use recommended practice of manufacturer or appropriate trade association.
7. Fit Work airtight pipes, sleeves, ducts, conduit and other penetrations through surfaces and fill voids.
8. Remove specimens of installed Work for testing when requested by the Engineer.

END OF SECTION

SECTION 01 31 19 – PROJECT MEETINGS

PART 1 GENERAL

1.01 REQUIREMENTS INCLUDED

A. Contractor participation in preconstruction conferences.

B. Contractor participation in progress meetings and pre-installation conferences.

1.02 PRECONSTRUCTION CONFERENCES

A. The Engineer shall administer a preconstruction conference for execution of Owner- Contractor Agreement and exchange of preliminary submittals.

B. Attendance: The Owner, Engineer, Contractor, major Subcontractors.

1.03 PROGRESS MEETINGS

A. The Engineer shall schedule and administer project meetings throughout progress of the work at maximum monthly intervals, as well as administer called meetings, and pre- installation conferences.

B. The Engineer shall make physical arrangements for meetings, prepare agenda with copies for participants, preside at meetings, records minutes, and distribute copies within seven (7) days to the Contractor, participants, and those affected by decisions made at meetings.

C. Attendance: The Contractor's Superintendent, Contractor's Project Manager, major Subcontractors and Suppliers; the Owner and Engineer as appropriate to agenda topics for each meeting.

D. Suggested Agenda: Review of the Work progress, status of progress schedule and adjustments thereto, delivery schedules, submittals, maintenance of quality standards, pending changes and substitutions, and other items affecting progress of the Work.

1.04 PRE-INSTALLATION CONFERENCES

A. When required in individual specification Section, the Contractor shall convene a pre- installation conference prior to commencing work of that Section.

B. Require attendance of entities directly affecting, or affected by, work of the Section.

C. Review conditions of installation, preparation and installation procedures, and coordination with related work.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION 01 33 00 – SUBMITTALS

PART 1 GENERAL

1.01 REQUIREMENTS INCLUDED

A. Procedures

B. Schedule of Submittals

C. Construction Progress Schedules

D. Schedule of Values

E. Shop Drawings

F. Product Data

G. Manufacturer's Instructions

H. Operation & Maintenance Manuals

1.02 PROCEDURES

A. Contractor is required to provide submittals for all materials and equipment furnished and installed under this contract.

B. Contractor shall deliver submittals to Engineer.

C. Transmit each item with Submittal cover attached.

1. Number submittals by specification section and revision number (e.g. 013000-1 for initial submission of schedule of submittals.)

2. Submit only one item per cover. Highlight all deviations from the Contract Documents and provide explanation/justification for deviation.

3. Complete all portions of the form above the Contractor's signature line. Incomplete submittals or submittals with unhighlighted deviations will be returned unreviewed.

D. Submit initial progress schedules, schedule of values, and schedule of submittals in duplicate within 15 days after date of Owner-Contractor Agreement. After review by Engineer, revise and resubmit as required. Submit revised schedules with each Application for Payment, reflecting changes since previous submittal.

E. Comply with progress schedule for shop drawings, product data, and manufacturer's instructions related to Work progress, and coordinate submittal of related items.

F. Allow a minimum of two weeks' review time.

G. Distribute copies of reviewed submittals to appropriate parties. Instruct recipients to promptly report any inability to comply with provisions.

1.03 SCHEDULE OF SUBMITTALS

A. Contractor to provide to Engineer a Schedule of Submittals for all products used during construction 2 weeks prior to the start of work.

B. Submit the number of copies required by the Contractor, plus three for the Engineer to retain.

1.04 CONSTRUCTION PROGRESS SCHEDULES

A. Submit horizontal bar chart with separate bar for each major trade or operation, identifying first workday of each week. Show relationships between critical path items and indicate lead times for equipment and materials delivery, etc.

B. Show complete sequence of construction by activity, identifying work of separate stages and other logically grouped activities. Show projected percentage of completion for each item of Work as of time of each Application for Progress Payment.

C. Construction schedule shall consider the following typical number of weather days, (i.e. > 0.10" of precipitation) as well as days following during which site conditions may impede progress of the work. The Contractor will not be allowed a time extension due to inclement weather conditions if the total number of inclement weather days for the duration of the project is less than the total inclement weather days indicated below.

J	F	M	A	M	J	J	A	S	O	N	D
6	6	7	6	6	6	8	6	5	5	5	6

D. Submit the number of copies required by the Contractor, plus three for the Engineer to retain.

E. Determination of actual rain days will be based on data published by NOAA for the gauging station nearest the project site, which will be identified at the pre-construction meeting.

F. At each monthly progress meeting, prepare a Monthly Project Summary Report (form included with this section) and attach to the revised project schedule.

1.05 SHOP DRAWINGS

A. Submit the number of copies required by the Contractor, plus three for the Engineer to retain.

1.06 PRODUCT DATA

A. Mark each copy to identify applicable products, models, options, and other data; supplement manufacturer's standard data to provide information unique to the Work.

B. Submit the number of copies required by the Contractor, plus three for the Engineer to retain.

1.07 MANUFACTURER'S INSTRUCTIONS

A. Submit manufacturer's printed instructions for delivery, storage, assembly, installation adjusting, and finishing.

B. Submit the number of copies required by the Contractor, plus three for the Engineer to retain.

PART 2 PRODUCTS – NOT USED

PART 3 EXECUTION

3.01 Shop Drawings and Submittals

A. Contractor shall keep a copy of all shop drawings and submittals on the project site for the duration of the contract

END OF SECTION 01 33 00

(See Monthly Project Summary Report which follows)
(See Submittal Cover which follows)

MONTHLY PROJECT SUMMARY REPORT

MEETING DATE: _____

Is the project on Schedule? _____ Yes _____ No

Number of weeks AHEAD of Schedule _____

Number of weeks BEHIND Schedule _____

List items from Schedule which are **AHEAD OF SCHEDULE**:

_____

List items from Schedule which are **RIGHT ON SCHEDULE**:

_____

List items from Schedule which are **BEHIND SCHEDULE**:

_____

If behind, what is the Contractor doing to get back on schedule?

_____

_____

When does the Contractor anticipate the Project to be back on Schedule? Date: _____

Are there any outstanding change order items? _____ Yes _____No

If so, list them:

_____

_____

Adverse Weather Summary

	J	F	M	A	M	J	J	A	S	O	N	D
Scheduled												
Actual												
Balance												

SUBMITTED:_____ DATE: _____

SIGNED: _____ TITLE: _____

Submittal Cover

No. ___-___

Project: Master Meter and Booster Pump Addition Project #: 70141

To: Timmons Group
Attn: Chris Petree
5410 Trinity Road, Suite 102
Raleigh, North Carolina 27607

From:

Date Submitted: Review Requested Not Later Than:

Submittal Information and Contractor's Representation

Subject: _____

Pursuant to Specification Section(s): _____ Drawing No(s). _____

Submitted as: ☐ Specified Item ☐ "Equal" Item ☐ Substitution ☐ _____

Items Submitted: _____

_____

The Contractor's submittal of items for the Engineer's review and approval constitutes a representation that the items proposed have been reviewed thoroughly by the Contractor and found to be in conformance with the requirements of the Contract Drawings and Specifications. All deviations have been clearly listed in the submittal package and an explanation provided for the deviation.

Contractor's Reviewer (sign): Date:

Review Information

Timmons Group:
Received on: _____ Forwarded for review to: _____

Reviewer:
Received On: _____ Reviewed by: _____

Review is for general compliance with the Contract Documents. Nothing in this review shall be taken as permitting variation from the Contract Documents, unless specifically stated by the reviewer in writing. Sole responsibility for correctness of dimensions, options, details, quantities, and safety during fabrication and erection shall remain with the Contractor. EVALUATION OF INSTALLATION FOR FINAL ACCEPTANCE WILL BE BASED ON THE CONTRACT DOCUMENTS, NOT THE SUBMITTALS, EXCEPT AS SPECIFICALLY APPROVED OTHERWISE IN WRITING.

☐ No Exceptions Taken ☐ Rejected ☐ Resubmission Not Required

☐ Revise and Resubmit ☐ Submit Specified Item ☐ _____

Comments: _____

_____

_____

_____

_____

Returned to Timmons Group: Returned to Contractor:

SECTION 01 50 00 – TEMPORARY FACILITIES AND CONTROLS

PART 1 GENERAL

1.01 TEMPORARY FACILITIES

A. General:

1. Temporary facilities and protective devices include, but are not limited to, the following items: temporary barricades, fences, bridges, guards, temporary utilities, steel plates over trenches, maintenance of pedestrian traffic and project identification signs.

2. All materials used in construction of the above-mentioned items of work shall be of such size, shape and strength as to be suitable for the use intended.

3. The Contractor shall conduct construction operations in such a manner as to cause as little inconvenience as possible to the general public, and the Owner. Wherever required, the Contractor shall erect and maintain signs, fences, barricades, and pedestrian bridges for the protection of the public.

4. The Contractor shall take positive measures to prevent at all times, entry to the site of the work and storage areas by children, animals, and unauthorized adults.

B. Furnish and construct temporary fencing as needed to fence off excavation, storage, and operating areas. All temporary fences erected by the Contractor shall be substantially constructed, and neat in appearance.

1. Barricade or close all openings in roadways, floors, walls, or other parts of structures or walkways while the openings are not in regular use. Barricades shall be substantial and neat in appearance.

C. Unless otherwise specified, the Contractor will furnish water required during the entire construction period for the project at no cost to the Owner. The Contractor shall assure the availability of drinking water for his work force, and provide temporary pumps, tanks, pre-assembled flushing mechanisms and compressors as necessary to produce the required pressures.

D. The Contractor shall make the necessary arrangements and provide all temporary electrical service and lighting required during the entire construction period. The cost of electricity used shall be borne by the Contractor. The electrical service shall be sufficient capacity and characteristics to supply the proper current for the various types of construction tools, motors, welding machines, lights, heating plant, pumps, and other work required. All necessary temporary wiring, panel boards, outlets, switches, lamps, fuses, controls, and accessories shall be provided.

E. The Contractor shall provide and maintain an adequate number of temporary toilets with proper enclosures as necessary for use of workmen during construction. The Contractor shall keep toilets clean and comply with local and state health requirements and sanitary regulations. Toilet facilities shall be the prefabricated chemical type unless otherwise permitted.

F. The Contractor shall be responsible for provisions of temporary heating, including all costs of equipment and installation, fuel and attendance, whenever and for such periods as such heating may be required, either because of general weather conditions to prevent freezing, to provide suitable working conditions, or to assure progress of the operation within the established scheduled time for curing of concrete.

1.02 MAINTENANCE OF PEDESTRIAN TRAFFIC

A. The Contractor shall be responsible for maintaining a normal through traffic flow in accordance with Owner requirements.

B. The Contractor shall provide temporary facilities as required for pedestrian access to properties adjacent to or contiguous to the project. The Contractor shall notify all affected parties of the time, extent, and duration of the interruption.

C. Contractor shall not obstruct any walkway without providing an alternate temporary access to the property.

1.03 ENVIRONMENTAL PROTECTION

A. The contractor shall be responsible for furnishing all necessary items for fulfilling the work described herein for Environmental Protection including prevention and control of erosion and sedimentation that results directly or indirectly from the project.

B. Prevention of Water Pollution:

1. The Contractor shall take all such precautions in the conduct of his operations as may be necessary to avoid contaminating the water in adjacent watercourses or water storage areas.

2. All earthwork, moving of equipment, and other operations likely to create silting, shall be conducted so as to minimize pollution of water courses and water storage areas.

3. Water used during the work which has become contaminated with oil, bitumins, harmful or objectionable chemicals, sewage or other pollutants, shall be disposed of so as to avoid affecting all nearby waters and lands. Under no circumstances shall the Contractor discharge pollutants into any watercourse or water storage area. The Contractor shall not allow water used in aggregate processing, concrete curing, foundation, and concrete lift cleanup, or any other waste, to enter a stream.

C. Noise and Air Pollution Control

1. The Contractor shall conduct his operations so as not to violate any applicable ordinances, regulations, rules, and laws in effect in the area pertaining to noise and air pollution.

D. Preservation of Natural Resources

1. All construction operations, cleanup, and the condition of the adjacent terrain upon completion of the work shall fully comply with all applicable regulations and laws concerning the preservation of natural resources.

E. Dust Control

1. Throughout the entire construction period, maintain dust control by use of water sprinklers or chemical dust control binder as may be approved by the Engineer.

1.04 CONFINED SPACE REQUIREMENTS

A. The Contractor shall be responsible for all practices and procedures, either singularly or in combination, required for entry into a confined space area as defined by the North Carolina Department of Labor. Such practices include, but are not limited to:

1. Preparation

2. Atmospheric Testing

3. Attendants and Rescue Teams

4. Permit Systems

5. Training

6. Special Equipment and Tools

7. Tripods, Safety Harnesses, Retrieval Lines, and Respiratory Protection

B. The contractor shall be required to conform to requirements stipulated in the Occupational Safety and Health Administration regulations.

1.05 CLEANING DURING CONSTRUCTION

A. Control accumulation of waste materials and rubbish; periodically dispose of off-site.

B. Clean areas prior to start of finish work; maintain areas free of dust and other contaminants during finishing operations.

END OF SECTION

SECTION 01 70 00 – CLOSEOUT PROCEDURES

PART 1 GENERAL

1.01 SUMMARY

A. This Section includes administrative and procedural requirements for contract closeout, including but not limited to the following:
   1. Inspection procedures
   2. Warranties
   3. Final cleaning

B. See Section 01 20 00 for requirements for Applications for Payment for Substantial and Final Completion.

C. See Section 01 33 00 for submitting Record Drawings, Record Specifications, and Record Product Data.

D. See Divisions 2 through 46 Sections for specific closeout and special cleaning requirements for the Work in those Sections.

1.02 SUBSTANTIAL COMPLETION

A. Preliminary Procedures: Before requesting inspection for determining date of Substantial Completion, complete the following. List items below that are incomplete in the request.
   1. Prepare a list of items to be completed and corrected (punch list), the value of items on the list, and reasons why the Work is not complete.
   2. Advise the Owner of pending insurance changeover requirements.
   3. Submit specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
   4. Obtain and submit releases permitting the Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
   5. Prepare and submit the Project Record Documents, Operation and Maintenance Manuals, final completion construction photographs and photographic negatives if available, damage or settlement surveys, property surveys, and similar final record information.
   6. Deliver tools, spare parts, extra materials, and similar items to location designated by Owner. Label with the Manufacturer's name and model number where applicable.
   7. Make final changeover of permanent locks and deliver keys to the Owner. Advise the Owner’s personnel of changeover in security provisions.
   8. Complete startup testing of systems.
   9. Submit test/adjust/balance records.
   10. Terminate and remove temporary facilities from the Project site, along with mockups, construction tools, and similar elements.
   11. Advise the Owner of changeover in heat and other utilities.
   12. Submit changeover information related to the Owner's occupancy, use, operation, and maintenance.
   13. Complete final cleaning requirements, including touchup painting.
   14. Touch up and otherwise repair and restore marred exposed finishes to eliminate visual defects.

B. Inspection: Submit a written request for inspection for Substantial Completion. On receipt of request, the Engineer will either proceed with inspection or notify the Contractor of unfulfilled requirements. The Engineer will prepare the Certificate of Substantial Completion after inspection or will notify the Contractor of items, either on the Contractor's list or additional items identified by the Engineer, that must be completed or corrected before certificate will be issued.
   1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.
   2. Results of the completed inspection will form the basis of requirements for Final Completion.

1.03 LIST OF INCOMPLETE ITEMS (PUNCH LIST)

A. Preparation: Submit three copies of the list. Include name and identification of each space and area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by the Contractor that are outside the limits of construction.
   1. Organize list of spaces in sequential order.
   2. Organize items applying to each space by major element, including categories for individual walls, and equipment, and building systems.

1.04 Final Completion

A. Preliminary Procedures: Before requesting the final inspection for determining date of Final Completion, complete the following:
   1. Submit a final Application for Payment according to Division 1 Section "Measurement and Payment."
   2. Submit a certified copy of Engineer's Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by the Engineer. The certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.
   3. Submit evidence of final, continuing insurance coverage complying with insurance requirements.
   4. Instruct the Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems. Submit demonstration and training videos. Inspection: Submit a written request for Final Inspection for acceptance. On receipt of request, the Engineer will either proceed with inspection or notify the Contractor of unfulfilled requirements. The Engineer will prepare a final Certificate for Payment after inspection or will notify the Contractor of construction that must be completed or corrected before certificate will be issued.
   5. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.

PART 2 PRODUCTS

2.01 Materials

A. Cleaning Agents: Use cleaning materials and agents recommended by the Manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces

PART 3 EXECUTION

3.01 Final Cleaning

A. General: Provide final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal, State and Local environmental and antipollution regulations.

B. Cleaning: Clean each surface or unit to condition equal to original plant condition. Comply with the Manufacturer's written instructions.

1. Complete the following cleaning operations before requesting inspection for certification of Final Completion for entire Project or for a portion of Project:
   a) Clean Project site, yard, and grounds, in areas disturbed by construction activities, of rubbish, waste material, litter, and other foreign substances.
   b) Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.
   c) Remove tools, construction equipment, machinery, and surplus material from the Project site.
   d) Clean exposed exterior and interior hard-surfaced finishes to a dirt free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.
   e) Remove debris and surface dust from limited access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.
   f) Remove labels that are not permanent.
   g) Touch up and otherwise repair and restore marred, exposed finishes and surfaces. Replace finishes and surfaces that cannot be satisfactorily repaired or restored or that already show evidence of repair or restoration.
   h) Wipe surfaces of mechanical and electrical equipment and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.
   i) Replace parts subject to unusual operating conditions.
   j) Leave Project clean and ready for occupancy.

2. Comply with safety standards for cleaning. Do not burn waste materials. Do not bury debris or excess materials on the Owner's property. Do not discharge volatile, harmful, or dangerous materials into drainage systems. Remove waste materials from the Project site and dispose of lawfully.

3.02 Substantial Completion

A. Contractor shall demonstrate to the Owner and Engineer that each until process functions and performs in accordance with the plans, specifications, and the Manufacture′s design criteria.

B. The Contractor shall coordinate the date, time, and duration of the performance testing and demonstration with the Owner and Engineer.

C. The Contractor shall correct deficiencies identified by the Owner or Engineer during performance demonstration prior to rescheduling a subsequent performance demonstration.

D. Once the Contractor has demonstrated that each unit process functions and performs as required, the Engineer shall advice the Contractor in writing as to the date of Substantial Completion.

E. The punch list of items to be corrected before the date of the final completion will be attached to the notification of substantial completion.

3.03 Final Completion

A. The Contractor shall coordinate with the Owner and Engineer confirmation that each item appearing on the punch list has been corrected.

B. Once all punch list items have been corrected, the Engineer shall issue the Certificate of Final Completion.

END OF SECTION

PART 1 GENERAL

1.01 DESCRIPTION

A. Existing utility facilities and structures are shown in accordance with the best available information. The Engineer and / or the Owner will not be responsible for the completeness or accuracy thereof nor for any deductions, interpretations, or conclusions drawn there from. Forty-eight hours in advance of work in the vicinity of existing facilities, the Contractor shall call NC 811 at 811 or 1-800-632-4949. The Contractor shall verify to his own satisfaction, the actual locations of existing facilities prior to construction in their vicinity.

1. Should the Contractor, in the course of his operations, encounter any underground utilities, the presence of which was not previously known or of a different type than shown, he shall immediately notify the Engineer and take all precautions necessary to support and protect the utility and maintain continuous service until said utilities can be adjusted by the appropriate owners or other corrective measures taken.

2. Relocations by others arranged by and for the convenience of the Contractor shall be at no additional cost to the Owner.

3. The Contractor shall be responsible for filing all requests with public utility corporations, jurisdictional agencies, or other owners to make all adjustments to public utility fixtures and appurtenances within or adjacent to the limits of construction. Furnish copies of all such requests and replies to the Engineer. The Contractor shall be responsible for coordinating his activities with said body. Additional costs resulting from a lack of coordination between the utilities and Contractor shall be at no additional cost to the Owner, and extension of time, therefore, will not be granted.

4. Damage caused to utilities either directly or indirectly by the Contractor shall be repaired and the facilities restored to their original condition to the satisfaction of the Engineer and the utility owner, at no additional cost to the Owner.

B. Work in Vicinity of Existing Utilities

1. At least 48 hours prior to starting work in the vicinity of utility structures and appurtenances, the Contractor shall notify NC 811 as stated hereinbefore. The Contractor, at his own expense, shall support and protect all utility structures and appurtenances in accordance with the Contract Documents and/or the Owner's requirements and shall take any other steps necessary to protect the structures from disturbance and damage.

C. Access to Utilities Facilities

1. The Contractor shall at all times permit free and clear access to the various affected facilities by personnel of the utility for the purpose of inspection, maintenance, providing additional service requirements and the construction of new facilities. When personnel of the utility are working within the limits of work to be performed by the Contractor, the contractor will not be relieved of his responsibility for the maintenance and protection of such facilities.

D. When local codes or laws require notification of work to agencies or departments, the Contractor shall be responsible for providing such notification.

END OF SECTION

SECTION 03 30 00 – CAST-IN-PLACE CONCRETE

PART 1. GENERAL

1.01 SUMMARY

A. This Section specifies cast-in place concrete, including formwork, reinforcement, concrete materials, mixture design, placement procedures, and finishes, for Building and Environmental Structures as follows:

1. Footings.
2. Foundation walls.
3. Slabs-on-grade.
4. Concrete toppings.
5. Concrete fill.
6. Liquid retaining structures.

1.02 DEFINITIONS

A. Cementitious Materials: Portland cement alone or in combination with one or more of the following: blended hydraulic cement, fly ash, ground granulated blast-furnace slag, and silica fume; subject to compliance with requirements.

1.03 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Design Mixtures: For each concrete mixture. Submit alternate design mixtures when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.

1. Indicate amounts of mixing water to be withheld for later addition at Project site.

C. Steel Reinforcement Shop Drawings: Placing drawings that detail fabrication, bending, and placement. Include bar sizes, lengths, material, grade, bar schedules, stirrup spacing, bent bar diagrams, bar arrangement, splices and laps, mechanical connections, tie spacing, hoop spacing, and supports for concrete reinforcement.

D. Formwork Shop Drawings: Prepared by or under the supervision of a qualified professional engineer detailing fabrication, assembly, and support of formwork.

1. Shoring and Reshoring: Indicate proposed schedule and sequence of stripping formwork, shoring removal, and installing and removing reshoring.

E. Samples: For waterstops.

F. Welding certificates.

G. Material Test Reports: For the following, from a qualified testing agency, indicating compliance with requirements:

1. Aggregates. Include service record data indicating absence of deleterious expansion of concrete due to alkali aggregate reactivity.

H. Material Certificates: For each of the following, signed by manufacturers:

1. Cementitious materials.
2. Admixtures.
3. Form materials and form-release agents.
4. Steel reinforcement and accessories.

5. Waterstops.
6. Curing compounds.
7. Floor and slab treatments.
8. Bonding agents.
9. Adhesives.
10. Vapor retarders.
11. Repair materials.

I. Minutes of preinstallation conference.

1.04 QUALITY ASSURANCE

A. Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C 94/C 94M requirements for production facilities and equipment.

1. Manufacturer certified according to NRMCA's "Certification of Ready Mixed Concrete Production Facilities."

B. Source Limitations: Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant, obtain aggregate from one source, and obtain admixtures through one source from a single manufacturer.

C. Welding: Qualify procedures and personnel according to AWS D1.4, "Structural Welding Code--Reinforcing Steel."

D. ACI Publications: Comply with the following unless modified by requirements in the Contract Documents:

1. ACI 301-99, "Specification for Structural Concrete," Sections 1 through 5.
2. ACI 117, "Specifications for Tolerances for Concrete Construction and Materials."

E. Concrete Testing Service: Engage a qualified independent testing agency to perform material evaluation tests and to design concrete mixtures.

F. Preinstallation Conference: conduct conference at Project site.

1. Before submitting design mixtures, review concrete design mixture and examine procedures for ensuring quality of concrete materials. Require representatives of each entity directly concerned with cast-in-place concrete to attend, including the following:
   a) Contractor's superintendent.
   b) Independent testing agency responsible for concrete design mixtures.
   c) Ready-mix concrete manufacturer.
   d) Concrete subcontractor.
2. Review special inspection and testing and inspecting agency procedures for field quality control, concrete finishes and finishing, cold- and hot-weather concreting procedures, curing procedures, construction contraction and isolation joints, and joint-filler strips, semirigid joint fillers, forms and form removal limitations, shoring and reshoring procedures, vapor-retarder installation, anchor rod and anchorage device installation tolerances, steel reinforcement installation, floor and slab flatness and levelness measurement, concrete repair procedures, and concrete protection.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Steel Reinforcement: Deliver, store, and handle steel reinforcement to prevent bending and damage. Avoid damaging coatings on steel reinforcement.

B. Waterstops: Store waterstops under cover to protect from moisture, sunlight, dirt, oil, and other contaminants.

PART 2. PRODUCTS

2.01 MANUFACTURERS

2.02 FORM-FACING MATERIALS

A. Smooth-Formed Finished Concrete: Form-facing panels that will provide continuous, true, and smooth concrete surfaces. Furnish in largest practicable sizes to minimize number of joints.

1. Plywood, metal, or other approved panel materials.

2. Exterior-grade plywood panels, suitable for concrete forms, complying with DOC PS 1, and as follows:
   a) High-density overlay, Class 1 or better.
   b) Medium-density overlay, Class 1 or better; mill-release agent treated, and edge sealed.
   c) Structural 1, B-B or better; mill oiled, and edge sealed.
   d) B-B (Concrete Form), Class 1 or better; mill oiled, and edge sealed.

