

PROJECT NO. 50083060

SEYMOUR DRIVE AND HODGES  
STREET WATERLINE  
IMPROVEMENTS

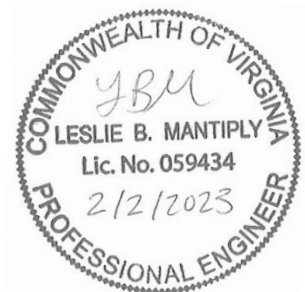
Contract Documents and Specifications

FEBRUARY 2023



SUBMITTED BY  
Dewberry Engineers Inc.  
551 Piney Forest Road  
Danville, Virginia 24540  
434-797-4497

SUBMITTED TO  
Halifax County Service Authority  
2529 Houghton Avenue  
Halifax, Virginia 24592  
434-575-4240





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**ADVERTISEMENT FOR BID  
SOUTH BOSTON, VIRGINIA**

Halifax County Service Authority (Owner) is requesting Bids for the construction of the **SEYMOUR DRIVE AND HODGES STREET WATERLINE IMPROVEMENTS** project.

Scope of work: **Installation of approximately 2,900 LF of new 6" waterline and related appurtenances along Hodges Street, including service connections. An existing 6" waterline along Seymour Drive will be abandoned in place and all services will be tied into an existing 10" waterline. The project also includes replacement of approximately 15 stormwater inlets, rehabilitation of 23 sanitary sewer manholes, and replacement of 150 LF of sanitary sewer.**

Bids for construction of the project will be received by:

Halifax County Service Authority  
2529 Houghton Avenue, South Boston, VA 24592  
434-575-4240; [mestes@hcsa.us](mailto:mestes@hcsa.us)

**Public Bid Opening:** Tuesday, March 7<sup>th</sup> at 2:00 PM EST, HCSA Conference Room, 2529 Houghton Avenue, South Boston, VA 24592

**Non-Mandatory Pre-Bid Conference:** Tuesday, February 21<sup>st</sup> at 10:00 AM EST, HCSA Conference Room, 2529 Houghton Avenue, South Boston, VA 24592

**Download Contract Documents:** <http://www.hcsa.us/projects.html>

**Issuing Office:** Dewberry, 551 Piney Forest Road, Danville, VA 24540

**Contact:** Leslie Mantiply, PE; [lmantiply@dewberry.com](mailto:lmantiply@dewberry.com); 434-549-8504

Prospective Bidders must notify the issuing office of intent to bid to be placed on the plan holders list. All official notifications, addenda, and other Bidding Documents will be offered only through the designated website and sent directly to the plan holders.

Bids will be received for a single prime Contract. Bids shall be on a unit price basis as indicated on the Bid Form. All further requirements regarding bid submittal, qualifications, procedures, and contract award are provided in the Instructions to Bidders that are included in the Bidding Documents.

Printed copies of the Bidding Documents may be obtained from the Issuing Office by paying a deposit of \$150 for each set. Bidders who return full sets in good condition within 10 days after receipt of Bids will receive a full refund. Non-Bidders, and Bidders who obtain more than one set of the Bidding Documents, will receive a refund of 50% for documents returned in good condition within 10 days. Make deposit checks for Bidding Documents payable to Dewberry Engineers Inc.

End of Advertisement

# 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 Article 7 for a list of the Contract Documents. It is Bidder's responsibility to determine that it is using a complete set of documents in the preparation of a Bid. Bidder assumes sole responsibility for errors or misinterpretations resulting from the use of incomplete documents, by Bidder itself or by its prospective Subcontractors and Suppliers.
- 2.02 Bidding Documents are made available for the sole purpose of obtaining Bids for completion of the Project and permission to download or distribution of the Bidding Documents does not confer a license or grant permission or authorization for any other use. Authorization to download documents, or other distribution, includes the right for plan holders to print documents solely for their use, and the use of their prospective Subcontractors and Suppliers, provided the plan holder pays all costs associated with printing or reproduction. Printed documents may not be re-sold under any circumstances.
- 2.03 Owner has established a Bidding Documents Website as indicated in the Advertisement or invitation to bid. Owner recommends that Bidder register as a plan holder with the Issuing Office at such website, and obtain a complete set of the Bidding Documents from such website. Bidders may rely that sets of Bidding Documents obtained from the Bidding Documents Website are complete, unless an omission is blatant. Registered plan holders will receive Addenda issued by Owner.
- 2.04 *Electronic Documents*
- A. Electronic (digital) copies of the Bidding Documents are 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 2019 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 Each bidder must submit with their bid package the following information to demonstrate Bidder's qualifications to perform the Work:
- 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. Bidder's state or other contractor license number, if applicable.
  - D. Subcontractor and Supplier qualification information.
  - E. Other required information regarding qualifications.
- 3.02 A Bidder's failure to submit required qualification information within the times indicated may disqualify Bidder from receiving an award of the Contract.
- 3.03 No requirement in this Article 3 to submit information will prejudice the right of Owner to seek additional pertinent information regarding Bidder's qualifications.

### **ARTICLE 4—PRE-BID CONFERENCE**

- 4.01 A pre-bid conference will be held. Refer to the advertisement for details.

### **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.
- 4. ~~Geotechnical Baseline Report/Geotechnical Data Report: The Bidding Documents contain a Geotechnical Baseline Report (GBR) and Geotechnical Data Report (GDR).~~
  - a. ~~As set forth in the Supplementary Conditions, the GBR describes certain select subsurface conditions that are anticipated to be encountered by Contractor during construction in specified locations ("Baseline Conditions"). The GBR is a Contract Document.~~
  - b. ~~The Baseline Conditions in the GBR are intended to reduce uncertainty and the degree of contingency in submitted Bids. However, Bidders cannot rely solely on the Baseline Conditions. Bids should be based on a comprehensive approach that includes an independent review and analysis of the GBR, all other Contract Documents, Technical Data, other available information, and observable surface conditions. Not all potential subsurface conditions are baselined.~~
  - c. ~~Nothing in the GBR is intended to relieve Bidders of the responsibility to make their own determinations regarding construction costs, bidding strategies, and Bid prices, nor of the responsibility to select and be responsible for the means, methods, techniques, sequences, and procedures of construction, and for safety precautions and programs incident thereto.~~
  - d. ~~As set forth in the Supplementary Conditions, the GDR is a Contract Document containing data prepared by or for the Owner in support of the GBR.~~
- B. *Underground Facilities:* Underground Facilities are shown or indicated on the Drawings, pursuant to Paragraph 5.05 of the General Conditions, and not in the drawings referred to in Paragraph 5.02.A of these Instructions to Bidders. Information and data regarding the presence or location of Underground Facilities are not intended to be categorized, identified, or defined as Technical Data.

#### 5.03 *Other Site-related Documents*

- A. No other Site-related documents are available.

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. Bidders visiting the Site are required to arrange their own transportation to the Site.
- C. Bidder is not required to conduct any subsurface testing, or exhaustive investigations of Site conditions.
- D. 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.
- E. 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.
- F. 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 Engineer in writing.
- 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 Base Bid price (Total Base Bid of all unit price Bid Items 1 through 10) 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.
- 8.02 The Bid security of the apparent Successful Bidder will be retained until Owner awards the contract to such Bidder, and such Bidder has executed the Contract, furnished the required Contract security, and met the other conditions of the Notice of Award, whereupon the Bid security will be released. If the Successful Bidder fails to execute and deliver the Contract and furnish the required Contract security within 15 days after the Notice of Award, Owner may consider Bidder to be in default, annul the Notice of Award, and the Bid security of that Bidder will be forfeited, in whole in the case of a penal sum bid bond, and to the extent of Owner's damages in the case of a damages-form bond. Such forfeiture will be Owner's exclusive remedy if Bidder defaults.
- 8.03 The Bid security of other Bidders that Owner believes to have a reasonable chance of receiving the award may be retained by Owner until the earlier of 7 days after the Effective Date of the Contract or 61 days after the Bid opening, whereupon Bid security furnished by such Bidders will be released.
- 8.04 Bid security of other Bidders that Owner believes do not have a reasonable chance of receiving the award will be released within 7 days after the Bid opening.

## **ARTICLE 9—CONTRACT TIMES**

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

## **ARTICLE 10—SUBSTITUTE AND “OR EQUAL” ITEMS**

- 10.01 The Contract for the Work, as awarded, will be on the basis of materials and equipment specified or described in the Bidding Documents, and those “or-equal” or substitute or materials and equipment subsequently approved by Engineer prior to the submittal of Bids and identified by Addendum. No item of material or equipment will be considered by Engineer as an “or-equal” or substitute unless written request for approval has been submitted by Bidder and has been received by Engineer within 10 days of the issuance of the Advertisement for Bids or invitation to Bidders. Each such request must comply with the requirements of Paragraphs 7.05 and 7.06 of the General Conditions, and the review of the request will be governed by the principles in those paragraphs. The burden of proof of the merit of the proposed item is upon Bidder. Engineer’s decision of approval or disapproval of a proposed item will be final. If Engineer approves any such proposed item, such approval will be set forth in an Addendum issued to all registered Bidders. Bidders cannot rely upon approvals made in any other manner.
- 10.02 All prices that Bidder sets forth in its Bid will be based on the presumption that the Contractor will furnish the materials and equipment specified or described in the Bidding Documents, as supplemented by Addenda. Any assumptions regarding the possibility of post-Bid approvals of “or-equal” or substitution requests are made at Bidder’s sole risk.

## **ARTICLE 11—SUBCONTRACTORS, SUPPLIERS, AND OTHERS**

- 11.01 All bidders must submit to Owner a list of the Subcontractors or Suppliers proposed for the following portions of the Work with their Bid: directional drill subcontractor and jack and bore subcontractor.
- 11.02 If requested by Owner, within five days of such request, 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.

## **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 will enter the words "No Bid."
- 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.
  - 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. Bidder's state contractor license number 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.

#### **ARTICLE 14—SUBMITTAL OF BID**

- 14.01 The Bidding Documents include one separate unbound copy of the Bid Form and 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, 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.
- 14.04 All bids must be submitted and/or delivered before 2 pm on the bid date. No exceptions will be made.
- 14.05 Emailed bids will not be accepted.

#### **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 2 business days 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.

#### **ARTICLE 16—OPENING OF BIDS**

- 16.01 Bids will be received at the time and place indicated in the advertisement or invitation to bid and the bid opening will be presented electronically via a link to be provided in an addendum. An abstract of the amounts of the base Bids and major alternates, if any, will be made available to Bidders and posted to eVA by close of business the same day that bids are due as stated on the Advertisement for 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.
- 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. 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 and Alternate Bid Items as selected by the Owner
- 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 FORM FOR CONSTRUCTION CONTRACT

The terms used in this Bid with initial capital letters have the meanings stated in the Instructions to Bidders, the General Conditions, and the Supplementary Conditions.

## ARTICLE 1—OWNER AND BIDDER

1.01 This Bid is submitted to:

**Halifax County Service Authority, 2529 Houghton Avenue, South Boston, VA 24592.**

1.02 The undersigned Bidder proposes and agrees, if this Bid is accepted, to enter into an Agreement with Owner in the form included in the Bidding Documents to perform all Work as specified or indicated in the Bidding Documents for the prices and within the times indicated in this Bid and in accordance with the other terms and conditions of the Bidding Documents.

## ARTICLE 2—ATTACHMENTS TO THIS BID

2.01 The following documents are submitted with and made a condition of this Bid:

- A. Bid Form;
- B. Required Bid security;
- C. List of Proposed Subcontractors (Qualification Statements required for Directional Drill and Jack and Bore Subcontractors);
- D. List of Proposed Suppliers;
- E. Evidence of authority to do business in the state of the Project; or a written covenant to obtain such authority within the time for acceptance of Bids;
- F. Contractor's license number as evidence of Bidder's State Contractor's License or a covenant by Bidder to obtain said license within the time for acceptance of Bids;
- G. Required Bidder Qualification Statement with supporting data.

## ARTICLE 3—BASIS OF BID—LUMP SUM BID AND UNIT PRICES

3.01 *Unit Price Bids*

- A. Bidder will perform the following Work at the indicated unit prices:

<b>General</b>					
<b>LI</b>	<b>Description</b>	<b>QTY</b>	<b>Unit</b>	<b>Unit Price</b>	<b>Total Price</b>
1	Mobilization & Site Prep	1	LS	\$	\$
2	Erosion and Sediment Control	1	LS	\$	\$
3	Traffic Management and Control	1	LS	\$	\$
4	Disinfection and Testing	1	LS	\$	\$
5	Sewer Bypass Pumping	1	LS	\$	\$
6	Site Restoration	1	LS	\$	\$
<b>General Total</b>					\$
<b>Hodges Street</b>					
<b>LI</b>	<b>Description</b>	<b>QTY</b>	<b>Unit</b>	<b>Unit Price</b>	<b>Total Price</b>
7	New 6" Waterline in Pavement	2900	LF	\$	\$
8	Fire Hydrant Assembly (including gate valve)	4	EA	\$	\$
9	6" Gate Valve	14	EA	\$	\$
10	Air Release Valve	1	EA	\$	\$
11	Tie Services into New Waterline - same side of road	12	EA	\$	\$
12	Tie Services into New Waterline - opposite side of road, include casing	13	EA	\$	\$
13	Tie Side Streets into New Waterline	8	EA	\$	\$
14	Tie New Waterline into N. Main	1	EA	\$	\$
15	Abandon/Demo 6" Existing WL	2900	LF	\$	\$
16	Stone Backfill	1215	CY	\$	\$
17	Asphalt Base Course BM-25	300	TON	\$	\$
18	Replace SW Inlet - 8' DI-3B	1	EA	\$	\$
19	Replace SW Inlet - 6' DI-3C	1	EA	\$	\$
20	Replace SW Inlet - 8' DI-3C	1	EA	\$	\$
21	Misc. Curb and Gutter Repair	1000	LF	\$	\$
22	Sewer Manhole Rehabilitation	11	EA	\$	\$
23	8" Sewer Replacement with DIP	110	LF	\$	\$
24	Replace 10" TC SS with C900 - Sheet C-102	20	LF	\$	\$
<b>Hodges Street Total</b>					\$
<b>Seymour Drive</b>					
<b>LI</b>	<b>Description</b>	<b>QTY</b>	<b>Unit</b>	<b>Unit Price</b>	<b>Total Price</b>
25	Tie Services into 10" Waterline - same side of road	8	EA	\$	\$
26	Tie Services into 10" Waterline - opposite side of road, include casing	23	EA	\$	\$
27	Tie Hydrants into 10" Waterline	6	EA	\$	\$
28	Abandon/Demo 6" Existing WL	4100	LF	\$	\$
29	Asphalt Base Course BM-25	23	TON	\$	\$
30	Replace SW Inlet - 6' DI-3B	3	EA	\$	\$
31	Replace SW Inlet - 8' DI-3B	2	EA	\$	\$
32	Replace SW Inlet - 14' DI-3B	1	EA	\$	\$
33	Replace SW Inlet - 8' DI-3C	6	EA	\$	\$

34	Replace SW Culvert with New 15" RCP	45	LF	\$	\$
35	Curb and Sidewalk Improvement at Edmondson	82	LF	\$	\$
36	Slope Stabilization and Pipe Extension at STR-459	1	LS	\$	\$
37	Sewer Manhole Rehabilitation	12	EA	\$	\$
38	6" Sewer Replacement with DIP	25	LF	\$	\$
<b>Seymour Drive Total</b>					<b>\$</b>

**TOTAL BASE BID OF ALL UNIT PRICE BID ITEMS 1 through 38:** \_\_\_\_\_

\_\_\_\_\_ (in words)

Dollars (\$ \_\_\_\_\_).

B. Bidder acknowledges that:

1. each Bid Unit Price includes an amount considered by Bidder to be adequate to cover Contractor's overhead and profit for each separately identified item, and
2. estimated quantities are not guaranteed and are solely for the purpose of comparison of Bids, and final payment for all Unit Price Work will be based on actual quantities, determined as provided in the Contract Documents.

#### **ARTICLE 4—TIME OF COMPLETION**

4.01 Bidder agrees that the Work will be substantially complete and will be completed and ready for final payment in accordance with Paragraph 15.06 of C700 General Conditions on or before the dates or within the number of calendar days indicated in the Agreement.

4.02 Bidder accepts the provisions of the Agreement as to liquidated damages.

#### **ARTICLE 5—BIDDER'S ACKNOWLEDGEMENTS: ACCEPTANCE PERIOD, INSTRUCTIONS, AND RECEIPT OF ADDENDA**

##### *5.01 Bid Acceptance Period*

- A. This Bid will remain subject to acceptance for 60 days after the Bid opening, or for such longer period of time that Bidder may agree to in writing upon request of Owner.

##### *5.02 Instructions to Bidders*

- A. Bidder accepts all of the terms and conditions of the Instructions to Bidders, including without limitation those dealing with the disposition of Bid security.

##### *5.03 Receipt of Addenda*

- A. Bidder hereby acknowledges receipt of the following Addenda:

<b>Addendum Number</b>	<b>Addendum Date</b>

## ARTICLE 6—BIDDER’S REPRESENTATIONS AND CERTIFICATIONS

### 6.01 *Bidder’s Representations*

- A. In submitting this Bid, Bidder represents the following:
1. Bidder has examined and carefully studied the Bidding Documents, including Addenda.
  2. Bidder 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. Bidder is familiar with all Laws and Regulations that may affect cost, progress, and performance of the Work.
  4. Bidder 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. Bidder 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. Bidder has considered the information known to Bidder itself; information commonly known to contractors doing business in the locality of the Site; information and observations obtained from visits to the Site; the Bidding 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 Bidder, if selected as Contractor; and (c) Bidder’s (Contractor’s) safety precautions and programs.
  7. Based on the information and observations referred to in the preceding paragraph, Bidder 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. Bidder 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 Bidding Documents.
  9. Bidder has given Engineer written notice of all conflicts, errors, ambiguities, or discrepancies that Bidder has discovered in the Bidding Documents, and of discrepancies between Site conditions and the Contract Documents, and the written resolution thereof by Engineer is acceptable to Contractor.
  10. The Bidding Documents are generally sufficient to indicate and convey understanding of all terms and conditions for performance and furnishing of the Work.
  11. The submission of this Bid constitutes an incontrovertible representation by Bidder that without exception the Bid and all prices in the Bid are premised upon performing and furnishing the Work required by the Bidding Documents.