B. Rough-Formed Finished Concrete: Plywood, lumber, metal, or another approved material. Provide lumber dressed on at least two edges and one side for tight fit.

C. Pan-Type Forms: Glass-fiber-reinforced plastic or formed steel, stiffened to resist plastic concrete loads without detrimental deformation.

D. Chamfer Strips: Wood, metal, PVC, or rubber strips, 3/4-by-3/4-inch, minimum.

E. Rustication Strips: Wood, metal, PVC, or rubber strips, kerfed for ease of form removal.

F. Form-Release Agent: Commercially formulated form-release agent that will not bond with, stain, or adversely affect concrete surfaces and will not impair subsequent treatments of concrete surfaces.

1. Formulate form-release agent with rust inhibitor for steel form-facing materials.

G. Form Ties: Factory-fabricated, removable or snap-off metal or glass-fiber-reinforced plastic form ties designed to resist lateral pressure of fresh concrete on forms and to prevent spalling of concrete on removal.

1. Furnish units that will leave no corrodible metal closer than 1 inch to the plane of exposed concrete surface.

2. Furnish ties that, when removed, will leave holes no larger than 1 inch in diameter in concrete surface.

3. Furnish ties with integral water-barrier plates to walls indicated to receive damp-proofing or waterproofing.

2.03 STEEL REINFORCEMENT

A. Reinforcing Bars: ASTM A 615/A 615M, Grade 60, deformed.

B. Low-Alloy-Steel Reinforcing Bars: ASTM A 706/A 706M, deformed when welding is indicated.

C. Plain-Steel Wire: ASTM A 82, as drawn.

D. Plain-Steel Welded Wire Reinforcement: ASTM A 185, plain, fabricated from as-drawn steel wire into flat sheets.

2.04 REINFORCEMENT ACCESSORIES

A. Joint Dowel Bars: ASTM A 615/A 615M, Grade 60, plain-steel bars, cut bars true to length with ends square and free of burrs.

B. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded wire reinforcement in place. Manufacture bar supports from steel wire, plastic, or precast concrete according to CRSI's "Manual of Standard Practice," of greater compressive strength than concrete and as follows:

1. For concrete surfaces exposed to view where legs of wire bar supports contact forms, use CRSI Class 1 plastic-protected steel wire or CRSI Class 2 stainless-steel bar supports.

2.05 CONCRETE MATERIALS

A. Cementitious Material: Use the following cementitious materials, of the same type, brand, and source, throughout Project:

1. Portland Cement: ASTM C 150, Type I/II, gray. Supplement with the following:
   a) Fly Ash: ASTM C 618, Class C.
   b) Ground Granulated Blast-Furnace Slag: ASTM C 989, Grade 120.

B. Normal-Weight Aggregates: ASTM C 33, Class 3S coarse aggregate or better, graded. Provide aggregates from a single source.

1. Maximum Coarse-Aggregate Size: 1-1/2 inches nominal except as otherwise limited by ACI 318-99, paragraph 3.3.2.

2. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.

C. Water: ASTM C 94/C 94M and potable.

2.06 ADMIXTURES

A. Air-Entraining Admixture: ASTM C 260.

B. Chemical Admixtures: Provide admixtures certified by manufacturer to be compatible with other admixtures and that will not contribute water-soluble chloride ions exceeding those permitted in hardened concrete. Do not use calcium chloride or admixtures containing more than 0.1% chloride ions.

1. Water-Reducing Admixture: ASTM C 494/C 494M, Type A.

2. Retarding Admixture: ASTM C 494/C 494M, Type B.

3. Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type D.

4. High-Range, Water-Reducing Admixture: ASTM C 494/C 494M, Type F.

5. High-Range, Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type G.

6. Plasticizing and Retarding Admixture: ASTM C 1017/C 1017M, Type II.

C. Non-Set-Accelerating Corrosion-Inhibiting Admixture: Commercially formulated, non-set-accelerating, anodic inhibitor or mixed cathodic and anodic inhibitor; capable of forming a protective barrier and minimizing chloride reactions with steel reinforcement in concrete.

2.07 WATERSTOPS

A. Chemically Resistant Flexible Waterstops: Thermoplastic elastomer rubber waterstops for embedding in concrete to prevent passage of fluids through joints; resistant to oils, solvents, and chemicals. Factory fabricate corners, intersections, and directional changes.

1. Products:
   a) JP Specialties, Inc.; Earth Shield TPE-Rubber.
   b) Vinylex Corp.; PetroStop.
   c) WESTEC Barrier Technologies, Inc.; 600 Series TPE-R.

2. Profile: Ribbed with center bulb.

3. Dimensions: 4 inches by 3/16 inch thick; nontapered.

2.08 VAPOR RETARDERS

A. Plastic Vapor Retarder: ASTM E 1745, Class C, or polyethylene sheet, ASTM D 4397, not less than 10 mils thick. Include manufacturer's recommended adhesive or pressure-sensitive joint tape.

2.09 FLOOR AND SLAB TREATMENTS

A. Unpigmented Mineral Dry-Shake Floor Hardener: Factory-packaged dry combination of portland cement, graded quartz aggregate, and plasticizing admixture when indicated.

B. Penetrating Liquid Floor Treatment: Clear, chemically reactive, waterborne solution of inorganic silicate or siliconate materials and proprietary components; odorless; colorless; that penetrates, hardens, and densifies concrete surfaces when indicated.

2.10 CURING MATERIALS

A. Evaporation Retarder: Waterborne, monomolecular film forming, manufactured for application to fresh concrete.

B. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. when dry.

C. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.

D. Water: Potable.

E. Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B, nondissipating, certified by curing compound manufacturer to not interfere with bonding of floor covering.

2.11 RELATED MATERIALS

A. Bonding Agent: ASTM C 1059, Type II, non-redispersible, acrylic emulsion or styrene butadiene.

B. Epoxy Bonding Adhesive: ASTM C 881, two-component epoxy resin, capable of humid curing and bonding to damp surfaces, of class suitable for application temperature and of grade to suit requirements, and as follows:

1. Types IV and V, load bearing, for bonding hardened or freshly mixed concrete to hardened concrete.

C. Reglets: Fabricate reglets of not less than 0.0217-inch- thick, galvanized steel sheet. Temporarily fill or cover face opening of reglet to prevent intrusion of concrete or debris.

D. Dovetail Anchor Slots: Hot-dip galvanized steel sheet, not less than 0.0336 inch thick, with bent tab anchors. Temporarily fill or cover face opening of slots to prevent intrusion of concrete or debris.

2.12 REPAIR MATERIALS

A. Repair Underlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/8 inch and that can be feathered at edges to match adjacent floor elevations.

1. Cement Binder: ASTM C 150, portland cement or hydraulic or blended hydraulic cement as defined in ASTM C 219.

2. Primer: Product of underlayment manufacturer recommended for substrate, conditions, and application.

3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch or coarse sand as recommended by underlayment manufacturer.

4. Compressive Strength: Not less than 4100 psi at 28 days when tested according to ASTM C 109/C 109M.

B. Repair Overlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/8 inch and that can be feathered at edges to match adjacent floor elevations.

1. Cement Binder: ASTM C 150, portland cement or hydraulic or blended hydraulic cement as defined in ASTM C 219.
2. Primer: Product of topping manufacturer recommended for substrate, conditions, and application.
3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch or coarse sand as recommended by topping manufacturer.
4. Compressive Strength: Not less than 5000 psi at 28 days when tested according to ASTM C 109/C 109M.

2.13 CONCRETE MIXTURES, GENERAL

A. Prepare design mixtures for each type and strength of concrete, proportioned on the basis of laboratory trial mixture or field test data, or both, according to ACI 301.
   1. Use a qualified independent testing agency for preparing and reporting proposed mixture designs based on laboratory trial mixtures.

B. Cementitious Materials: Limit percentage, by weight, of cementitious materials other than portland cement in concrete as follows:
   1. Fly Ash: 25 percent.
   2. Ground Granulated Blast-Furnace Slag: 50 percent.

C. Limit water-soluble, chloride-ion content in hardened concrete to 0.06 percent by weight of cement.

D. Admixtures: Use admixtures according to manufacturer's written instructions.
   1. Use water-reducing high-range water-reducing or plasticizing admixture in concrete, as required, for placement and workability.
   2. Use water-reducing and retarding admixture when required by high temperatures, low humidity, or other adverse placement conditions.
   3. Use corrosion-inhibiting admixture in concrete mixtures when indicated.

E. Color Pigment: Add color pigment to concrete mixture according to manufacturer's written instructions and to result in hardened concrete color consistent with approved mockup.

2.14 CONCRETE MIXTURES FOR NON-ENVIRONMENTAL BUILDING ELEMENTS

A. Footings: Proportion normal-weight concrete mixture as follows:
   1. Minimum Compressive Strength: 4000 psi at 28 days.
   2. Slump Limit: 4 inches; 8 inches for concrete with verified slump of 2 to 4 inches before adding high-range water-reducing admixture or plasticizing admixture, plus or minus 1 inch.
   3. Air Content: 6 percent, plus or minus 1.5 percent at point of delivery.

B. Foundation Walls: Proportion normal-weight concrete mixture as follows:
   1. Minimum Compressive Strength: 4000 psi at 28 days.
   2. Slump Limit: 4 inches; 8 inches for concrete with verified slump of 2 to 4 inches before adding high-range water-reducing admixture or plasticizing admixture, plus or minus 1 inch.
   3. Air Content: 6 percent, plus or minus 1.5 percent at point of delivery.

C. Slabs-on-Grade: Proportion normal-weight concrete mixture as follows:
   1. Minimum Compressive Strength: 4000 psi at 28 days.
   2. Slump Limit: 4 inches, plus or minus 1 inch.

3. Air Content: Do not allow air content of troweled finished floors to exceed 3 percent.
4. Synthetic Fiber: Uniformly disperse in concrete mixture at manufacturer's recommended rate, but not less than 1.5 lb/cu. yd.

D. Suspended Slabs: Proportion normal-weight concrete mixture as follows:

1. Minimum Compressive Strength: 4000 psi at 28 days.
2. Slump Limit: 4 inches, plus or minus 1 inch.
3. Air Content: Do not allow air content of troweled finished floors to exceed 3 percent.
4. Synthetic Fiber: Uniformly disperse in concrete mixture at manufacturer's recommended rate, but not less than 1.5 lb/cu. yd.

E. Concrete Toppings: Proportion normal-weight concrete mixture as follows:

1. Minimum Compressive Strength: 4000 psi at 28 days.
2. Slump Limit: 4 inches, plus or minus 1 inch.
3. Air Content: Do not allow air content of troweled finished toppings to exceed 3 percent.
4. Synthetic Fiber: Uniformly disperse in concrete mixture at manufacturer's recommended rate, but not less than 1.5 lb/cu. yd.

2.15 CONCRETE MIXES FOR ENVIRONMENTAL AND LIQUID RETAINING STRUCTURES

A. Footings: Proportion normal-weight concrete mixture as follows:

1. Minimum Compressive Strength: 4000 psi at 28 days.
2. Slump Limit: 4 inches; 8 inches for concrete with verified slump of 2 to 4 inches before adding high range water-reducing or plasticizing admixture, plus or minus 1 inch.
3. Air Content: 6 percent plus or minus 1.5 percent at point of delivery.

B. All other concrete: Proportion normal weight concrete mixture as follows:

1. Minimum compressive strength: 4000 psi at 28 days.
2. Maximum Water-Cementitious Material Ratio: 0.45.
3. Minimum Cementitious Materials Content: 540 lbs/cu. yd.
4. Slump Limit: 4 inches plus or minus 1 inch.
5. Air Content: 6 percent plus or minus 1.5 percent at point of delivery. Do not allow air content of troweled finished floors to exceed 3 percent

2.16 FABRICATING REINFORCEMENT

A. Fabricate steel reinforcement according to CRSI's "Manual of Standard Practice."

2.17 CONCRETE MIXING

A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete according to ASTM C 94/C 94M, and furnish batch ticket information.

1. When air temperature is between 85 and 90 deg F, reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F, reduce mixing and delivery time to 60 minutes.

PART 3. EXECUTION

3.01 FORMWORK

A. Design, erect, shore, brace, and maintain formwork, according to ACI 301, to support vertical, lateral, static, and dynamic loads, and construction loads that might be applied, until structure can support such loads.

B. Construct formwork so concrete members and structures are of size, shape, alignment, elevation, and position indicated, within tolerance limits of ACI 117.

C. Limit concrete surface irregularities, designated by ACI 347R as abrupt or gradual, as follows:

1. Class A, 1/8 inch for smooth-formed finished surfaces.

2. Class B, 1/4 inch for rough-formed finished surfaces.

D. Construct forms tight enough to prevent loss of concrete mortar.

E. Fabricate forms for easy removal without hammering or prying against concrete surfaces. Provide crush or wrecking plates where stripping may damage cast concrete surfaces. Provide top forms for inclined surfaces steeper than 1.5 horizontal to 1 vertical.

F. Install keyways, reglets, recesses, and the like, for easy removal.

1. Do not use rust-stained steel form-facing material.

2. Set edge forms, bulkheads, and intermediate screed strips for slabs to achieve required elevations and slopes in finished concrete surfaces. Provide and secure units to support screed strips; use strike-off templates or compacting-type screeds.

G. Provide temporary openings for cleanouts and inspection ports where interior area of formwork is inaccessible. Close openings with panels tightly fitted to forms and securely braced to prevent loss of concrete mortar. Locate temporary openings in forms at inconspicuous locations.

H. Chamfer exterior corners and edges of permanently exposed concrete.

I. Form openings, chases, offsets, sinkages, keyways, reglets, blocking, screeds, and bulkheads required in the Work. Determine sizes and locations from trades providing such items.

J. Clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, and other debris just before placing concrete.

K. Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.

L. Coat contact surfaces of forms with form-release agent, according to manufacturer's written instructions, before placing reinforcement.

3.02 EMBEDDED ITEMS

A. Place and secure anchorage devices and other embedded items required for adjoining work that is attached to or supported by cast-in-place concrete. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.

1. Install anchor rods, accurately located, to elevations required and complying with tolerances in Section 7.5 of AISC's "Code of Standard Practice for Steel Buildings and Bridges."

2. Install reglets to receive waterproofing and to receive through-wall flashings in outer face of concrete frame at exterior walls, where flashing is shown at lintels, shelf angles, and other conditions.

3. Install dovetail anchor slots in concrete structures as indicated.

3.03 REMOVING AND REUSING FORMS

A. General: Formwork for sides of beams, walls, columns, and similar parts of the Work that does not support weight of concrete may be removed after cumulatively curing at not less than 50 deg F for 24 hours after placing concrete, if concrete is hard enough to not be damaged by form-removal operations and curing and protection operations are maintained.

1. Leave formwork for beam soffits, joists, slabs, and other structural elements that supports weight of concrete in place until concrete has achieved at least 75 percent of its 28-day design compressive strength.

2. Remove forms only if shores have been arranged to permit removal of forms without loosening or disturbing shores.

B. Clean and repair surfaces of forms to be reused in the Work. Split, frayed, delaminated, or otherwise damaged form-facing material will not be acceptable for exposed surfaces. Apply new form-release agent.

C. When forms are reused, clean surfaces, remove fins and laitance, and tighten to close joints. Align and secure joints to avoid offsets. Do not use patched forms for exposed concrete surfaces unless approved by Engineer.

3.04 SHORES AND RESHORES

A. Comply with ACI 318 and ACI 301 for design, installation, and removal of shoring and reshoring.

1. Do not remove shoring or reshoring until measurement of slab tolerances is complete.

B. In multistory construction, extend shoring or reshoring over a sufficient number of stories to distribute loads in such a manner that no floor or member will be excessively loaded or will induce tensile stress in concrete members without sufficient steel reinforcement.

C. Plan sequence of removal of shores and reshore to avoid damage to concrete. Locate and provide adequate reshoring to support construction without excessive stress or deflection.

3.05 VAPOR RETARDERS

A. Plastic Vapor Retarders: Place, protect, and repair vapor retarders according to ASTM E 1643 and manufacturer's written instructions.

1. Lap joints 6 inches and seal with manufacturer's recommended tape.

3.06 STEEL REINFORCEMENT

A. General: Comply with CRSI's "Manual of Standard Practice" for placing reinforcement.

1. Do not cut or puncture vapor retarder. Repair damage and reseal vapor retarder before placing concrete.

B. Clean reinforcement of loose rust and mill scale, earth, ice, and other foreign materials that would reduce bond to concrete.

C. Accurately position, support, and secure reinforcement against displacement. Locate and support reinforcement with bar supports to maintain minimum concrete cover. Do not tack weld crossing reinforcing bars.

1. Weld reinforcing bars according to AWS D1.4, where indicated.

D. Set wire ties with ends directed into concrete, not toward exposed concrete surfaces.

E. Install welded wire reinforcement in longest practicable lengths on bar supports spaced to minimize sagging. Lap edges and ends of adjoining sheets at least one mesh spacing. Offset laps of adjoining sheet widths to prevent continuous laps. Lace overlaps with wire.

3.07 JOINTS

A. General: Construct joints true to line with faces perpendicular to surface plane of concrete.

B. Construction Joints: Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by Engineer.

1. Place joints perpendicular to main reinforcement. Continue reinforcement across construction joints, unless otherwise indicated. Do not continue reinforcement through sides of strip placements of floors and slabs.

2. Form keyed joints as indicated. Embed keys at least 1-1/2 inches into concrete.

3. Locate joints for beams, slabs, joists, and girders in the middle third of spans. Offset joints in girders a minimum distance of twice the beam width from a beam-girder intersection.

4. Locate horizontal joints in walls and columns at underside of floors, slabs, beams, and girders and at the top of footings or floor slabs.

5. Space vertical joints in walls as indicated. Locate joints beside piers integral with walls, near corners, and in concealed locations where possible.

6. Use a bonding agent at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.

7. Use epoxy-bonding adhesive at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.

C. Isolation Joints in Slabs-on-Grade: After removing formwork, install bond break strips at slab junctions with vertical surfaces, such as column pedestals, foundation walls, grade beams, and other locations, as indicated.

1. Extend bond break strips full width and depth of joint, terminating flush with finished concrete surface, unless otherwise indicated.

2. Terminate full-width bond break strips not less than 1/2 inch or more than 1 inch below finished concrete surface where joint sealants, specified in Division 7 Section "Joint Sealants," are indicated.

3. Install bond break strips in lengths as long as practicable. Where more than one length is required, lace or clip sections together.

D. Doweled Joints: Install dowel bars and support assemblies at joints where indicated. Lubricate or asphalt coat one-half of dowel length to prevent concrete bonding to one side of joint.

3.08 WATERSTOPS

A. Flexible Waterstops: Install in construction joints and at other joints indicated to form a continuous diaphragm. Install in longest lengths practicable. Support and protect exposed waterstops during progress of the Work. Field fabricate joints in waterstops according to manufacturer's written instructions.

B. Self-Expanding Strip Waterstops: Install in construction joints and at other locations indicated, according to manufacturer's written instructions, adhesive bonding, mechanically fastening, and firmly pressing into place. Install in longest lengths practicable.

3.09 CONCRETE PLACEMENT

A. Before placing concrete, verify that installation of formwork, reinforcement, and embedded items is complete and that required inspections have been performed.

B. Notify Soils Engineer to permit inspection of sub-base a minimum of 24 hours prior to placement of reinforcing steel and concrete. Owner's Soils Engineer shall inspect and approve all foundation subgrades prior to placing concrete.

C. Notify Owner's Inspection service to permit inspection of reinforcing steel a minimum of 24 hours prior to concrete placement. Notify Owner 24 hours prior to any scheduled concrete pour.

D. Before placing concrete, water may be added at Project site, subject to limitations of ACI 301.

1. Do not add water to concrete after adding high-range water-reducing admixtures to mix.

E. Deposit concrete continuously in one layer or in horizontal layers of such thickness that no new concrete will be placed on concrete that has hardened enough to cause seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as indicated. Deposit concrete to avoid segregation.

1. Deposit concrete in horizontal layers of depth to not exceed formwork design pressures and in a manner to avoid inclined construction joints.

2. Consolidate placed concrete with mechanical vibrating equipment according to ACI 301.

3. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations to rapidly penetrate placed layer and at least 6 inches into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to lose plasticity. At each insertion, limit duration of vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing mixture constituents to segregate.

F. Deposit and consolidate concrete for floors and slabs in a continuous operation, within limits of construction joints, until placement of a panel or section is complete.

1. Consolidate concrete during placement operations so concrete is thoroughly worked around reinforcement and other embedded items and into corners.

2. Maintain reinforcement in position on chairs during concrete placement.

3. Screed slab surfaces with a straightedge and strike off to correct elevations.

4. Slope surfaces uniformly to drains where required.

5. Begin initial floating using bull floats or darbies to form a uniform and open-textured surface plane, before excess bleedwater appears on the surface. Do not further disturb slab surfaces before starting finishing operations.

G. Cold-Weather Placement: Comply with ACI 306.1 and as follows. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.

1. When average high and low temperature is expected to fall below 40 deg F for three successive days, maintain delivered concrete mixture temperature within the temperature range required by ACI 301.

2. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.

3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in mixture designs.

H. Hot-Weather Placement: Comply with ACI 301 and as follows:

1. Maintain concrete temperature below 90 deg F at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated to total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.

2. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade uniformly moist without standing water, soft spots, or dry areas.

3.10 FINISHING FORMED SURFACES

A. Forms used for formed concrete shall produce a smooth formed finish.

B. Smooth-Formed Finish: As-cast concrete texture imparted by form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams. Repair and patch tie holes and de-

fects. Remove fins and other projections that exceed specified limits on formed-surface irregularities.

1. Apply to concrete surfaces to receive a rubbed finish and to be covered with a coating or covering material applied directly to concrete.

C. Rubbed Finish: Apply the following to smooth-formed finished as-cast concrete where indicated:

1. Grout-Cleaned Finish: Wet concrete surfaces and apply grout of a consistency of thick paint to coat surfaces and fill small holes. Mix one part portland cement to one and one-half parts fine sand with a 1:1 mixture of bonding admixture and water. Add white portland cement in amounts determined by trial patches so color of dry grout will match adjacent surfaces. Scrub grout into voids and remove excess grout. When grout whitens, rub surface with clean burlap and keep surface damp by fog spray for at least 36 hours.

2. Apply to concrete surfaces exposed to view or permanently exposed to process liquids.

D. Related Unformed Surfaces: At tops of walls, horizontal offsets, and similar unformed surfaces adjacent to formed surfaces, strike off smooth and finish with a texture matching adjacent formed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces, unless otherwise indicated.

3.11 FINISHING FLOORS AND SLABS

A. General: Comply with ACI 302.1R recommendations for screeding, restraightening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.

B. Scratch Finish: While still plastic, texture concrete surface that has been screeded and bull-floated or darbied. Use stiff brushes, brooms, or rakes to produce a profile amplitude of 1/4 inch in 1 direction.

1. Apply scratch finish to surfaces indicated and to receive: concrete floor toppings; to receive mortar setting beds for bonded cementitious floor finishes.

C. Float Finish: Consolidate surface with power-driven floats or by hand floating if area is small or inaccessible to power driven floats. Restraighten, cut down high spots, and fill low spots. Repeat float passes and restraightening until surface is left with a uniform, smooth, granular texture.

1. Apply float finish to surfaces indicated to receive trowel finish and to be covered with fluid-applied or sheet waterproofing, built-up or membrane roofing, or sand-bed terrazzo.

D. Trowel Finish: After applying float finish, apply first troweling and consolidate concrete by hand or power-driven trowel. Continue troweling passes and restraighten until surface is free of trowel marks and uniform in texture and appearance. Grind smooth any surface defects that would telegraph through applied coatings or floor coverings.

1. Apply a trowel finish to surfaces indicated exposed to view or to be covered with resilient flooring, carpet, ceramic or quarry tile set over a cleavage membrane, paint, or another thin-film-finish coating system.

2. Finish and measure surface so gap at any point between concrete surface and an unleveled, freestanding, 10-foot- long straightedge resting on 2 high spots and placed anywhere on the surface does not exceed 1/8 inch

E. Broom Finish: Apply a broom finish to exterior concrete platforms, steps, and ramps, and elsewhere as indicated.

1. Immediately after trowel finishing, slightly roughen trafficked surface by brooming with fiber-bristle broom perpendicular to main traffic route. Coordinate required final finish with Engineer before application.

F. Dry-Shake Floor Hardener Finish: After initial floating, apply dry-shake floor hardener to surfaces according to manufacturer's written instructions and as follows:

1. Uniformly apply dry-shake floor hardener at a rate of 100 lb/100 sq. ft. unless greater amount is recommended by manufacturer.
2. Uniformly distribute approximately two-thirds of dry-shake floor hardener over surface by hand or with mechanical spreader, and embed by power floating. Follow power floating with a second dry-shake floor hardener application, uniformly distributing remainder of material, and embed by power floating.
3. After final floating, apply a trowel finish. Cure concrete with curing compound recommended by dry-shake floor hardener manufacturer and apply immediately after final finishing.

3.12 MISCELLANEOUS CONCRETE ITEMS

A. Filling In: Fill in holes and openings left in concrete structures, unless otherwise indicated, after work of other trades is in place. Mix, place, and cure concrete, as specified, to blend with in-place construction. Provide other miscellaneous concrete filling indicated or required to complete the Work.

B. Curbs: Provide monolithic finish to interior curbs by stripping forms while concrete is still green and by steel-troweling surfaces to a hard, dense finish with corners, intersections, and terminations slightly rounded.

C. Equipment Bases and Foundations: Provide machine and equipment bases and foundations as shown on Drawings. Set anchor bolts for machines and equipment at correct elevations, complying with diagrams or templates from manufacturer furnishing machines and equipment.

D. Steel Pan Stairs: Provide concrete fill for steel pan stair treads, landings, and associated items. Cast-in inserts and accessories as shown on Drawings. Screed, tamp, and trowel-finish concrete surfaces.

3.13 CONCRETE PROTECTING AND CURING

A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 306.1 for cold-weather protection and ACI 301 for hot-weather protection during curing.

B. Evaporation Retarder: Apply evaporation retarder to unformed concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. x h before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete, but before float finishing.

C. Formed Surfaces: Cure formed concrete surfaces, including underside of beams, supported slabs, and other similar surfaces. If forms remain during curing period, moist cure after loosening forms. If removing forms before end of curing period, continue curing for the remainder of the curing period.

D. Unformed Surfaces: Begin curing immediately after finishing concrete. Cure unformed surfaces, including floors and slabs, concrete floor toppings, and other surfaces.

E. Cure concrete according to ACI 308, by one or a combination of the following methods:

1. Moisture Curing: Keep surfaces continuously moist for not less than seven days with the following materials:
   a) Water.
   b) Continuous water-fog spray.
   c) Absorptive cover, water saturated, and kept continuously wet. Cover concrete surfaces and edges with 12-inch lap over adjacent absorptive covers.
2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches, and sealed by waterproof tape or adhesive. Cure for not less than seven days. Immediately repair any holes or tears during curing period using cover material and waterproof tape.

a) Moisture cure or use moisture-retaining covers to cure concrete surfaces to receive penetrating liquid floor treatments.
b) Cure concrete surfaces to receive floor coverings with either a moisture-retaining cover or a curing compound that the manufacturer certifies will not interfere with bonding of floor covering used on Project.

3. Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating and repair damage during curing period.
   a) After curing period has elapsed, remove curing compound without damaging concrete surfaces by method recommended by curing compound manufacturer unless manufacturer certifies curing compound will not interfere with bonding of floor covering used on Project.

3.14 LIQUID FLOOR TREATMENTS

A. Penetrating Liquid Floor Treatment: Prepare, apply, and finish penetrating liquid floor treatment according to manufacturer's written instructions.

1. Remove curing compounds, sealers, oil, dirt, laitance, and other contaminants and complete surface repairs.

2. Do not apply to concrete that is less than 28 days' old.

3. Apply liquid until surface is saturated, scrubbing into surface until a gel forms; rewet; and repeat brooming or scrubbing. Rinse with water; remove excess material until surface is dry. Apply a second coat in a similar manner if surface is rough or porous.

B. Sealing Coat: Uniformly apply a continuous sealing coat of curing and sealing compound to hardened concrete by power spray or roller according to manufacturer's written instructions.

3.15 CONCRETE SURFACE REPAIRS

A. Defective Concrete: Repair and patch defective areas when approved by Engineer. Remove and replace concrete that cannot be repaired and patched to Engineer's approval.

B. Patching Mortar: Mix dry-pack patching mortar, consisting of one part portland cement to two and one-half parts fine aggregate passing a No. 16 sieve, using only enough water for handling and placing.

C. Repairing Formed Surfaces: Surface defects include color and texture irregularities, cracks, spalls, air bubbles, honeycombs, rock pockets, fins and other projections on the surface, and stains and other discolorations that cannot be removed by cleaning.

1. Immediately after form removal, cut out honeycombs, rock pockets, and voids more than 1/2 inch in any dimension in solid concrete, but not less than 1 inch in depth. Make edges of cuts perpendicular to concrete surface. Clean, dampen with water, and brush-coat holes and voids with bonding agent. Fill and compact with patching mortar before bonding agent has dried. Fill form-tie voids with patching mortar or cone plugs secured in place with bonding agent.

2. Repair defects on surfaces exposed to view by blending white portland cement and standard portland cement so that, when dry, patching mortar will match surrounding color. Patch a test area at inconspicuous locations to verify mixture and color match before proceeding with patching. Compact mortar in place and strike off slightly higher than surrounding surface.

3. Repair defects on concealed formed surfaces that affect concrete's durability and structural performance as determined by Engineer.

D. Repairing Unformed Surfaces: Test unformed surfaces, such as floors and slabs, for finish and verify surface tolerances specified for each surface. Correct low and high areas. Test surfaces sloped to drain for trueness of slope and smoothness; use a sloped template.

1. Repair finished surfaces containing defects. Surface defects include spalls, popouts, honeycombs, rock pockets, crazing and cracks in excess of 0.01 inch wide or that penetrate to reinforcement or completely through unreinforced sections regardless of width, and other objectionable conditions.
2. After concrete has cured at least 14 days, correct high areas by grinding.
3. Correct localized low areas during or immediately after completing surface finishing operations by cutting out low areas and replacing with patching mortar. Finish repaired areas to blend into adjacent concrete.
4. Correct other low areas scheduled to receive floor coverings with a repair underlayment. Prepare, mix, and apply repair underlayment and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface. Feather edges to match adjacent floor elevations.
5. Correct other low areas scheduled to remain exposed with a repair topping. Cut out low areas to ensure a minimum repair topping depth of 1/4 inch to match adjacent floor elevations. Prepare, mix, and apply repair topping and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface.
6. Repair defective areas, except random cracks and single holes 1 inch or less in diameter, by cutting out and replacing with fresh concrete. Remove defective areas with clean, square cuts and expose steel reinforcement with at least a 3/4-inch clearance all around. Dampen concrete surfaces in contact with patching concrete and apply bonding agent. Mix patching concrete of same materials and mixture as original concrete except without coarse aggregate. Place, compact, and finish to blend with adjacent finished concrete. Cure in same manner as adjacent concrete.
7. Repair random cracks and single holes 1 inch or less in diameter with patching mortar. Groove top of cracks and cut out holes to sound concrete and clean off dust, dirt, and loose particles. Dampen cleaned concrete surfaces and apply bonding agent. Place patching mortar before bonding agent has dried. Compact patching mortar and finish to match adjacent concrete. Keep patched area continuously moist for at least 72 hours.

E. Perform structural repairs of concrete, subject to Engineer's approval, using epoxy adhesive and patching mortar.

F. Repair materials and installation not specified above may be used, subject to Engineer's approval.

3.16 FIELD QUALITY CONTROL

A. Testing and Inspecting: Contractor will engage a special inspector and qualified testing and inspecting agency to perform field tests and inspections and prepare test reports. Testing Agency shall provide certification of field and laboratory technicians for qualifications required in ACI 318-08, Section 5.6.1.

B. Inspections:

1. Steel reinforcement placement.
2. Steel reinforcement welding.
3. Headed bolts and studs.
4. Verification of use of required design mixture.
5. Concrete placement, including conveying and depositing.
6. Curing procedures and maintenance of curing temperature.
7. Verification of concrete strength before removal of shores and forms from beams and slabs.

C. Concrete Tests: Testing of composite samples of fresh concrete obtained according to ASTM C 172, as modified in these specifications, shall be performed according to the following requirements:

1. Testing Frequency: Obtain one composite sample for each day's pour of each concrete mixture exceeding 5 cu. yd., but less than 25 cu. yd., plus one set for each additional 50 cu. yd. or fraction thereof.
   a) When frequency of testing will provide fewer than five compressive-strength tests for each concrete mixture, testing shall be conducted from at least five randomly selected batches or from each batch if fewer than five are used.
2. Slump: ASTM C 143/C 143M; one test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mixture. Perform additional tests when concrete consistency appears to change.
3. Air Content: ASTM C 231, pressure method, for normal-weight concrete; one test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
4. Concrete Temperature: ASTM C 1064/C 1064M; one test hourly when air temperature is 40 deg F and below and when 80 deg F and above, and one test for each composite sample.
5. Compression Test Specimens: ASTM C 31/C 31M. Samples shall be taken from concrete pump discharge hose when concrete is transported by concrete pump.
   a) Cast and laboratory cure two sets of two 6 x 12-cylinder specimens or two sets of three 4 x 8-cylinder specimens for each composite sample. Test specimen size shall be agreed upon by A/E and testing agency before construction.
   b) Cast and field cure two sets of cylinder specimens for each composite sample for formed elevated slab or beam elements.
6. Compressive-Strength Tests: ASTM C 39-05.
   a) 6 x 12 Specimens: Test one set of two laboratory-cured specimens at 7 days and one set of two specimens at 28 days.
   b) 4 x 8 Specimens: Test one set of three laboratory-cured specimens at 7 days and one set of three specimens at 28 days.
   c) A compressive-strength test shall be the average compressive strength from a set of specimens obtained from same composite sample and tested at age indicated.
7. When strength of field-cured cylinders is less than 85 percent of companion laboratory-cured cylinders, Contractor shall evaluate operations and provide corrective procedures for protecting and curing in-place concrete.
8. Strength of each concrete mixture will be satisfactory if every average of any three consecutive compressive-strength tests equals or exceeds specified compressive strength, and no compressive-strength test value falls below specified compressive strength by more than 500 psi.
9. Test results shall be reported in writing to Engineer, concrete manufacturer, and Contractor within 48 hours of testing. Reports of compressive-strength tests shall contain Project identification name and number, date of concrete placement, name of concrete testing and inspecting agency, location of concrete batch in Work, design compressive strength at 28 days, concrete mixture proportions and materials, compressive breaking strength, and type of break for both 7- and 28-day tests.
10. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by Engineer but will not be used as sole basis for approval or rejection of concrete.
11. Additional Tests: Testing and inspecting agency shall make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by Engineer. Testing and inspecting agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42/C 42M or by other methods as directed by Engineer.

12. Additional testing and inspecting will be at Contractor's expense.
13. Correct deficiencies in the Work that test reports and inspections indicate does not comply with the Contract Documents.

END OF SECTION

SECTION 31 23 33 – TRENCHING AND BACKFILL

PART 1 GENERAL

1.01 This section is designed to provide the minimum requirements for trenching and backfilling of pipe trenches. Should the drawings provide specific details for specific installations, the more stringent requirement shall take precedent. When working in NCDOT right of ways the NCDOT requirements shall take precedent.

1.02 GEOTECHNICAL REPORT

A. Earthwork and trenching EXCAVATION IS UNCLASSIFIED and includes excavation to subgrade elevations indicated, regardless of character of materials and obstructions encountered. No extra payment will be made, regardless of the suitability or unsuitability of on-site soils for the disposal or importing of soils to the project site.

1.03 EXISTING UTILITIES

A. Locate existing utilities, culverts, and structures, above or below ground, before any excavation starts. Coordinate work with utility companies. Protect, maintain in service, and prevent damage to utilities not designated to be removed. When utilities are encountered and are not shown on the Contract Drawings or when locations differ from those shown on the Contract Drawings, notify the Engineer for instructions before proceeding.

1.04 EXPLOSIVES

A. Use of explosives is not allowed.

1.05 TESTING AND INSPECTION

A. In trenching operations, compaction testing shall be performed at increments of approximately 1000 L.F. of trench, and at all access road crossings.

B. Allow the Inspector to approve subgrade and each fill layer, or for every 2,000 square feet of fill placed, whichever results in more frequent inspection.

C. The degree of compaction obtained shall be verified by means of field density tests made by an Independent Testing Laboratory. Where tests indicate a deficiency in degree of compaction, the Contractor shall correct such conditions, and the Testing Laboratory shall make additional tests in order to verify that the corrected work has been satisfactory. The Testing Laboratory shall provide four (4) certified copies of all test reports.

1.06 DEFINITIONS

A. EXCAVATION: Removal of material encountered to required subgrade and/or subsoil elevations indicated, and the subsequent disposal of materials removed.

B. FILL: Material placed and compacted above the level of the subsoil, which existed before construction of the project.

C. ROCK: Hard bed rock, boulders, or similar material requiring the use of rock drills and/or explosives for removal. The criteria for classification of general excavation as rock is any material that cannot be dislodged by a Caterpillar D-8 Tractor, or equivalent, equipped with a single tooth hydraulically operated power ripper. The criteria for trench rock shall be that a Caterpillar 345 Backhoe, or equivalent, with a proper width bucket cannot remove the material.

D. SUBGRADE: The undisturbed earth, or the compacted soil layer, immediately below granular subbase, drainage fill, or topsoil materials.

E. SUBSOIL: The undisturbed earth immediately below the existing topsoil layer

F. UNAUTHORIZED EXCAVATION: Removal of materials below indicated subgrade elevations or beyond horizontal excavation dimensions without specific direction of the Inspector.

G. UNDERCUT EXCAVATION: When excavation has reached required sub grade elevations, notify the Inspector who will inspect conditions. If unsuitable bearing material is encountered at required subgrade elevations, carry excavations deeper as directed by the Inspector.

H. UNSUITABLE MATERIAL: Material such as clay mass, frozen materials, cinders, ashes, refuse, vegetable, organic material, or any other material deemed unsuitable by the Inspector. Unsuitable material shall be removed and replaced with suitable material as specified herein for the intended use.

I. BEDDING. Bedding is the material placed under the pipe.

J. HAUNCHING. Material that is placed on the sides of the pipe to the spring line.
K. INITIAL BACKFILL. Material placed on top of the haunch material until 12" above the pipe.
L. GENERAL BACKFILL. Material Placed on top of the initial backfill up to grade.
M. Unless otherwise noted, the Contractor shall be responsible for the disposal of excess material (including but not limited to undercut, root mat and excess topsoil and fill material), obtaining borrow material and the suitability of all on-site material above subgrade.

PART 2 PRODUCTS

2.01 CLEAN EARTH: Fill: Approved material free of debris, roots, frozen materials, organic matter, rock, or gravel larger than 2 inches in any dimension or other harmful matter and be classified as ML or better material in accordance with the Unified Soils System, ASTM D-2487.

2.02 FINE AGGREGATE: #9 or #10 stone as per NCDOT or Grade A or Grade B fine aggregate as per NCDOT.

2.03 COARSE AGGREGATE: #57 stone as per NCDOT.

2.04 CRUSHER RUN: Aggregate: #26 as per NCDOT.

2.05 SELECT MATERIAL: Type I or II according to NCDOT.

2.06 SHOULDER STONE: Aggregate material #21A or #21B as per NCDOT.

2.07 TOPSOIL: In trenching operations, topsoil shall be the top 6 inches of original soil from the trench. Otherwise, topsoil shall be fertile, friable loam, containing not less than 2 percent by weight of finely divided, decomposed vegetation. Topsoil shall be free of subsoil, clay lumps, brush, weeds, roots larger than 1/2-inch diameter, stones larger than 1/2-inch diameter and other material toxic or harmful to growth.

2.08 GEOTEXTILE FABRIC: Woven or nonwoven polypropylene or polyester equaling or exceeding the following test:

TEST	TEST METHOD	TYPICAL TEST VALUES
Weight	ASTM D-1910	3.9 oz per sq. yd. minimum
Grab Tensile Strength	ASTM D-1682	200 lbs. minimum
Trapezoid Tear Strength	ASTM D-1117	100 lbs. minimum
Grab Modulus (Mullen Burst)	ASTM D-3786	370 lbs. minimum

PART 3 EXECUTION

3.01 GENERAL EXCAVATION

A. Remove vegetation, debris, unsatisfactory materials and harmful materials prior to placement of fill. Plow, strip, or break up sloped surfaces steeper than 4 to 1 so that fill material will bond with existing surface.
B. Strip existing topsoil, leaf mold and organic materials, meeting topsoil requirements. Deposit in storage piles separate from other excavated material.
C. Provide adequate and positive site drainage throughout construction. Keep excavations free of water while work is being performed and until backfilled. Where underground streams or springs are found, provide temporary drainage and notify the Inspector.
D. Excavate unsatisfactory soil materials encountered that extend below required elevations, to the additional depth as directed by the Inspector.
E. Where rock is encountered so that a manhole, vault, or other structure will bear on rock, the rock shall be used to support the foundation. When only a portion of the foundation will bear on rock, the Contractor shall excavate the rock at least 8 inches below the foundation and provide at least 8 inches of aggregate fill.
F. Where unauthorized excavation has been carried below authorized depth, backfill and compact in the

same manner as specified for authorized excavations of same classification, unless otherwise directed by the Inspector.

G. Stockpile excavated soil material satisfactory for backfill or fill until required. Place, grade and shape stockpiles for proper drainage. Do not store within drip lines of trees indicated to remain.

H. SHEETING AND SHORING

1. Sheeting and shoring shall be provided as necessary to construct and protect the excavation, structures of all types, and as necessary for the safety of the employees.

2. All sheeting and bracing shall be removed unless directed otherwise by the Inspector, in such a manner so the construction or other structures are not endangered. All voids left or caused by the withdrawal of sheeting shall be backfilled immediately with approved material and compacted by ramming with tools especially adapted for that purpose, or by other means directed by the Inspector.

3. All sheeting and bracing that is left in place shall be cut to a depth of eighteen inches below the final grade line. The cut off ends shall be removed from the site.

I. Remove surplus or unsuitable material and dispose of the materials off the site at no additional cost to the Owner.

J. DEWATERING

1. Where conditions are such that running or standing water occurs in the trench bottom or the soil in the trench bottom displays a “quick” tendency, the water should be removed by pumps and suitable means such as well points or pervious under drain bedding until the pipe has been installed and the backfill has been placed to a sufficient height to prevent pipe flotation.

3.02 TRENCHING

A. Excavate to the lines and grades indicated for pipelines and structures making proper allowance for pipe bedding materials, pipe bells and concrete form work.

B. Excavate pipeline trenches with vertical walls. Maintain trench width within allowable trench width from bottom of trench to a point 12 inches above top of pipe.

C. Where rock is encountered, excavate 6 inches below the pipe bottom and provide stone to bed the pipe.

D. Where unsuitable soil is encountered, excavate to depth determined by the Inspector and replace with coarse granular fill (pipe bedding) thoroughly and uniformly compacted.

3.03 BACKFILLING OF PIPES AND TRENCHES

A. The following is the minimum requirement for backfilling of pipes and trenches. Should the drawings indicate a deviation from these minimum specifications the more stringent shall apply.

B. Pipe Bedding

1. Ductile Iron Pressure Pipe

a) Ductile iron pipe shall be laid on a minimum of 4 inches of compacted crusher run aggregate NCDOT #68. If rock is encountered at the bottom of the trench, bedding shall be a minimum of six inches of compacted coarse aggregate or crusher run aggregate. Trench bottom shall be hand excavated for bell holes at all joints. Over rock, the six- inch minimum depth of bedding shall be maintained at all joints or other pipe appurtenances. Bedding shall be compacted to a minimum 95 percent of maximum density as determined by ASTM D698 (standard Proctor).

2. Ductile Iron Gravity Pipe

a) Ductile iron pipe shall be laid on a minimum of 4 inches of compacted coarse aggregate or crusher run aggregate. If rock is encountered at the bottom of the trench, bedding material shall be a minimum of six inches. Trench bottom shall be hand excavated for bell holes at all joints. Over rock, the six-inch minimum depth of bedding shall be maintained at all joints or other pipe appurtenances. Bedding material shall be compacted to a minimum 95 percent of maximum density as determined by ASTM D698 (Standard Proctor).

3. PVC, HDPE, PE and CT Pressure Pipe 3 inches and smaller

a) PVC, HDPE, PE and CT pipe shall be laid on a minimum of 4 inches of compacted fine aggregate placed upon undisturbed earth. If rock is encountered at the bottom of the trench, fine aggregate shall be a minimum of six inches.
b) Trench bottom shall be hand excavated for bell holes at all joints. The minimum depth of bedding shall be maintained at all joints or other pipe appurtenances.
c) Bedding material shall be compacted to a minimum 95 percent of maximum density as determined by ASTM D698 (Standard Proctor).

4. PVC Pressure Pipe 4 inches and larger
   a) PVC pressure pipe shall be laid on a minimum of 4 inches of compacted coarse aggregate or crusher run aggregate placed upon undisturbed earth. If rock is encountered at the bottom of the trench, coarse aggregate shall be a minimum of six inches. Trench bottom shall be hand excavated for bell holes at all joints. The minimum depth of bedding shall be maintained at all joints or other pipe appurtenances. Bedding material shall be compacted to a minimum 95 percent of maximum density as determined by ASTM D698 (standard Proctor).
5. PVC Gravity Pipe 6 inches and larger
   a) PVC pressure pipe shall be laid on a minimum of 4 inches of compacted coarse aggregate or crusher run aggregate placed upon undisturbed earth. If rock is encountered at the bottom of the trench, bedding shall be a minimum of six inches. Trench bottom shall be hand excavated for bell holes at all joints. The minimum depth of bedding shall be maintained at all joints or other pipe appurtenances. Bedding material shall be compacted to a minimum 95 percent of maximum density as determined by ASTM D698 (standard Proctor).

C. HAUNCHING

1. Haunching material shall be the same as the bedding material. Material shall be placed and consolidated under the pipe haunch to provide adequate side support to the pipe while avoiding both vertical and lateral displacement of the pipe from proper alignment. Haunching is placed to the pipe spring line and shall be compacted to a minimum 95 percent of maximum density as determined by ASTM D698 (Standard Proctor).

D. BACKFILLING TRENCHES

1. General:
   a) All trenches shall be backfilled immediately after the pipes and appurtenances are laid therein with the exception of pressure pipe, where joints are to remain uncovered until after pressure testing is completed.
2. Initial Backfill:
   a) Ductile Iron Pressure Pipe and Gravity Pipe
      i. Initial backfill shall be with select material. Initial backfill shall begin at the spring line of the pipe and shall be placed in six-inch layers up to a minimum level of 12 inches above the crown of the pipe. Initial backfill shall be compacted to a minimum 95 percent of maximum density as determined by ASTM D698.
   b) PVC Pressure Pipe and Gravity Pipe 4” and larger
      i. Initial backfill shall be with select material. Initial backfill shall begin at the spring line of the pipe and shall be placed in six-inch layers up to a minimum level of 12 inches above the crown of the pipe. Initial backfill shall be compacted to a minimum 95 percent of maximum density as determined by ASTM D698.
   c) PVC, HDPE, PE and CT Pressure Pipe 3” and smaller
      i. Initial backfill shall be with the same material as the haunching material and shall be placed in 6” layers to a minimum level of 6” over the crown of the pipe. The remainder of the initial backfill shall be with select material to a minimum level of 12” above the crown of the pipe.
3. Final Backfill:

a) General:
   i. Final backfill for trenches shall be with general backfill material. Final backfill not subjected to vehicular traffic or greater than 5' feet from the edge of pavement shall be placed in layers no greater than one foot thick and compacted to at least 85 percent maximum density as determined by ASTM D698. Final backfill shall not contain stones larger than 6 inches in their greatest dimension, the stones shall not be in excess of 20 percent of the volume of backfill material, and such stones shall be well distributed throughout the mass. Topsoil (in grassed areas) shall be de-posited in the final layer of backfill to guarantee the areas will be re-turned to original or better conditions.

b) Roadways:
   i. Where excavation has been made through pavement, subgrades of roadways under construction, where subgrades are undercut by excavation, or where excavation is within 5' of edge of pavement, backfilling shall be performed with shoulder stone. Backfill material shall be placed in layers not greater than six inches thick, with each layer thoroughly compacted to 95 percent of maximum density as determined by ASTM D698. Work within NCDOT rights-of-way shall meet all requirements of the North Carolina Department of Transportation.

3.04 COMPACTION

A. Percentage of Maximum Density Requirements. Compact each layer of fill or backfill to not less than the following percentages of the maximum density at optimum moisture content as determined by ASTM D 698 (AASHTO T-99). Compact soil materials using equipment suitable for materials to be compacted and work area locations.

   1. 95 percent beneath and within 25 feet of buildings and structures, including those shown for future construction.

   2. 95 percent beneath pavements, walks, road shoulders, including those shown for future construction or proposed, 95 percent up to 12 inches above top of pipes.

   3. 85 percent in other unpaved areas, unless drawings indicate a more stringent compaction requirement.

   4. If the density of the adjacent soil is more than the density specified, compact to a density not less than the density of the adjacent soil.

B. Use power-driven hand tampers for compacting materials adjacent to structures and in areas inaccessible to rollers. Use equipment capable of adding moisture to the soil material as determined by moisture-density tests. Where required, uniformly apply water to the surface of the subgrade or layer of soil material in such a manner as to prevent free water appearing on the surface, either during or subsequent to compacting operations.

C. Remove and replace, or scarify and air dry, soil material that is too wet to permit compaction to specified percentage of maximum density.

D. Do not place or compact material that is muddy, frozen, or contains frost or ice.

3.05 GENERAL BACKFILL

A. Place clean earth fill to obtain elevations shown on the drawings. Do not place fill on muddy or frozen areas.

B. When the existing ground surface has been disturbed and has a density of less than that specified for the particular area classification, scarify the ground surface, pulverize, adjust moisture condition to optimum moisture content, and compact to required depth and percentage of maximum density. Excavate depressions caused by removal of stumps or other clearing operations to firm subgrade. Fill with clean earth fill.

C. Place backfill and fill materials in loose lifts no less than 4 inches and no more than 8 inches in depth. Before compaction, moisten or aerate each layer as necessary to provide optimum moisture content.

D. Place backfill materials evenly adjacent to structures. Take care to prevent wedging action of the backfill against structures by carrying the material uniformly around the structure to approximately the same elevation in each lift.

E. Backfill excavations to excess elevations (above the finished grade) to allow for shrinkage and

settlement. Excess elevation under paved and surfaced roadways and parking areas shall not exceed 2 inches.

3.06 PIPE BEDDING AND BACKFILL

A. Place and compact bedding in accordance with the construction plans below bottom of pipe prior to laying pipe. Where directed by the Inspector place soil stabilization fabric in the excavation before placing bedding. Place fabric in accordance with the manufacturer's recommendations.