## 6.02 *Bidder's Certifications*

### A. The Bidder certifies the following:

1. This Bid is genuine and not made in the interest of or on behalf of any undisclosed individual or entity and is not submitted in conformity with any collusive agreement or rules of any group, association, organization, or corporation.
2. Bidder has not directly or indirectly induced or solicited any other Bidder to submit a false or sham Bid.
3. Bidder has not solicited or induced any individual or entity to refrain from bidding.
4. Bidder has not engaged in corrupt, fraudulent, collusive, or coercive practices in competing for the Contract. For the purposes of this Paragraph 6.02.A:
  - a. 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.
  - b. Fraudulent practice means an intentional misrepresentation of facts made (a) to influence the bidding process to the detriment of Owner, (b) to establish bid prices at artificial non-competitive levels, or (c) to deprive Owner of the benefits of free and open competition.
  - c. 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.
  - d. 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.

BIDDER hereby submits this Bid as set forth above:

Bidder:

\_\_\_\_\_  
*(typed or printed name of organization)*

By:

\_\_\_\_\_  
*(individual's signature)*

Name:

\_\_\_\_\_  
*(typed or printed)*

Title:

\_\_\_\_\_  
*(typed or printed)*

Date:

\_\_\_\_\_  
*(typed or printed)*

*If Bidder 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)*

Date:

\_\_\_\_\_  
*(typed or printed)*

Address for giving notices:

\_\_\_\_\_  
\_\_\_\_\_

Bidder's Contact:

Name:

\_\_\_\_\_  
*(typed or printed)*

Title:

\_\_\_\_\_  
*(typed or printed)*

Phone:

Email:

Address:

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Bidder's Contractor License No.: (if applicable)

\_\_\_\_\_

## BID BOND (PENAL SUM FORM)

<b>Bidder</b> Name: Address <i>(principal place of business)</i> :	<b>Surety</b> Name: Address <i>(principal place of business)</i> :
<b>Owner</b> Name: Address <i>(principal place of business)</i> : <b>2529 Houghton Avenue</b> <b>South Boston, VA 24592</b>	<b>Bid</b> Project <i>(name and location)</i> : <b>Seymour Drive and Hodges Street Waterline Improvements</b> <b>South Boston, VA</b>  Bid Due Date:
<b>Bond</b> Penal Sum: Date of Bond:	
Surety and Bidder, intending to be legally bound hereby, subject to the terms set forth in this Bid Bond, do each cause this Bid Bond to be duly executed by an authorized officer, agent, or representative.	
Bidder	Surety
<div style="text-align: center;"><i>(Full formal name of Bidder)</i></div> <hr/> By: <div style="text-align: center;"><i>(Signature)</i></div> <hr/> Name: <div style="text-align: center;"><i>(Printed or typed)</i></div> <hr/> Title: <div style="text-align: center;"><i>(Signature)</i></div> <hr/> Attest: <div style="text-align: center;"><i>(Signature)</i></div> <hr/> Name: <div style="text-align: center;"><i>(Printed or typed)</i></div> <hr/> Title:	<div style="text-align: center;"><i>(Full formal name of Surety) (corporate seal)</i></div> <hr/> By: <div style="text-align: center;"><i>(Signature) (Attach Power of Attorney)</i></div> <hr/> Name: <div style="text-align: center;"><i>(Printed or typed)</i></div> <hr/> Title: <div style="text-align: center;"><i>(Signature)</i></div> <hr/> Attest: <div style="text-align: center;"><i>(Signature)</i></div> <hr/> Name: <div style="text-align: center;"><i>(Printed or typed)</i></div> <hr/> Title:
<i>Notes: (1) Note: Addresses are to be used for giving any required notice. (2) Provide execution by any additional parties, such as joint venturers, if necessary.</i>	

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



# QUALIFICATIONS STATEMENT

## 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:	<input type="checkbox"/> Sole Proprietorship <input type="checkbox"/> Partnership <input type="checkbox"/> Corporation		
<input type="checkbox"/> Limited Liability Company <input type="checkbox"/> 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?		<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> 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:	<input type="checkbox"/> Yes <input type="checkbox"/> No	Limit of Authority:	\$
Name:		Title:	
Authorized to sign contracts:	<input type="checkbox"/> Yes <input type="checkbox"/> No	Limit of Authority:	\$
Name:		Title:	
Authorized to sign contracts:	<input type="checkbox"/> Yes <input type="checkbox"/> 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
<input type="checkbox"/> Disadvantaged Business Enterprise		
<input type="checkbox"/> Minority Business Enterprise		
<input type="checkbox"/> Woman-Owned Business Enterprise		
<input type="checkbox"/> Small Business Enterprise		
<input type="checkbox"/> Disabled Business Enterprise		
<input type="checkbox"/> Veteran-Owned Business Enterprise		
<input type="checkbox"/> Service-Disabled Veteran-Owned Business		
<input type="checkbox"/> HUBZone Business (Historically Underutilized) Business		

<input type="checkbox"/> Other			
<input type="checkbox"/> 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:		<input type="checkbox"/> Attached	
Date of Business's most recent audited financial statement:		<input type="checkbox"/> 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?	<input type="checkbox"/> Yes <input type="checkbox"/> 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? <input type="checkbox"/> Yes <input type="checkbox"/> 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?		<input type="checkbox"/> Yes <input type="checkbox"/> No	
Does provider have an A.M. Best Rating of A-VII or better?		<input type="checkbox"/> Yes <input type="checkbox"/> 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? <input type="checkbox"/> Yes <input type="checkbox"/> No				
Been barred from contracting by any local, state, or federal agency within the last 5 years? <input type="checkbox"/> Yes <input type="checkbox"/> No				
Been released from a bid in the past 5 years? <input type="checkbox"/> Yes <input type="checkbox"/> No				
Defaulted on a project or failed to complete any contract awarded to it? <input type="checkbox"/> Yes <input type="checkbox"/> No				
Refused to construct or refused to provide materials defined in the contract documents or in a change order? <input type="checkbox"/> Yes <input type="checkbox"/> No				
Been a party to any currently pending litigation or arbitration? <input type="checkbox"/> Yes <input type="checkbox"/> 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. Schedule A (Current Projects), Schedule B (Previous Experience with Similar Projects), and Schedule C (Key Individuals) must be completed for Directional Drill Subcontractor and Jack and Bore Subcontractor as identified by Bidder.

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**

<b>Project Manager</b>			
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	
<b>Project Superintendent</b>			
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	

<b>Safety Manager</b>			
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	
<b>Quality Control Manager</b>			
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	

## NOTICE OF AWARD

Date of Issuance:

Owner:

Owner's Project No.:

Engineer:

Engineer's Project No.: 50083060

Project:

Contract Name:

Bidder:

Bidder's Address:

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

### **Seymour Drive and Hodges Street Waterline Improvements**

The Contract Price of the awarded Contract is \$[ ]. Contract Price is subject to adjustment based on the provisions of the Contract, including but not limited to those governing changes, Unit Price Work, and Work performed on a cost-plus-fee basis, as applicable.

[ ] unexecuted counterparts of the Agreement accompany this Notice of Award, and one copy of the Contract Documents accompanies this Notice of Award, or has been transmitted or made available to Bidder electronically.

☐ Drawings will be delivered separately from the other Contract Documents.

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

1. Deliver to Owner five (5) counterparts of the Agreement, signed by Bidder (as Contractor).
2. Deliver with the signed Agreement(s) the Contract security (such as required performance and payment bonds) and insurance documentation, as specified in the Instructions to Bidders and in the General Conditions, Articles 2 and 6.
3. Other conditions precedent (if any):

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

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

Owner:

By (signature): \_\_\_\_\_

Name (printed): \_\_\_\_\_

Title: \_\_\_\_\_

Copy: Engineer

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

This Agreement is by and between Halifax County Service Authority ("Owner") and \_\_\_\_\_ ("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:

## ARTICLE 2—THE PROJECT

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

Installation of approximately 2,900 LF of new 6" waterline and related appurtenances along Hodges Street, including service connections. An existing 6" waterline along Seymour Drive will be abandoned in place and all services will be tied into an existing 10" waterline. The project also includes replacement of approximately 15 stormwater inlets, rehabilitation of 23 sanitary sewer manholes, and replacement of 150 LF of sanitary sewer.

## ARTICLE 3—ENGINEER

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

## ARTICLE 4—CONTRACT TIMES

- 4.01 *Time is of the Essence*

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

- 4.02 *Contract Times: Days*

A. The Work will be substantially complete within **180 calendar** days after the date when the Contract Times commence to run as provided in Paragraph 4.01 of the General Conditions, and completed and ready for final payment in accordance with Paragraph 15.06 of the General Conditions within **210 calendar** days after the date when the Contract Times commence to run.

#### 4.03 *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 **\$450** 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 **\$300** for each day that expires after such time until the Work is completed and ready for final payment.
  3. Liquidated damages for failing to timely attain Milestones, 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 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).

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 C700 General Conditions, estimated quantities are not guaranteed, and determinations of actual quantities and classifications are to be made by Engineer.

- B. Total of Unit Price Work (subject to final Unit Price adjustment)  
\$\_\_\_\_\_.
- C. In addition to those items included in 5.01 B, the Owner has elected to include the following items as Bid Alternates in the Work:
- D. Total of Alternate Bid Item Unit Price Work (subject to final Unit Price adjustment)  
\$\_\_\_\_\_.

- E. Total of Unit Price Work plus Alternate Bid Item Unit Price Work (subject to final Unit Price adjustment) \$\_\_\_\_\_.
- F. For all Work, at the prices stated in Contractor's Bid, attached hereto as an exhibit.

## **ARTICLE 6—PAYMENT PROCEDURES**

### **6.01 Submittal and Processing of Payments**

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

### **6.02 Progress Payments; Retainage**

- A. Owner shall make progress payments on the basis of Contractor's Applications for Payment on or about the 25<sup>th</sup> day of each month during performance of the Work as provided in Paragraph 6.02.A.1 below, provided that such Applications for Payment have been submitted in a timely manner and otherwise meet the requirements of the Contract. All such payments will be measured by the Schedule of Values established as provided in the General Conditions (and in the case of Unit Price Work based on the number of units completed) or, in the event there is no Schedule of Values, as provided elsewhere in the Contract.
  - 1. Prior to Substantial Completion, progress payments will be made in an amount equal to the percentage indicated below but, in each case, less the aggregate of payments previously made and less such amounts as Owner may withhold, including but not limited to liquidated damages, in accordance with the Contract.
    - a. **95** percent of the value of the Work completed (with the balance being retainage).
      - 1) If 50 percent or more of the Work has been completed, as determined by Engineer, and if the character and progress of the Work have been satisfactory to Owner and Engineer, then as long as the character and progress of the Work remain satisfactory to Owner and Engineer, there will be no additional retainage; and
    - b. **95** percent of cost of materials and equipment not incorporated in the Work (with the balance being retainage).
- B. Upon Substantial Completion, Owner shall pay an amount sufficient to increase total payments to Contractor to **95** percent of the Work completed, less such amounts set off by Owner pursuant to Paragraph 15.01.E of the General Conditions, and less **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 5 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.
  7. Addenda (numbers **[number]** to **[number]**, inclusive).
  8. Exhibits to this Agreement (enumerated as follows):
    - a. Contractor's Bid
  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 \_\_\_\_\_ (which is the Effective Date of the Contract).

Owner:

\_\_\_\_\_  
(typed or printed name of organization)

By:

\_\_\_\_\_  
(individual's signature)

Date:

\_\_\_\_\_  
(date signed)

Name:

\_\_\_\_\_  
(typed or printed)

Title:

\_\_\_\_\_  
(typed or printed)

Attest:

\_\_\_\_\_  
(individual's signature)

Title:

\_\_\_\_\_  
(typed or printed)

Address for giving notices:

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Designated Representative:

Name:

\_\_\_\_\_  
(typed or printed)

Title:

\_\_\_\_\_  
(typed or printed)

Address:

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Phone:

Email:

\_\_\_\_\_  
(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.)

APPROVED as to form:

\_\_\_\_\_

Contractor:

\_\_\_\_\_  
(typed or printed name of organization)

By:

\_\_\_\_\_  
(individual's signature)

Date:

\_\_\_\_\_  
(date signed)

Name:

\_\_\_\_\_  
(typed or printed)

Title:

\_\_\_\_\_  
(typed or printed)

(If [Type of Entity] is a corporation, a partnership, or a joint venture, attach evidence of authority to sign.)

Attest:

\_\_\_\_\_  
(individual's signature)

Title:

\_\_\_\_\_  
(typed or printed)

Address for giving notices:

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Designated Representative:

Name:

\_\_\_\_\_  
(typed or printed)

Title:

\_\_\_\_\_  
(typed or printed)

Address:

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Phone:

Email:

License No.:

\_\_\_\_\_  
(where applicable)

State:

\_\_\_\_\_

## NOTICE TO PROCEED

Owner: \_\_\_\_\_ Owner's Project No.: \_\_\_\_\_  
Engineer: \_\_\_\_\_ Engineer's Project No.: 50083060  
Contractor: \_\_\_\_\_ Contractor's Project No.: \_\_\_\_\_  
Project: Seymour Drive and Hodges Street Waterline Improvements  
Contract Name: \_\_\_\_\_  
Effective Date of Contract: \_\_\_\_\_

Owner hereby notifies Contractor that the Contract Times under the above Contract will commence to run on \_\_\_\_\_ 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 **XXX calendar days** from the date stated above for the commencement of the Contract Times, resulting in a date for Substantial Completion of \_\_\_\_\_; and the number of days to achieve readiness for final payment is **XXX calendar days** from the commencement date of the Contract Times, resulting in a date for readiness for final payment of \_\_\_\_\_.

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

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

Owner: \_\_\_\_\_  
By (signature): \_\_\_\_\_  
Name (printed): \_\_\_\_\_  
Title: \_\_\_\_\_  
Date Issued: \_\_\_\_\_  
Copy: Engineer

## PERFORMANCE BOND

<b>Contractor</b> Name: _____ Address <i>(principal place of business)</i> : _____	<b>Surety</b> Name: _____ Address <i>(principal place of business)</i> : _____
<b>Owner</b> Name: <b>Halifax County Service Authority</b> Mailing address <i>(principal place of business)</i> : <b>2529 Houghton Avenue</b> <b>South Boston, VA 24592</b>	<b>Contract</b> Description <i>(name and location)</i> : <b>Seymour Drive and Hodges Avenue Waterline Improvements</b> <b>South Boston, VA</b> Contract Price: <b>[Amount from Contract]</b> Effective Date of Contract: <b>[Date from Contract]</b>
<b>Bond</b> Bond Amount: <b>[Amount]</b> Date of Bond: <b>[Date]</b> <i>(Date of Bond cannot be earlier than Effective Date of Contract)</i> Modifications to this Bond form: <input type="checkbox"/> None <input type="checkbox"/> See Paragraph 16	
Surety and Contractor, intending to be legally bound hereby, subject to the terms set forth in this Performance Bond, do each cause this Performance Bond to be duly executed by an authorized officer, agent, or representative.	
Contractor as Principal	Surety
<i>(Full formal name of Contractor)</i>	<i>(Full formal name of Surety) (corporate seal)</i>
By: _____	By: _____
<i>(Signature)</i>	<i>(Signature)(Attach Power of Attorney)</i>
Name: _____	Name: _____
<i>(Printed or typed)</i>	<i>(Printed or typed)</i>
Title: _____	Title: _____
Attest: _____	Attest: _____
<i>(Signature)</i>	<i>(Signature)</i>
Name: _____	Name: _____
<i>(Printed or typed)</i>	<i>(Printed or typed)</i>
Title: _____	Title: _____
<i>Notes: (1) Provide supplemental execution by any additional parties, such as joint venturers. (2) Any singular reference to Contractor, Surety, Owner, or other party is considered plural where applicable.</i>	

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

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



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

14. Definitions

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

## PAYMENT BOND

<b>Contractor</b> Name: Address <i>(principal place of business)</i> :	<b>Surety</b> Name: Address <i>(principal place of business)</i> :
<b>Owner</b> <div style="text-align: center;"><b>Halifax County Service Authority</b></div> Name: Mailing address <i>(principal place of business)</i> : <b>2529 Houghton Avenue</b> <b>South Boston, VA 24592</b>	<b>Contract</b> Description <i>(name and location)</i> : <b>Seymour Drive and Hodges Avenue Waterline Improvements</b> <b>South Boston, VA</b> Contract Price: <b>[Amount, from Contract]</b> Effective Date of Contract: <b>[Date, from Contract]</b>
<b>Bond</b> Bond Amount: <b>[Amount]</b> Date of Bond: <b>[Date]</b> <i>(Date of Bond cannot be earlier than Effective Date of Contract)</i> Modifications to this Bond form: <input type="checkbox"/> None <input type="checkbox"/> See Paragraph 18	
Surety and Contractor, intending to be legally bound hereby, subject to the terms set forth in this Payment Bond, do each cause this Payment Bond to be duly executed by an authorized officer, agent, or representative.	
Contractor as Principal	Surety
<i>(Full formal name of Contractor)</i>	<i>(Full formal name of Surety) (corporate seal)</i>
By: _____ <div style="text-align: center;"><i>(Signature)</i></div>	By: _____ <div style="text-align: center;"><i>(Signature)(Attach Power of Attorney)</i></div>
Name: _____ <div style="text-align: center;"><i>(Printed or typed)</i></div>	Name: _____ <div style="text-align: center;"><i>(Printed or typed)</i></div>
Title: _____	Title: _____
Attest: _____ <div style="text-align: center;"><i>(Signature)</i></div>	Attest: _____ <div style="text-align: center;"><i>(Signature)</i></div>
Name: _____ <div style="text-align: center;"><i>(Printed or typed)</i></div>	Name: _____ <div style="text-align: center;"><i>(Printed or typed)</i></div>
Title: _____	Title: _____
<i>Notes: (1) Provide supplemental execution by any additional parties, such as joint venturers. (2) Any singular reference to Contractor, Surety, Owner, or other party is considered plural where applicable.</i>	