B. Compact pipe bedding by tamping or rodding to prevent settlement.

C. Unless otherwise required, backfill trench to a compacted depth of one foot over the pipe with clean earth fill. Backfill shall be placed uniformly on each side of the pipe and compacted in layers not exceeding 6 inches. Do not backfill when the subgrade is muddy or frozen or when the backfill material is frozen or muddy.

3.07 GRADING

A. Grade in compliance with NCDOT specifications. Uniformly grade areas within limits of grading, including adjacent transition areas. Smooth finished surface within specified tolerances, compact with uniform levels or slopes between points where elevations are indicated, or between such points and existing grades.

B. Unless otherwise indicated, evenly slope subgrade to provide positive drainage away from building walls in all directions at a grade not less than 1/4-inch per foot.

C. Protect newly graded areas from traffic and erosion. Where compacted areas settle, or are disturbed by subsequent construction or adverse weather, scarify the surface, reshape and compact to the required density, with additional fill material if required. Use hand tamper for recompacting over underground utilities.

D. Where topsoiling is specified, excavate or fill below finished grades shown, leaving space for topsoiling.

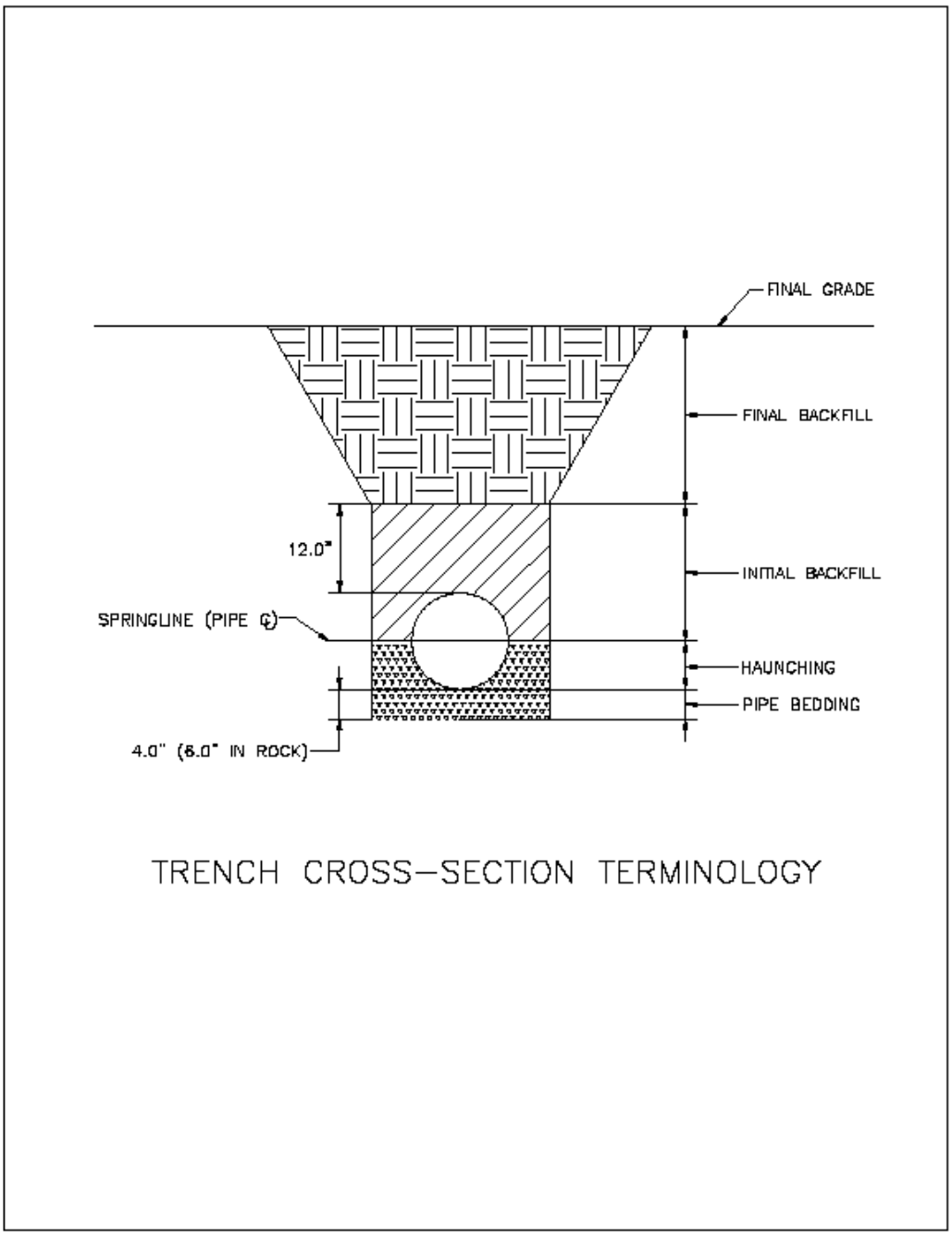
E. Where not otherwise shown on the Contract Drawings, all disturbed areas shall be restored to the original grade.

F. Tolerances

1. Shape subgrade under pavements to line, grade, and cross-section to within 1/2 inch of required subgrade elevations.

2. Finish areas to receive topsoil to within 0.10 foot of required elevations.

Trench Cross-section Terminology



END OF SECTION

SECTION 31 25 00 – EROSION CONTROL

PART 1 GENERAL

1.01 RELATED DOCUMENTS:

A. The North Carolina Erosion and Sediment Control Planning and Design Manual, latest edition.

1.02 SUMMARY

A. This Section includes the installation, maintenance, and removal of erosion control measures required for prevention of sediment leaving the project site.

1.03 EROSION AND SEDIMENT CONTROL PERMIT

A. Prior to commencement of work, obtain a copy of the approved Erosion and Sediment Control Plan from the North Carolina Energy, Minerals, and Land Resources Division of DEQ.

B. Schedule a pre-construction conference on-site with the Engineer and the City Inspector. Hold this meeting prior to the start of any construction activities.

1.04 SUBMITTALS

A. Responsible Land Disturber registration information.

B. A copy of the Erosion and Sediment Control Plan.

PART 2 PRODUCTS

2.01 EROSION CONTROL PRODUCTS:

A. Construction Entrance
   1. Heavy-duty stone aggregate and filter fabric construction entrance, complying with the requirements of Standard and Specification 3.02 of the North Carolina Erosion and Sediment Control Planning and Design Manual.
   2. The water source for washing operations shall be the responsibility of the Contractor.

B. Silt Fence
   1. Synthetic filter fabric, complying with the requirements of the North Carolina Erosion and Sediment Control Planning and Design Manual.
   2. Wooden stakes shall be 2” oak, a minimum length of five feet.

C. Storm Drain Inlet Protection
   1. Block and Gravel Drop Inlet Sediment Filter, complying with the requirements of the North Carolina Erosion and Sediment Control Planning and Design Manual.
   2. Gravel Curb Inlet Sediment Filter complying with the requirements of the North Carolina Erosion and Sediment Control Planning and Design Manual.

D. Culvert Inlet Protection
   1. Silt Fence Culvert Inlet Protection, complying with the requirements of the North Carolina Erosion and Sediment Control Planning and Design Manual.

E. Temporary Diversion Dike
   1. Berm of compacted soil material, stabilized with vegetation, complying with the requirements of the North Carolina Erosion and Sediment Control Planning and Design Manual.

F. Temporary Fill Diversion
   1. A channel with a berm on the lower side, placed at the top of a fill slope, complying with the requirements of the North Carolina Erosion and Sediment Control Planning and Design Manual.

G. Diversion
   1. A channel with a berm on the lower side, stabilized with vegetation, complying with the requirements of the North Carolina Erosion and Sediment Control Planning and Design Manual.

H. Temporary Sediment Trap

1. A temporary ponding area, formed with an earthen embankment and a stone outlet structure, complying with the requirements of the North Carolina Erosion and Sediment Control Planning and Design Manual.

I. Temporary Sediment Basin
   1. A temporary pond with a controlled outfall release, complying with the requirements of the North Carolina Erosion and Sediment Control Planning and Design Manual and to the details indicated on the Drawings.

J. Temporary Slope Drain
   1. A flexible pipe extending from the top to the bottom of a fill slope, complying with the requirements of the North Carolina Erosion and Sediment Control Planning and Design Manual.
   2. Pipe shall be smooth lined polyethylene, complying with the requirements of ASTM F667 or AASHTO M294.

K. Outlet Protection
   1. A level area of riprap, placed over filter fabric, complying with the requirements of the North Carolina Erosion and Sediment Control Planning and Design Manual.

L. Riprap
   1. Graded stone, placed over filter fabric, complying with the requirements of of the North Carolina Erosion and Sediment Control Planning and Design Manual.
   2. The size of the stone required is indicated on the drawings.

M. Rock Check Dams
   1. Temporary stone dams constructed across a swale or ditch, complying with the requirements of the North Carolina Erosion and Sediment Control Planning and Design Manual.
   2. Check dams shall be placed on filter fabric.

N. Dewatering Structure
   1. A temporary filtering device used for dewatering operations, complying with the requirements of the North Carolina Erosion and Sediment Control Planning and Design Manual.

O. Temporary Seeding
   1. Temporary vegetative cover for disturbed areas, complying with the requirements of the North Carolina Erosion and Sediment Control Planning and Design Manual.

PART 3 EXECUTION

3.01 INSTALLATION OF EROSION CONTROL MEASURES

A. Install all erosion and sediment control measures per the requirements of the North Carolina Erosion and Sediment Control Planning and Design Manual.

B. Protect all points of construction ingress and egress to the site to prevent tracking of mud onto public streets. Provide temporary construction entrances at all points of access to the site.

C. Clear only those areas necessary for installation of the perimeter erosion control measures. The balance of the site shall not be cleared or otherwise disturbed until the perimeter erosion control measures are installed and functional.

D. Follow the construction sequence and install erosion control measures as indicated on the Drawings and as directed by the NC DEQ guidelines.

E. Install additional measures as necessary to prevent sediment from leaving the project site.

3.02 MAINTENANCE OF EROSION CONTROL MEASURES

A. Maintain all erosion and sediment control measures per the requirements of the North Carolina Erosion and Sediment Control Planning and Design Manual.

B. At a minimum, the following maintenance is required:
   1. Safety Fence
      a) Review fence regularly for damage. Repair any damage immediately.
      b) Secure the fence at the end of each working day. Repair or replace all locking devices as

necessary.

2. Construction Entrance
   a) Wash and rework stone and/or place additional stone as required to prevent tracking of mud onto the roadways.
   b) Clean out the sediment-trapping device for the wash rack.
   c) Remove all materials spilled, dropped, washed, or otherwise tracked onto road- ways or into storm sewers immediately. Do not use water trucks to wash the roadways.
3. Silt Fence
   a) Inspect immediately following each rainfall and at least daily during prolonged rainfall.
   b) Make any required repairs immediately. Give special attention to damage resulting from end-runs and undercutting.
   c) Replace fabric that is decomposing or is otherwise ineffective.
   d) Clean out accumulated sediment following every storm event. Do not allow sediment to accumulate higher than one-half the height of the barrier.
4. Wire Reinforced Silt Fence
   a) Inspect immediately following each rainfall and at least daily during prolonged rainfall.
   b) Make any required repairs immediately. Give special attention to damage result- ing from end-runs and undercutting.
   c) Replace fabric that is decomposing or is otherwise ineffective.
   d) Clean out accumulated sediment following every storm event. Do not allow sediment to accumulate higher than one-half the height of the barrier.
5. Storm Drain Inlet Protection
   a) Inspect immediately following each rainfall and at least daily during prolonged rainfall.
   b) Remove and clean or replace stone filters that have been clogged with sediment. Make any required repairs immediately.
   c) Remove accumulated sediment as required. Do not allow sediment to accumulate higher than one-half the height of the measure.
6. Culvert Inlet Protection
   a) Inspect immediately following each rainfall and at least daily during prolonged rainfall.
   b) Remove and clean or replace stone filters that have been clogged with sediment. Make any required repairs immediately.
   c) Remove accumulated sediment as required. Do not allow sediment to accumulate higher than one-half the height of the measure.
7. Temporary Diversion Dike
   a) Inspect immediately following each rainfall and at least daily during prolonged rainfall. Inspect at least once every two weeks, whether or not it has rained. Make any necessary repairs immediately.
   b) Repair damages caused by construction activities by the end of each working day.
8. Temporary Fill Diversion
   a) Review measure at the end of each working day to ensure its effective operation.
9. Diversion
   a) Inspect diversion following every rainfall and at least once every two weeks.
   b) Remove accumulated sediment and make repairs as necessary.
   c) Re-seed as necessary to maintain vegetative cover.
10. Temporary Sediment Trap
    a) Remove sediment and restore the trap to its original dimensions once the sediment accumulates to the cleanout level. Refer to the drawings for the appropriate cleanout level elevations.
    b) Any pumping shall be discharged through an approved dewatering structure.
    c) Remove and clean or replace stone choked with sediment.

d) Regularly check the structure to ensure that it is structurally sound. Immediately repair any damage discovered.

11. Temporary Sediment Basin
    a) Remove sediment and restore the basin to its original dimensions once the sediment accumulates to the cleanout level. Refer to the drawings for the appropriate cleanout level elevations.
    b) Any pumping shall be discharged through an approved dewatering structure.
    c) Regularly inspect the principal spillway and outfall for proper function. Regularly inspect the emergency spillway to ensure that its lining is well established and erosion resistant. Immediately repair any damage discovered.
    d) Regularly check the embankment to ensure that it is structurally sound. Immediately repair any damage discovered.
12. Temporary Slope Drain
    a) Inspect the temporary slope drains weekly and following every storm event. Immediately make any necessary repairs to ensure a free flow through the pipe.
13. Outlet Protection
    a) Inspect outlet protection following every storm event. Re-lay riprap as necessary to prevent concentrated flow from running across the outlet protection.
14. Riprap
    a) Inspect riprap following every storm event. Re-lay riprap as necessary to prevent concentrated flow from running under or around the riprap.
    b) Clean out accumulated sediment from the riprap.
15. Rock Check Dams
    a) Inspect immediately following each rainfall and at least daily during prolonged rainfall.
    b) Remove and clean or replace stone that has been clogged with sediment.
    c) Inspect for evidence of by-pass flows. Make any required repairs immediately
    d) Remove accumulated sediment as required. Do not allow sediment to accumulate higher than one-half of the height of the dam.
16. Dewatering Structure
    a) Repair or replace the filtering media to prevent sediment accumulation from affecting the filtering capacity of the structure.
17. Temporary Seeding
    a) Re-seed and mulch areas where cover is inadequate to protect against erosion until adequate cover is obtained.

C. Remove accumulated sediment as required and at appropriate intervals to maintain the effective function of all erosion control measures.

D. Inspect, repair and remove accumulated sediment from erosion control measures following significant (greater than ½") rainfall events.

E. If erosion control measures become clogged, causing the impoundment of water, restore the measures immediately. Ponded water poses a potential drowning hazard and shall be relieved immediately by either pumping (through an approved dewatering structure) or by removal of the blockage.

3.03 REMOVAL OF EROSION CONTROL MEASURES

A. Remove all temporary erosion control measures following the stabilization of the site. Do not remove erosion control measures until authorized by the City Inspector.

B. Topsoil, permanently seed, and stabilize areas occupied by erosion control measures.

END OF SECTION

SECTION 32 12 16 – ASPHALT PAVING

PART 1 GENERAL

1.01 SCOPE OF WORK

A. Work covered by this section includes all work associated with asphalt mill and overlay for road resurfacing.

B. All materials and workmanship associated with this section shall be in accordance with NCDOT Standards and Specifications for Roads and Structures.

1.02 SUBMITTALS

A. Submit Certified test results and/or mix designs to the Engineer.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.01 INSTALLATION

A. All work shall be constructed in accordance with NCDOT's Specifications for Roads and Structures.

B. The typical street section shall be constructed as shown on the Contract Drawings.

PART 4 MEASUREMENT AND PAYMENT

4.01 ASPHALT MILL AND OVERLAY

A. Measurement shall be for the horizontal area of pavement not exceeding the pay limits. Payment shall include all labor, material, and equipment necessary for the asphalt milling and overlay as specified in the Contract documents and to the satisfaction of the Town. Work shall include the proper disposal of millings, and the restoration of pavement markings disturbed during construction.

END OF SECTION

SECTION 33 14 43 – PACKAGED PUMPING SYSTEMS FOR WATER UTILITY SERVICE

PART 1 GENERAL

1.01 SCOPE. To provide a single source responsibility for the manufacture, warranty, service and operation of a prefabricated, skid mounted, fully automatic pumping system for potable water and high flow firefighting use.

A. Pumping system shall conform to the following specifications in all respects.

B. This specification covers minimum requirements; however, it should not be construed as all inclusive.

C. It is the successful vendor's responsibility to include everything necessary to provide a complete, automatic, smooth operating, and reliable pumping system.

D. The manufacturer shall warrant all items supplied by him, whether of his manufacture or of his purchase, per the warranty requirements below.

1. Pass through warranties, warranties provided by manufacturers of purchased equipment included in the pump station, passed through to the owner, shall not be accepted.
2. Pumping system manufacturer shall have a history, covering at least twenty five years, of providing warranties of a single source responsibility nature.
3. On request, pumping system manufacturer shall provide contact information for pumping systems in which the manufacturer has provided this single source responsibility.

E. Manufacturer shall be a US manufacturer, and system shall be manufactured in the USA. All imported pumping systems or pumping systems from foreign manufacturers shall be rejected.

1.02 RELATED SECTIONS.

A. Section 33 10 00 - Water Distribution

1.03 MANUFACTURER.

A. The pumping system shall be model, 5P1800CCES28/50PM as manufactured by SyncroFlo, Inc., Norcross, Georgia, U.S.A., as basis of design, operating on 460 volt 3 phase 60 hertz power. Alternate manufacturers seeking authorization to bid shall be a registered ISO9001-2015 manufacturer, shall hold a current Quality Management Certificate, for the assembly of custom packaged pumping systems accessories and controls for use in commercial, irrigation, municipal, industrial and fire applications.

B. All bids shall be submitted using the SyncroFlo system as base bid. Those bids not using the SyncroFlo system as their base bid will be rejected as nonresponsive.

C. For a proposed alternate pumping system to be considered as a post-bid deduct system, the contractor shall furnish the following data in the form of a qualification submittal, in three bound and tabbed copies with each copy bound as a single document complete with detailed table of contents, and two electronic copies saved on USB drives with the same data in Adobe Acrobat format, to the engineer at least 15 business days prior to the date of the bid opening. Qualification submittal shall have been prepared specifically for this project and shall not be a "typical" document that may apply to a number of systems. Qualification submittal shall include a title page that includes the project name, project number, owner's name, engineer's name, submitting party's name and contact information, date of submittal, and bid date. The qualification submittal shall include the following information as a minimum:

1. A complete written specification for the pumping system proposed as an equal, including a detailed operating sequence, a detailed alarm sequence, and a complete bill of materials.
2. A statement of full conformance to the following specifications, including the supplying of the brands of products listed, and to the plans without exception. Statement shall be signed by an officer of the manufacturing firm, and the signature shall be notarized.
3. Complete submittal data for all major equipment and materials, as listed in this specification, including properly indicated pump curves.
4. A project specific electrical schematic showing power and control wiring.
5. Complete PLC and OIT program listings, properly annotated.
6. Installation list of 20 similar pumping systems which have been in operation for a minimum of 8 years.
7. Location and contact information of the closest factory owned and/or trained service centers and date of last factory training session.
8. In order to assure that the manufacturer submitting for pre-approval has in place an acceptable quality assurance program, the manufacturer shall submit copies of their

ISO9001:2015 Certificate of Registration, their UL authorization, and their ETL authorization as a part of the qualification submittal.

9. A copy of manufacturer's certificate of insurance showing as a minimum, a general liability coverage of $1,000,000, and an excess liability coverage of $10,000,000.
10. In order to assure that all welding will be accomplished according to ASME standards, copies of all fabricating employees' ASME Section IX pressure vessel certification and AWS D1.1 structural certification shall be included in the pre-qualification submittal.
11. A listing of service department employees authorized for system commissioning and start up, including employee's name and employee number, years of experience starting systems as an employee of the submitting company, contact information, and employee's supervisor's name and contact information .

D. Only if, in the sole opinion of the engineer, the data submitted shows the pumping system to be an acceptable alternate deduct system that is in full compliance with the project specifications in their entirety, shall the bidding contractors be notified not less than 3 days prior to the bid opening date of acceptance of the submitted equipment as an approved alternate deduct to the base bid.

E. All bids shall be submitted using the SyncroFlo system as basis of design. Alternate manufacturers, whose pumping system has been preapproved as an alternate deduct, shall be included by addendum as an alternate deduct to the base bid system.

F. Approval of a prequalification submittal does not relieve the manufacturer or supplier from providing full and complete submittals if their system is selected, nor does it relieve them of having to conform to these specification and plans in all respects.

G. Any bids for equipment not pre-approved prior to the bid opening date shall be considered non responsive and rejected.

H. Requests for the substitution of major equipment brand, size, type or function shall be made in writing prior to the preparation of the prequalification submittal, and shall only be included in the prequalification submittal and the official after bid submittal if previously approved. Otherwise, major equipment shall be as specified in brand, size, type and function as described herein and on the plan drawings. Under no circumstance shall the substitution of the preapproved alternate piece of major equipment cause the price of the pumping system to increase; however, a significant decrease in price shall be expected and required due to the substitution.

1.04 SUBMITTALS. Within six weeks from the award of the contract, provide one electronic copy of the submittal for approval. The submittal shall be properly dated, sectioned, and titled, and include a detailed table of contents, including no less than the following:

A. Full set of mechanical drawings including skid dimensioning, connection dimensions, anchor bolt locations and typical installation, and equipment layout, all to scale.

B. Full electrical schematics, including three line power schematic, control ladder logic, PLC and SCADA system interface.

C. In order to assure that all welding will be accomplished according to ASME standards, submit copies of all fabricating employees' ASME Section IX pressure vessel certification and AWS D1.1 structural certification. Only those employees with said welding certificates submitted shall weld on the structural or piping portions of the system.

D. Properly indicated pump curves, whose total dynamic head includes pumping system internal losses, manufacturer's name (other than pumping system manufacturer), pump model number, motor type, RPM, and horsepower.

E. Properly marked data sheets for each major component of the pumping system, both mechanical and electrical.

F. Copies of both UL and ETL authorizations for control panels, and for the complete pumping system.

G. Manufacturer's current ISO9001-2015 certificate.

H. Complete description of the system including:

1. Submittal schedule.
2. Shipment schedule after receipt of approved submittals.
3. Specification section number relevant to the submittal.
4. Technical information.
   a. system model number.
   b. design GPM.

c. rated suction pressure.
d. rated discharge pressure.
e. voltage, phase, and frequency of required power.
f. system approximate dry weight.

5. Operation sequence.
6. Alarm sequence.
7. Mechanical major components bill of materials.
8. Electrical major components bill of materials.
9. Spare parts list.
10. SCADA interface (if required).
11. Post production features.
12. Notes clarification and exceptions.
13. Receiving instructions.
14. Storage instructions.
15. Warranty statement.

1.05 OWNER'S MANUALS.

A. Operation and maintenance manual shall be provided in electronic format.

B. Operation and maintenance manual shall have been prepared for this specific project, and shall not be a general manual applicable to many systems. Manufacturers' technical manuals shall be included for each piece of equipment that is field serviceable.

C. Manuals shall include the approved submittal data and shall be produced in the same format as the submittal, in electronic format with bookmarked sections.

D. Manufacturer's Operation and Maintenance Manuals shall be included after the submittal data pages for each field serviceable device.

E. Components that are serviceable through replacement only shall not have any manuals included. Such components shall include, but shall not necessarily be limited to:

1. Flexible pipe couplings.
2. Relays.
3. Pressure transducers.
4. Pressure switches.
5. PLC & OIT components.

1.06 REFERENCES.

A. American Water Works Association (AWWA)
B. American National Standards (ANSI)
C. American Standards for Testing Materials (ASTM)
D. Hydraulic Institute (HI)
E. American Society of Mechanical Engineers (ASME)

1.07 CODES.

A. Without exception, pumping system shall be both UL and ETL listed as finally assembled.

B. The completed Control Panel Assembly shall be built in accordance to NEC, U.L and ETL. standards.

1. Without exception, the electrical components and enclosure shall be labeled by both U.L. and ETL as a complete assembly.
2. Manufacturer's U.L. and ETL labels shall be applied to the control panel door.

C. Without exception, pumping system shall be manufactured under the manufacturer's ISO9001:2015 quality assurance program.

1.08 SEQUENCE OF OPERATION.

A. General items applying to each alarm circuit shall include a display of condition, the illumination of a control panel door mounted red indicating light, and manual or automatic reset of condition.

B. Alarm sequence

1. Low Suction Pressure Alarm. Low Suction Pressure alarm shall protect the pumps from operating without adequate inlet pressure, which could cause damage to pumps. A pressure sensor shall monitor pressure at the suction manifold. This feature shall include a short time delay to handle transient conditions which can occur during the starting of a pump.

Operator interface terminal (OIT), mounted in enclosure door, shall signal low suction pressure. Pump system shall not start until low suction pressure is corrected and circuit has been reset. Alarm shall be equipped with visual indication and automatic reset.