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

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

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

**Contractor's Application for Payment**

<b>Owner:</b> <u>Halifax County Service Authority</u>	<b>Owner's Project No.:</b> _____
<b>Engineer:</b> <u>Dewberry</u>	<b>Engineer's Project No.:</b> <u>50083060</u>
<b>Contractor:</b> _____	<b>Contractor's Project No.:</b> _____
<b>Project:</b> <u>Seymour Drive and Hodges Street Waterline Improvements</u>	
<b>Contract:</b> _____	
<b>Application No.:</b> _____ <b>Application Date:</b> _____	
<b>Application Period:</b> <b>From</b> _____ <b>to</b> _____	

1. Original Contract Price	\$	-
2. Net change by Change Orders	\$	-
3. Current Contract Price (Line 1 + Line 2)	\$	-
4. Total Work completed and materials stored to date (Sum of Column G Lump Sum Total and Column J Unit Price Total)	\$	-
5. Retainage		
a. _____ X \$ _____ Work Completed	\$	-
b. _____ X \$ _____ Stored Materials	\$	-
c. Total Retainage (Line 5.a + Line 5.b)	\$	-
6. Amount eligible to date (Line 4 - Line 5.c)	\$	-
7. Less previous payments (Line 6 from prior application)		
8. Amount due this application	\$	-
9. Balance to finish, including retainage (Line 3 - Line 4)	\$	-

**Contractor's Certification**

The undersigned Contractor certifies, to the best of its knowledge, the following:

(1) All previous progress payments received from Owner on account of Work done under the Contract have been applied on account to discharge Contractor's legitimate obligations incurred in connection with the Work covered by prior Applications for Payment;

(2) Title to all Work, materials and equipment incorporated in said Work, or otherwise listed in or covered by this Application for Payment, will pass to Owner at time of payment free and clear of all liens, security interests, and encumbrances (except such as are covered by a bond acceptable to Owner indemnifying Owner against any such liens, security interest, or encumbrances); and

(3) All the Work covered by this Application for Payment is in accordance with the Contract Documents and is not defective.

<b>Contractor:</b> _____	
<b>Signature:</b> _____	<b>Date:</b> _____

<b>Recommended by Engineer</b>	<b>Approved by Owner</b>
<b>By:</b> _____	<b>By:</b> _____
<b>Title:</b> _____	<b>Title:</b> _____
<b>Date:</b> _____	<b>Date:</b> _____
<b>Approved by Funding Agency</b>	
<b>By:</b> _____	<b>By:</b> _____
<b>Title:</b> _____	<b>Title:</b> _____
<b>Date:</b> _____	<b>Date:</b> _____

### Progress Estimate - Unit Price Work

## Contractor's Application for Payment

<b>Owner:</b>	Halifax County Service Authority	<b>Owner's Project No.:</b>	
<b>Engineer:</b>	Dewberry	<b>Engineer's Project No.:</b>	50083060
<b>Contractor:</b>		<b>Contractor's Project No.:</b>	
<b>Project:</b>	Seymour Drive and Hodges Street Waterline Improvements		
<b>Contract:</b>			

Application No.: \_\_\_\_\_ Application Period: From \_\_\_\_\_ to \_\_\_\_\_ Application Date: \_\_\_\_\_

A	B	C	D	E	F	G	H	I	J	K	L
Bid Item No.	Description	Contract Information				Work Completed		Materials Currently Stored (not in G) (\$)	Work Completed and Materials Stored to Date (H + I) (\$)	% of Value of Item (J / F) (%)	Balance to Finish (F - J) (\$)
		Item Quantity	Units	Unit Price (\$)	Value of Bid Item (C X E) (\$)	Estimated Quantity Incorporated in the Work	Value of Work Completed to Date (E X G) (\$)				
Original Contract											
					-		-		-		-
					-		-		-		-
					-		-		-		-
					-		-		-		-
					-		-		-		-
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					-		-		-		-
					-		-		-		-
Original Contract Totals					\$ -		\$ -	\$ -	\$ -		\$ -

### Stored Materials Summary

### Contractor's Application for Payment

<b>Owner:</b>	Halifax County Service Authority								<b>Owner's Project No.:</b>			
<b>Engineer:</b>	Dewberry								<b>Engineer's Project No.:</b>		50083060	
<b>Contractor:</b>									<b>Contractor's Project No.:</b>			
<b>Project:</b>	Seymour Drive and Hodges Street Waterline Improvements											
<b>Contract:</b>												
<b>Application No.:</b>												
<b>Application Period:</b>				<b>From</b>	<b>to</b>				<b>Application Date:</b>			
A	B	C	D	E	F	G	H	I	J	K	L	M
Item No. (Lump Sum Tab) or Bid Item No. (Unit Price Tab)	Supplier Invoice No.	Submittal No. (with Specification Section No.)	Description of Materials or Equipment Stored	Storage Location	Application No. When Materials Placed in Storage	Materials Stored			Incorporated in Work			Materials Remaining in Storage (I-L) (\$)
						Previous Amount Stored (\$)	Amount Stored this Period (\$)	Amount Stored to Date (G+H) (\$)	Amount Previously Incorporated in the Work (\$)	Amount Incorporated in the Work this Period (\$)	Total Amount Incorporated in the Work (J+K) (\$)	
								-			-	-
								-			-	-
								-			-	-
								-			-	-
								-			-	-
								-			-	-
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								-			-	-
								-			-	-
								-			-	-
								-			-	-
								-			-	-
Totals						\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -



# 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, expeditors, timekeepers, clerks, and other personnel employed by Contractor, whether at the Site or in Contractor's principal or branch office for general administration of the Work and not specifically included in the agreed upon schedule of job classifications referred to in Paragraph 13.01.B.1 or specifically covered by Paragraph 13.01.B.4. The payroll costs and other compensation excluded here are to be considered administrative costs covered by the Contractor's fee.
  - 2. The cost of purchasing, renting, or furnishing small tools and hand tools.
  - 3. Expenses of Contractor's principal and branch offices other than Contractor's office at the Site.
  - 4. Any part of Contractor's capital expenses, including interest on Contractor's capital employed for the Work and charges against Contractor for delinquent payments.
  - 5. Costs due to the negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, including but not limited to, the correction of defective Work, disposal of materials or equipment wrongly supplied, and making good any damage to property.
  - 6. Expenses incurred in preparing and advancing Claims.
  - 7. Other overhead or general expense costs of any kind and the costs of any item not specifically and expressly included in Paragraph 13.01.B.
- D. *Contractor's Fee*
- 1. When the Work as a whole is performed on the basis of cost-plus-a-fee, then:
    - a. Contractor's fee for the Work set forth in the Contract Documents as of the Effective Date of the Contract will be determined as set forth in the Agreement.
    - b. for any Work covered by a Change Order, Change Proposal, Claim, set-off, or other adjustment in Contract Price on the basis of Cost of the Work, Contractor's fee will be determined as follows:
      - 1) When the fee for the Work as a whole is a percentage of the Cost of the Work, the fee will automatically adjust as the Cost of the Work changes.
      - 2) When the fee for the Work as a whole is a fixed fee, the fee for any additions or deletions will be determined in accordance with Paragraph 11.07.C.2.
  - 2. When the Work as a whole is performed on the basis of a stipulated sum, or any other basis other than cost-plus-a-fee, then Contractor's fee for any Work covered by a Change

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

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

### 13.02 Allowances

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

### 13.03 Unit Price Work

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

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

E. *Adjustments in Unit Price*

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

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

14.01 *Access to Work*

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

14.02 *Tests, Inspections, and Approvals*

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

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

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

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

#### 14.03 *Defective Work*

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

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

#### 14.04 *Acceptance of Defective Work*

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

#### 14.05 *Uncovering Work*

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

#### 14.06 *Owner May Stop the Work*

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

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

**14.07 Owner May Correct Defective Work**

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

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

**15.01 Progress Payments**

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



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

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

*C. Review of Applications*

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

4. Neither Engineer's review of Contractor's Work for the purposes of recommending payments nor Engineer's recommendation of any payment, including final payment, will impose responsibility on Engineer:
  - a. to supervise, direct, or control the Work;
  - b. for the means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto;
  - c. for Contractor's failure to comply with Laws and Regulations applicable to Contractor's performance of the Work;
  - d. to make any examination to ascertain how or for what purposes Contractor has used the money paid by Owner; or
  - e. to determine that title to any of the Work, materials, or equipment has passed to Owner free and clear of any Liens.
5. Engineer may refuse to recommend the whole or any part of any payment if, in Engineer's opinion, it would be incorrect to make the representations to Owner stated in Paragraph 15.01.C.2.
6. Engineer will recommend reductions in payment (set-offs) necessary in Engineer's opinion to protect Owner from loss because:
  - a. the Work is defective, requiring correction or replacement;
  - b. the Contract Price has been reduced by Change Orders;
  - c. Owner has been required to correct defective Work in accordance with Paragraph 14.07, or has accepted defective Work pursuant to Paragraph 14.04;
  - d. Owner has been required to remove or remediate a Hazardous Environmental Condition for which Contractor is responsible; or
  - e. Engineer has actual knowledge of the occurrence of any of the events that would constitute a default by Contractor and therefore justify termination for cause under the Contract Documents.

**D. *Payment Becomes Due***

1. Ten days after presentation of the Application for Payment to Owner with Engineer's recommendation, the amount recommended (subject to any Owner set-offs) will become due, and when due will be paid by Owner to Contractor.

**E. *Reductions in Payment by Owner***

1. In addition to any reductions in payment (set-offs) recommended by Engineer, Owner is entitled to impose a set-off against payment based on any of the following:
  - a. Claims have been made against Owner based on Contractor's conduct in the performance or furnishing of the Work, or Owner has incurred costs, losses, or damages resulting from Contractor's conduct in the performance or furnishing of the Work, including but not limited to claims, costs, losses, or damages from workplace injuries, adjacent property damage, non-compliance with Laws and Regulations, and patent infringement;

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

#### 15.02 *Contractor's Warranty of Title*

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

#### 15.03 *Substantial Completion*

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

submit to Owner and Engineer an initial draft of punch list items to be completed or corrected before final payment.

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

#### 15.04 *Partial Use or Occupancy*

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

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

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

#### 15.05 *Final Inspection*

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

#### 15.06 *Final Payment*

##### A. *Application for Payment*

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

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

#### 15.07 *Waiver of Claims*

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

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

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

#### 15.08 *Correction Period*

- A. If within one year after the date of Substantial Completion (or such longer period of time as may be prescribed by the Supplementary Conditions 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 OF THE CONSTRUCTION CONTRACT**

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# SUPPLEMENTARY CONDITIONS OF THE CONSTRUCTION CONTRACT

These Supplementary Conditions amend or supplement EJCDC® C-700, Standard General Conditions of the Construction Contract (2018). The General Conditions remain in full force and effect except as amended.

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—for example, "Paragraph SC-4.05."

## ARTICLE 1—DEFINITIONS AND TERMINOLOGY

No suggested Supplementary Conditions in this Article.

## ARTICLE 2—PRELIMINARY MATTERS

### 2.01 *Delivery of Bonds and Evidence of Insurance*

SC-2.01 Delete Paragraphs 2.01.B. and C. in their entirety and insert the following in their place:

- B. *Evidence of Contractor's Insurance:* When Contractor delivers the signed counterparts of the Agreement to Owner, Contractor shall also deliver to Owner copies of the policies (including all endorsements, and identification of applicable self-insured retentions and deductibles) of insurance required to be provided by Contractor in this Contract. Contractor may block out (redact) any confidential premium or pricing information contained in any policy or endorsement furnished under this provision.

### 2.02 *Copies of Documents*

SC-2.02 Amend the first sentence of Paragraph 2.02.A. to read as follows:

Owner shall furnish to Contractor 5 printed copies of the Contract Documents (including one fully signed counterpart of the Agreement), and one copy in electronic portable document format (PDF).

### 2.06 *Electronic Transmittals*

SC-2.06 Delete Paragraphs 2.06.B and 2.06.C in their entirety and insert the following in their place:

- B. *Electronic Documents Protocol:* The parties shall conform to the following provisions in Paragraphs 2.06.B and 2.06.C, together referred to as the Electronic Documents Protocol ("EDP" or "Protocol") for exchange of electronic transmittals.

#### 1. *Basic Requirements*

- a. To the fullest extent practical, the parties agree to and will transmit and accept Electronic Documents in an electronic or digital format using the procedures described in this Protocol. Use of the Electronic Documents and any information contained therein is subject to the requirements of this Protocol and other provisions of the Contract.

- b. The contents of the information in any Electronic Document will be the responsibility of the transmitting party.
- c. Electronic Documents as exchanged by this Protocol may be used in the same manner as the printed versions of the same documents that are exchanged using non-electronic format and methods, subject to the same governing requirements, limitations, and restrictions, set forth in the Contract Documents.
- d. Except as otherwise explicitly stated herein, the terms of this Protocol will be incorporated into any other agreement or subcontract between a party and any third party for any portion of the Work on the Project, or any Project-related services, where that third party is, either directly or indirectly, required to exchange Electronic Documents with a party or with Engineer. Nothing herein will modify the requirements of the Contract regarding communications between and among the parties and their subcontractors and consultants.
- e. When transmitting Electronic Documents, the transmitting party makes no representations as to long term compatibility, usability, or readability of the items resulting from the receiving party's use of software application packages, operating systems, or computer hardware differing from those established in this Protocol.
- f. Nothing herein negates any obligation 1) in the Contract to create, provide, or maintain an original printed record version of Drawings and Specifications, signed and sealed according to applicable Laws and Regulations; 2) to comply with any applicable Law or Regulation governing the signing and sealing of design documents or the signing and electronic transmission of any other documents; or 3) to comply with the notice requirements of Paragraph 18.01 of the General Conditions.

## 2. *System Infrastructure for Electronic Document Exchange*

- a. Each party will provide hardware, operating system(s) software, internet, e-mail, and large file transfer functions ("System Infrastructure") at its own cost and sufficient for complying with the EDP requirements. With the exception of minimum standards set forth in this EDP, and any explicit system requirements specified by attachment to this EDP, it is the obligation of each party to determine, for itself, its own System Infrastructure.
  - 1) The maximum size of an email attachment for exchange of Electronic Documents under this EDP is **10 MB**. Attachments larger than that may be exchanged using large file transfer functions or physical media.
  - 2) Each Party assumes full and complete responsibility for any and all of its own costs, delays, deficiencies, and errors associated with converting, translating, updating, verifying, licensing, or otherwise enabling its System Infrastructure, including operating systems and software, for use with respect to this EDP.
- b. Each party is responsible for its own system operations, security, back-up, archiving, audits, printing resources, and other Information Technology ("IT") for maintaining operations of its System Infrastructure during the Project, including coordination with the party's individual(s) or entity responsible for managing its System Infrastructure and capable of addressing routine communications and other IT issues affecting the exchange of Electronic Documents.

- c. Each party will operate and maintain industry-standard, industry-accepted, ISO-standard, commercial-grade security software and systems that are intended to protect the other party from: software viruses and other malicious software like worms, trojans, adware; data breaches; loss of confidentiality; and other threats in the transmission to or storage of information from the other parties, including transmission of Electronic Documents by physical media such as CD/DVD/flash drive/hard drive. To the extent that a party maintains and operates such security software and systems, it shall not be liable to the other party for any breach of system security.
- d. In the case of disputes, conflicts, or modifications to the EDP required to address issues affecting System Infrastructure, the parties shall cooperatively resolve the issues; but, failing resolution, the Owner is authorized to make and require reasonable and necessary changes to the EDP to effectuate its original intent. If the changes cause additional cost or time to Contractor, not reasonably anticipated under the original EDP, Contractor may seek an adjustment in price or time under the appropriate process in the Contract.
- e. Each party is responsible for its own back-up and archive of documents sent and received during the term of the contract under this EDP, unless this EDP establishes a Project document archive, either as part of a mandatory Project website or other communications protocol, upon which the parties may rely for document archiving during the specified term of operation of such Project document archive. Further, each party remains solely responsible for its own post-Project back-up and archive of Project documents after the term of the Contract, or after termination of the Project document archive, if one is established, for as long as required by the Contract and as each party deems necessary for its own purposes.
- f. If a receiving party receives an obviously corrupted, damaged, or unreadable Electronic Document, the receiving party will advise the sending party of the incomplete transmission.
- g. The parties will bring any non-conforming Electronic Documents into compliance with the EDP. The parties will attempt to complete a successful transmission of the Electronic Document or use an alternative delivery method to complete the communication.
- h. The Owner will operate a Project information management system (also referred to in this EDP as "Project Website") for use of Owner, Engineer and Contractor during the Project for exchange and storage of Project-related communications and information. Except as otherwise provided in this EDP or the General Conditions, use of the Project Website by the parties as described in this Paragraph will be mandatory for exchange of Project documents, communications, submittals, and other Project-related information. The following conditions and standards will govern use of the Project Website:
  - 1) Describe the period of time during which the Project Website will be operated and be available for reliance by the parties;
  - 2) Provide any minimum system infrastructure, software licensing and security standards for access to and use of the Project Website;

- 3) Describe the types and extent of services to be provided at the Project Website (such as large file transfer, email, communication and document archives, etc.); and
- 4) Include any other Project Website attributes that may be pertinent to Contractor's use of the facility and pricing of such use.