2. High Discharge Pressure Alarm. High Discharge Pressure alarm circuit shall shut down pumping system if discharge pressure reaches a predetermined high level. Operator interface terminal (OIT), mounted in enclosure door, shall signal high discharge pressure. Pumping system shall not operate until pressure is reduced and alarm has been reset. Alarm shall be equipped with visual indication and automatic reset.
3. Low Discharge Pressure alarm. Low Discharge Pressure alarm circuit shall shut down pumping system in the event discharge pressure drops below normal level. Operator interface terminal (OIT), mounted in enclosure door, shall signal low discharge pressure. Pumping system shall operate until alarm has been manually reset. Alarm shall be equipped with visual indication and manual override.
4. Main Power phase or voltage failure safety circuit shall retire the pumping system if it experiences high voltage, low voltage, phase failure or phase reversal as monitored at the line-side of control power. Phase monitor shall have a time delay to allow for transient low voltage during motor starting and to allow maximum motor protection Operator interface terminal (OIT), mounted in enclosure door, shall signal phase failure for any affected pump.
5. System Thermal Purge. Thermal purge shall include a temperature sensor and valve for each pump. Thermal sensor shall open the valve when it experiences a water temperature in excess of 140 degrees F. Valve shall be a 1/4" brass two way valve. Valve, when actuated, shall purge water from the pump and discharge to atmosphere. A 1/2" line to drain shall be run from each thermal purge valve to a nearby floor drain where it will discharge to the exterior of the prefabricated pumping system building. Thermal purge shall not be considered as an alarm, but its function shall be considered as normal operation. There shall be no indication of its operation, other than warm water discharge, and it shall not shut down any pumps.
6. Intruder Alarm. An entry door mounted switch shall be wired to the control panel and provide the signal for the Intruder alarm circuit. This signal shall be relayed to the SCADA system to alert the owner of the opening of the main entry door. Alarm shall not be equipped with visual indication, other than on the Operator Interface Terminal (OIT) but shall be a “silent” alarm with no audible indication at the pump station.
7. Pump or VFD Failure Alarm. Pump or VFD Failure alarm circuit shall shut down its individual pump and VFD if the VFD detects an overload condition or if the VFD experiences any fault condition. Alarm shall be equipped with visual indication.
8. Audible Alarm. Pumping system controls shall include an audible alarm which shall be activated by any other alarm. Audible alarm shall continue to operate until the silence button is pressed to deactivate the audible alarm. Audible alarm shall not be completely reset until all other alarm functions have ceased.
9. High Suction Pressure Alarm. High suction pressure alarm shall be indication only, and shall not stop operation of the pumps. It shall have a delay of five seconds on actuation and shall cease when suction pressure drops below the setpoint of this alarm. Indication of the alarm shall be displayed visually on the control panel door. Alarm shall be equipped with visual indication and automatic reset.
10. High Suction Pressure Alarm and Shutdown. High suction pressure alarm shall shut down the pumps in an orderly manner. It shall have a delay of five seconds on actuation and shall cease when suction pressure drops below the setpoint of this alarm. Alarm shall disable only automatic operation. Indication of the alarm shall be displayed visually on the control panel door. Alarm shall be equipped with visual indication and automatic reset.
11. Pump Failure Alarm. Pump Failure alarm circuit shall shut down its individual pump if the pump fails to raise its discharge pressure above its discharge pressure switch setting within a predetermined time after the motor has been started, or if the pump discharge pressure drops below its discharge pressure switch setting while it is running. Operator interface terminal (OIT), mounted in enclosure door, shall signal pump failure. Affected pump shall not operate until alarm has been reset manually. Circuit shall include a pressure switch sensing

pump discharge pressure, timer, relay, manual reset, and indication of condition. Alarm shall be equipped with visual indication.

C. FUNCTIONAL SEQUENCE, PRESSURE & FLOW SEQUENCING.

1. Equal sized pumps shall be alternated based on accumulated run time, the pump having the least run time starting as lead.
2. In the event a pump has failed to run or start, or if its HOA switch is turned off, PLC shall shift the pumping sequence to utilize the remaining pumps.
3. Lead Domestic Water (DW) pump shall start immediately on a reduction in discharge pressure (10 psid factory default value).
4. PLC shall control all pump's VFD to maintain discharge pressure regardless of flow rate, at all points of this sequencing.
5. DW Lag pump shall start on a reduction in discharge pressure (10 psid factory default value) as maintained for a time (10 seconds default value).
6. Second DW Lag pump shall start on a reduction in discharge pressure (10 psid factory default value) as maintained for a time (15 seconds default value).
7. Second lag pump shall retire when flow has decreased to 80% of the preceding two pumps' combined capacity (300 GPM default value) as maintained for a time (30-45 seconds default value).
8. Lag pump shall retire when flow has decreased to 80% of the lead pump's capacity (150 GPM default value) as maintained for a time (30-45 seconds default value).
9. Lead pump shall retire when flow has decreased to zero as maintained for a time (30-45 seconds default value).
10. In the case that the pressure drops 20 psi or greater below the system discharge setpoint for a sustained period of time (default 15 seconds) or the flowrate exceeds 450 GPM, the domestic water pumps shall ramp down, and the lead high flow/fire duty pump will activate. Only one high flow pump will be active at any given time. The high flow pumps will alternate after each high flow pump cycle. The booster system controls program shall include an exercise time that will automatically rotate the high flow pumps on a user adjustable schedule.

1.09 CONTROLS REQUIREMENTS.

A. All control enclosures and controls shall have been manufactured on the pumping system manufacturer's site by the pumping system manufacturer.

B. In order to assure complete system integration, Manufacturer, without exception, shall maintain a fully equipped UL and ETL authorized panel shop at his facility under the same roof as the fabrication, painting, and assembly of the mechanical components.

C. Manufacturer, without exception, shall be authorized by Underwriters' Laboratories to label its manufactured control panels as UL Listed under category NITW/NITW7.

D. Manufacturer, without exception, shall conform to the latest edition of NFPA 70 in the manufacturing of its control panels.

E. Manufacturers not conforming fully to these requirements shall have their bids rejected as non-responsive.

PART 2 PRODUCTS

2.01 END SUCTION CENTRIFUGAL PUMPS.

A. The pumps shall be horizontal close coupled end suction centrifugal pumps with flow and head as defined below. The pumps shall be manufactured according to the standards of the Hydraulic Institute and to ANSI specification No. B58.1 and NSF Certified to NSF/ANSI 61 & 372 for use in potable water applications. The pump casing shall be ASTM 48, class 30, cast-iron capable of hydrostatic test @ 150% of maximum discharge pressure and have both suction and hub replaceable wear rings. All mating parts shall have a register fit to ensure alignment.

B. The impeller shall be an enclosed, single piece nickel aluminum bronze casting, from ASTM B148, C95800, modified C87500 completely machined on all outside surfaces and dynamically balanced at time of pump assembly. The impeller shall be keyed to the shaft and securely fastened with a vibration resistant lock screw and washer.

C. Casing wear ring shall be from lead free bismuth bronze.
D. The packing box shall contain a mechanical seal for the specific application.
E. The impeller shall not contact the suction or hub wear ring under any operating load condition.
F. The pump and motor shall be connected by an ASTM 48 class 30, cast-iron bracket incorporating a full isolating shield with neoprene slinger ring to prevent moisture from entering the front motor bearing.
G. Mechanical seal shall be equivalent to John Crane, type 21 standard seal.
   a. Rotary seal shall be from carbon.
   b. Stationary seat shall be from ceramic.
   c. Metallic parts shall be from 316 stainless steel.
   d. Elastomeric parts shall be from Buna-N.
H. Pumps with suction and discharge connections of 3"x 2.5" and smaller shall have female threaded connections.
I. Pumps with larger suction and discharge connections shall have flanges conforming to the flange pattern of ANSI 125 psi flanges.
J. Maximum allowable pump suction pressure shall be 100 PSI at 212ºF.
K. Maximum working pressure shall be 175 PSI at 212ºF.
L. The pumps shall be manufactured by Cornell Pump of Clackamas, Oregon or Engineer preapproved equal. Refer to paragraph 1.3 for preapproval submission requirements.
M. The pumping systems manufacturer shall have a network of service centers which shall have available spare parts and trained pump technicians to handle service, repair and warranty procedures.
N. Conditions of service:
   Pumping System Minimum Inlet Pressure: **32 PSIG Minimum**
   Pumping System Estimated Internal Losses: **5 PSIG**
   Pumping System Discharge Pressure: **55 PSIG (Domestic Operation)**
   Pumping System Discharge Pressure: **77 PSIG (High/Fire Flow Operation)**

Pump No.	Duty Point	Pump TDH	% Efficiency	Horsepower	RPM
1	150 GPM	65'	66.5%	5	1800
2	150 GPM	65'	66.5%	5	1800
3	150 GPM	65'	66.5%	5	1800
4	1500 GPM	116'	84.7%	60	1800
5	1500 GPM	116'	84.7%	60	1800

2.02 TOTALLY ENCLOSED JM SHAFT MOTORS. Motors for the close coupled end suction pumps shall be from a United States manufacturer.
A. Motor enclosure shall be TEFC, JM frame, premium efficient, conforming to MG-1 Part 31 for use with variable frequency drive.
B. Motor shall have a 1.15 service factor, and shall be derated to 1.0 service factor when used on inverter, and class F insulation.
C. Motors shall be wound for full voltage starting.
D. Maximum pump horsepower shall not be greater than motor nameplate rating exclusive of service factor.
E. The motor shaft shall be high-strength steel protected by a bronze or stainless steel shaft sleeve secured to the shaft.
F. Motors shall be as manufactured by U.S. Electrical Motors, or Baldor.

2.03 AWWA C504 BUTTERFLY ISOLATION VALVES.
A. All isolation valves 3” and larger shall be provided as shown on the contract drawings.
B. Valve shall be manufactured in accordance with the latest revision of AWWA C504, Class 150B (and/or 250B as required), and shall conform to NSF Standard 61.
C. Valve shall be sized for a maximum velocity of 7 FPS.
D. Valve shall have one piece body cast from ASTM A126 Class B cast iron.
E. Stem shall be 304 stainless steel.
F. Disc shall be from ASTM A536 Class B cast iron, grade 65-45-12 retained by stainless steel pins extending through the stem.
G. Stem bushings shall be self-lubricating nonmetallic material.

H. Seat shall be one piece elastomer, bonded into a recessed cavity in the valve body.
I. Manual actuator shall be of the traveling nut, self-locking type and shall be designed to hold the valve in any position intermediate between fully open and fully closed without creeping or fluttering.
J. Valve shall be rated at 150 PSI working pressure.
K. Pump isolation valves shall be model 2000 as manufactured by Val-Matic.

2.04 BALL VALVES.

A. Isolation valves shall be provided as full port ball valves in sizes 2.5” and smaller.
B. Valve shall be a two piece bronze full port ball valve.
C. Valve shall be sized for a maximum velocity of 7 FPS.
D. Valve shall have adjustable packing, blow-out proof stem, RPTFE seats and stuffing box ring, hardened ball, and actuator mounting pad.
E. Stem and gland shall be from B16 bronze.
F. Ball shall be chrome plated, from B16 bronze.
G. Retainer and body shall be from B584-C84400 bronze.
H. Body seal shall be from PTFE.
I. Quarter turn manual actuator shall be from zinc plated steel, with Vinyl cover.
J. Valve shall be rated at 600 PSI CWP.
K. Pump isolation valve shall be Apollo model 77-100 as manufactured by Conbraco.

2.05 FLEXIBLE GROOVED PIPE SERVICE COUPLINGS.

To facilitate pump, branch piping, and valve servicing, an NSF61 Certified Flexible Grooved Pipe Service Coupling shall be provided on the suction branch piping and the discharge branch piping of each pump. On the discharge branch piping, the flexible grooved pipe service couplings shall be installed below the check valves.

A. Flexible Grooved Pipe Service Couplings.
   1. Each pumps suction branch piping and discharge branch piping shall include an NSF61 Certified flexible grooved pipe service coupling rated at a minimum of 300 psi maximum working pressure for connector sizes through 12".
   2. The flexible grooved pipe service couplings shall be of the two bolt design.
   3. Sealing rings shall be made of EPDM.
   4. The flexible grooved pipe service coupling shall be as manufactured by Victaulic or Grinnell.

2.06 CHECK VALVES. A check valve shall be provided on the discharge of each pump. Check valve shall be of the silent type. The Domestic booster pumps shall have Wafer Style Silent Check Valves. The High Flow/Fire booster pumps shall have Globe Style Silent Check Valves. Check valves shall begin to close as forward velocity diminishes and shall be fully closed at zero velocity preventing flow reversal.

A. Valve bodies shall be cast from ductile iron ASTM A536, Grade 65-45-12 and shall be free from blow holes, sand holes, and other impurities.
B. Seat shall be as manufactured from Bronze ASTM B584, ALLOY C83600 and have a Buna-N insert for positive sealing to the disc.
C. Disc shall be as manufactured from Bronze ASTM B584, ALLOY C83600.
C. Spring shall be as manufactured from stainless steel T316, ASTM A313.
D. Bushing shall be as manufactured from Bronze ASTM B16, ALLOY C36000
E. Retaining screws shall be as manufactured from STAINLESS STEEL T316, ASTM F879.
F. The valve design shall incorporate a center guided, spring loaded poppet, guided at opposite ends, having a short linear stroke that generates a flow area equal to the pipe diameter.
G. Valves shall be sized to permit full pump capacity to discharge through them without exceeding a pressure drop of 6 feet of water column.
H. Check valves through 8" shall be from series 1400ABN rated at 400 psi working pressure.

I. Check valves greater than or equal to 10" shall be from series 1800ABN rated at 232 psi working pressure.
J. Check valves shall be as manufactured by Val-Matic.

2.07 THERMAL PURGE VALVES.

A. Thermal purge shall be an encapsulated thermo-mechanical device.
B. Valve shall be a 1/4" brass.
C. A 1/2" line from each pumps thermal purge valve to a nearby floor drain shall be provided.
D. Thermal purge shall not be considered as an alarm, but its function shall be considered as normal operation.
E. There shall be no indication of thermal purge operation, other than warm water discharge.
F. Thermal purge shall not shut down any pumps.
G. Thermal purge shall be provided on each pump.

2.08 SAMPLE TAP. A sample tap shall be installed with a vacuum breaker to prevent the possibility of cross contamination.

2.09 HOSE BIBB. Hose bibb shall be installed with a vacuum breaker to prevent the possibility of cross contamination. Two (2) hose bibbs shall be provided, one on the suction manifold and one on the discharge manifold.

2.10 WELDER QUALIFICATION.

A. Welders performing structural and pipe welds shall be certified to ASME section IX, and their certificates shall be on file with the manufacturer. Upon request by the engineer or owner, the certificates shall be made available for inspection.
B. All employees welding structural members shall have certificates on file exhibiting conformance to ASME AWS D1.1 structural welding.

2.11 STATION BASE.

A. All equipment including, but not limited to, pumps, motors, valves, hydro pneumatic tank, instrumentation, and controls, shall be mounted on a common structural steel base to form a complete operating pumping system.
B. The pumping system base shall be designed and fabricated to provide proper structural support for all attached equipment if it is supported solely on the peripheral members. Internal members need not contact the floor. This design shall allow the pumping system to be mounted on a slab, a frost wall, or a basement foundation. The base shall supply sufficient rigidity to withstand the stresses of reasonable and competent transportation to the jobsite, off-loading, installation, and operation.
C. Peripheral structural members shall be from channel or wide flange beam, ASTM A36.
D. Internal structural members shall be from ASTM A36 rectangular tubing or channel.
E. Station base to be covered with ¼" carbon steel diamond deck plate.
F. All employees welding structural members shall have certificates on file exhibiting conformance to ASME AWS D1.1 structural welding.
G. Provisions shall be made in the station base for off-loading and handling the station at the site.

2.12 FDA LINED PIPING, FUSION BONDING.

A. All piping, 10" and smaller, shall be constructed from ASTM A105 or ASTM A-53 schedule 40 pipe.
B. Piping greater than 10" shall be standard weight and conform to the same specification.
C. Piping smaller than 4" and greater than 36" shall be flame cut and beveled, having the cut surface ground to bare metal before welding.
D. Piping 4" to 36" size shall be plasma cut and beveled, including ends, and side penetrations, on a single machine, capable of tilting, extending, and rotating the pipe for making three dimensional cuts. All entrances and exits to the piping shall also be cut in this fashion. Machine shall cut manifolds and branches to be welded onto the manifolds, including any cuts that are not 90 degrees to the axis of the pipe.
E. Welders performing structural and pipe welds shall be certified to ASME section IX, and their certificates shall be on file with the manufacturer. Upon request by the engineer or owner, the certificates shall be made available for inspection.
F. After fabrication and before coating, piping shall be hydrostatically tested to 150% of maximum pump shutoff pressure plus stated suction pressure, or greater.

G. All steel piping shall be blasted inside to SSPC SP10, near white metal, and lined with an FDA approved fusion bonded epoxy, meeting the requirements of AWWA Standard C213 and C550, tested and found to be without holidays. Fusion bonded epoxy shall be applied to the manufacturer's recommendations regarding thickness, temperature, and duration. Manufacturer's certificate of application shall be retained on file, and shall be available for inspection when requested by the engineer or owner.

H. Fusion bonded epoxy shall be equivalent to 3M 134 FEBC.

2.13 PIPING SUPPORT.

A. Piping support shall be manufactured from structural rectangular tubing, sized according to the weight and size of the piping to be supported.

B. Each tubing member shall be capped to prevent internal corrosion.

C. Vertical tubing members shall be solidly welded to the skid and shall support the weight of the piping when filled with water.

D. Horizontal tubing members shall be solidly welded to the vertical members, shall extend beyond the pipe OD, and shall support the weight of the piping when filled with water.

E. Piping shall be secured to the members through the use of piping U bolts designed for this purpose.

F. Thrust of the piping, whether the thrust is in the vertical or horizontal direction, shall be restrained on site by the installing contractor.

2.14 TRAVELING BRIDGE CRANE

A traveling bridge crane shall be mounted on the skid within the pump system building.

A. The crane's support structure shall span the entire length and width of the building and shall allow for ease of maintenance and repair, and the delivery of any pump, motor, valve, flowmeter or variable frequency drive to the service access double door located at the end wall of the building.

B. The crane shall be equipped with stops to prevent the crane from running off the end of the rails and damaging the walls or other equipment, and to prevent personnel injury.

C. Structure and crane shall be rated to support a one-ton load along its entire length

D. Trolley shall be rated at one ton.

E. Hoist shall be manually operated and be capable of lifting and holding one ton.

F. Hoist chain shall be long enough to allow its hook to be delivered to the floor, and not stop short of the floor.

G. When at rest the crane assembly shall not be stored over the electrical panels or the required NEC clearance areas.

2.15 PRESSURE GAUGES.

A. A pressure gauge complete with isolation ball valve shall be mounted on each manifold and on each pumps discharge branch piping.

B. Each gauge shall be liquid filled to reduce wear due to vibration.

C. Gauge accuracy shall be within 0.5%, and shall comply with ASME B40.1 Grade 2A.

D. Gauge diameter shall be 4.5" minimum.

E. Gauge materials of construction:

1. Connection and bourdon tube shall be from 316 stainless steel.
2. Movement shall be from stainless steel with an internal stop at 1.3 times the gauge range.
3. Dial shall be from white aluminum with black lettering and a stop at the 6 o'clock position.
4. Pointer shall be adjustable from black aluminum.
5. Turret style case shall be from black glass reinforced thermoplastic (PBTP), and shall have built in rear flange lugs, with a solid front and blow-out back, rated at NEMA 4X.
6. Window shall be from acrylic.
7. Window gasket shall be from Buna-N.
8. Filling material shall be glycerin.

F. Range shall be selected so that operating pressure is in the mid-range of the gauge.

G. Gauge range shall in no case be less than 20% higher than the highest pressure attainable from the pumps at shutoff head conditions.
H. Gauge shall resist shocks to 100G.
I. Pressure gauge shall be model 233.34 as manufactured by WIKA.

2.16 PRESSURE TRANSMITTERS.

A. Pressure Transmitters shall be installed on both the suction and discharge manifolds and shall provide all pressure signals for the control logic of the booster system.
B. Pressure Transmitters shall be supplied with isolating ball valves.
C. Pressure Transmitters shall be a media isolated instruments, having no silicone oil, internal o-rings, or welds.
D. Pressure Transmitter wetted materials shall be T316 stainless steel NACE compatible housed in T316 stainless steel having a male threaded process connection.
E. Pressure Transmitter shall provide a 4-20 mA analog output linear with the sensed pressure, from a two wire 10-28 VDC supply, reverse polarity protected.
F. Pressure Transmitter shall have an accuracy of plus/minus 0.25% BFSL.
G. Resolution of the Transmitter shall be greater than the resolution of the analog to digital conversion for PLC operation.
H. The Suction Pressure Transmitter shall be rated for 0-100 PSI & the Discharge Pressure Transmitter shall be rated for 0-200 PSI. The Pressure Transmitters shall provide gauge pressure output, rather than absolute pressure.
I. Pressure Transmitters shall be WIKA A-10 Series or equivalent.

2.17 PRESSURE SWITCHES.

A. Pressure switch shall have a NEMA 4X housing.
B. Pressure switch shall have SPDT contacts rated 5 amps at 240 volts, non-inductive, and 125 VA at 24 to 600 volts for control circuit.
C. Operating temperature rating of pressure switch shall be -22ºF to 150ºF (-30ºC to 66ºC).
D. Storage temperature rating of pressure switch shall be -22ºF to 200ºF (-30ºC to 93ºC).
E. Pressure switches sensing suction pressure shall have a range of 30" vacuum to 100 psi with an adjustable differential of 2 to 25 psid.
F. Pressure switches sensing discharge pressure shall have a range of 4 to 150 psi or greater with an adjustable differential of 2 to 25 psid or greater.
G. Pressure switches shall be UE series 100 type H100, or Allen Bradley series 836C.

2.18 MAGNETIC FLOW METER. The pumping system shall include two (2) Magnetic Flow Meters as shown on the Plan Drawing. A 6" Magnetic Flow Meter shall be used to measure and transmit the Domestic Water pump(s) flowrate to the Domestic Water Flow Meter Indicator/Totalizer. A 10**"** Magnetic Flow Meter shall be used to measure and transmit the High Flow/Fire pump flowrate to the High Flow/Fire Pump Flow Meter Indicator/Totalizer. The two (2) Flow Meter Indicator/Totalizers shall display both the current flowrate as well as the totalized flow and transmit the flowrates to the Booster Station PLC and Operator Interface Terminal (OIT) where the flowrates and totalized flows will be displayed, recorded, and utilized for system control and pump staging. Flow meters shall be electromagnetic and comprised of two major components, a primary head and a signal converter. The flow meter signal converters shall produce two separate signals, pulse and 4-20mA, in linear proportion to flow rate. Flow meters shall read flows from 1-40 FPS, with a worst case inaccuracy of 0.5% of indicated value (not a percentage of full scale) at 1.3 FPS or greater. Flows less than 1.3 FPS shall have a lower accuracy with accuracy applying to indicated value (not full scale). Flow meters shall be sized so that the maximum system flow lies between 5 and 15 FPS through the meter. Meters shall be installed according to manufacturer's recommendations. Manufacturer shall have a US based manufacturing and assembly center. Flow meters shall be manufactured by Krohne, without exception. The following requirements apply to both flow meters.

A. Primary Head: The flow tube shall be an ANSI B16.5 class 150 flanged for sizes less than 24" and AWWA class D flanged for sizes above 24" with a 304SS spool. Wetted liner shall be hard rubber. Liner shall extend beyond the ends of the flow tube and over the flange faces. Liner shall remain stable and in place under a 500 mBar absolute vacuum or pressure situation. Liner shall be rated for the medium pumped. Magnetic coils shall be wound by the flow meter manufacturer and held in

place in such a way as to prevent any fluctuation in the magnetic field generated. Magnetic coils in flow tubes 6" and smaller shall be epoxied together through a fusion bonding process, which renders the magnetic coil a single solid piece with no loose windings. Electrodes shall be from Hastelloy C4. They shall be inserted from the inside of the flow tube, and shall be sealed along their length. Electrodes sealed at one or more discrete points shall not be accepted. The wires connecting the electrodes to the primary head shall be fastened in place along their entire length to prevent the transmission of erroneous data or signal noise acquired through signal wire movement. All wiring shall be brought into the primary head connection box and terminated. The shroud protecting the coils and electrodes shall be welded in place, and internally pressure tested to 1.5 atmospheres with air pressure. On completion, the flow tube shall be finish painted on all outside metallic surfaces. Primary head shall be NEMA 6 rated.

B. Signal Converter: The signal converter shall be NEMA 4X rated, and shall house the microprocessor-based electronics required for magnet excitation and flow measurement. Functions and data requirements shall be set by either a PC or by a hand held programmer. Unit shall process flow using a bipolar pulsed DC signal. Power supply shall be 115/230VAC 48-64 Hz. Outputs shall be 4-20 mA and pulsed output scalable at 0-100Hz or 0-1000 Hz for full scale range. Signal converter shall also include a binary output to indicate direction of flow.

C. Grounding rings: Where magnetic flow meters are placed in a pipeline that insulates the water from ground (e.g., epoxy lined steel pipe or plastic pipe) grounding rings are required at both ends of the flow meter to eliminate electrical eddy currents that may exist within the medium being pumped. Grounding rings and flow meter body must be grounded properly., in accordance with manufacturer's recommendations.

D. Calibration and Testing: Meter shall be hydraulically calibrated on a testing device that is at least 10 times more accurate than the meter, and shall not be calibrated against a master meter. Each and every flow meter produced by the flow meter manufacturer shall be flow tested and hydraulically calibrated according to this procedure. Manufacturer's test and calibration equipment shall be internationally certified, and shall be re-certified every three years. Calibration shall be accomplished through direct volumetric comparison, on rigs certified as having a measurement error of equal to or less than 0.03%. A calibration certificate shall be issued for each and every flow meter produced by the flow meter manufacturer. Calibration certificate shall be traceable to the US National Bureau of Standards. Meters shall be calibrated under standard conditions to a measurement error of less than 0.50% of rate.