**C. *Software Requirements for Electronic Document Exchange; Limitations***

1. Each party will acquire the software and software licenses necessary to create and transmit Electronic Documents and to read and to use any Electronic Documents received from the other party (and if relevant from third parties), using the software formats required in this section of the EDP.
  - a. Prior to using any updated version of the software required in this section for sending Electronic Documents to the other party, the originating party will first notify and receive concurrence from the other party for use of the updated version or adjust its transmission to comply with this EDP.
2. The parties agree not to intentionally edit, reverse engineer, decrypt, remove security or encryption features, or convert to another format for modification purposes any Electronic Document or information contained therein that was transmitted in a software data format, including Portable Document Format (PDF), intended by sender not to be modified, unless the receiving party obtains the permission of the sending party or is citing or quoting excerpts of the Electronic Document for Project purposes.
3. Software and data formats for exchange of Electronic Documents will conform to the requirements set forth in Exhibit A to this EDP, including software versions, if listed.

**2.07 *Availability of Funds***

SC-2.07 Add the following new section immediately after Section 2.06:

- A. It is understood and agreed between the parties herein that the agency shall be bound hereunder only to the extent of the funds available or which may hereafter become available for the purpose of this agreement.

**ARTICLE 4—COMMENCEMENT AND PROGRESS OF THE WORK**

**4.05 *Delays in Contractor's Progress***

SC-4.05.C.5 Add the following new paragraphs immediately after Paragraph 4.05.C.4:

5. Weather-Related Delays
  - a. The existence of abnormal weather conditions will be determined on a month-by-month basis in accordance with the following:
    - 1) Every workday on which one or more of the following conditions exist will be considered a "bad weather day":
      - i) Total precipitation (as rain equivalent) occurring between 7:00 p.m. on the preceding day (regardless of whether such preceding day is a workday) through 7:00 p.m. on the workday in question equals or exceeds one half inch of precipitation (as rain equivalent).



- 2) Determination of actual bad weather days during performance of the Work will be based on the weather records measured and recorded by Richmond International Airport weather monitoring station at Richmond International Airport.
6. When establishing the contract time, an allowance will be made for four (4) days of work lost per month due to inclement weather conditions as defined above. The Contractor, at the time of each periodic pay request, shall submit to the Engineer and Owner for approval a list of all working days lost due to either inclement weather or site conditions caused by inclement weather for the period. Accompanying his list should be a summary of the specific conditions which caused the loss. This request will be reviewed by the Engineer in light of observations made by the Engineer and resident inspector. Approval of the periodic payment estimate by the Engineer and Owner will also include approval of the weather delay request. After substantial completion, and not until then, a change order must be executed if a time extension for weather related delays is requested by the Contractor. The time extension must be based solely on the time requested within the periodic payment estimates. Subtracted from this time will be the four (4) days per month allowance assumed in the contract. There cannot be a decrease in contract length if the allowance for inclement weather exceeds the actual number of days lost due to inclement weather.

## **ARTICLE 5—SITE, SUBSURFACE AND PHYSICAL CONDITIONS, HAZARDOUS ENVIRONMENTAL CONDITIONS**

### **5.03    *Subsurface and Physical Conditions***

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

- E. The following reports of explorations and tests of subsurface conditions at or adjacent to the Site are known to Owner:
- F. The following drawings of physical conditions relating to existing surface or subsurface structures at or adjacent to the Site (except Underground Facilities) are known to Owner:
  1. No drawings of physical conditions relating to existing surface or subsurface structures at or adjacent to the Site are known to Owner.

### **5.05    *Underground Facilities***

SC 5.05      Delete Paragraphs 5.05.A.1 in its entirety and insert the following:

1. reviewing and verifying all information and data regarding existing Underground Facilities at the Site;

### **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.

## ARTICLE 6—BONDS AND INSURANCE

### 6.03 Contractor's Insurance

SC-6.03 Supplement Paragraph 6.03 with the following provisions after Paragraph 6.03.C:

- D. *Other Additional Insureds:* As a supplement to the provisions of Paragraph 6.03.C of the General Conditions, the commercial general liability, automobile liability, umbrella or excess, pollution liability, and unmanned aerial vehicle liability policies must include as additional insureds (in addition to Owner and Engineer) the following:
- E. *Workers' Compensation and Employer's Liability:* Contractor shall purchase and maintain workers' compensation and employer's liability insurance, including, as applicable, United States Longshoreman and Harbor Workers' Compensation Act, Jones Act, stop-gap employer's liability coverage for monopolistic states, and foreign voluntary workers' compensation (from available sources, notwithstanding the jurisdictional requirement of Paragraph 6.02.B of the General Conditions).

Workers' Compensation and Related Policies	Policy limits of not less than:
<b>Workers' Compensation</b>	
State	\$1,000,000
Applicable Federal (e.g., Longshoreman's)	Statutory
Foreign voluntary workers' compensation (employer's responsibility coverage), if applicable	Statutory
<b>Jones Act (if applicable)</b>	
Bodily injury by accident—each accident	\$1,000,000
Bodily injury by disease—aggregate	\$1,000,000
<b>Employer's Liability</b>	
Each accident	\$500,000
Each employee	\$500,000
Policy limit	\$1,000,000
<b>Stop-gap Liability Coverage</b>	
For work performed in monopolistic states, stop-gap liability coverage must be endorsed to either the worker's compensation or commercial general liability policy with a minimum limit of:	\$

- F. *Commercial General Liability—Claims Covered:* Contractor shall purchase and maintain commercial general liability insurance, covering all operations by or on behalf of Contractor, on an occurrence basis, against claims for:
  - 1. damages because of bodily injury, sickness or disease, or death of any person other than Contractor's employees,

2. damages insured by reasonably available personal injury liability coverage, and
  3. damages because of injury to or destruction of tangible property wherever located, including loss of use resulting therefrom.
- G. *Commercial General Liability—Form and Content:* Contractor's commercial liability policy must be written on a 1996 (or later) Insurance Services Organization, Inc. (ISO) commercial general liability form (occurrence form) and include the following coverages and endorsements:
1. Products and completed operations coverage.
    - a. Such insurance must be maintained for three years after final payment.
    - b. Contractor shall furnish Owner and each other additional insured (as identified in the Supplementary Conditions or elsewhere in the Contract) evidence of continuation of such insurance at final payment and three years thereafter.
  2. Blanket contractual liability coverage, including but not limited to coverage of Contractor's contractual indemnity obligations in Paragraph 7.18.
  3. Severability of interests and no insured-versus-insured or cross-liability exclusions.
  4. Underground, explosion, and collapse coverage.
  5. Personal injury coverage.
  6. Additional insured endorsements that include both ongoing operations and products and completed operations coverage through ISO Endorsements CG 20 10 10 01 and CG 20 37 10 01 (together). If Contractor demonstrates to Owner that the specified ISO endorsements are not commercially available, then Contractor may satisfy this requirement by providing equivalent endorsements.
  7. For design professional additional insureds, ISO Endorsement CG 20 32 07 04 "Additional Insured—Engineers, Architects or Surveyors Not Engaged by the Named Insured" or its equivalent.
- H. *Commercial General Liability—Excluded Content:* The commercial general liability insurance policy, including its coverages, endorsements, and incorporated provisions, must not include any of the following:
1. Any modification of the standard definition of "insured contract" (except to delete the railroad protective liability exclusion if Contractor is required to indemnify a railroad or others with respect to Work within 50 feet of railroad property).
  2. Any exclusion for water intrusion or water damage.
  3. Any provisions resulting in the erosion of insurance limits by defense costs other than those already incorporated in ISO form CG 00 01.
  4. Any exclusion of coverage relating to earth subsidence or movement.
  5. Any exclusion for the insured's vicarious liability, strict liability, or statutory liability (other than worker's compensation).
  6. Any limitation or exclusion based on the nature of Contractor's work.

7. Any professional liability exclusion broader in effect than the most recent edition of ISO form CG 22 79.

I. *Commercial General Liability—Minimum Policy Limits*

<b>Commercial General Liability</b>	<b>Policy limits of not less than:</b>
General Aggregate	\$2,000,000
Products—Completed Operations Aggregate	\$1,000,000
Personal and Advertising Injury	\$1,000,000
Bodily Injury and Property Damage—Each Occurrence	\$1,000,000

- J. *Automobile Liability*: Contractor shall purchase and maintain automobile liability insurance for damages because of bodily injury or death of any person or property damage arising out of the ownership, maintenance, or use of any motor vehicle. The automobile liability policy must be written on an occurrence basis.

<b>Automobile Liability</b>	<b>Policy limits of not less than:</b>
<b>Bodily Injury</b>	
Each Person	\$1,000,000
Each Accident	\$1,000,000
<b>Property Damage</b>	
Each Accident	\$1,000,000
<b>[or]</b>	
<b>Combined Single Limit</b>	
Combined Single Limit (Bodily Injury and Property Damage)	\$

- K. *Umbrella or Excess Liability*: Contractor shall purchase and maintain umbrella or excess liability insurance written over the underlying employer's liability, commercial general liability, and automobile liability insurance described in the Paragraphs above. The coverage afforded must be at least as broad as that of each and every one of the underlying policies.

<b>Excess or Umbrella Liability</b>	<b>Policy limits of not less than:</b>
Each Occurrence	\$5,000,000
General Aggregate	\$5,000,000

- L. *Using Umbrella or Excess Liability Insurance to Meet CGL and Other Policy Limit Requirements*: Contractor may meet the policy limits specified for employer's liability, commercial general liability, and automobile liability through the primary policies alone, or through combinations of the primary insurance policy's policy limits and partial attribution of the policy limits of an umbrella or excess liability policy that is at least as broad in coverage as that of the underlying policy, as specified herein. If such umbrella or excess liability policy was required under this Contract, at a specified minimum policy limit, such umbrella or excess policy must retain a minimum limit of \$[specify amount] after accounting for partial attribution of its limits to underlying policies, as allowed above.

- M. *Contractor's Pollution Liability Insurance:* Contractor shall purchase and maintain a policy covering third-party injury and property damage, including cleanup costs, as a result of pollution conditions arising from Contractor's operations and completed operations. This insurance must be maintained for no less than three years after final completion.

<b>Contractor's Pollution Liability</b>	<b>Policy limits of not less than:</b>
Each Occurrence/Claim	\$N/A
General Aggregate	\$N/A

- N. *Contractor's Professional Liability Insurance:* If Contractor will provide or furnish professional services under this *Contract*, through a delegation of professional design services or otherwise, then Contractor shall be responsible for purchasing and maintaining applicable professional liability insurance. This insurance must cover negligent acts, errors, or omissions in the performance of professional design or related services by the insured or others for whom the insured is legally liable. The insurance must be maintained throughout the duration of the Contract and for a minimum of two years after Substantial Completion. The retroactive date on the policy must pre-date the commencement of furnishing services on the Project.

<b>Contractor's Professional Liability</b>	<b>Policy limits of not less than:</b>
Each Claim	\$2,000,000
Annual Aggregate	\$2,000,000

## **ARTICLE 7—CONTRACTOR'S RESPONSIBILITIES**

### **7.02   *Supervision and Superintendence***

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

1.   At the Owner's or Engineer's request, Contractor shall provide a summary of the superintendent's relevant experience with current references and their contact information.

### **7.05   *"Or Equals"***

SC-7.05.A     Amend the third sentence of Paragraph 7.05.A by striking out the following words:

Unless the specification or description contains or is followed by words reading that no like, equivalent, or 'or-equal' item is permitted.

SC 7.05.A.1   Amend the last sentence of Paragraph a.3 by striking out "and;" and adding a period at the end of Paragraph a.3.

SC 7.05.A.1   Delete paragraph 7.05.A.1.a.4 in its entirety and insert the following in its place:

[Deleted]

### **7.07   *Concerning Subcontractors and Suppliers***

SC-7.07.A Amend Paragraph 7.07.A by adding the following text to the end of the Paragraph:

The Contractor shall not award work valued at more than fifty percent of the Contract Price to Subcontractor(s), without prior written approval of the Owner.

SC 7.07.B Delete paragraph 7.07.B in its entirety and insert the following in its place:

[Deleted]

SC 7.07.E Amend the second sentence of Paragraph 7.07.E by striking out “Owner may also require Contractor to retain specific replacements; provided, however, that”.

#### *7.09 Permits*

SC-7.09.A Amend Paragraph 7.09.A by striking out the following text: “... construction permits, licenses, and certificates of occupancy.” and inserting the following text:

... construction permits, licenses, bonds, and other costs associated with construction permitting agency requirements.

#### *7.10 Taxes*

SC-7.10.B Add the following new paragraphs immediately after Paragraph 7.10.A:

- B. Sales to the County are normally exempt from State sales tax. State sales and use tax certificates of exemption, Form ST-12, will be issued upon request. Deliveries against this contract shall usually be free of Federal excise and transportation taxes. Sales tax, however, is paid by Halifax County Service Authority on materials and supplies that are installed by a contractor and become a part of real property. Contractors are not exempt from paying taxes on these categories, as they are considered to be a cost of doing business and should be considered in pricing when preparing a proposal. The County’s excise tax exemption registration number is 54-6001528.

#### *7.11 Laws and Regulation*

SC 7.11.A Delete paragraph 7.11.A in its entirety and insert the following in its place:

- A. Contractor shall give all notices required by and shall comply with Virginia Code and 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.

#### *7.13 Safety and Protection*

SC 7.13.C Add the following new paragraphs immediately after Paragraph 7.13.C.3:

- 4. failure of the Contractor to provide due diligence to comply with such safety standards, rules, and regulations shall constitute the Contractor responsible for

rectifying such damages at the Contractor's expense. Damages such as, but not limited to:

- a. Vandalism, which are linked to any unsecured entryways due to performance negligence.
- b. Persons or property that occurs as a result of the Contractor's fault or negligence in connection with the execution of work under the contract.

#### *7.20 Antitrust*

SC 7.20 Add the following new paragraph immediately after Paragraph 7.19:

- A. By entering into a contract, the contractor conveys, sells, assigns, and transfers to Halifax County Service Authority all rights, title and interest in and to all causes of action it may now have or hereafter acquire under the antitrust laws of the United States and the Halifax County Service Authority, relating to the particular goods or services purchased or acquired by the Halifax County Service Authority under said contract.

#### *7.21 Drug-Free Workplace*

SC 7.21 Add the following new paragraphs immediately after Paragraph 7.20:

- A. During the performance of this contract, the contractor agrees to (i) provide a drug-free workplace for the contractor's employees; (ii) post in conspicuous places, available to employees and applicants for employment, a statement notifying employees that the unlawful manufacture, sale, distribution, dispensation, possession, or use of a controlled substance or marijuana is prohibited in the contractor's workplace and specifying the actions that will be taken against employees for violations of such prohibition; (iii) state in all solicitations or advertisements for employees placed by or on behalf of the contractor that the contractor maintains a drug-free workplace; and (iv) include the provisions of the foregoing clauses in every subcontract or purchase order of over \$10,000, so that the provisions will be binding upon each subcontractor or vendor.
- B. For the purposes of this section, "drug-free workplace" means a site for the performance of work done in connection with a specific contract awarded to a contractor, the employees of whom are prohibited from engaging in the unlawful manufacture, sale, distribution, dispensation, possession or use of any controlled substance or marijuana during the performance of the contract.

#### *7.22 Ethics in Public Contracting*

SC 7.22 Add the following new paragraphs immediately after Paragraph 7.21:

- A. By submitting their proposals, offerors certify that their proposals are made without collusion or fraud and that they have not offered or received any kickbacks or inducements from any other offeror, supplier, manufacturer or subcontractor in connection with their proposal), and that they have not conferred on any public employee having official responsibility for this procurement transaction any payment, loan, subscription, advance,

deposit of money, services or anything of more than nominal value, present or promised, unless consideration of substantially equal or greater value was exchanged.

- B. The offeror shall identify any actual or potential conflicts of interest that exist, or which may arise if the offeror is recommended for award, and propose how such conflicts might be resolved.
- C. By his/her signature on the proposal documents submitted, each offeror attests that her/his agents and/or employees, to the best of his/her knowledge and belief, have not in any way colluded with anyone for and on behalf of the offeror, or themselves, to obtain information that would give the offeror an unfair advantage over others, nor has he/she colluded with anyone for and on behalf of the offeror, or itself, to gain any favoritism in the award of this Request for Proposal.

#### 7.23 *Immigration Reform and Control Act of 1986*

SC 7.23 Add the following new paragraphs immediately after Paragraph 7.22:

- A. By submitting their proposals, offerors certify that they do not and will not during the performance of this contract employ illegal alien workers or otherwise violate the provisions of the federal Immigration Reform and Control Act of 1986.

### **ARTICLE 10—ENGINEER'S STATUS DURING CONSTRUCTION**

#### 10.03 *Resident Project Representative*

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

- C. The Resident Project Representative (RPR) will be Engineer's representative at the Site. RPR's dealings in matters pertaining to the Work in general will be with Engineer and Contractor. RPR's dealings with Subcontractors will only be through or with the full knowledge or approval of Contractor. The RPR will:
  - 1. *Conferences and Meetings:* Attend meetings with Contractor, such as preconstruction conferences, progress meetings, job conferences, and other Project-related meetings (but not including Contractor's safety meetings), and as appropriate prepare and circulate copies of minutes thereof.
  - 2. *Safety Compliance:* Comply with Site safety programs, as they apply to RPR, and if required to do so by such safety programs, receive safety training specifically related to RPR's own personal safety while at the Site.
  - 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 Contractor's proper execution of the Work.



4. *Review of Work; Defective Work*
    - a. Conduct on-Site observations of the Work to assist Engineer in determining, to the extent set forth in Paragraph 10.02, if the Work is in general proceeding in accordance with the Contract Documents.
    - b. Observe whether any Work in place appears to be defective.
    - c. Observe whether any Work in place should be uncovered for observation, or requires special testing, inspection or approval.
  5. *Inspections and Tests*
    - a. Observe Contractor-arranged inspections required by Laws and Regulations, including but not limited to those performed by public or other agencies having jurisdiction over the Work.
    - b. Accompany visiting inspectors representing public or other agencies having jurisdiction over the Work.
  6. *Payment Requests: Review Applications for Payment with Contractor.*
  7. *Completion*
    - a. Participate in Engineer's visits regarding Substantial Completion.
    - b. Assist in the preparation of a punch list of items to be completed or corrected.
    - c. Participate in Engineer's visit to the Site in the company of Owner and Contractor regarding completion of the Work, and prepare a final punch list of items to be completed or corrected by Contractor.
    - d. Observe whether items on the final punch list have been completed or corrected.
- D. The RPR will 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 construction.
  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. Authorize Owner to occupy the Project in whole or in part.

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

### **13.01 *Cost of the Work***

SC-13.01.E Add the following new paragraph immediately after Paragraph 13.01.E:

- F. The contractor shall retain all books, records, and other documents relative to this contract for five (5) years after final payment, or until audited by Halifax County Service Authority, whichever is sooner. The agency, its authorized agents, and/or state auditors shall have full access to and the right to examine any of said materials during said period.

## **ARTICLE 15—PAYMENTS TO CONTRACTOR, SET OFFS; COMPLETIONS; CORRECTION PERIOD**

### **15.01 Progress Payments**

SC-15.01.B.2 Amend the second sentence of Paragraph 15.01.B.2 by striking out the following text: “or at another location agreed to in writing.”

SC-15.01.B.2 Amend the second sentence of Paragraph 15.01.B.2 by striking out the following text: “a bill of sale, invoice, or other.”

SC-15.01.B.3 Add the following language at the end of paragraph 15.01.B.3:

No payments will be made that would deplete the retainage, place in escrow any funds that are required for retainage, or invest the retainage for the benefit of the Contractor.

SC-15.01.B.5 Add the following new Paragraph after Paragraph 15.01.B.4:

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

### **15.03 Substantial Completion**

SC-15.03 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, will 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 this Article 15.

## **ARTICLE 19—ADDITIONAL ITEMS**

### **19.01 Anti-Discrimination**

SC-19.01 Add the following new paragraphs immediately after Article 18:

- A. By submitting their proposals, offerors certify to the County that they will conform to the provisions of the Federal Civil Rights Act of 1964, as amended, as well as the Virginia Fair Employment Contracting Act of 1975, as amended, where applicable, the Virginians with Disabilities Act, the Americans with Disabilities Act and § 2.2-4311 of the Virginia Public Procurement Act (VPPA). If the award is made to a faith-based organization, the organization shall not discriminate against any recipient of goods, services, or disbursements made pursuant to the contract on the basis of the recipient's religion, religious belief, refusal to participate in a religious practice, or on the basis of race, age, color, gender or national origin and shall be subject to the same rules as other organizations that contract with public bodies

to account for the use of the funds provided; however, if the faith-based organization segregates public funds into separate accounts, only the accounts and programs funded with public funds shall be subject to audit by the public body. (Code of Virginia, § 2.2-4343.1E).

In every contract over \$10,000 the provisions in 1. and 2. below apply:

1. During the performance of this contract, the contractor agrees as follows:
  - a. The contractor will not discriminate against any employee or applicant for employment because of race, religion, color, sex, national origin, age, disability, or any other basis prohibited by state law relating to discrimination in employment, except where there is a bona fide occupational qualification reasonably necessary to the normal operation of the contractor. The contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices setting forth the provisions of this nondiscrimination clause.
  - b. The contractor, in all solicitations or advertisements for employees placed by or on behalf of the contractor, will state that such contractor is an equal opportunity employer.
  - c. Notices, advertisements and solicitations placed in accordance with federal law, rule or regulation shall be deemed sufficient for the purpose of meeting these requirements.
2. The contractor will include the provisions of 1. above in every subcontract or purchase order over \$10,000, so that the provisions will be binding upon each subcontractor or vendor.

#### 19.02 *Applicable Laws*

SC-19.02 Add the following new paragraphs immediately after Paragraph 19.01:

- A. This solicitation and any resulting contract shall be governed in all respects by the laws of the Commonwealth of Virginia and any litigation with respect thereto shall be brought in the courts of the County. The agency and the contractor are encouraged to resolve any issues in controversy arising from the award of the contract or any contractual dispute using Alternative Dispute Resolution (ADR) procedures (Code of Virginia, § 2.2-4366). The contractor shall comply with all applicable federal, state and local laws, rules and regulations.

#### 19.03 *Prime/General Contractor Responsibilities:*

SC-19.03 Add the following new paragraphs immediately after Paragraph 19.02:

- A. The Contractor shall be responsible for completely supervising and directing the work under this contract and all subcontractors that he may utilize, using his best skill and attention. Subcontractors who perform work under this contract shall be responsible to the prime Contractor. The Contractor agrees that he is as fully responsible for the acts and omissions of his subcontractors and of persons employed by them as he is for the acts and omissions of his own employees.

19.04 *Protection of Persons and Property:*

SC-19.04 Add the following new paragraphs immediately after Paragraph 19.03:

- A. The Contractor expressly undertakes both directly and through its subcontractor(s), to take every precaution at all times for the protection of persons and property which may come on the building site or be affected by the Contractor's operation in connection with the work. The Contractor shall be solely responsible for initiating, maintaining, and supervising all safety precautions and programs in connection with the work.
- B. The provisions of all rules and regulations governing safety as adopted by the Safety Codes Commission of the Commonwealth of Virginia, issued by the Department of Labor and Industry under Title 40.1 of the Code of Virginia shall apply to all work under this contract.
- C. The Contractor shall continuously maintain adequate protection of all his work from damage and shall protect the County's property from injury or loss arising in connection with this contract. The Contractor shall make good any such damage, injury, or loss, except such as may be directly due to errors in the contract documents or caused by agents or employees of the owner. The Contractor shall adequately protect adjacent property to prevent any damage to it or loss of use and enjoyment by the County. The Contractor shall provide and maintain all passageways, guard fences, lights, and other facilities for protection required by public authority, local conditions, any of the contract documents or erected for the fulfillment of his obligations for the protection of persons and property.
- D. In an emergency affecting the safety or life of persons or of the work, or of the adjoining property, the Contractor, without special instruction or authorization from the County, shall act, at his discretion, to prevent such threatened loss or injury. Also, should he, to prevent threatened loss or injury, be instructed or authorized to act by the County, the Contractor shall so act immediately, without appeal. Any additional compensation or extension of time claimed by the Contractor on account of any emergency work shall be determined as provided by approval by the County.

**CHANGE ORDER NO.: [Number of Change Order]**

Owner: Halifax County Service Authority

Owner's Project No.:

Engineer:

Engineer's Project No.: 50083060

Contractor:

Contractor's Project No.:

Project: Seymour Drive and Hodges Street Waterline Improvements

Contract Name:

Date Issued:

Effective Date of Change Order:

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

Description:

Attachments:

<b>Change in Contract Price</b>	<b>Change in Contract Times</b> [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: _____
<b>[Increase] [Decrease]</b> from previously approved Change Orders No. 1 to No. <b>[Number of previous Change Order]</b> : \$ _____	<b>[Increase] [Decrease]</b> from previously approved Change Orders No.1 to No. <b>[Number of previous Change Order]</b> : 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: _____
<b>[Increase] [Decrease]</b> this Change Order: \$ _____	<b>[Increase] [Decrease]</b> 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)

Authorized by Owner

By: \_\_\_\_\_

\_\_\_\_\_

Title: \_\_\_\_\_

\_\_\_\_\_

Date: \_\_\_\_\_

\_\_\_\_\_

Authorized by Owner

Approved by Funding Agency (if applicable)

By: \_\_\_\_\_

\_\_\_\_\_

Title: \_\_\_\_\_

\_\_\_\_\_

Date: \_\_\_\_\_

\_\_\_\_\_

**SECTION 01010**  
**SUMMARY OF WORK**

**PART 1- GENERAL**

**1.1 WORK COVERED BY CONTRACT DOCUMENTS**

**A. DESCRIPTION**

1. All work shown on Drawings and/or called for in these Specifications shall be performed under the General Contract, unless specifically noted to the contrary in the Contract Documents.
2. The project includes installation of approximately 2,900 LF of new 6" waterline and related appurtenances along Hodges Street, including service connections. An existing 6" waterline along Seymour Drive will be abandoned in place and all services will be tied into an existing 10" waterline. The project also includes replacement of approximately 15 stormwater inlets, rehabilitation of 23 sanitary sewer manholes, and replacement of 150 LF of sanitary sewer.

**B. Contractor's Duties: CONTRACTOR'S duties in performance of the WORK shall include, however are not limited to:**

1. Responsibilities: CONTRACTOR shall be:
  - a. Responsible for the management of the Project.
  - b. Responsible for hiring all subcontractors.
  - c. The sole arbitrator of the division of WORK of all trades, associated with WORK provided for in the Contract Documents.
2. Work: Except as specifically noted, provide and pay for all:
  - a. Labor, materials, and equipment.
  - b. Tools, construction equipment and machinery.
  - c. Water, heat, and utilities required for construction.
  - d. Other facilities and services necessary for proper execution and completion of WORK.
3. Permits and Fees: Secure and pay for, as necessary for proper execution and completion of WORK, and as applicable at time of receipt of Bids:
  - a. Permits (including building and trade permits),
  - b. Government fees,
  - c. Bonds,
  - d. Licenses
  - e. Insurance.
4. Notices: Unless specifically indicated otherwise, give required Notices to ENGINEER, government agencies, (local, state and federal), utility companies,

Owner and others as required and within the time frames identified in the Contract Documents.

5. Regulations: Comply with all codes, ordinances, rules regulations, orders, and other legal requirements of public authorities which bear on performance of WORK.
6. Written Notice: Promptly submit Written Notice to ENGINEER of observed conflicts in Contract Documents. It is CONTRACTOR'S responsibility to make certain that all work performed as defined in the Drawings and Specifications comply with codes and regulations.
7. Coordinate: Coordinate WORK with appropriate authorities, *i.e.*, utility companies, Virginia Department of Health (VDH), and Virginia Department of Transportation (VDOT), etc., and other Contractors who may be performing other work at the project site of this work or adjacent to this work.

## 1.2 ADDITIONAL ENGINEERING SERVICES

- A. In the event that the ENGINEER is required to provide additional engineering services as a result of CONTRACTOR error or omissions; substitution of materials or equipment by the CONTRACTOR that are different from what is specified that results in change in dimensions, layout, power requirements, etc.; or if the ENGINEER is required to examine and evaluate any changes proposed by the CONTRACTOR for the convenience of the CONTRACTOR; or if the ENGINEER is required to witness retests of project components, then the ENGINEER's charges in connection with such additional services shall be charged to the CONTRACTOR by the ENGINEER.

## 1.3 AGREEMENT

- A. Construct WORK under single, all-inclusive AGREEMENT.

## 1.4 PLANS AND SPECIFICATIONS

- A. Plans and Specifications describe the scope of work for this project. Should there be a conflict between the drawings and specifications the more stringent shall apply.

## 1.5 LINES, GRADES, AND REFERENCE POINTS

- A. Project Stakeout: Lines, grades, elevations, locations, pipe inverts and centerlines, and construction staking necessary for the proper execution of all the WORK specified here in will be established by CONTRACTOR at his expense by a Professional Land Surveyor licensed in the Commonwealth of Virginia.
- B. Where the ENGINEER deems that additional survey is required for the proper execution of the Work or verification that the Work was completed per Contract Document requirements, the CONTRACTOR at his expense shall provide this additional survey by a Professional Land Surveyor licensed in the Commonwealth of Virginia.

## SUMMARY OF WORK

### HALIFAX COUNTY SERVICE AUTHORITY

### SEYMOUR DRIVE AND HODGES STREET WATERLINE IMPROVEMENTS

01010-2

- C. Project Control: Ground control and Field surveying has been established during design of the Project by ENGINEER. These points will be provided only one (1) time upon request. All existing grade stakes, reference lines, etc. destroyed by CONTRACTOR during the progress of its WORK will be replaced at CONTRACTOR'S expense.
- D. Field Verification: Where called for on the Drawings and Specifications or, required for accuracy and fit with existing WORK, CONTRACTOR will make its own field measurements to verify any dimensions shown on the Drawings. Consequently, OWNER and ENGINEER present this information only as an approximation and not a guideline. CONTRACTOR shall be responsible for verification prior to submittal.

#### 1.6 RESPONSIBILITY REGARDING EXISTING UTILITIES AND STRUCTURES

- A. Tie-ins and Operation of Owner's Equipment
  - 1. Contractor shall not make any tie-ins to existing systems whether in service or not without pre-approval from the owner and without an owner's representative present. Contractor shall not operate any valves and/or equipment belonging to the owner.
- B. Existing Structures: The existence and location of underground utilities indicated on the Drawings are not guaranteed and shall be investigated and verified in the field by CONTRACTOR before WORK is begun. Excavation in the vicinity of existing structures and utilities shall be carefully performed by hand if deemed appropriate by CONTRACTOR.
- C. Responsibility: CONTRACTOR shall be held responsible for any damages to, and for maintenance and protection of, existing utilities and structures; and, for repair of such to the complete satisfaction of the respective owner(s).
- D. Pre-Existing Conditions: For the protection of both itself and OWNER, CONTRACTOR shall make a survey of adjacent properties before commencing operations. Such a survey shall locate all existing cracks and damage to the existing structures by means of drawings and photographs. "Tell tales" shall be placed as directed by ENGINEER. In addition, a videotape shall be made by the Contractor showing the entire project area prior to commencing work, with copies to be submitted to the ENGINEER and OWNER.
- E. Documentation: A copy of this report shall be filed with ENGINEER. Any refusal of owner(s) of adjacent property to permit entry for purposes of inspection shall be noted in the report. The purpose of filing the report is to document the pre-existing conditions. Any liability resulting from this documentation as provided by the contract is solely the CONTRACTOR's responsibility.
- F. Protection of the Work: CONTRACTOR shall continuously maintain adequate protection of all its WORK and materials from damage or theft and shall protect OWNER'S property and all adjacent property from injury or loss arising in connection with activities provided for this Project. CONTRACTOR shall be liable for any such damage, injury, or loss.



- G. Protection of Adjacent Facilities: CONTRACTOR shall take, use, provide, and maintain all necessary precautions, safeguards, and protection to prevent accidents, or injury to persons or property on, about, or adjacent to the site of the WORK. CONTRACTOR shall post danger signs warning against any hazards created by the WORK being done under this CONTRACT. CONTRACTOR shall designate a responsible member of its organization to be responsible for the prevention of accidents on the Project. The name of this person so designated shall be reported in writing to ENGINEER. In an emergency affecting the safety of life, or of the WORK or adjoining property, CONTRACTOR, without special instructions or authorization from ENGINEER or OWNER, is hereby permitted to act, at its discretion, to prevent such threatened loss or injury. It must take such action if so instructed or authorized by ENGINEER or OWNER.
- H. Requirements of Law: CONTRACTOR shall also protect adjacent property as required by law.

#### 1.7 APPLICABLE CODES

- A. Specified Codes: Whenever reference is made to the furnishing of materials or testing thereof to conform to the standards of any technical organization or body, it shall be construed to mean the latest standard, code, specification, or tentative specification adopted and published at the date of Advertisement for Bids, even though reference has been made to an earlier standard; and such standards are made a part thereof to the extent which is indicated or intended.
- B. Non-Specified Codes: When no reference is made to a code, standard, or specification, the standard Specifications of the ASTM, the ASA, the AIEE, or the NEMA or others, as applicable, shall govern.
- C. Permits: CONTRACTOR shall be responsible for compliance with all state and local codes and ordinances.

#### 1.8 COORDINATION

- A. All WORK shall be coordinated with the OWNER and individual property owners and business owners. At least 48 hours' notice will be given for any WORK involving the existing facilities.

#### 1.9 SEQUENCE OF WORK

- A. Obtain all required permits and bonds.
- B. Mobilize and install all erosion and sediment control measures on site.
- C. Complete scope of work based on Engineer approved construction schedule. Work includes stormwater inlet replacement on Hodges Street and Seymour Drive, waterline replacement on Hodges Street, switching water services from the 6" waterline to the 10" along Seymour Drive, and miscellaneous sewer repair and manhole rehabilitation.
- D. All utility replacement within the roadway will be backfilled with base course asphalt to the surface in preparation for future paving by VDOT.
- E. Work shall be completed prior to the VDOT pavement schedule for the designated streets.
- F. All new waterlines shall be disinfected and tested prior to placing into service.

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- G. Restore site to equal or better conditions prior to demobilizing.

#### 1.10 EQUIPMENT/MATERIAL GUARANTEE

CONTRACTOR shall furnish a written guarantee from the manufacturer of the equipment and material to ENGINEER at the time of completion of WORK and before acceptance of the installation. The guarantee does not apply to any item damaged from misuse, lack of maintenance, alternation, neglect, accident, or wear from normal use.