E. Best resolution of flowmeter shall be with 5 diameters of straight pipe upstream of the center of the flowmeter, and 2 such diameters downstream of the center of the meter. In space critical situations, the meter manufacturer shall authorize the system manufacturer to attach 90 degree elbows directly to both flanges of the meter, without compromising the accuracy to worse than 1% of indicated value (not full scale). Meter manufacturer shall have provided system manufacturer with a written authorization and test data, which shall be kept on file at the system manufacturer's place of business, and made available for inspection on request.

F. Stainless steel grounding rings, properly bonded, shall be provided at the inlet and outlet of the flowmeter, when the piping is non-conductive, to arrest any electrical eddy currents in the water that could affect the meter accuracy.

2.19 PAINT.

A. Structural steel and supports shall be de-slagged then grit-blasted per SSPC-SP6 to commercial blast condition.

B. Primer shall be immediately applied, and shall be a two part epoxy primer.

C. Primer shall be PPG’s EPX-900 applied in one coat to 4.0-6.0 mils WFT, or pre-approved equal.

D. Finish coat shall be applied after proper curing time for the primer.

E. Finish coat shall be PPG’s AUE-300/301 applied in one coat to 2.7-4.0 mils WFT, or pre-approved equal.

F. Finish coat shall be SyncroFlo Municipal Blue in color.

2.20 HARDWARE. All bolts and nuts used in the assembly of the pumping system shall be zinc plated grade 5. As required in specific locations to protect the finish and prevent loosening, bolts shall be provided with washers and lock washers.

2.21 CONTROL PANEL ENCLOSURE.

A. All Controls and VFDs shall be housed inside a fan force ventilated NEMA 12 double door free standing enclosure with legs.
B. The control enclosure shall be constructed of 12 gauge steel and the back plate assembly shall be constructed of 12 gauge steel.
C. All indicating lights, reset buttons, selector switches and the operator interface terminal (OIT) shall be mounted on the enclosure door and shall be rated NEMA 4.
D. All internal components shall be mounted and secured to the removable back plate assembly. All equipment and wiring shall be mounted within the enclosure and labeled for proper identification.
E. All adjustments and maintenance shall be able to be accomplished from the front of the control panel enclosure.
F. A complete wiring circuit and legend with all terminals, components, and wiring identification shall be provided.
G. Equipment shall be provided within the controls enclosure to assure compliance with current NEC and UL codes.

2.22 SCADA RTU.

A. Space shall be provided near the control enclosure for the mounting of the SCADA RTU (if applicable).
B. SCADA RTU, if required, shall be provided by others.
C. At the engineer's or contractor's request, the SCADA RTU shall be shipped to the manufacturer's facility for mounting and interfacing to be provided by the pumping system manufacturer. If the SCADA RTU communicates with the Owner's SCADA system via radio, the radio antenna shall be provided, installed/mounted, and wired in the field by the SCADA provider.

2.23 LIGHTENING & SURGE ARRESTOR.

A. Electrical equipment shall be protected by a U.L. 1449 Third Edition Listed Sure Protection Devise (SPD) to suppress voltage surges on the incoming power.
B. SPD shall be connected to the line side of the pumping system landing lugs and shall be properly grounded.
C. The device shall be rated according to IEEE C62.41.1-2002, C62.41.2-2002, and C63.45-2002 to provide a surge capacity of no less than 50kA per phase.
D. Response time shall not be greater than 1 nanosecond.
E. SPD shall withstand no less than 5000 3kA impulses, 8x20µs, or 1000 10kA impulses, 8x20µs.
F. Manufacturer of SPD shall be ISO 9001:2000 certified, and shall have an ISO 17025:2005 test lab.

2.24 CIRCUIT BREAKER MAIN DISCONNECT.

A. A circuit breaker main disconnect shall be provided to isolate all controls and motor starting equipment from the incoming power.
B. UL/CSA short-circuit interrupting capacity rating of the circuit breaker shall be not less than 25,000 amps.
C. Main disconnect shall have a through the door operator, and shall be sized in accordance with current NFPA 70 and UL requirements.
D. Disconnect shall be manufactured by Eaton or Schneider Electric .
E. Disconnect's short circuit rating shall not be less than 25,000 amps.

2.25 CONTROL POWER.

A. Power for the controls shall be provided by a control power transformer which shall provide 120 volt, single phase power for the pumping system controls operation.
B. Control power transformer shall not be used for any load other than the booster pumping system controls.

C. The control power transformer shall be protected on the primary side by control limiting fuses of adequate size and voltage rating.
D. All control components on the load side of the transformer shall be protected by time delay circuit breakers of adequate size.
E. The control power transformer shall be manufactured by Micron Industries or pre-approved equal.

2.26 VFD/PUMP CIRCUIT BREAKER DISCONNECT.

A. A circuit breaker disconnect shall be provided in the control panel to isolate each VFD/Pump from the incoming power and provide short circuit protection.
B. UL/CSA short-circuit interrupting capacity rating of the circuit breaker shall be not less than 25,000 amps.
C. Disconnect shall be manufactured by Eaton or Schneider Electric .
D. Disconnect's short circuit rating shall not be less than 25,000 amps.

2.27 VARIABLE FREQUENCY DRIVES. Variable frequency drives shall be ABB ACS580 Series.

A. The Drive shall be solid state, with a Pulse Width Modulated (PWM) output. The drive shall utilize the latest isolated gate bipolar transistor (IGBT) technology. VFD must include all of the following features.
B. Control Specifications:
   1. Control System – selectable as high carrier frequency PWM control (V/F control), optimum excitation control, and simple magnetic flux vector control
   2. Output frequency range – 0.5-400 Hz
   3. Frequency Setting Resolution:
      a. Voltage input: 0.015Hz from 0 to 60Hz for 0 to 10V =12bit resolution.
      b. Voltage input: 0.03Hz from 0 to 60Hz 0 to 5V = 11bit resolution.
      c. Milliamp input: 0 to 20mA at approximately 11bit resolution.
      d. Voltage input: -10V to +10V = 11bit resolution.
      e. Voltage input: 0 to ±5V = 10bit resolution.
      f. Digital Input: 0.01Hz
   4. Frequency accuracy:
      a. Analog input: Within ±0.2% of the max. output frequency (25°C ± 10°C)
      b. Digital Input: Within 0.01% of the set output frequency
   5. Voltage/Frequency Characteristics: Base frequency can be set from 0 to 400Hz. Constant torque/variable torque pattern or adjustable 5 points V/F can be selected.
   6. Starting Torque: 120% (3Hz) when set to simple magnetic flux vector control and slip compensation
   7. Acceleration/Deceleration Time Setting: 0 to 3600s (acceleration and deceleration can be set individually), linear or S-pattern acceleration/deceleration mode can be selected
   8. Stall Prevention Operation Level: Operation current level can be set (0 to 150% adjustable), whether to use the function or not can be selected
C. Operation Specifications:
   1. Frequency Setting Signal:
      a. Analog Input: 0 to 10V, 0 to 5V, 4 to 20mA, -10 to +10V, -5 to 5V can be selected.
      b. Digital Input: Four-digit BCD or 16-bit binary using the setting dial of the operation panel (when used with the option FR-A7AX)
   2. Start Signal: Available individually for forward and reverse rotation. Start signal automatic self-holding input (3-wire input) can be selected.
   3. Operational Functions:
      a. Maximum and minimum frequency settings,
      b. Frequency jump operation,
      c. External thermal relay input selection,
      d. Polarity reversible operation,
      e. Automatic restart after instantaneous power failure operation,
      f. Continuous operation at an instantaneous power failure,
      g. Commercial power supply-inverter switchover operation,

h. Forward/reverse rotation prevention,
i. Operation mode selection,
j. PID control,
k. Computer link operation (RS-485).

4. Output Signal Selection (Choose up to seven points, one point per function unless otherwise indicated):
   a. Inverter running,
   b. Up-to-speed,
   c. Instantaneous power failure/undervoltage,
   d. Overload warning, output frequency detection,
   e. Second output frequency detection,
   f. Electronic thermal relay function pre-alarm,
   g. PU operation mode,
   h. Inverter operation ready,
   i. Output current detection,
   j. Zero current detection,
   k. PID lower limit,
   l. PID upper limit,
   m. PID forward rotation, reverse rotation output,
   n. Commercial power supply-inverter switchover MC1,
   0. Commercial power supply- inverter switchover MC2,
   p. Commercial power supply-inverter switchover MC3,
   q. Fan fault output,
   r. Heat sink overheat pre-alarm,
   s. Inverter running start command on,
   t. Deceleration at an instantaneous power failure,
   u. PID control activated,
   v. During retry,
   w. During pid output suspension,
   x. Life alarm,
   y. Input mc stop signal,
   z. Power savings average value update timing,
   aa. Current average monitor,
   ab. Alarm output 2,
   ac. Maintenance timer alarm,
   ad. Remote output,
   ae. Minor failure output,
   af. Alarm output.
   ag. Open collector output (5 points),
   ah. Relay output (2 points)
   ai. Alarm code of the inverter can be output (4 bit) from the open collector.
5. Pulse/Analog Output (select one of the following):
   a. Output frequency,
   b. Motor current (steady or peak value),
   c. Output voltage,
   d. Frequency setting value,
   e. Running speed,
   f. Converter output voltage (steady or peak value),
   g. Electronic thermal relay function load factor,
   h. Input power,
   i. Output power,
   j. Load meter,
   k. Reference voltage output,
   l. Motor load factor,
   m. Energy saving effect,
   n. PID set value,

o. PID process value, pulse train output
p. AM terminal function selection, analog output

D. Display Specifications:
1. Operating Status:
a. Output frequency,
b. Motor current (steady or peak value),
c. Output voltage,
d. Alarm indication,
e. Frequency setting,
f. Running speed,
g. Converter output voltage (steady or peak value),
h. Electronic thermal load factor,
i. Input voltage,
j. Output voltage,
k. Road meter,
l. Cumulative energization time,
m. Actual operation time,
n. Motor load factor,
o. Cumulative energization power,
p. Power saving effect,
q. Cumulative saving power,
r. PID set point,
s. PID process value,
t. PID deviation value,
u. Inverter I/O terminal monitor,
2. Alarms - displayed when the protective function is activated, and the output voltage/current/frequency/cumulative energization time right before the protection function was activated and the past 8 alarm definitions are selected to be stored.
3. Interactive Guidance - Operation guide and trouble shooting with a help function

E. Protective and Warning Functions:
1. Overcurrent during acceleration,
2. Overcurrent during constant speed,
3. Overcurrent during deceleration,
4. Overvoltage during acceleration,
5. Overvoltage during constant speed,
6. Overvoltage during deceleration,
7. Inverter protection thermal operation,
8. Heat sink overheat,
9. Instantaneous power failure occurrence,
10. Undervoltage,
11. Input phase failure,
12. Motor overload,
13. Output side ground fault overcurrent,
14. Output phase failure,
15. External thermal relay operation,
16. PTC thermistor operation,
17. Option alarm,
18. Parameter error,
19. PU disconnection,
20. Retry count excess,
21. CPU alarm,
22. Power supply short for operation panel,
23. 24vdc power output short,
24. Output current detection value over,

25. Inrush resistance overheat,
26. Communication alarm (inverter),
27. Analog input alarm,
28. Internal circuit alarm (15v power supply),
29. Fan fault,
30. Overcurrent stall prevention,
31. Overvoltage stall prevention,
32. Electronic thermal pre-alarm,
33. PU stop,
34. Maintenance timer alarm,
35. Parameter write error,
36. Copy operation error,
37. Operation panel lock.

F. Environment Requirements:
1. Ambient Temperature: -10ºC to +50ºC (non-freezing)
2. Ambient Humidity: 90% RH or less (non-condensing)
3. Storage temperature: -20ºC to +65ºC (applicable for a short period in transit, etc.)
4. Atmosphere: NEMA 1, Plenum rated - Indoors (without corrosive gas, flammable gas, oil mist, dust and dirt, etc.)
5. Altitude: Maximum 1000 meters (3300 feet) MSL
6. Vibration: 5.9m/s^2 or less

G. Variable Torque Ratings: Three phase VFDs are to be derated by 40% for single phase input, three phase output operation. All Mitsubishi F700 VFDs rated for single phase input, three phase output operation have been tested and certified for use on single phase input power.
1. 240 volt, single phase, class: 1/2-75 hp, UL & cUL listed
2. 240 volt class: 1-200 hp at 200-240/3/60
3. 480 volt, single phase, class: 1/2-200 hp, UL & cUL listed
4. 480 volt class: 1-1000 hp at 380-480/3/60

H. Communications protocols (optional):
1. Ethernet I/P
2. Modbus TCP/IP
3. BacNET I/P
4. Metasys N2
5. Siemens FLN
6. Modbus RTU
7. BacNET MSTP

I. Harmonics mitigation: Harmonic mitigation shall be in the form of a High Z 5% line reactor connected between the VFD and its circuit breaker. Line reactor shall have no more than 80 watts heat rejection. Line reactor shall be installed in the control panel.

J. Load side filter: Load side filter shall be a dV/dT filter, V1K series, as manufactured by TCI or preapproved equal. Load side filter shall be NEMA 1 enclosed and mounted directly beneath its VFD. Load side filter shall suppress reflected wave phenomenon and resonant circuit phenomenon.

2.28 MICROPROCESSOR CONTROLS, VARIABLE SPEED. All control logic shall be handled by an industrial microprocessor logic controller (PLC) accessible through a ” high definition widescreen graphic operator interface terminal (OIT) which shall provide data entry and read-out capabilities. Controller shall provide demand controlled sequential pump start up, shutdown and alarm features through its pressure sensing, flow sensing and voltage sensing devices. Controller shall be provided with a built in memory. Controller shall operate VFDs using dual PID loops, one for acceleration, and one for pressure maintenance. All logic for system control, and timing shall be handled by the controller.

A. Control software shall be parameter driven, fully documented, and allow user to easily change all operational parameters.

B. Conditions that shall be displayed on the controller's operator interface terminal (OIT):
1. Suction Pressure
2. Discharge pressure
3. Current flow rate

4. Total gallons pumped
5. Each alarm on its occurrence, retained until reset.
6. Each pump run time hours and tenths
7. Selection of manual or automatic alternation sequence.
8. Automatic or manual adjustment (selectable) of VFD speed if pump H-O-A switches are in Auto.
9. Alarm Log History with date/time stamp and description of the alarm condition.

C. Panel face switches and lights:
1. Individual pump run lights – Green LED
2. General alarm light – Red LED
3. Control power on light – White LED
3. Individual pump Hand/Off/Automatic switches
4 Alarm reset and audible alarm silence pushbuttons.

D. All pumping system shutdowns shall be of the controlled type which sequence pumps off at user selectable intervals.

E. 10" high definition widescreen graphic operator interface terminal (OIT) shall be mounted on the control panel door.
1. This device shall allow the operator to view and modify each register in the PLC.
2. The device shall allow for display and modification of all timer values, set points, lockout times, etc.

F. PLC shall be FX5U as manufactured by Mitsubishi, and shall be capable of Ethernet interface to a variety of SCADA platforms, or have to ability to communicate to a module capable of Ethernet/IP communications

G. Operator Interface Terminal (OIT) shall be a Maple Systems HMI5100BV2 with 10" color touch screen.

2.29 SCADA INTERFACE.

A. A dedicated terminal strip shall be provided near the bottom of the enclosure to which shall be connected the remote signals for the SCADA system (if applicable). In lieu of a terminal strip for dedicated hard wired SCADA communication, an Ethernet connection for MODBUS TCP/IP SCADA communication may be provided. The method of SCADA communication (Hard Wired Contacts or Ethernet) shall be confirmed during the submittal preparation stage.

B. If hardwired SCADA communication is required, the SCADA system's RTU shall be connected to a dedicated terminal strip within the controls enclosure. SCADA RTU shall be provided, installed, and connected to the terminal strip on site by others. Contacts shall be provided as follows:

1. Set of auxiliary analog signals including:
   a. Suction Pressure (AO)
   b. Discharge Pressure (AO)
   c. Flow Rate (AO)
2. Set of auxiliary contacts including:
   a. Each Pump Call (DI)
   b. Each Pump Running (DO)
   c. Each Pump Fault (DO)
   d. General Alarm (DO)

C. In lieu of a terminal strip for dedicated hard wired SCADA communication, an Ethernet connection for MODBUS TCP/IP SCADA communication may be provided to make all of the communication signals described above available through a single Ethernet cable connection. The method of SCADA communication (Hard Wired Contacts or Ethernet) shall be confirmed during the submittal preparation stage.

2.30 SPARE PARTS.

A. Spare parts shall be provided as listed below, wrapped or bagged to prevent premature oxidation, and properly identified and boxed.
   1. Two (2) Mechanical Seal kits with gaskets for the Domestic Pumps.
   2. Two (2) Mechanical Seal kits with gaskets for the High Flow/Fire Pumps.
   3. Qty (1) Complete set of control panel replacement fuses
   4. Qty (1) Set of pilot light replacement lamps
   5. Qty (2) Spare Pressure Transmitters (one (1) 0-100 PSI Transmitter for suction PSI and one (1) 0-200 PSI Transmitter for discharge PSI).

2.31 PUMPING SYSTEM METAL BUILDING.

A. Building shall be manufactured by Parkline, Inc., Winfield, WV without exception.

B. Building shall be designed in accordance with the applicable sections of the latest edition of the AISC "Specifications for Structural Steel Buildings" and the AISI "Specification for the Design of Cold-Formed Steel Structural Members". Wood building materials are not permitted and any packaged booster pumping systems that include buildings with wooden framing or wooden sheathing will be rejected.

C. Building shall be designed for the following loads, in addition to the stationary weight of the building. Reduction of loads due to tributary loaded areas will not be permitted.

1. The vertical Live Load of the building shall not less than 30 pounds per square foot applied on the Horizontal projection of the roof.

2. The Ground Snow Load of the building shall not less than 15 pounds per square foot applied on the Horizontal projection of the roof.

3. The horizontal Wind Load of the building shall not be less than 140 MPH and shall be distributed and applied in accordance with the applicable edition of the "International Building Code" published by the International Code Council

4. All combining and distributing of auxiliary equipment loads imposed on the building system shall be done in accordance with the applicable section of the current edition of the "International Building Code" published by the International Code Council.

5. Upon request, the building manufacturer shall provide the building purchaser with a complete design certification signed and sealed by a registered professional engineer. This documentation if required, shall be provided after the building has been manufactured and will be for record purposes only.

D. Roof Panel Design

1. Roof panels shall be supplied in a single continuous length from eave line to ridge line and shall be designed to tightly interlock so that no fasteners are required at intermediate points along the panel side laps. Roof panels shall be 16" or 12" wide with a smooth surface between the interlocking side ribs. The interlocking ribs shall be a minimum 3" high and shall be turned upward. All roof panels shall be factory punched for connection at the eave line of the building.

2. There shall be no fastener penetrations through the roof covering except at the eave lines, ridge lines and roof accessory openings such as skylights and ventilators if required.

3. Roof panels shall be a nominal 24-gauge steel coated on both sides with a coating of corrosion resistant aluminum-zinc alloy conforming to ASTM A 792 specification with the coating conforming to AZ55 (55%) standard by a continuous hot dipping process. Coating weight shall be a minimum of 0.50 oz. of aluminum-zinc alloy per square foot of coated sheet equivalent to about 0.8 mil thickness on each side. Minimum yield strength of panel material shall be 50,000 PSI.

4. The building shall have a Single Slope Style roof line as shown on the Plan Drawings.

E. Wall Panel Design

1. Exterior wall panels of the building shall be a single continuous length from the base channel to the roof line of the building at the sidewalls and end walls of the building except where interrupted by wall openings.

2. Wall panels shall be 16" wide with a 3" deep inward turned interlocking side rib. Wall panels shall contain two 3/4" deep by 3-1/8" wide fluted recesses, each starting 2-7/16" from the panel edge.

3. Wall panels shall be fastened internally to the base channel and eave cap of the building with 3/8" diameter electro-galvanized machine bolts placed within the panel interlock. The fastening system shall be designed so that no wall fasteners are exposed on the exterior surface of the walls.

4. Wall panels shall be nominal 24-gauge galvanized steel conforming to ASTM A-653 specifications with the galvanized coating conforming to G90 (1.25 oz. commercial) standards.

5. Minimum yield strength of the panel material shall be 40,000 PSI. Panel material shall be embossed with a random pattern pebble embossure of approximately .007 - .008 depth.

6. All exterior surfaces of the galvanized steel wall covering and exterior trim shall receive a factory, roller applied, paint coating having an exterior coating thickness of 0.8 to 1.2 mils of dry film thickness. The finish coat for the exterior wall panels shall be a siliconized polyester formulation of one of the following standard Parkline Colors: Arctic White, Desert Tan, Twilight Blue, Laurel Green, Roman Bronze or Shell Grey. The finish coat for the exterior trim shall be a siliconized polyester formulation of one of the following standard Parkline Colors: Arctic White or Roman Bronze. The submittal shall include the Manufacturer's standard color selection chart. The Owner will select the Parkline Building exterior wall and trim colors during submittal review and their chosen selections will be included in the submittal review notes and comments.

7. The wall panel color coating shall carry a low fire hazard rating equal to a Class 1 material as defined by Factory Mutual. The panel coating shall have achieved a Flame Spread Index of 0 and a Fuel Contributed Index of 5 or less when tested in accordance with ASTM E-84 test procedures.

8. Exterior color coatings shall meet the following performance standards after 10 years continuous exposure in normal atmospheric conditions not containing corrosive fumes such as chemical fumes or salt spray.

a. Panels shall show no evidence of blistering, peeling, or chipping.

b. Panels shall not show surface chalking in excess of the No. 8 rating D659 as established by the American Society of Testing Materials (ASTM).

c. Panels, after cleaning, shall not show color change in excess of five (5) NBS units when measured in accordance with the ASTMD-2244 standard.

F. Each building shall have an interlocking panel roof system with a 1-1/2" pitch over the building width. Roof panels shall be attached to the wall cap through factory punched holes, with #14 corrosion resistant fasteners.

G. The roof system shall include a gutter and downspout system at the low sidewall, eave trim at the high sidewall, and matching rake trim at the building end walls. All gutters and trim shall be galvanized steel pre-painted in Arctic White or Roman Bronze (owner's choice).

H. Transmission of horizontal wind loads across the building shall be made through the panel roof system and no separate roof or wall diagonal bracing shall be required. Where required for proper transmission of lateral wind loads, structural frame wind bents shall be installed.

Wind bents shall consist of a prime painted column and rafter bolted assembly made of steel conforming to ASTM A-36 specifications.

I. The interlocking panel roof system shall extend a minimum of 8" over the end wall panels and a minimum of 6" over the sidewall panels of the building, except buildings with 6" high rib roof panels shall have no end wall overhang.

J. The building roof liner shall be finished with nominal 26-gauge factory painted rake trim having matching ridge and eave cornices. Color of rake trim and cornices shall be Arctic White or Roman Bronze (owner's choice).

K. The eave of the low side of the single slope roof shall have a gutter and downspout system of nominal 26-gauge factory painted gutters of the same configuration as the building rake trim and 2" x 3" box type aluminum downspouts. Gutters and downspouts shall be the same color as the building rake trim and shall be complete with all required outlet drops, elbows and connecting hardware.

L. Hollow Metal Doors

The Parkline Metal Building shall include two (2) doors. A single leaf personnel access door shall be installed in the front wall of the building as shown on the plan drawing. This door will be used for personnel access/entry. A double leaf service access door shall be installed on the end wall of the building as shown on the plan drawing. This door will be used for service access.

All doors shall be 1-3/4" thick flush construction type. Door panels shall be nominal 20 gauge galvanized steel reinforced by lamination to a honeycomb core enclosed with 16 gauge end channel. The hinge reinforcements shall be nominal 7 gauge and the lock reinforcements shall be nominal 16 gauge. Door frames shall be 4-3/4" deep double rabbeted type of nominal 16 gauge galvanized steel.

Doors and frames shall be factory painted with one coat of baked-on primer, and one coat of polyester paint to match the building wall or trim color (determined by owner during submittal approval based upon building wall and trim color selections). After painting, the doors shall be preassembled in their frames and the door hardware installed and tested prior to shipment.

1. Door hardware shall consist of:

a. Three 11/16" wide x 5/8" high extruded aluminum threshold. (Out Swing)

b. Vinyl/Aluminum rigid rubber weatherstripping.

c. Three 4-1/2" x 4-1/2" standard weight ball bearing hinges per ANSI A5112 630 Satin Stainless Finish with non-rising pins.

d. Mortise lockset per ANSI A156.13, Series 1000, Grade 1, Function F13, 626 Satin Chrome Finish (levers both sides). The single leaf personnel access door and the double leaf service access door shall be keyed alike.

e. Door closer is certified to conform to ANSI 156.4 Grade 1 and meets exterior barrier free codes in 689 Aluminum Lacquer Finish.

f. Rim type "Cross Bar" panic device per ANSI A156.3, Type 1, Grade 1, Function 05, with 627 Satin Aluminum Finish.

g. Rim type "push pad" panic device built to ANSI A156.3, Type 1, Grade 2, Function 08 with Aluminum Lacquer Interior Finish and 626 Satin Chrome Exterior Finish.