- A. Initial Installation: All equipment/material installed per the Contract Documents shall be free from defect in material or workmanship, and CONTRACTOR shall repair or replace at its expense any such defective equipment for a period of 1 year from the date of Substantial Completion unless otherwise noted in the Contract Documents.
- B. After Installation: CONTRACTOR shall be responsible for repair or replacement of any equipment or material which fails to meet the design requirements as specified which are revealed during fabrication, installation, demonstration and/or acceptance testing. Repair or replacement of any such equipment/material shall be completed within 60 days at the expense of CONTRACTOR. Liquidated Damages for failure to complete such repair or replacement within the specified time will be assessed in the manner specified in the General Conditions.

#### 1.11 WORK OUTSIDE REGULAR HOURS

- A. If the CONTRACTOR desires to perform work outside the regular hours or on Saturday, he shall request permission to work 48 hours in advance to allow arrangements to be made for proper inspection. The OWNER may refuse the CONTRACTOR permission to work if the 48-hour notice is not given or for other just cause. Reasonable efforts shall be made by the CONTRACTOR to avoid undue noise during the night and on Sundays, if it is necessary to work at such times. Under normal circumstances the CONTRACTOR will not be permitted to work on Sundays.
- B. Unless specifically scheduled to work outside normal hours by the OWNER in the interest of public safety or convenience, then the CONTRACTOR will be liable for the expense of overtime work required by OWNER's and/or ENGINEER's employees. This expense includes but is not limited to OWNER and ENGINEER called to the job site outside normal working hours to resolve problems directly related to the project. Normal or regular working hours are defined as 7:00 a.m. to 5:00 p.m. Monday through Friday.
- C. IF CONTRACTOR anticipates working outside normal work hours, he shall notify the ENGINEER and OWNER as soon as possible and no less than 48 hours in advance.

#### 1.12 MATERIAL SUBSTITUTIONS

- A. The specifications and project drawings depict equipment and materials which are deemed most suitable for the service anticipated. It is not intended, however, to eliminate other products of equal quality and performance. The contractor shall prepare his bid based on the specified equipment for purposes of determining low bid. Award of a contract shall constitute an obligation to furnish the specified equipment and materials.

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- B. After execution of the contract, the contractor may offer substitutions to the specified equipment for consideration. The equipment proposed for substitution must be equal to or superior in construction and performance to that specified in the contract, and the quality must be demonstrated by a list of current users of the proposed equipment in similar installations.
- C. In event the contractor obtains engineer's approval for equipment substitution, the contractor shall, at his own expense, make all resulting changes to the enclosures, buildings, piping or electrical systems as required to accommodate the proposed equipment. CONTRACTOR shall at his own expense provide detail drawings illustrating the substituted equipment to be submitted to the ENGINEER for approval prior to acceptance.
- D. Should the substitution not be acceptable to the OWNER or ENGINEER the CONTRACTOR shall resubmit the original equipment specified. The contractor shall be responsible for all additional costs accrued by the ENGINEER and OWNER associated with the substitution.
- E. If the cost to the contractor is less for the proposed substitution, the saving shall be equably shared by the CONTRACTOR and the OWNER.

1.13 Storage

- A. Contractor shall store all materials and equipment in accordance with all manufacturers' recommendations. Contractor shall include in his submittal package the manufacturers' recommended long term and short term storage procedures. Storage procedures shall extend to equipment installed but not put into service and shall continue until project completion.

**PART 2- PRODUCTS (Not Applicable).**

**PART 3- EXECUTION (Not Applicable).**

**END OF SECTION**

## SECTION 012200 - UNIT PRICES

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. Section includes administrative and procedural requirements for unit prices.
- B. Related Requirements:
  - 1. Division 01 Section "Contract Modification Procedures" for procedures for submitting and handling Change Orders.
  - 2. Division 01 Section "Quality Requirements" for general testing and inspecting requirements.

#### 1.3 DEFINITIONS

- A. Unit price is an amount incorporated in the Agreement, applicable during the duration of the Work as a price per unit of measurement for materials, equipment, or services, or a portion of the Work, added to or deducted from the Contract Sum by appropriate modification, if the scope of Work or estimated quantities of Work required by the Contract Documents are increased or decreased.

#### 1.4 PROCEDURES

- A. Unit prices include all necessary material, plus cost for delivery, installation, insurance, applicable taxes, overhead, and profit.
- B. Measurement and Payment: See individual Specification Sections for work that requires establishment of unit prices. Methods of measurement and payment for unit prices are specified in those Sections.
- C. Owner reserves the right to reject Contractor's measurement of work-in-place that involves use of established unit prices and to have this work measured, at Owner's expense, by an independent surveyor acceptable to Contractor.
- D. List of Unit Prices: A schedule of unit prices is included in Part 3. Specification Sections referenced in the schedule contain requirements for materials described under each unit price.

## PART 2 - PRODUCTS (Not Used)

## PART 3 - EXECUTION

### 3.1 UNIT PRICE DESCRIPTION

#### A. Unit Prices

1. Payment for all work performed under the contract shall be included in the lump sums or unit prices shown in the Agreement. All required work, labors, auxiliary materials, traffic control, permits, bond, mobilization, E&S measure, seeding and site restoration, temporary water supply connection for filling and testing, etc. necessary for completion of work specified and ready for use but not specifically listed as a pay item shall be incorporated into the Contractor's Bid through the Bid items listed.
2. Contractor shall furnish labor and equipment necessary to perform measurements for payment. All measurement shall be made in the presence of and/or approved by the Engineer or his representative.

#### B. Unit Prices for Water Line Items: Measurement and payment shall be as follows:

1. Mobilization and Site Prep: Furnish all equipment, labor and materials to perform work as defined by the Contract Documents and as determined necessary by the Engineer. Provide all site prep including all temporary utilities, access, traffic control devices, protective devices, site clearing, site grading and disposal of debris. Provide all permits as required to execute work. All quantities within this line shall not include work detailed under a separate line item. Unit: Lump Sum
2. Erosion and Sediment Control: Provide all temporary E&S controls as required for the Project and as described in the Contract Documents. Unit: Lump Sum
3. Traffic Management and Control: Contractor shall obtain the required Town of South Boston Permit and bond and provide all traffic control and management as required for the duration of the project. This includes but is not limited to safety cones, flaggers, message boards, detour routes and signage, public notices, etc. Contractor shall ensure that the construction site is clean and well maintained in the right-of-way and shall abide by all maintenance requests in a timely manner. Unit: lump sum.
4. Waterline Disinfection and Testing: Owner will provide water for testing. Contractor shall provide all materials and labor for pressure testing and disinfection chemicals to perform disinfection of water main, including final flushing and bacteriological testing. Contractor shall submit tests to a certified lab and provide results to the Engineer. Inspector shall sign off on an inspection report indicating results of field inspection of testing. Unit: LS.
5. Sewer Bypass Pumping: Contractor shall provide all pumps, piping, controls, autodialer, monitoring for a complete and reliable bypass pumping system during construction. Contractor shall provide a detailed bypass pumping system indicating location of pumps, length of pipe, lateral connections, strategy for bypass during construction and monitoring plan. Unit: lump sum.

6. Site Restoration: Provide all equipment, materials and labor to return the project site to its original or better condition prior to construction and as detailed on the Contract Drawings and Specifications. This includes but is not limited to removal of all debris, establishing final turf materials, removal of temporary E&S and replacement or repair of any damaged structures (including signs and mailboxes), materials or vegetation including resurfacing of roads, sidewalks and driveways where impacted by the Contractor. Unit: Lump Sum.
7. Tie Hydrants into 10" WL: Provide all piping and appurtenances required to tie existing hydrants that are currently tied into the 6" waterline to be abandoned into the 10" waterline. Unit: Each.
8. Abandon/Demo 6" Existing WL: cut and plug existing waterline at each connection point to the existing system. Remove all water valve bonnets along the abandoned section of waterline and install concrete blocking. Unit: linear foot. Measurement: horizontal distance of pipe abandoned in place.
9. Temporary Base Course Road Patch: The streets in this project will be paved by VDOT in the near future. Provide stone back fill and base course to existing grade, as shown in the detail on the drawings, so that the road can be milled and overlaid with asphalt in the future by VDOT. Unit: ton. Measurement: delivery ticket documentation for total tonnage of material installed.
10. Replace SW Inlet: Provide all materials, equipment and labor to remove existing stormwater inlet structure and install a new VDOT standard DI-3A, -3B, or -3C as shown on the drawings, complete and ready for use. Localized repair of sidewalk or private pavement should be included in this line item. Curb and gutter repair can be billed as a unit cost in the line item provided in the bid form. Unit: each. Measurement: each completed installed stormwater inlet structure.
11. Replace SW Culvert: Provide all materials, equipment and labor to replace the existing stormwater culvert in place with new RCP. Provide stone backfill and base course asphalt to the surface for future paving. Unit: linear foot. Measurement: horizontal length of pipe installed, or by station.
12. Curb and Sidewalk Improvement at Edmondson: provide curb and gutter and sidewalk improvements where the new STR-410 will be installed. Ref. C-104 for details. Unit: linear foot. Measurement: horizontal distance of sidewalk/ curb and gutter installed.
13. Slope Stabilization and Pipe Extension at STR-459: provide improvements to existing slope behind STR- 459 and related piping extension as shown in the detail on sheet C-302. Unit: lump sum.
14. Sewer Manhole Rehabilitation: provide coating system as specified to existing manholes. Provide cementitious base coat to fill all voids and cracks, followed by a 100% solids epoxy coating. Unit: each. Measurement: each completed coated manhole that passes specified inspection testing to be placed in service.
15. Sewer Replacement with DIP: Provide new ductile iron (DIP) gravity sewer as specified including excavation, all specified restraints and fittings, bedding, backfill, compaction testing, site restoration, dewatering, cleanup, testing, tie in of sewer laterals and bypass

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pumping required for tie in of laterals, etc., necessary to install sewer pipe and place sewer into full operation. Pipe material to be provided as described in Contract Documents. Includes all fittings and coatings as detailed in the Contract Documents. Unit: Linear Feet. Measurement: Horizontal distance along the centerline of the pipe from center of manhole to center of manhole, or by station.

16. Water Main - Furnish and install water main of nominal diameter and of ductile iron pipe or C905 PVC (bidder choice) material unless specified otherwise on drawing along with necessary pipe fittings (excluding valves) including clearing and grubbing, excavation, erosion control as shown on drawings, backfill, compaction testing, restoration (including private pavements), flushing, disinfecting, and testing complete and ready for use. Unit: linear foot. Note that stone backfill for the new waterline along Hodges Street and base course asphalt will be billed in separate line items. Measurement: along trench centerline from end to end, or by station.
17. Fire Hydrant Assembly: Furnish and install hydrant, valve, 6" ductile iron pipe, riser pipe, thrust blocks, rods, clamps, etc. complete and ready for use. Unit: each. Measurement: per fire hydrant assembly installed.
18. Gate Valve - Furnish and install the specified nominal diameter gate valve as specified on drawing and valve box including thrust restraint, and box cover marked "water", complete and ready for use. Unit: each. Measurement: per valve installed.
19. Air Release Valve: Furnish and install air release valve assembly as shown and specified, including offsets where required, vault, ball valve, connection to main, daylight of tracer wire, and valve marker when required, etc. complete and ready for use. Unit: each. Measurement: per air release installed.
20. Waterline Tie-in: Furnish and install the necessary fittings, pipe and appurtenances required to make a tie-in of existing laterals and service connections to the new water main, complete and ready for use. Unit: lump sum.
21. Stone Backfill: provide stone backfill as shown in the waterline trench detail in pavement along Hodges Street. Unit: cubic yard. Measurement: total volume installed as certified by the fulltime inspector and supported by material delivery tickets.
22. Misc. Curb and Gutter Repair: provide new curb and gutter in localized as necessary when replacing stormwater inlet structures meeting VDOT standard detail as shown in the drawings. Unit: linear foot. Measurement: horizontal distance of curb and gutter installed.

### 3.2 APPLICATIONS FOR PAYMENT

- A. Applications for payment shall be made on the form included in this Manual. Contractor shall certify each payment application.
- B. Procedure for filling applications shall be as outlined in Section 19 of the General Conditions. Due date of payments shall be as agreed to in the pre-construction conference.

### 3.3 CLAIMS FOR EXTRA WORK

- A. The Engineer may at any time, by issuing a Field Order, make changes in the details of the Work. The Contractor shall proceed with the performance of any changes in the Work so ordered by the Engineer unless the Contractor believes that such Field Order entitles him to a change in Contract Price or Time, or both, in which event he shall give receipt of the ordered change. Thereafter, the Contractor shall document the basis for the change in Contract Price or time within thirty (30) days. The Contractor shall not execute such changes pending the receipt of an executed Change Order or further instruction from the Owner.

END OF SECTION 01220



## SECTION 01260 - CONTRACT MODIFICATION PROCEDURES

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. Section includes administrative and procedural requirements for handling and processing Contract modifications.
- B. Related Requirements:
  - 1. Section 01250 "Alternates" for administrative procedures for handling requests for substitutions made after the Contract award.

#### 1.3 MINOR CHANGES IN THE WORK

- A. Engineer will issue supplemental instructions authorizing minor changes in the Work, not involving adjustment to the Contract Sum or the Contract Time, on form included in Project Manual.

#### 1.4 PROPOSAL REQUESTS

- A. Owner-Initiated Proposal Requests: Engineer will issue a detailed description of proposed changes in the Work that may require adjustment to the Contract Sum or the Contract Time. If necessary, the description will include supplemental or revised Drawings and Specifications.
  - 1. Work Change Proposal Requests issued by Engineer are not instructions either to stop work in progress or to execute the proposed change.
  - 2. Within time specified in Proposal Request or 20 days, when not otherwise specified, after receipt of Proposal Request, submit a quotation estimating cost adjustments to the Contract Sum and the Contract Time necessary to execute the change.
    - a. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
    - b. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
    - c. Include costs of labor and supervision directly attributable to the change.
    - d. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and

finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.

e. Quotation Form: Use forms acceptable to Engineer.

B. Contractor-Initiated Proposals: If latent or changed conditions require modifications to the Contract, Contractor may initiate a claim by submitting a request for a change to Engineer.

1. Include a statement outlining reasons for the change and the effect of the change on the Work. Provide a complete description of the proposed change. Indicate the effect of the proposed change on the Contract Sum and the Contract Time.
2. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
3. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
4. Include costs of labor and supervision directly attributable to the change.
5. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
6. Comply with requirements in Section 012500 "Substitution Procedures" if the proposed change requires substitution of one product or system for product or system specified.
7. Proposal Request Form: Use form acceptable to Engineer.

## 1.5 CHANGE ORDER PROCEDURES

A. On Owner's approval of a Work Changes Proposal Request, Engineer will issue a Change Order for signatures of Owner and Contractor on EJCDC Document C-941.

## 1.6 CONSTRUCTION CHANGE DIRECTIVE

A. Work Change Directive: Engineer may issue a Work Change Directive on EJCDC Document C-940. Work Change Directive instructs Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order.

1. Work Change Directive contains a complete description of change in the Work. It also designates method to be followed to determine change in the Contract Sum or the Contract Time.

B. Documentation: Maintain detailed records on a time and material basis of work required by the Work Change Directive.

1. After completion of change, submit an itemized account and supporting data necessary to substantiate cost and time adjustments to the Contract.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01260

## SECTION 012900 - PAYMENT PROCEDURES

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. Section includes administrative and procedural requirements necessary to prepare and process Applications for Payment.
- B. Related Requirements:
  - 1. Section 012200 "Unit Prices" for administrative requirements governing the use of unit prices.
  - 2. Section 012600 "Contract Modification Procedures" for administrative procedures for handling changes to the Contract.
  - 3. Section 013200 "Construction Progress Documentation" for administrative requirements governing the preparation and submittal of the Contractor's construction schedule.

#### 1.3 DEFINITIONS

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

#### 1.4 SCHEDULE OF VALUES

- A. Coordination: Coordinate preparation of the schedule of values with preparation of Contractor's construction schedule.
  - 1. Coordinate line items in the schedule of values with other required administrative forms and schedules, including the following:
    - a. Application for Payment forms with continuation sheets.
    - b. Submittal schedule.
    - c. Items required to be indicated as separate activities in Contractor's construction schedule.
  - 2. Submit the schedule of values to Engineer at earliest possible date, but no later than seven days before the date scheduled for submittal of initial Applications for Payment.
- B. Format and Content: Use Project Manual table of contents as a guide to establish line items for the schedule of values. Provide at least one line item for each Specification Section.

1. Identification: Include the following Project identification on the schedule of values:
  - a. Project name and location.
  - b. Name of Engineer.
  - c. Engineer's project number.
  - d. Contractor's name and address.
  - e. Date of submittal.
2. Arrange schedule of values consistent with format of EJCDC Document C-620.
3. Arrange the schedule of values in tabular form with separate columns to indicate the following for each item listed:
  - a. Related Specification Section or Division.
  - b. Description of the Work.
  - c. Name of subcontractor.
  - d. Name of manufacturer or fabricator.
  - e. Name of supplier.
  - f. Change Orders (numbers) that affect value.
  - g. Dollar value of the following, as a percentage of the Contract Sum to nearest one-hundredth percent, adjusted to total 100 percent.
    - 1) Labor.
    - 2) Materials.
    - 3) Equipment.
4. Provide a breakdown of the Contract Sum in enough detail to facilitate continued evaluation of Applications for Payment and progress reports. Coordinate with Project Manual table of contents. Provide multiple line items for principal subcontract amounts in excess of five percent of the Contract Sum.
  - a. Include separate line items under Contractor and principal subcontracts for Project closeout requirements in an amount totaling five percent of the Contract Sum and subcontract amount.
5. Round amounts to nearest whole dollar; total shall equal the Contract Sum.
6. Provide a separate line item in the schedule of values for each part of the Work where Applications for Payment may include materials or equipment purchased or fabricated and stored, but not yet installed.
  - a. Differentiate between items stored on-site and items stored off-site. If required, include evidence of insurance.
7. Provide separate line items in the schedule of values for initial cost of materials, for each subsequent stage of completion, and for total installed value of that part of the Work.
8. Each item in the schedule of values and Applications for Payment shall be complete. Include total cost and proportionate share of general overhead and profit for each item.
  - a. Temporary facilities and other major cost items that are not direct cost of actual work-in-place may be shown either as separate line items in the schedule of values or distributed as general overhead expense, at Contractor's option.

9. Schedule Updating: Update and resubmit the schedule of values before the next Applications for Payment when Change Orders or Construction Change Directives result in a change in the Contract Sum.

## 1.5 APPLICATIONS FOR PAYMENT

- A. Each Application for Payment following the initial Application for Payment shall be consistent with previous applications and payments as certified by Engineer and paid for by Owner.
  1. Initial Application for Payment, Application for Payment at time of Substantial Completion, and final Application for Payment involve additional requirements.
- B. Payment Application Times: Submit Application for Payment to Engineer by the 25<sup>th</sup> of the month. The period covered by each Application for Payment is one month, ending on the last day of the month.
  1. Submit draft copy of Application for Payment seven days prior to due date for review by Engineer.
- C. Application for Payment Forms: Use EJCDC Document C-620 as form for Applications for Payment.
- D. Application Preparation: Complete every entry on form. Notarize and execute by a person authorized to sign legal documents on behalf of Contractor. Engineer will return incomplete applications without action.
  1. Entries shall match data on the schedule of values and Contractor's construction schedule. Use updated schedules if revisions were made.
  2. Include amounts for work completed following previous Application for Payment, whether or not payment has been received. Include only amounts for work completed at time of Application for Payment.
  3. Include amounts of Change Orders and Construction Change Directives issued before last day of construction period covered by application.
  4. Indicate separate amounts for work being carried out under Owner-requested project acceleration.
- E. Stored Materials: Include in Application for Payment amounts applied for materials or equipment purchased or fabricated and stored, but not yet installed. Differentiate between items stored on-site and items stored off-site.
  1. Provide certificate of insurance, evidence of transfer of title to Owner, and consent of surety to payment, for stored materials.
  2. Provide supporting documentation that verifies amount requested, such as paid invoices. Match amount requested with amounts indicated on documentation; do not include overhead and profit on stored materials.
  3. Provide summary documentation for stored materials indicating the following:
    - a. Value of materials previously stored and remaining stored as of date of previous Applications for Payment.

- b. Value of previously stored materials put in place after date of previous Application for Payment and on or before date of current Application for Payment.
  - c. Value of materials stored since date of previous Application for Payment and remaining stored as of date of current Application for Payment.
- F. Transmittal: Submit five signed and notarized original copies of each Application for Payment to Engineer by a method ensuring receipt within 24 hours. One copy shall include waivers of lien and similar attachments if required.
  - 1. Transmit each copy with a transmittal form listing attachments and recording appropriate information about application.
- G. Waivers of Mechanic's Lien: With each Application for Payment, submit waivers of mechanic's liens from subcontractors, sub-subcontractors, and suppliers for construction period covered by the previous application.
  - 1. Submit partial waivers on each item for amount requested in previous application, after deduction for retainage, on each item.
  - 2. When an application shows completion of an item, submit conditional final or full waivers.
  - 3. Owner reserves the right to designate which entities involved in the Work must submit waivers.
  - 4. Submit final Application for Payment with or preceded by conditional final waivers from every entity involved with performance of the Work covered by the application who is lawfully entitled to a lien.
  - 5. Waiver Forms: Submit executed waivers of lien on forms, acceptable to Owner.
- H. Initial Application for Payment: Administrative actions and submittals that must precede or coincide with submittal of first Application for Payment include the following:
  - 1. List of subcontractors.
  - 2. Schedule of values.
  - 3. Contractor's construction schedule (preliminary if not final).
  - 4. Products list (preliminary if not final).
  - 5. Schedule of unit prices.
  - 6. Submittal schedule (preliminary if not final).
  - 7. List of Contractor's staff assignments.
  - 8. List of Contractor's principal consultants.
  - 9. Copies of building permits.
  - 10. Copies of authorizations and licenses from authorities having jurisdiction for performance of the Work.
  - 11. Initial progress report.
  - 12. Report of preconstruction conference.
  - 13. Certificates of insurance and insurance policies.
  - 14. Performance and payment bonds.
  - 15. Data needed to acquire Owner's insurance.
- I. Application for Payment at Substantial Completion: After Architect issues the Certificate of Substantial Completion, submit an Application for Payment showing 100 percent completion for portion of the Work claimed as substantially complete.

1. Include documentation supporting claim that the Work is substantially complete and a statement showing an accounting of changes to the Contract Sum.
  2. This application shall reflect Certificate(s) of Substantial Completion issued previously for Owner occupancy of designated portions of the Work.
- J. Final Payment Application: After completing Project closeout requirements, submit final Application for Payment with releases and supporting documentation not previously submitted and accepted, including, but not limited, to the following:
1. Evidence of completion of Project closeout requirements.
  2. Insurance certificates for products and completed operations where required and proof that taxes, fees, and similar obligations were paid.
  3. Updated final statement, accounting for final changes to the Contract Sum.
  4. AIA Document G707, "Consent of Surety to Final Payment."
  5. Evidence that claims have been settled.
  6. Final liquidated damages settlement statement.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 012900



**SECTION 013100  
PROJECT MEETINGS**

**PART 1 - GENERAL**

**1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.
- B. Project meeting minutes will be taken and distributed by the Engineer.

**1.2 SUMMARY**

- A. This Section specifies administrative and procedural requirements for project meetings, including, but not limited to, the following:
  - 1. Preconstruction conferences.
  - 2. Pre-installation conferences.
  - 3. Progress meetings.
  - 4. Coordination meetings.
- B. Related Sections: The following Sections contain requirements that relate to this Section:
  - 1. Division 1 Section "Submittals" for submitting the Contractor's Construction Schedule.

**1.3 PRECONSTRUCTION CONFERENCE**

Schedule and hold the conference at the Project Site or another convenient location. Conduct the meeting to review responsibilities and personnel assignments.

- A. Attendees: Authorized representatives of the Owner, Owner's Representative, and their consultants; the Contractor and its superintendent; major subcontractors; manufacturers; suppliers; funding agency representatives; and other concerned parties shall attend the conference. All participants at the conference shall be familiar with the Project and authorized to conclude matters relating to the Work.
- B. Agenda: Discuss items of significance that could affect progress, including the following:
  - 1. Sign-in and agenda.
  - 2. Introduction of official representatives.
  - 3. Status of contract documents.
    - a. Contracts.
    - b. Notice to Proceed.

4. Contract time issues.
  - a. Total contract time.
  - b. Project schedule.
5. Contract price issues.
  - a. Status of contract price.
  - b. Schedule of values.
  - c. Payment requests.
  - d. Change in the work.
6. Submittals.
7. Responsibilities of each stakeholder.
  - a. Owner's representative.
  - b. Owner.
  - c. Contractor.
  - d. Funding Agency
8. Comments, questions, discussion points.

#### 1.4 PRE-INSTALLATION CONFERENCES

- A. Conduct a pre-installation conference at the Project Site before each construction activity that requires coordination with other construction. Meetings will be determined during the preconstruction conference.
- B. Attendees: The Installer and representatives of manufacturers and fabricators involved in or affected by the installation, and its coordination or integration with other materials and installations that have preceded or will follow, shall attend the meeting. Advise the Owner's Representative of scheduled meeting dates.
  1. Review the progress of other construction activities and preparations for the particular activity under consideration at each preinstallation conference, including requirements for the following:
    - a. Sign-in sheet and agenda distribution.
    - b. Review of minutes from the previous meeting.
    - c. Status of contract time.
    - d. Status of contract price.
    - e. Status of submittals.
    - f. Status of change orders.
    - g. Owner's concerns.
    - h. Contractor's concerns.
    - i. Engineer's concerns.
    - j. Schedule next progress meeting and close.
    - k. Site visit.

2. Record significant discussions and agreements and disagreements of each conference, and the approved schedule. Promptly distribute the record of the meeting to everyone concerned, including the Owner and the Owner's Representative.
3. Do not proceed with the installation if the conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of Work and reconvene the conference at the earliest feasible date.

## 1.5 PROGRESS MEETINGS

Can be requested and coordinated by any party as the need arises. Otherwise:

- A. Conduct progress meetings at the Project Site at regular intervals no greater than every 30 days. The Owner and the Owner's Representative and Contractor shall agree on a next day and time for monthly meetings.
- B. Attendees: In addition to representatives of the Owner and the Owner's Representative, each subcontractor, supplier, funding agency or other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the conference shall be familiar with the Project and authorized to conclude matters relating to the Work.
- C. Agenda: Review and correct or approve minutes of the previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to the status of the Project.
  1. Contractor's Construction Schedule: Review progress since the last meeting. Determine where each activity is in relation to the Contractor's Construction Schedule, whether on time or ahead or behind schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to insure that current and subsequent activities will be completed within the Contract Time.
  2. Review the present and future needs of each entity present, including the following:
    - a. Interface requirements.
    - b. Time.
    - c. Sequences.
    - d. Status of submittals.
    - e. Deliveries.
    - f. Off-site fabrication problems.
    - g. Access.
    - h. Site utilization.
    - i. Temporary facilities and services.
    - j. Hours of work.
    - k. Hazards and risks.
    - l. Housekeeping.
    - m. Quality and work standards.
    - n. Change Orders.

## PROJECT MEETINGS

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- o. Documentation of information for payment requests.
  - D. Reporting: After each meeting, distribute minutes of the meeting to each party present and to parties who should have been present. Include a brief summary, in narrative form, of progress since the previous meeting and report.
    - 1. Schedule Updating: Revise the Contractor's Construction Schedule after each progress meeting where revisions to the schedule have been made or recognized. Issue the revised schedule concurrently with the report of each meeting.

#### 1.6 COORDINATION MEETINGS

- A. Conduct project coordination meetings at regular intervals convenient for all parties involved. Project coordination meetings are in addition to specific meetings held for other purposes, such as regular progress meetings and special pre-installation meetings.
- B. Request representation at each meeting by every party currently involved in coordination or planning for the construction activities involved.
- C. Record meeting results and distribute copies to everyone in attendance and to others affected by decisions or actions resulting from each meeting.

#### 1.7 MEASUREMENT AND PAYMENT

- A. Payment for work described in this section shall be included in the various bid items for this project. No measurement shall be made.

### **PART 2 - PRODUCTS**

Not Applicable.

### **PART 3 - EXECUTION**

Not Applicable.

**END OF SECTION**

## SECTION 013200 - CONSTRUCTION PROGRESS DOCUMENTATION

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. Section includes administrative and procedural requirements for documenting the progress of construction during performance of the Work, including the following:
  - 1. Startup construction schedule.
  - 2. Contractor's construction schedule.
  - 3. Construction schedule updating reports.
  - 4. Daily construction reports.
  - 5. Site condition reports.
- B. Related Requirements:
  - 1. Section 013300 "Submittal Procedures" for submitting schedules and reports.
  - 2. Section 014000 "Quality Requirements" for submitting a schedule of tests and inspections.

#### 1.3 DEFINITIONS

- A. Activity: A discrete part of a project that can be identified for planning, scheduling, monitoring, and controlling the construction project. Activities included in a construction schedule consume time and resources.
  - 1. Critical Activity: An activity on the critical path that must start and finish on the planned early start and finish times.
  - 2. Predecessor Activity: An activity that precedes another activity in the network.
  - 3. Successor Activity: An activity that follows another activity in the network.
- B. Float: The measure of leeway in starting and completing an activity.
  - 1. Float time is not for the exclusive use or benefit of either Owner or Contractor, but is a jointly owned, expiring Project resource available to both parties as needed to meet schedule milestones and Contract completion date.
  - 2. Free float is the amount of time an activity can be delayed without adversely affecting the early start of the successor activity.
  - 3. Total float is the measure of leeway in starting or completing an activity without adversely affecting the planned Project completion date.

- C. Resource Loading: The allocation of manpower and equipment necessary for the completion of an activity as scheduled.

#### 1.4 INFORMATIONAL SUBMITTALS

- A. Format for Submittals: Submit required submittals in the following format:
  - 1. Working electronic copy of schedule file, where indicated.
  - 2. PDF electronic file.
- B. Startup construction schedule.
- C. Startup Network Diagram: Of size required to display entire network for entire construction period. Show logic ties for activities.
- D. Contractor's Construction Schedule: Initial schedule, of size required to display entire schedule for entire construction period.
- E. Construction Schedule Updating Reports: Submit with Applications for Payment.
- F. Daily Construction Reports: Submit at monthly intervals.
- G. Site Condition Reports: Submit at time of discovery of differing conditions.
- H. Qualification Data: For scheduling consultant.

#### 1.5 QUALITY ASSURANCE

- A. Prescheduling Conference: Conduct conference at Project site to comply with requirements in Section 013100 "Project Management and Coordination." Review methods and procedures related to the preliminary construction schedule and Contractor's construction schedule, including, but not limited to, the following:
  - 1. Review software limitations and content and format for reports.
  - 2. Verify availability of qualified personnel needed to develop and update schedule.
  - 3. Discuss constraints.
  - 4. Review submittal requirements and procedures.
  - 5. Review time required for review of submittals and resubmittals.
  - 6. Review requirements for tests and inspections by independent testing and inspecting agencies.
  - 7. Review time required for Project closeout and Owner startup procedures.
  - 8. Review and finalize list of construction activities to be included in schedule.
  - 9. Review procedures for updating schedule.

## 1.6 COORDINATION

- A. Coordinate Contractor's construction schedule with the schedule of values, list of subcontracts, submittal schedule, progress reports, payment requests, and other required schedules and reports.
  - 1. Secure time commitments for performing critical elements of the Work from entities involved.
  - 2. Coordinate each construction activity in the network with other activities and schedule them in proper sequence.

## PART 2 - PRODUCTS

### 2.1 CONTRACTOR'S CONSTRUCTION SCHEDULE, GENERAL

- A. Time Frame: Extend schedule from date established for the Notice to Proceed to date of final completion.
  - 1. Contract completion date shall not be changed by submission of a schedule that shows an early completion date, unless specifically authorized by Change Order.
- B. Activities: Treat each story or separate area as a separate numbered activity for each main element of the Work. Comply with the following:
  - 1. Activity Duration: Define activities so no activity is longer than 30 days, unless specifically allowed by Engineer.
  - 2. Procurement Activities: Include procurement process activities for the following long lead items and major items, requiring a cycle of more than 60 days, as separate activities in schedule. Procurement cycle activities include, but are not limited to, submittals, approvals, purchasing, fabrication, and delivery.
  - 3. Submittal Review Time: Include review and resubmittal times indicated in Section 013300 "Submittal Procedures" in schedule. Coordinate submittal review times in Contractor's construction schedule with submittal schedule.
  - 4. Startup and Testing Time: Include no fewer than 15 days for startup and testing.
  - 5. Substantial Completion: Indicate completion in advance of date established for Substantial Completion, and allow time for Engineer's administrative procedures necessary for certification of Substantial Completion.
  - 6. Punch List and Final Completion: Include not more than 30 days for completion of punch list items and final completion.
- C. Constraints: Include constraints and work restrictions indicated in the Contract Documents and as follows in schedule, and show how the sequence of the Work is affected.
  - 1. Work Restrictions: Show the effect of the following items on the schedule:
    - a. Use of premises restrictions.
    - b. Seasonal variations.
    - c. Environmental control.
- D. Milestones: Include milestones indicated in the Contract Documents in schedule, including, but not limited to, the Notice to Proceed, Substantial Completion, and final completion.

- E. Cost Correlation: Superimpose a cost correlation timeline, indicating planned and actual costs. On the line, show planned and actual dollar volume of the Work performed as of planned and actual dates used for preparation of payment requests.
  - 1. See Section 012900 "Payment Procedures" for cost reporting and payment procedures.
- F. Upcoming Work Summary: Prepare summary report indicating activities scheduled to occur or commence prior to submittal of next schedule update. Summarize the following issues:
  - 1. Unresolved issues.
  - 2. Unanswered Requests for Information.
  - 3. Rejected or unreturned submittals.
  - 4. Notations on returned submittals.
  - 5. Pending modifications affecting the Work and Contract Time.
- G. Recovery Schedule: When periodic update indicates the Work is 14 or more calendar days behind the current approved schedule, submit a separate recovery schedule indicating means by which Contractor intends to regain compliance with the schedule. Indicate changes to working hours, working days, crew sizes, and equipment required to achieve compliance, and date by which recovery will be accomplished.
- H. Computer Scheduling Software: Prepare schedules using current version of a program that has been developed specifically to manage construction schedules.

## 2.2 CONTRACTOR'S CONSTRUCTION SCHEDULE (GANTT CHART)

- A. Gantt-Chart Schedule: Submit a comprehensive, fully developed, horizontal, Gantt-chart-type, Contractor's construction schedule within 30 days of date established for the Notice to Proceed. Base schedule on the startup construction schedule and additional information received since the start of Project.
- B. Preparation: Indicate each significant construction activity separately. Identify first workday of each week with a continuous vertical line.
  - 1. For construction activities that require three months or longer to complete, indicate an estimated completion percentage in 10 percent increments within time bar.

## 2.3 REPORTS

- A. Daily Construction Reports: Prepare a daily construction report recording the following information concerning events at Project site:
  - 1. List of subcontractors at Project site.
  - 2. Equipment at Project site.
  - 3. Material deliveries.
  - 4. High and low temperatures and general weather conditions, including presence of rain or snow.
  - 5. Accidents.
  - 6. Meetings and significant decisions.