M. Environmental Control Systems

1. Station Heater, Ventilation, and Air Conditioner (HVAC) unit- The manufacturer shall provide one (1) 3-phase, 460-volt wall mounted heater and air conditioner combination unit. The HVAC unit shall be provided with thermostat control and two wall penetrations, one for supply air and one for return air. The HVAC system shall be powered from a dedicated circuit breaker located in the booster pump station control panel. The combination heater and air conditioner unit shall be prewired and securely mounted to the Parkline metal building at the booster station manufacturer's facility and tested prior to shipment. The air conditioner shall be rated for three (3) ton capacity. The integral heater shall be 5 kW. The HVAC System shall be manufactured by BARD without exception.

2. Station Dehumidifier - A pump station dehumidifier shall be supplied with the pump system building to remove and prevent moisture from the ambient air. The unit shall plug directly into one of the wall mounted GFI outlets. The unit shall be compact and portable with the ability to remove 30 pints of water within a 24-hour period. The dehumidifier cabinet shall be mar resistant, gray stone vinyl on steel laminate on the sides and top with impact resistant polystyrene grille. The unit shall have a 3-point suspension system to enable the system to remain level. The unit shall also come complete with an automatic humidistat control that is dial controlled to enable the system to be turned on or turn off at pre-selected moisture levels. The unit can also be turned off or set to continuous operation by the same dial. A threaded drain connection and flexible discharge hose shall be included for continuous draining to a nearby floor drain. The unit shall also have the built-in feature to automatically shut off the compressor in the event frost develops on the evaporator coil. This shall take place in the event that the ambient temperature drops to below 65 degrees F. The fan shall continue to run until the coil has defrosted. Water removal capacities are certified to ANSI/AHAM standard DH-1-1992. The unit shall come with a standard 1-year warranty on parts and labor and the warranty shall be directed through the pump station manufacturer.

N. Electrical

1. All system enclosure utility wiring shall be housed in surface mounted EMT or schedule 40 PVC conduit, except for final approaches to device connections, where flexible conduit may be used. All flexible conduit must be interior to the enclosure and easily accessible.

2. A minimum of four (4) ground fault interrupting receptacles shall be located in strategic positions to assure access to all equipment. One (1) of the ground fault interrupting receptacles shall be located on the exterior end wall of the building adjacent to the HVAC unit.

3. A minimum of six (6) two lamp, 48-inch long ceiling mounted LED lights shall be installed to deliver optimum lighting. The ceiling mounted LED lights shall be controlled by a light switch mounted near personnel entry door.

4. Two (2) Exterior mounted 50-watt equivalent LED lights shall be supplied. One (1) exterior light shall be installed above the main personnel entrance door. The other exterior light shall be mounted above or adjacent to the double service door. The Lights shall be controlled by integral photocells, and each light shall draw no more than 3.00 amps at 120/1/60. The exterior light lens shall be a single piece from refractive prismatic polycarbonate material. The exterior light housing shall be from die cast aluminum and bronze colored. Each light fixture shall be equipped with a photocell and an internally mounted lighting switch. Each exterior mounted LED light with integral photocell operation shall also include a wall mounted switch on the wall inside the door to enable the operator to manually turn off the exterior lights if desired.

5. A two lamp LED battery operated emergency light with exit sign shall be installed near the main personnel entry door to provide personnel adequate light to exit the premises in the event of power failure. The fixture shall include a battery charger and shall be wired to 120/1/60 power.

6. A single smoke alarm shall be installed for personnel safety. The smoke alarm shall include a dry contact which shall close on activation of the alarm. The dry contact shall be connected to the SCADA system (if applicable) to alert the operator of a potential fire.

7. A water sensor float switch alarm shall be installed near the interior finished floor of the booster pump station building. The water sensor float switch shall include a dry contact which shall close on activation of the switch. The dry contact shall be connected to the SCADA system (if applicable) to alert the operator of a flood condition inside the booster pump station building.

8. Station Power Supply - The pump station manufacturer shall provide an auxiliary mini power zone with primary circuit breaker and secondary main circuit breaker and load center, prewired and mounted on the skid. It shall deliver 15 kVA of 240/120 volt single phase power to support all building loads without overloading. Properly sized load side circuit breakers shall be provided for:

a. Interior lights.

b. GFCI duplex receptacles.

c. Exterior lights.

d. Emergency light.

e. Dehumidifier.

f. SCADA RTU Panel.

g. Generator battery charger.

h. Generator block heater.

i. Two spare 20-Amp circuit breakers for owners use.

8. All conduit and wiring shall be installed in accordance with the latest edition of the National Electric Code.

O. Booster Station manufacturer shall supply rubber safety floor matting in front of the control panels occupying the entire space required by NEC for proper clearances. Rubber floor matting shall supply slip resistant footing for maintenance personnel.

PART 3 EXECUTION

3.00 SYSTEM FACTORY WINESSED FLOW TEST. The entire pumping system shall be flow tested across its entire range of operation at the manufacturer's facility prior to shipment.

A. The factory flow test rig shall include a flowmeter and gauges that are NIST traceable. The test rig shall be able to supply power to the pumping system control panel to support the operation of all pumps. The test may be conducted with the air separation tees removed, in order to allow for connection to the suction and discharge headers from a horizontal position.

B. System shall be supplied with the established minimum suction pressure, and adequate flow for testing of the pumps.

C. All electrical controls and circuits shall be included in the system test, as shall their interface to the motors and the outputs to the SCADA system.

D. System factory flow test results shall be provided in the form of an X-Y plot.

E. Any failure in the flow test, either for any pump or for the system, shall be corrected by the manufacturer at his expense, and the test repeated until satisfactory results are obtained.

F. Flow test may be witnessed in person. Advise engineer two weeks in advance of flow test to be witnessed in person. Transportation, lodging and per diem expenses shall be for the account of the person(s) witnessing the test in person.

G. Instead of a flow test being witnessed in person, a witness flow test shall be conducted virtually, via the internet, using a portable web cam. Test shall be interactive between the tester and the witness, allowing questions, comments and responses to be communicated while the test is in progress. Advise engineer one week in advance of flow test to be witnessed virtually.

3.01 UNLOADING & SETTING.

A. Setting of the pumping system and connection to suction, discharge and power, anchoring of the pumping system, and thrust blocking of the suction and discharge piping that is connected to the pumping system shall be the responsibility of the installing contractor and not the manufacturer.

B. Crane to off-load and set the pumping system onto the concrete slab shall be provided by installing contractor.

C. Manufacturer shall inform the contractor, prior to system shipment, of the calculated weight of the pumping system.

3.02 INSTALLATION. The installing contractor shall be responsible for providing all materials, equipment, and labor necessary to install and connect the pumping system.

A. The factory prefabricated pumping system must sit flush/level on the concrete slab/foundation, the installing contractor shall provide and install steel shims in between the pumping system skid base and the concrete slab/foundation as required to ensure the pumping system is level prior to anchoring the pumping system skid to the concrete slab/foundation and prior to the connection of the pumping system to the field installed piping. Any mechanical issues or pumping system operational problems caused by the installing contractor's failure to properly level the pumping system during installation shall be corrected at the installing contractor's expense. After the system is confirmed to be level, any gaps between the pump skid base and the concrete slab shall be filled with non-shrink grout around the entire perimeter of the skid base to provide a neat and uniform appearance.

3.03 START-UP.

A. When discharge piping, electrical connections, and electrical inspection have been completed, the pumping system manufacturer shall be contacted for start-up.

B. A minimum three week notice shall be given to the Packaged Pumping System Manufacturer and the Project Engineer prior to the start-up date.

C. Field testing:

1. During start up, the complete pumping system shall be inspected for proper installation, and shall be given a running test of normal start and stop, and fully loaded operating conditions.
2. During this test, each pump shall demonstrate its ability to operate without undue vibration, or overheating and shall demonstrate its general fitness for service.
3. All defects shall be corrected and adjustments made at the expense of the pumping system manufacturer.
4. Test shall be repeated until satisfactory results are obtained.

D. Start-up assistance shall be limited to one trip and two (2) consecutive eight (8) hour days on site.

E. After the station startup has been completed but before the factory employed start-up technician leaves the job site, a training session shall be given to the owner and/or the owner's representative to familiarize them with the pumping system operation, maintenance and system adjustments.

3.04 WARRANTY.

A. The manufacturer shall warrant that the water pumping system shall be free of defects in workmanship for a period of one year from date of authorized start-up but not to exceed eighteen months from date of shipment from the manufacturer's facility.

B. Provided that all installation and operation responsibilities have been properly performed, manufacturer shall provide a replacement part or component during the warranty period. Any repairs to be accomplished at manufacturer's expense must be pre-authorized. The start-up certificate must be on file with manufacturer to activate warranty. Upon request, manufacturer shall provide trouble shooting assistance for any potential operational problems or defects during the warranty period.

C. Manufacturer shall use only first quality material. As with any mechanical or electrical device, some preventive maintenance efforts are required to assure an adequate service life. A periodic preventive

maintenance program recommendation shall be included in the owner's manual. Manufacturer shall support a large national network of technical service technicians. Manufacturer's field service technicians shall be contacted for service. Because of varied conditions beyond the control of manufacturer, this warranty may not be valid or may not cover damage as follows:

1. Default of any agreement with manufacturer.
2. Misuse, abuse, or failure to conduct routine maintenance.
3. Handling any liquid other than clean water.
4. Exposure to electrolysis, erosion, or abrasion.
5. Presence of destructive gaseous or chemical solutions.
6. Over voltage or unprotected low voltage.
7. Unprotected electrical phase loss or phase reversal.

END OF SECTION

SECTION 33 10 00 – WATER UTILITIES

1. GENERAL

1.1 DESCRIPTION

A. All water distribution pumps, piping, valves, fittings, fire hydrants, meters, meter vaults, appurtenances and other products shall conform to the requirements set forth in this Section and the Contract Documents.

1.2 QUALITY ASSURANCE

A. Comply with all applicable codes and regulations as required by regulatory agencies having jurisdictions over this Work.

1.3 CONNECTIONS TO EXISTING SYSTEM

A. The Contractor shall make connections to the existing system under a pressure or non-pressure condition, as indicated, complying with the system owner's requirements for the time of day such work can be done.

B. Contractor shall notify the Fire Marshal’s Office 72 hours in advance with date, time, location, and duration of all work that affects the Fire Protection Lines or Hydrants.

C. Contractor to provide the coupon produced for all tapping sleeve and valve installation to the Town. The Fire Marshal’s Office reserves the right to be on-site for all reinstatements that affect Fire Suppression mains.

D. Owner's valves and equipment shall be operated only by the Owner.

E. Contractor shall submit for approval dimensioned layout drawings for all flanged ductile iron pipe. Drawings shall include all fittings, valves, equipment, taps, appurtenances, and dimensions to locate pipe in buildings.

F. Exposed pipe shall be installed level, plumb and square to building walls and equipment in accordance with industry standards and practices.

2. PRODUCTS

2.1 UNDERGROUND PIPE AND FITTINGS

A. Ductile Iron Pipe:

1. Ductile iron pipe shall meet the requirements of AWWA C151 and AWWA C150. Minimum thickness shall be Class 52 with a working pressure of 350 psi. Rubber-gasket joints shall meet the requirements of AWWA C111. Pipe shall have a single cement-mortar lining and a bituminous seal coat conforming to the requirement of AWWA C104. A minimum of 5% of the pipe furnished for a project shall be gauged for roundness full length and so marked. Pressure class of pipe shall be increased if the specific installation warrants it.

B. Ductile Iron Restrained Joint Pipe

1. Ductile iron restrained joint pipe shall meet the requirements of AWWA C151 and AWWA C150. Minimum thickness shall be Class 52 with a working pressure of 350 psi. Rubber-gasket joints shall meet the requirements of AWWA C111. Pipe shall have a single cement-mortar lining and a bituminous seal coat conforming to the requirement of AWWA C104. Restrained push-on joints shall utilize a gripper ring, field weldments, or approved equal and shall be designed for a working pressure of 350 psi for sizes 4” through 24”. A minimum of 5% of the pipe furnished for a project shall be gauged for roundness full length and so marked. Pressure class of pipe shall be increased if the specific installation warrants it.

C. Polyvinylchloride (PVC) Pipe

1. PVC pipe shall meet requirements of AWWA C900 for sizes 4 inches to 48 inches in diameter. Joints shall be in accordance with manufacturer's instructions and ASTM D2564, D2464, D2467, D319, and F477. Where working pressures over 150 psi are encountered, ductile iron pipe shall be used. Cell classification shall be 12454-B

D. High Density Polyethylene (HDPE) Pipe

1. 3-Inches and Smaller Pipe: Pipe shall be manufactured from a PE 4710 resin listed with the Plastic Pipe Institute (PPI) as TR-4. The resin material shall meet the specifications of ASTM D3350 with a cell classification of 445574C/E and is formulated with carbon black and/or ultraviolet stabilizer. Pipe shall have a manufacturing standard of ASTM D2737 (copper tubing size), ASTM D2239 (iron pipe size, controlled inside diameter) and ASTM D 3035 (iron pipe size, controlled outside diameter). Pipe shall have a maximum dimension ratio of DR-9 and a minimum pressure class PC 250 psi. The pipe shall contain no recycled compounds except that generated in the manufacturer's own plant from resin of the same specification from the same raw material. All pipes shall be suitable for use as pressure conduits, and per AWWA C901, have nominal burst values of three times the Working Pressure Rating (WPR) of the pipe. Pipe shall also have the following agency listing of NSF 14.
2. 4-Inches and Larger Pipe: Pipe shall be manufactured from a PE 4710 resin listed with the Plastic Pipe Institute (PPI) as TR-4. The resin material will meet the specifications of ASTM D3350 with a cell classification of 445574C/E and is formulated with carbon black and/or ultraviolet stabilizer. Pipe shall have a manufacturing standard of ASTM F714. Pipe O.D. size shall be ductile iron pipe size (DIPS). Pipe shall have a maximum dimension ratio of DR-9 and a minimum pressure class PC 250 psi. The pipe shall contain no recycled compounds except that generated in the manufacturer's own plant from resin of the same specification from the same raw material. All pipes shall be suitable for use as pressure conduits per AWWA C906 and listed as NSF 61. Pipe shall have a nominal burst value of three and one-half times the Working Pressure Rating (WPR) of the pipe.
3. HDPE pipe shall be continuously marked by the manufacturer with permanent printing indicating the following:
   a. "NSF-PW"
   b. Nominal size (inches)
   c. Dimension ratio (DR)
   d. Pressure rating (psi)
   e. Material classification (PE 4710)
   f. Plant, extruder, and operator codes
   g. Resin supplier code
   h. Date produced
4. HDPE pipe used for water shall be black in color with permanent blue stripes extruded into the pipe length or shall be solid blue.

E. E. Copper Tubing – 2" and Smaller

1. Underground services shall be seamless, annealed copper tubing Type K, in conformance with ASTM B88. Fittings shall be brass with compression joints suitable for direct burial.
2. Above ground, copper tubing shall be seamless hard copper tubing Type L, in conformance with ASTM B88. Fittings shall be brass or wrought copper. Joints shall be threaded or soldered.
3. Solder shall be 95-5 lead free solder meeting the requirements of NSF 61.

F. Fittings

1. Ductile Iron Fittings

a. Fittings for PVC pipe and DI pipe shall be ductile iron. Ductile iron fittings shall be in accordance with AWWA C110 or AWWA C153. Pressure ratings shall be a minimum of 350 psi. All fittings shall have a single cement mortar lining on the interior and a bituminous seal coating on the exterior. Fittings shall have mechanical joints conforming to the requirements of AWWA C111. Bolts for mechanical joint fittings shall be high strength, corrosion resistant low alloy steel with hexagon nuts having a minimum yield point of 45,000 psi in accordance with AWWA C111. Mechanical joint bolts shall be torqued with a torque wrench as per manufacturer's recommendations.

2. Polyethylene Pipe Fittings

a. Fittings for polyethylene pipe shall be manufactured specifically for the intended use and be approved by the piping manufacturer to be compatible with their product. All fittings shall have a working pressure rating equal to or greater than the pipe and shall meet all requirements of NSF 61.

b. Butt Fusion Fittings

i. Butt fusion fittings shall be PE4710 HDPE, Cell Classification of 445574C/E as determined by ASTM D3350 and approved for AWWA use. Butt fusion fittings shall have a manufacturing standard of ASTM D3261. Molded & fabricated fittings shall have a pressure rating equal to the pipe unless otherwise specified in the plans. Fabricated fittings are to be manufactured using Data Loggers. Temperature, fusion pressure, and a graphic representation of the fusion cycle shall be part of the quality control records. All fittings shall be suitable for use as pressure conduits, and per AWWA C901 and C906, shall have a nominal burst value of three and one-half times the Working Pressure Rating (WPR).

c. Electrofusion Fittings

i. Electro-fusion fittings shall be PE4710 HDPE, Cell Classification of 445574C/E as determined by ASTM D3350. Electro-fusion fittings shall have a manufacturing standard of ASTM F1055. Fittings shall have a pressure rating equal to the pipe. All electro-fusion fittings shall be suitable for use as pressure conduits, and per AWWA C901 and C906, have nominal burst values of three and one-half times the Working Pressure Rating (WPR).

d. Flanged and Mechanical Joint Adapters

i. Flanged and mechanical joint adapters shall be PE 4710 HDPE, Cell Classification of 445574C/E as determined by ASTM D3350. Flanged and mechanical joint adapters shall have a manufacturing standard of ASTM D3261.

3. Coupling Style Fittings

a. Pipe fittings 2" and smaller may be Dresser style 90, and Ford Meter Products Quick Joint or pack joint fittings upon approval of the engineer or owner.

G. Thrust Restraint

1. The Contractor shall install concrete thrust blocks at all tie-in points and as indicated on the contract drawings or as directed by the Inspector based upon field conditions. Thrust blocks shall be sized as indicated on the applicable Standard Detail for thrust blocking. Concrete shall have 3,000 psi strength at 28 days and shall meet the requirements of ASTM C94.

2. All pipe fittings, plugs, caps, tees, and bends on underground ductile iron or PVC piping shall be restrained utilizing approved wedge-action retainer glands. Glands shall be manufactured of ductile iron conforming to ASTM A 536-80. Restraining devices shall be of ductile iron heat treated to a minimum hardness of 370 BHN. Dimensions of the gland shall be such that

it can be used with the standardized mechanical joint bell and tee-head bolts conforming to ANSI/AWWA A21.11 and C153/A21.53. Twist-off nuts shall be used to insure proper actuating of the restraining devices. The mechanical joint restraint device shall have a working pressure of at least 250 psi with a minimum safety factor of 2.

3. Ductile iron bell and spigot pipe joints shall be restrained on both sides of valves and fittings for the length specified on applicable Standard Detail or as indicated the drawings, whichever is greater. Approved push-on restraining gaskets or harness type restraints shall be used. Gaskets shall be manufactured by the pipe manufacturer to be compatible with their pipe.

4. PVC pipe bell and spigot pipe joints shall be restrained on both sides of valves and fittings for the length specified on applicable Standard Detail or as indicated the drawings, whichever is greater. Harness type restraining devices shall be used on PVC bell and spigot pipe joints.

H. Couplings for underground or buried service shall be ductile iron mechanical joint in accordance with underground ductile fittings in this section.

2.2 ABOVE GROUND OR EXPOSED PIPING

A. Ductile Iron Pipe

1. Ductile iron pipe installed above ground, inside buildings, or in underground vaults shall be flanged ductile iron pipe class 53 in accordance with ANSI A21.15 (AWWA C115). Unless indicated otherwise on the drawings, pipe shall have Class 125 flanged joints utilizing factory installed screwed flanges meeting the requirements of ANSI B 16.1. No Uniflange-type flanges are permitted. Outside coating shall be red primer. Gaskets for flanged pipe shall be 1/8-inch thick full face red rubber. All steel flanges mating to flat face flanges shall have the raised face machined off. Pipe shall have a single cement mortar lining with asphaltic seal coat meeting the requirements for AWWA C104.

B. Ductile Iron Fittings

1. Fittings for above-ground ductile iron pipe shall be flanged ductile iron in accordance with AWWA C110/ANSI A21.10. Fittings shall have a minimum working pressure rating of 250 psi. Unless indicated otherwise on the drawings, fittings shall have Class 125 flanged joints meeting the requirements of ANSI B 16.1. Outside coating shall be red primer. Gaskets for flanged fittings shall be 1/8-inch thick full face red rubber. Fittings shall have a single cement-mortar lining and a bituminous seal coat conforming to the requirement of AWWA C104.

C. Above Ground Copper Tubing

1. Copper tubing for exposed services shall be seamless, hard copper tubing Type L, in conformance with ASTM B88. Fittings shall be wrought copper with soldered joints. Solder shall be 95-5 approved for potable water service.

D. Flange adaptors

1. Flange adaptors shall only be used for final connections to equipment or to allow for disassembly of pipe for equipment maintenance in approved locations. Flange adaptors are not to be used to make up for misaligned pipe. Uniflanges are not permitted.

2.3 TEMPORARY ABOVE GROUND PIPE AND FITTINGS

A. Temporary above ground piping used for bypass piping, hydrant jumping or other temporary services shall be manufactured from high tensile strength, abrasion-resistant steel that is hot-dipped galvanized. Pipe and fittings shall be joined with quick connections with degree of articulation on coupling joints as indicated in the table below. Working pressure shall be as indicated in the following table.

Pipe diameter (inches)	Working pressure (psi)	Deflection (degrees)
2	290	30
3	290	30

4	175	30
6.25	175	20
7.625	175	20
10	99	10

2.4 GATE VALVES

A. Gate valves 3" through 12" shall open counterclockwise, have a resilient seat and meet the requirements of AWWA C509. Body shall be of cast iron with a 250-psig maximum working pressure and hydrostatically tested to 500 psig. Wedge shall be constructed of cast iron, bonded in synthetic rubber in accordance with ASTM D2000. Valve shall be coated inside and out with a fusion epoxy coating of a nominal 10 mil thickness on all exposed iron surfaces in compliance with AWWA C550 and be NSF 61 certified. Valves shall be bi-directional flow and have a ten-year limited warranty.

1. Above ground valves or exposed valves in vaults shall utilize outside screw and yoke (OS&Y) with rising stems and have flanged ends meeting the requirements of ANSI B 16.1, Class 125.
2. Underground valves shall utilize non rising stems, mechanical joint ends with a 2" operating nut in accordance with AWWA C111.
3. Gate valves 3" and larger when located 6ft. or more above the finish floor or operating platform shall have chain operators.

2.5 BUTTERFLY VALVES

A. Butterfly valves shall have a ductile iron body, seat in body design, ductile iron disk with a 316 stainless steel disc edge (3- and 4-inch valves to have 316 disk), symmetrical disc, nonmetallic bearings, chevron self-adjusting “V” type packing and have a 250 psi working pressure. Valves shall meet or exceed all the requirements of AWWA C504 standard class 250B and be NSF 61 certified. Exposed piping shall have flange ends Class 125 and underground valves shall have mechanical joint ends. Valves 4 inches and larger shall have gear operators. All exposed valves with gear operators shall have a position indicator.

2.6 BALL VALVES - ABOVE GROUND

A. Ball valves shall meet the requirements of AWWA C507.

B. Ball valves 2" and smaller shall be 150 lb. rated, threaded ends, bronze or stainless-steel body (stainless-steel valves shall be used on stainless-steel pipe), full port, lever operated, ball valves, with stainless-steel ball and stem, and Teflon seats.

2.7 CHECK VALVES

A. Swing check valves

1. 3-inch and larger
   a. Check valves 3" and larger shall be Class 125 flanged ends ductile iron body bronze mounted, bronze disc facing, swing type lever and weight check valves in accordance with AWWA C508. Flanged end dimension and drilling shall comply with ANSI B 16.1, Class 125. Check valves 3" through 24" shall have a 250-psig maximum working pressure.
2. Check valves shall have an adjustable air decelerator (air cushion) installed on the outside of the valve to control valve closing.
3. All check valves shall have a factory installed limit switch to indicate close position for flow confirmation.
4. Check valves 2" and smaller shall be class 150 bronze or stainless-steel y-pattern swing check valves with threaded ends.

B. Silent check valves

1. Silent check valves shall be the globe type with a spring-loaded disk. Valve shall have a ductile iron body, bronze plug, 316 stainless steel spring and a working pressure rating of 250-psig. Valves shall be flanged in accordance with ANSI B 16.1 class 125.

2.8 CORPORATION STOPS AND TAPPING SADDLES FOR UNDERGROUND SERVICE

A. Corporation stops shall have either compression end for 1-inch copper tubing. All corporation stops shall be installed with a tapping saddle. Saddles shall be double strap epoxy coated ductile iron with stainless steel straps, bolts, and nuts.

2.9 ABOVE GROUND OR EXPOSED TAPS

A. All taps on exposed pipe, flanged pipe, or above ground pipe shall be made on fitting bosses. No tapping saddles or tapping of pipe will be allowed unless specifically called for on the drawings.

2.10 VALVE BOXES

A. Valve boxes for buried valves shall be cast iron, screw adjustable shaft boxes, with a minimum shaft diameter of 5-1/4 inches, unless otherwise specified on the Drawings.

B. Valve box covers shall be marked with the word “WATER”.

C. Valves with valve boxes shall have an extended shaft pinned to the 2-inch operating nut. The extension shall terminate 12 inches below finish grade.

D. Valve boxes outside pavement shall have a 24-inch by 24-inch by 4-inch concrete collar around top of the valve box as per Standard Details.

E. A Valve Box Adaptor shall be installed between the valve and the valve box.

2.11 AIR RELEASE VALVES

A. Air release valves shall meet the requirements of AWWA C512.

B. Air release valves shall have a minimum of a 1-inch N.P.T. inlet for pipe sizes 16 inches and smaller with a 3/32-inch minimum size outlet orifice. For pipes 18” and larger, a 2-inch N.P.T. inlet with a 3/16-inch minimum size outlet orifice shall be used.

C. Valves shall have a cast iron body and cover, stainless steel float, Buna-N seat, Delrin lever frame and all other internal part shall be stainless steel or bronze.

D. Air release valves shall be suitable for 150 psi working pressure at a minimum.

E. All air release valve installations shall contain an isolation valve to allow removal of the air release valve for maintenance or replacement while the line is under pressure.

F. Air release valve shall have a manual valve on the body to allow manual venting of the pipeline without removal of the air release valve.

2.12 REDUCED PRESSURE ZONE ASSEMBLY

A. Reduced Pressure Zone Backflow Preventer assembly shall consist of an internal pressure differential relief valve located in a zone between two positive seating check modules with captured springs. Back siphonage protection shall include provision to admit air directly into the reduced pressure zone via a separate channel from the water discharge channel. The assembly shall include two tightly closing shutoff valves before and after the valve and test cocks. The assembly shall also include a protective wye strainer with screen and an air gap drain fitting.

B. The assembly shall meet the requirements of AWWA Std. C511-92, ASSE Std. 1013, CSA B64.5, and UL Classified File No. EX3185. In addition, the assembly shall hold current University of Southern California Foundation for Cross Connection Control and Hydraulic Research (USC) approval and be listed by the IAPMO (UPC). The valve body shall utilize a coating system with built

in electrochemical corrosion inhibitor and microbial inhibitor. The assembly shall be lead free and potable water safe.

C. All RPZA backflow preventers shall be installed in strict accordance with manufacturer's instructions.

2.13 SAMPLE TAPS

A. All sample taps shall be threadless, lead-free hose bibs unless indicated otherwise on the drawings.

2.14 HOSE BIBBS

A. Threaded hose bibbs shall be provided with a hose bib vacuum breaker.

2.15 WALL PIPES AND SLEEVES

A. Pipes through concrete walls and slabs shall be provided with wall pipes or penetration seals. Wall pipes shall comply with cast iron fittings specification and shall have flanged joint connections unless otherwise noted on the drawings. Penetration seals shall be an EPDM modular pipe seal system with reinforced nylon polymer pressure plate and use zinc plated carbon steel hardware. All hardware shall be stainless-steel. Sleeves inside diameters shall be sized to fit the outside diameter of the penetrating pipe and the link seal. Sleeves shall be of a thickness to maintain their shape and shall be manufactured by the seal manufacturer. All Sleeves shall have water-stops and be hot dipped galvanized after fabrication. Where pipe penetrations are in existing concrete structures, core drilling is acceptable provided the hole size is coordinated with the seal manufacturer.

2.16 FLUSHING HYDRANTS

A. Flushing hydrants shall comply with AWWA C502 standards for “dry barrel” compression type hydrants that open against pressure.

B. Hydrants shall have a working pressure rating of 150 psi and a test pressure of 300 psi. They shall meet all the requirements of fire hydrants regarding operating nuts, stems, working parts, stem design, full 360 rotation, body castings, and repairs without dismantling.

C. Flushing hydrants shall be equipped with a threaded or mechanical joint inlet of the size as indicated on the plans and shall have one 2-½-inch outlet with cap and chain.

2.17 TURBINE MASTER METER

A. The turbine master meter shall consist of two assemblies: a main case and a measuring chamber. The measuring chamber assembly shall include a “floating ball” impeller with a coated titanium shaft, hybrid axial bearings, integral flow straightener and an all-electronic programmable register with protective bonnet. The main case shall be made from ductile iron with an approved NSF epoxy coating, and shall include a high-pressure O-ring, testing port and integral strainer.

B. The turbine meter shall be lead free, potable water safe, and shall also meet the requirements of AWWA Std. C701 class II, and NSF/ANSI Std. 61 (including Annex F and G). The turbine meter shall also be IP68 rated.

C. The turbine meter shall have an operating range of at least 4 GPM – 2,500 GPM.

D. The turbine meter shall be Sensus compatible, without exception, to adhere to the City of Goldsboro’s meter requirements.

E. The size of the turbine meter installed shall match the size specified on the approved plans.

F. The turbine master meter shall be installed in strict accordance with manufacturer's instructions.

2.18 WATER SERVICE ACCESSORIES

A. Meter copper-setters shall be provided for all 5/8- inch and 1-inch meters. Each shall have removable pack joints suitable for copper tubing. All copper-setters shall have saddle nuts, padlock wings, and two valves. Meters and copper setters shall be installed in accordance with Standard Drawings.

B. Meter copper-setters shall be provided for all 1-½- thru 2 inch- meters. Each shall have removable NPT connections for hard copper tubing adaptors. All copper-setters shall have saddle nuts, padlock wings, and two valves. Meter setters for 1.50-inch and 2-inch meters shall have a lockable bypass. Meters and copper setters shall be installed in accordance with the Standard Drawings.

C. The meter box shall be in accordance with Standard Drawings.

2.19 TAPPING SLEEVES

A. Tapping sleeves shall meet requirements of AWWA C223 and AWWA C110 for pressure ratings shown on the drawings. Sleeves shall be two-part stainless steel with stainless steel bolts and nuts, flanged outlet, and a full circumferential gasket. Tapping sleeves shall be for the size and type of pipe specified on the approved plans.

2.20 COUPLINGS

A. Bolted, sleeve-type couplings, reducing or transition couplings, and flanged coupling adapters for above ground or exposed service used to join plain-end pipe shall meet the requirements of AWWA C219. Each coupling shall have similar components: a center sleeve (sometimes called a “middle ring”), end rings (sometimes called “followers”), and threaded fasteners (bolts and nuts), that, when tightened, pull the end rings together. These components compress elastomeric gaskets in the space formed between the end rings, center sleeve, and pipes being joined, thereby sealing the coupling/pipe combination. They shall be manufactured from ductile iron and are intended for use in systems conveying water. All couplings shall be rodded.

2.21 FIRE HYDRANTS

A. Fire hydrants shall be of the safety, flange, breakaway top type, meeting requirements of AWWA C502. Hydrants shall have a barrel diameter no smaller than 6 inches. The hydrant valve diameter shall be 4-½ inches and shall be equipped with two 2-½-inch hose nozzles and one 4-½-inch pumper connection. Hose and pumper outlet threads shall be National Standard. The fire hydrant base shall be coated with fusion bonded epoxy and all hardware below grade shall be ASTM F593/F594 rated stainless steel. Fire hydrant tees shall be used.

B. Fire hydrant color shall be as required by Wayne Community College.

2.22 TRACER WIRE

A. Tracer wire for open cut pipe installations shall be High Strength, High Flexibility 12 AWG Copper Clad Steel (CCS) wire with minimum 0.030” thickness blue-colored insulation of High Molecular Weight Polyethylene (HMW-PE) and shall be specifically manufactured for use as tracer wire.

B. Tracer wire for HDD pipe installations shall be Extra High Strength 10AWG Copper Clad Steel (CSS) polyethylene insulated with 0.045” wall thickness. Insulation color shall be blue for water lines.

2.23 CONNECTORS FOR TRACER WIRE

A. Wire connectors for tracer wire on open cut pipe installations shall be Set Screw Pressure type for use with 12AWG wire.

B. Wire connectors for splicing tracer wire on HDD pipe installations shall be In-line splice type with set screws, a solid brass lug, and a heat-shrink cover, for use on 10AWG wire.

C. Wire nuts shall not be used on tracer wire.

2.24 TRACER WIRE ACCESS BOXES

A. Tracer wire access boxes shall be made of cast iron with a permanently attached 3-inch by 12-inch ABS tube with a flared end to secure it in the ground.

B. Tracer wire access boxes shall have tamper-resistant cast iron locking lids with stainless steel terminal connectors on the bottom side to which tracer wires are attached.

C. Tracer wire access box lids shall utilize an AWWA pentagon key for opening.

D. Enough slack shall be coiled inside boxes to allow the removal of the lid.

E. Lids shall be marked “WATER”.

2.25 MARKING TAPE

A. Tape shall be 3.5 mil polyethylene tape, 3 inches in width, with a 14-gage metallic core, and continuous printed message “Caution – Waterline Buried Below.”

2.26 BORE CASING PIPE

A. Steel casing pipe shall be welded or seamless or smooth wall, consisting of Grade “B” steel as specified in ASTM A-139. Minimum yield strength shall be 35,000 psi, and pipe thickness shall be as specified on the construction plans. All pipe shall be furnished with beveled ends prepared for field welding of circumferential joints. Welds shall be a full penetration welds subject to visual inspection. All burrs at pipe ends shall be removed. Encasement pipe must be approved by the appropriate controlling agency (NCDOT, railroad, etc.) and the Engineer prior to ordering. Spiral weld casing pipe will not be allowed.

2.27 PRESSURE GAGES

A. Pressure gauges shall be of all stainless-steel construction, 3.5-inch case size, accuracy of 1% over the entire dial arch, ¼" NPT bottom connection, Pressure range shall be as indicated on the drawings.

B. Pressure gages shall be Ashcroft stainless steel-case 1009 pressure gauges or approved equal.

C. All pressure gages shall be installed with a ¼" stainless steel ball valve and stainless-steel nipples.

D. All pressure gages shall be mounted with fittings or on fitting bosses. NO TAPPING OF PIPE OR SADDLES WILL BE ALLOWED.

2.28 COMBINATION AIR/VACUUM VALVES

A. Air and vacuum valves shall be constructed with cast iron or stainless-steel bodies, type 304 stainless steel floats, bronze trim, and Buna-N seats. Valves shall be of the size and at the locations indicated on the drawings. Valves shall be of the combination type to relieve large volumes of air as the lines are filled or emptied and also release small quantities of entrained air under pressure. Valves shall be for working pressures indicated on the drawings. Valves shall be installed with a full-size gooseneck on the outlet.

2.29 SERVICE SADDLES

A. Service saddles shall be stainless steel, with stainless steel double straps and bolts, and tapped for AWWA threads.

3. EXECUTION

3.1 GENERAL

A. Water lines shall be laid to lines and grades shown on the drawings with appurtenances and service connections at required locations. Installation of all materials shall be in strict conformance with manufacturer's recommendations, AWWA standards, and the Contract Documents.

3.2 SEPARATION OF POTABLE WATER LINES AND SANITARY AND/OR COMBINED SEWER

A. Follow State Health Department standards for separation of water mains and sewer lines.

B. Parallel Installation:

1. Normal Conditions Water lines shall be constructed at least 10 feet horizontally from a sewer or sewer manhole whenever possible. The distance shall be measured edge to edge.

2. Unusual Conditions When local conditions prevent a horizontal separation of at least 10 feet, the water line may be laid closer to a sewer or sewer manhole provided that:

   a. The bottom of the water line is at least 18 inches above the top of the sewer.

   b. Where this vertical separation cannot be obtained, the sewer shall be constructed of AWWA approved water pipe pressure tested in place to 50 psi without leakage prior to backfilling. The sewer manhole shall be of watertight construction and tested in place.

C. Crossing:

1. Normal Conditions: Water lines crossing over sewers shall be laid to provide a separation of at least 18 inches between the bottom of the water line and the top of the sewer whenever possible.

2. Unusual Conditions: When local conditions prevent the vertical separation described in crossing, normal conditions, (paragraph above) the following construction shall be used.

   a. Sewers passing over or under water lines shall be constructed of the materials described in parallel installation, unusual conditions Paragraph b. above.

   b. Water lines passing under sewers shall, in addition, be protected by providing:

      i. A vertical separation of at least 18 inches between the bottom of the sewer and the top of the water lines.

      ii. That the length of the water line shall be centered at the point of the crossing so that joints shall be equidistant and as far as possible from the sewer.

D. No water pipes shall pass through or come in contact with any part of sewer or sewer manhole.

3.3 EXAMINATION OF MATERIAL:

A. All pipes, fittings, valves and other appurtenances shall be examined carefully for damage and other defects immediately before installation. Defective materials shall be marked and held for inspection by the Owner, who may prescribe corrective repairs or reject materials.

3.4 PIPE ENDS:

A. All lumps, blisters, and excess coating shall be removed from the socket and plain ends of each pipe, and the outside of the plain end and the inside of the bell shall be wiped clean and dry and be free from dirt sand, grit, or any other foreign material before the joint is made. Proper lubricant shall be used for all push joint pipe.

3.5 PIPE CLEANLINESS:

A. Foreign material shall be prevented from entering the pipe while it is being placed in the trench. During laying operations, no debris, tools, clothing or other materials shall be placed in the pipe.

3.6 PIPE PLACEMENT:

A. Laying of the pipe shall be commenced immediately after the excavation is started, and every means must be used to keep pipe lying closely behind the trenching as each length of pipe is placed in the trench, the joint shall be assembled and the pipe brought to correct line and grade before the next length of pipe is laid. No more than 200 lf of trench shall be opened at any one time. No opened trenches will be allowed at the end of the workday.

B. Lay pipe with bell ends facing the direction of laying. Where grade is 10 percent or greater, lay pipe uphill with bell ends upgrade.

3.7 PIPE PLUGS:

A. At times when pipe laying is not in progress, the open ends of the pipe shall be closed by a watertight plug or other means approved by the Engineer. When practical, the plug shall remain in place until

the trench is pumped completely dry. Care must be taken to prevent pipe flotation should the trench fill with water.

3.8 LAYING CONDITIONS

A. Pipe shall be placed in a dry trench at the proper line and grade.

3.9 PIPE DEFLECTION

A. Permissible deflection in mechanical joint pipe shall not be greater than 1/2 of that listed in AWWA C600 or as recommended by pipe manufacturer. No joint deflection shall be allowed in PVC pipe. Radius turn with PVC pipe shall be by bending pipe at 1/2 manufacturers recommended deflection.

3.10 PIPE CUTTING:

A. Cutting of the pipe shall be done in a neat, workmanlike manner with the proper tools without creating damage to the pipe or cement mortar lining.

3.11 RESTRAINED JOINTS

A. Provide reaction anchors of concrete blocking, metal harness, retainer gland type, restraining gaskets or restrained joint type pipe at all changes in direction of pressure pipelines and as shown on Drawings.

B. All mechanical joint bolts shall be torqued with a torque wrench as recommended by the manufacturer.

Bolt Size – Inches	Torque Ft. - Lbs.
5/8	45 - 60
3/4	75 - 90
1	100-120

C. Tighten nuts on alternate side of the gland until pressure on the gland is equally distributed

3.12 POLYETHYLENE PIPE INSTALLATION

A. Sections of polyethylene pipe should be joined into continuous lengths on the jobsite above ground. The joining method shall be the butt fusion method and shall be performed in strict accordance with the pipe manufacturer's recommendations. The butt fusion equipment used in the joining procedures should be capable of meeting all conditions recommended by the pipe manufacturer, including, but not limited to, temperature requirements of 400 degrees Fahrenheit, alignment, and an interfacial fusion pressure of 75 PSI. The butt fusion joining will produce a joint weld strength equal to or greater than the tensile strength of the pipe itself. All welds will be made using a Data Logger to record temperature, fusion pressure, with a graphic representation of the fusion cycle shall be part of the Quality Control records.

B. Sidewall fusions for connections to outlet piping shall be performed in accordance with HDPE pipe and fitting manufacturer's specifications. The heating irons used for sidewall fusion shall have an inside diameter equal to the outside diameter of the HDPE pipe being fused. The size of the heating iron shall be ¼ inch larger than the size of the outlet branch being fused.

C. Mechanical joining will be accomplished by either using a HDPE flange adapter with a Ductile Iron back-up ring or HDPE Mechanical Joint adapter with a Ductile Iron back-up ring.

D. Socket fusion, hot gas fusion, threading, solvents, and epoxies will not be used to join HDPE pipe.

3.13 SETTING VALVES AND VALVE BOXES.

A. Install valves with operator stems plumb in the vertical plane. Locate valves where shown on Drawings.

3.14 TRACER WIRE

A. In addition to detectable tracer tape, tracer wire shall be installed with all water mains and shall be attached to all fittings. Tracer wire shall be taped directly to the top of the pipe at a maximum

spacing of 8 feet and within 12” on each side of all fittings and be installed in a continuous traceable manner.

B. Tracer wires must be interconnected at pipe intersections. When non-metallic water lines have metallic service lines attached, the conductive tracer wire shall be attached to both the main line tracer wire and the corporation stop.

C. In Valve boxes, tracer wire shall be brought to within 6 inches of the surface and left in a coil containing at least 24” of wire.

D. Tracer wire shall be adequately and securely connected to tracer wire access boxes in accordance with the manufacturer’s specifications.

E. Tracer wire access boxes are to be utilized and spaced no more than 1,000 feet apart.

F. Tracer wire access boxes shall be installed adjacent to all fire hydrants.

G. A concrete mow collar shall be installed at finished grade around all tracer wire access boxes.

H. A tracer wire of fourteen (14) gauge copper shall be installed and taped directly on top of all water line pipe in a manner that results in a continuous trace. The wire is to be wrapped around hydrants, blow offs and corporation stops.

3.15 MARKING TAPE

A. Install marking tape in utility trenches above all pipes in accordance with manufacturer's recommendations. Install tape approximately 18 inches above the pipe and not less than 18 inches deep.

3.16 TESTING

A. The Contractor shall be responsible for the cost of potable water required for testing.

B. A temporary RPZ Backflow Preventer flushing apparatus is required if a direct connection to public water is used to fill the line.

C. After the line has been backfilled and at least seven days after the last thrust blocking has been poured, the line, or any valved section of the line, shall be subjected to a hydrostatic pressure test. Testing shall be in accordance with AWWA C600 and C605, except as modified herein.

D. The line to be tested shall be filled with potable water at a velocity of approximately 1 foot per second (fps). Take necessary measures to eliminate all air.

E. After the system has been filled, pressure shall be raised by pump to 1.5 times the working pressure or 150 psi, whichever is greater. Test pressures shall:

1. Not be less than 1.25 times the working pressure or 125 psi at the highest point along the test section.
2. Not vary by more than plus or minus 5 psi.
3. Not exceed twice the rated pressure of the valves or hydrants when test includes closed gate valves.
4. Not exceed rated pressure of valves if resilient-seated gate valves or butterfly valves are used. Thrust restraint shall be designed for the test pressure. Measure pressure at the low point on the line being tested, compensating for gage elevation.
5. Test pressure must be maintained for two hours. If pressure cannot be maintained, the Contractor shall determine the cause, perform necessary repairs, and repeat the test until successful.

F. A leakage test shall be conducted concurrently with the pressure test. Leakage is defined as the quantity of water required to maintain a pressure within 5 psi of the specified test pressure, after air has been expelled and the pipe filled with water.

G. No pipe installation will be accepted if the leakage is greater than that determined by the following formula:

$$L = SD * P0.5 / 148,000$$

Where: L is the allowable leakage, in gallons per hour;

S is the length of pipeline tested, in feet;

D is the nominal diameter of the pipe, in inches; and

P is the average test pressure during the leakage test in psig.

All visible leaks shall be repaired regardless of the amount of leakage

H. Acceptance shall be determined on the basis of allowable leakage. If any test of pipe installed discloses leakage greater than that specified above, the Contractor shall, at his own expense, locate and make repairs as necessary until the leakage is within the specified allowance. ALL VISIBLE LEAKS ARE TO BE REPAIRED REGARDLESS OF THE AMOUNT OF LEAKAGE.

3.17 DISINFECTION

A. The Contractor shall disinfect, flush and test water mains and accessories in accordance with the procedures listed below. The water used in the disinfection process shall be potable water from an approved supply. If water is to be transported to the subject site, then the tank trucks must also be properly disinfected prior to transporting water. Disinfection of tank trucks shall also include all appurtenances used such as valves, hoses, etc.

B. Preliminary Flushing: The main shall be flushed prior to disinfection. Flushing shall be at a velocity of not less than 3.0 feet per second (fps). Adequate provisions shall be made for drainage of flushing water. The following chart provides the pipe flow rates needed to maintain 3.0 fps velocity for various pipe diameters, based on CL 52 DIP

D (in)	Flow (GPM)
4	130
6	290
8	585
12	1,140
16	2,025
18	2,565
20	3,165
24	4,560

C. Form of Chlorine for Disinfection:

1. Liquid chlorine shall be used only when suitable equipment is available and only under the direct supervision of a person familiar with the physiological, chemical, and physical properties of this element and who is properly trained and equipped to handle any emergency that may arise. Introduction of chlorine-gas directly from the supply cylinder is unsafe and shall not be permitted.

2. Calcium hypochlorite contains 70 percent available chlorine by weight. It shall be either granular or tabular form. The tablets, 6-8 to the ounce, are designed to dissolve slowly in water. A chlorine-water solution shall be prepared by dissolving the granules in water in the proportion requisite for the desired concentration.

3. Sodium hypochlorite is supplied in strengths from 5.25 to 16 percent available chlorine. The chlorine-water solution shall be prepared by adding hypochlorite to water. Product

deterioration shall be reckoned with in computing the quantity of sodium hypochlorite required for the desired concentration.

D. Application: The hypochlorite solutions shall be applied to the water main with a gasoline or electrically powered chemical feed pump designed for feeding chlorine solutions. For small applications, the solutions may be fed with a hand pump, for example, a hydraulic test pump. Feed lines shall be of such material and strength as to safely withstand the maximum pressures that may be created by the pumps. All connections shall be checked for tightness before the hypochlorite solution is applied to the main.

E. Methods of Chlorine Application:

1. Continuous Feed Method: Water from the existing distribution system or other approved sources of supply shall be made to flow at a constant, measured rate into the newly laid water line. The water shall receive a dose of chlorine, also fed at a constant, measured rate. The two rates shall be proportioned so that the chlorine concentration in the water in the pipe is maintained at a minimum of 50 MG/L available chlorine. To assure that this concentration is maintained, the chlorine residual shall be measured at intervals along the pipe not exceeding 1,200 feet in accordance with the procedures described in the current edition of "Standard Methods" and AWWA M12 - "Simplified procedures for water examination". In the absence of a meter, the rate may be determined either by placing a pitot gage at the discharge or by measuring the time to fill a container of known volume. Table I gives the amount of chlorine required for each 100 feet of pipe of various diameters. Solutions of one percent (1%) chlorine may be prepared with sodium hypochlorite or calcium hypochlorite. The latter solution requires approximately 1 pound of calcium hypochlorite in 8.5 gallons of water.

TABLE I

CHLORINE REQUIRED TO PRODUCE
50 MG/L CONCENTRATION
IN 100 FT. OF PIPE - BY DIAMETER

PIPE SIZE (IN.)	100 PERCENT CHLORINE (LB.)	1 PERCENT CHLORIDE SOLUTIONS (GAL.)
4	0.027	0.33
6	0.061	0.73
8	0.108	1.30
10	0.170	2.04
12	0.240	2.88
16	0.430	5.12
20	0.675	8.00

2. During the application of chlorine, valves shall be manipulated, or a backflow preventer shall be provided, to prevent the treatment dosage from flowing back into the line supplying the water. Chlorine application shall not cease until the entire main is filled with the chlorine solution. The chlorinated water shall be retained in the main for at least 24 hours, during which time all valves and hydrants in the section treated shall be operated in order to disinfect the appurtenances. At the end of this 24-hour period, the treated water shall contain no less than 25 MG/L chlorine throughout the length of the main.

3. As chlorinated water flows past tees and crosses, related valves and hydrants shall be operated to disinfect appurtenances.

4. Final flushing: After the applicable retention period the heavily chlorinated water shall be flushed from the main until the chlorine concentration in the water leaving the main is no higher than that generally prevailing in the system, or less than 1 MG/L.

5. Chlorinated water shall be de-chlorinated before disposal. Water shall not be allowed to flow into a waterway without neutralizing the disinfectant residual. See the appendix of AWWA C651, C652, and C653 for acceptable neutralization methods.
6. Chlorine residual testing shall be performed to assure that the heavily chlorinated water has been removed from the pipeline.

3.18 BACTERIOLOGICAL TESTS

A. After final flushing, and before the water main is placed in service, samples shall be collected and tested for bacteriologic quality and shall show the absence of coliform organisms. At least 2 samples shall be collected at least 24 hours apart at intervals not exceeding 1,200 feet along the water line. Samples shall be tested by a State Health Department approved laboratory and results submitted to the Inspector.

B. In the case that trench water and/or excessive soil, or construction debris has entered the new water main as determined by the contractor, owner, or appointed inspector, bacteriological samples shall be collected at approximately every 200 feet along the water main from water that has stood within the water main for at least 16 hours after final flushing.

C. The Contractor may have an independent testing laboratory collect and test samples in accordance with these specifications. The samples shall be taken by laboratory personnel in the presence of the Inspector. The testing laboratory shall submit the results to the Department of Public Works and Utilities.

D. Samples for bacteriological analysis shall be collected in sterile bottles treated with sodium thiosulfate. If laboratory results indicate the presence of coliform bacteria, the samples are unsatisfactory, and disinfection shall be repeated until the samples are satisfactory. Cleaning, disinfection, and testing will be the responsibility of the Contractor. Water for these operations will be furnished by the Town, but the contractor shall be responsible for the cost of loading, hauling, and discharging the water.

E. A sampling tap consisting of a corporation cock with metal pipe shall be installed within two feet of the valves which isolate the section of water line to be tested. The corporation stop inlet shall be male one inch in size and the outlet shall have 1-inch I.P. threads and a cap. After bacteriological testing is completed, the piping shall be removed, and the corporation cock shall be closed and capped.

F. Testing and disinfection of the completed sections shall not relieve the contractor of his responsibility to repair or replace any cracked or defective pipe.

G. After disinfection, water storage or distribution facilities shall not be placed into service until bacteriological test results of representative water samples analyzed by a certified laboratory are found to be satisfactory.

END OF SECTION