7. Unusual events (see special reports).
  8. Stoppages, delays, shortages, and losses.
  9. Orders and requests of authorities having jurisdiction.
  10. Change Orders received and implemented.
  11. Work Change Directives received and implemented.
  12. Services connected and disconnected.
  13. Equipment or system tests and startups.
  14. Substantial Completions authorized.
- B. Material Location Reports: At monthly intervals, prepare and submit a comprehensive list of materials delivered to and stored at Project site. List shall be cumulative, showing materials previously reported plus items recently delivered. Include with list a statement of progress on and delivery dates for materials or items of equipment fabricated or stored away from Project site. Indicate the following categories for stored materials:
1. Material stored prior to previous report and remaining in storage.
  2. Material stored prior to previous report and since removed from storage and installed.
  3. Material stored following previous report and remaining in storage.
- C. Site Condition Reports: Immediately on discovery of a difference between site conditions and the Contract Documents, prepare and submit a detailed report. Submit with a Request for Information. Include a detailed description of the differing conditions, together with recommendations for changing the Contract Documents.

## PART 3 - EXECUTION

### 3.1 CONTRACTOR'S CONSTRUCTION SCHEDULE

- A. Contractor's Construction Schedule Updating: At monthly intervals, update schedule to reflect actual construction progress and activities. Issue schedule one week before each regularly scheduled progress meeting.
1. Revise schedule immediately after each meeting or other activity where revisions have been recognized or made. Issue updated schedule concurrently with the report of each such meeting.
  2. Include a report with updated schedule that indicates every change, including, but not limited to, changes in logic, durations, actual starts and finishes, and activity durations.
  3. As the Work progresses, indicate final completion percentage for each activity.
- B. Distribution: Distribute copies of approved schedule to Engineer, Owner, separate contractors, testing and inspecting agencies, and other parties identified by Contractor with a need-to-know schedule responsibility.

END OF SECTION 013200

**SECTION 013300  
SUBMITTAL PROCEDURES**

**PART 1- GENERAL**

**1.1 GENERAL REQUIREMENTS**

- A. The Contractor shall provide samples and shop for all materials and equipment furnished and installed under this contract as described in the specifications in accordance with the following requirements. When the Work of the Project is divided into separate Contracts, each Prime Contractor shall provide submittals directly to the Engineer. No materials shall be used in the work which do not equal the approved samples or shop drawings.
- B. Transmit each item with a Submittal cover attached.
  - 1. Number submittals by specification section and revision number (e.g. 01330-1 for initial submission of schedule of submittals.)
  - 2. Submit only one item per transmittal cover.
  - 3. CONTRACTOR shall identify all deviations from the Contract Documents by paragraph number, and provide an explanation/justification for deviation.
  - 4. Incomplete submittals or submittals without identified deviations will be returned un-reviewed.
- C. Materials or appliances requiring approval must not be fabricated or incorporated into the work until approval has been given. The approval or acceptance of samples shall not preclude the rejection of any material upon the discovery of defects prior to the final acceptance of the complete work.
- D. After a material has been approved, no change in brand or manufacturer will be permitted unless satisfactory written evidence is presented to, and approved by the Engineer, that the manufacturer cannot make scheduled delivery of approved material, or that other conditions are apparent which indicate the approval of such substitute materials to be in the best interest of the Owner.
- E. Samples, shop drawings, material lists, manufacturers' literature, and other required information shall be submitted in sufficient time, and clearly marked, to permit proper consideration and action on same before any materials which such samples, shop drawings, and information represent are delivered to the site. The Contractor shall be held responsible for any delay in the progress of the Work which may be due to his failure to observe these requirements.
- F. Shop drawings and samples shall be submitted to the Engineer in sufficient quantity to permit the Engineer to retain four (4) copies and return the number of copies required by the Contractor.
- G. Any submittal which requires the selection of color by the Engineer shall be submitted such that all color selections can be made at the same time. Submittals shall be held by the Contractor for a single submittal of all items requiring color choice or sufficient time will be allowed for the Engineer to receive all submittals to prepare a comprehensive color selection.

- H. Shop drawings shall include installation instructions and long and short term storage requirements.
- I. No payment shall be made for unapproved materials or equipment purchased or installed by the Contractor even if the materials or equipment meet all the requirements of the specifications and/or is the named product or equipment.

## 1.2 SAMPLES

- A. Samples and mock-ups shall be submitted in duplicate except where a greater number is specifically required by the specifications.
- B. Samples and manufacturers' literature shall be forwarded (prepaid) to Engineer's office accompanied with a transmittal letter containing the following information: name of project, contractor, description of product, manufacturer, model number, ASTM or Federal Specification number where applicable. Catalogs shall be marked to indicate specific items submitted for approval.
- C. Samples which are rejected by the Engineer must be re-submitted as soon as possible after notification of rejection and shall be marked "Re-submitted Sample" in addition to other required information.
- D. The right shall be reserved to require submission of samples of any material or any material lists, whether or not particularly mentioned in the Specifications.

## 1.3 SHOP DRAWINGS

- A. Submission of shop drawings shall comply with the following requirements:
  - 1. The shop drawings shall be clearly marked and submitted sufficiently in advance of the work which they cover to afford ample time for checking, correcting, and rechecking if necessary. No claim for delay will be granted to the Contractor if caused by his failure to comply with the requirements of this Section.
  - 2. Before submitting for approval, the Contractor shall check all shop drawings, including those submitted by subcontractors, for accuracy and to ascertain that all work contiguous with and having bearing on other work shown on the shop drawings is accurately drawn, and that the work shown is in conformity with the contract requirements.
  - 3. Shop drawings submitted for approval shall bear the Contractor's stamp of approval as evidence that such drawings and details have been checked by the Contractor. The submission of shop drawings (in either the original submission or when resubmitted with corrections) constitutes evidence that the Contractor has checked all information therein, and that he accepts and is willing to perform the work, as shown, in a workmanlike manner and in accordance with the best standard practices.
  - 4. No claim for an extra shall be based on work shown on the shop drawings, unless such claim is noted on the Contractor's transmittal letter accompanying the shop drawings.

## SUBMITTAL PROCEDURES

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- B. The Contractor's approval stamp shall contain the following statement:

*"The equipment and material shown and marked in this submittal is that proposed to be incorporated into this Project, and has been checked for and is in compliance with the Contract Documents unless otherwise shown in bold face type or lettering and listed on a page or pages headed "DEPARTURES FROM CONTRACT DOCUMENTS," and can be installed in the allocated spaces.*

Checked By: \_\_\_\_\_ Date: \_\_\_\_\_

The person signing the stamp shall be one designated in writing by the Contractor as having that authority. The signature shall be handwritten in ink. Stamped signatures are not acceptable.

1. The Engineer's approval of shop drawings and schedules shall not relieve the Contractor from responsibility for deviation from drawings and specifications unless he has in writing called the Engineer's attention to such deviations at the time of submission. The Engineer's approval shall not relieve Contractor from responsibility for errors of any sort on shop drawings or schedules.

C. ENGINEER'S ACTION:

1. Review is only for conformance with the design concept of the project. Markings or comments do not relieve the CONTRACTOR from compliance with the contract documents nor allows departure therefrom. The CONTRACTOR remains responsible for details and accuracy, for confirming and correlating all quantities and dimensions, for selecting fabrication processes, for technique of assembly, for coordination of the work with all trades, and for performing this work in compliance with the contract documents.
2. Where action and return is required or requested, ENGINEER will review each submittal, mark with "Action".
3. Final Unrestricted Release: Work may proceed, provided it complies with Contract Documents, when submittal is returned with the following marking:  
  
"Reviewed No Exceptions"
4. Final-But-Restricted Release: Work may proceed, provided it complies with notations and corrections on submittal and with Contract Documents, when submittal is returned with the following marking:  
  
"Reviewed Exceptions Noted"
5. Returned for Re-submittal: Do not proceed with work. Revise submittal in accordance with notations thereon, and resubmit without delay to obtain a different action marking. Do not allow submittals with the following marking (or unmarked submittals where a marking is required) to be used in connection with performance of the work:

"Revise and Resubmit"

6. Returned for Non-Compliance: Do not proceed with work. Product submitted does not comply with Contract Documents. Resubmit for product complying with the requirements of the Contract Documents. Do not allow submittals with the following marking to be used in connection with performance of the work:

"Not Approved" or "Rejected"

**PART 2- PRODUCTS**

Not Applicable

**PART 3- EXECUTION**

Not Applicable

**END OF SECTION**

## SECTION 014000 - QUALITY REQUIREMENTS

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. Section includes administrative and procedural requirements for quality assurance and quality control.
- B. Testing and inspecting services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with the Contract Document requirements.
  - 1. Specific quality-assurance and -control requirements for individual construction activities are specified in the Sections that specify those activities. Requirements in those Sections may also cover production of standard products.
  - 2. Specified tests, inspections, and related actions do not limit Contractor's other quality-assurance and -control procedures that facilitate compliance with the Contract Document requirements.
  - 3. Requirements for Contractor to provide quality-assurance and -control services required by Engineer, Owner, or authorities having jurisdiction are not limited by provisions of this Section.
  - 4. Specific test and inspection requirements are not specified in this Section.

#### 1.3 DEFINITIONS

- A. Quality-Assurance Services: Activities, actions, and procedures performed before and during execution of the Work to guard against defects and deficiencies and substantiate that proposed construction will comply with requirements.
- B. Quality-Control Services: Tests, inspections, procedures, and related actions during and after execution of the Work to evaluate that actual products incorporated into the Work and completed construction comply with requirements. Services do not include contract enforcement activities performed by Engineer.
- C. Source Quality-Control Testing: Tests and inspections that are performed at the source, e.g., plant, mill, factory, or shop.
- D. Field Quality-Control Testing: Tests and inspections that are performed on-site for installation of the Work and for completed Work.

- E. Testing Agency: An entity engaged to perform specific tests, inspections, or both. Testing laboratory shall mean the same as testing agency.
- F. Installer/Applicator/Erector: Contractor or another entity engaged by Contractor as an employee, Subcontractor, or Sub-subcontractor, to perform a particular construction operation, including installation, erection, application, and similar operations.
  - 1. Use of trade-specific terminology in referring to a trade or entity does not require that certain construction activities be performed by accredited or unionized individuals, or that requirements specified apply exclusively to specific trade(s).
- G. Experienced: When used with an entity or individual, "experienced" means having successfully completed a minimum of five previous projects similar in nature, size, and extent to this Project; being familiar with special requirements indicated; and having complied with requirements of authorities having jurisdiction.

#### 1.4 CONFLICTING REQUIREMENTS

- A. Referenced Standards: If compliance with two or more standards is specified and the standards establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement. Refer conflicting requirements that are different, but apparently equal, to Architect for a decision before proceeding.
- B. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of requirements. Refer uncertainties to Engineer for a decision before proceeding.

#### 1.5 INFORMATIONAL SUBMITTALS

- A. Testing Agency Qualifications: For testing agencies specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include proof of qualifications in the form of a recent report on the inspection of the testing agency by a recognized authority.

#### 1.6 REPORTS AND DOCUMENTS

- A. Test and Inspection Reports: Prepare and submit certified written reports specified in other Sections. Include the following:
  - 1. Date of issue.
  - 2. Project title and number.
  - 3. Name, address, and telephone number of testing agency.
  - 4. Dates and locations of samples and tests or inspections.
  - 5. Names of individuals making tests and inspections.
  - 6. Description of the Work and test and inspection method.
  - 7. Identification of product and Specification Section.

8. Complete test or inspection data.
9. Test and inspection results and an interpretation of test results.
10. Record of temperature and weather conditions at time of sample taking and testing and inspecting.
11. Comments or professional opinion on whether tested or inspected Work complies with the Contract Document requirements.
12. Name and signature of laboratory inspector.
13. Recommendations on retesting and reinspecting.

B. **Manufacturer's Technical Representative's Field Reports:** Prepare written information documenting manufacturer's technical representative's tests and inspections specified in other Sections. Include the following:

1. Name, address, and telephone number of technical representative making report.
2. Statement on condition of substrates and their acceptability for installation of product.
3. Statement that products at Project site comply with requirements.
4. Summary of installation procedures being followed, whether they comply with requirements and, if not, what corrective action was taken.
5. Results of operational and other tests and a statement of whether observed performance complies with requirements.
6. Statement whether conditions, products, and installation will affect warranty.
7. Other required items indicated in individual Specification Sections.

C. **Factory-Authorized Service Representative's Reports:** Prepare written information documenting manufacturer's factory-authorized service representative's tests and inspections specified in other Sections. Include the following:

1. Name, address, and telephone number of factory-authorized service representative making report.
2. Statement that equipment complies with requirements.
3. Results of operational and other tests and a statement of whether observed performance complies with requirements.
4. Statement whether conditions, products, and installation will affect warranty.
5. Other required items indicated in individual Specification Sections.

D. **Permits, Licenses, and Certificates:** For Owner's records, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, correspondence, records, and similar documents, established for compliance with standards and regulations bearing on performance of the Work.

## 1.7 QUALITY ASSURANCE

A. **General:** Qualifications paragraphs in this article establish the minimum qualification levels required; individual Specification Sections specify additional requirements.

B. **Manufacturer Qualifications:** A firm experienced in manufacturing products or systems similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.



- C. Fabricator Qualifications: A firm experienced in producing products similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.
- D. Installer Qualifications: A firm or individual experienced in installing, erecting, or assembling work similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful in-service performance.
- E. Specialists: Certain Specification Sections require that specific construction activities shall be performed by entities who are recognized experts in those operations. Specialists shall satisfy qualification requirements indicated and shall be engaged for the activities indicated.
  - 1. Requirements of authorities having jurisdiction shall supersede requirements for specialists.
- F. Testing Agency Qualifications: An NRTL, an NVLAP, or an independent agency with the experience and capability to conduct testing and inspecting indicated, as documented according to ASTM E 329; and with additional qualifications specified in individual Sections; and, where required by authorities having jurisdiction, that is acceptable to authorities.
  - 1. NRTL: A nationally recognized testing laboratory according to 29 CFR 1910.7.
  - 2. NVLAP: A testing agency accredited according to NIST's National Voluntary Laboratory Accreditation Program.
- G. Manufacturer's Technical Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to observe and inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.
- H. Factory-Authorized Service Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.

## 1.8 QUALITY CONTROL

- A. Owner Responsibilities: Where quality-control services are indicated as Owner's responsibility, Owner will engage a qualified testing agency to perform these services.
  - 1. Owner will furnish Contractor with names, addresses, and telephone numbers of testing agencies engaged and a description of types of testing and inspecting they are engaged to perform.
  - 2. Payment for these services will be made from testing and inspecting allowances, as authorized by Change Orders.
  - 3. Costs for retesting and reinspecting construction that replaces or is necessitated by work that failed to comply with the Contract Documents will be charged to Contractor.
- B. Contractor Responsibilities: Tests and inspections not explicitly assigned to Owner are Contractor's responsibility. Perform additional quality-control activities required to verify that the Work complies with requirements, whether specified or not.

1. Unless otherwise indicated, provide quality-control services specified and those required by authorities having jurisdiction. Perform quality-control services required of Contractor by authorities having jurisdiction, whether specified or not.
  2. Where services are indicated as Contractor's responsibility, engage a qualified testing agency to perform these quality-control services.
  3. Notify testing agencies at least 24 hours in advance of time when Work that requires testing or inspecting will be performed.
  4. Where quality-control services are indicated as Contractor's responsibility, submit a certified written report, in duplicate, of each quality-control service.
  5. Testing and inspecting requested by Contractor and not required by the Contract Documents are Contractor's responsibility.
  6. Submit additional copies of each written report directly to authorities having jurisdiction, when they so direct.
- C. Manufacturer's Field Services: Where indicated, engage a factory-authorized service representative to inspect field-assembled components and equipment installation, including service connections. Report results in writing as specified in Section 013300 "Submittal Procedures."
- D. Manufacturer's Technical Services: Where indicated, engage a manufacturer's technical representative to observe and inspect the Work. Manufacturer's technical representative's services include participation in preinstallation conferences, examination of substrates and conditions, verification of materials, observation of Installer activities, inspection of completed portions of the Work, and submittal of written reports.
- E. Retesting/Reinspecting: Regardless of whether original tests or inspections were Contractor's responsibility, provide quality-control services, including retesting and reinspecting, for construction that replaced Work that failed to comply with the Contract Documents.
- F. Testing Agency Responsibilities: Cooperate with Engineer and Contractor in performance of duties. Provide qualified personnel to perform required tests and inspections.
1. Notify Engineer and Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.
  2. Determine the location from which test samples will be taken and in which in-situ tests are conducted.
  3. Conduct and interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from requirements.
  4. Submit a certified written report, in duplicate, of each test, inspection, and similar quality-control service through Contractor.
  5. Do not release, revoke, alter, or increase the Contract Document requirements or approve or accept any portion of the Work.
  6. Do not perform any duties of Contractor.
- G. Associated Services: Cooperate with agencies performing required tests, inspections, and similar quality-control services, and provide reasonable auxiliary services as requested. Notify agency sufficiently in advance of operations to permit assignment of personnel. Provide the following:
1. Access to the Work.
  2. Incidental labor and facilities necessary to facilitate tests and inspections.

3. Adequate quantities of representative samples of materials that require testing and inspecting. Assist agency in obtaining samples.
  4. Facilities for storage and field curing of test samples.
  5. Delivery of samples to testing agencies.
  6. Preliminary design mix proposed for use for material mixes that require control by testing agency.
  7. Security and protection for samples and for testing and inspecting equipment at Project site.
- H. Coordination: Coordinate sequence of activities to accommodate required quality-assurance and -control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspecting.
1. Schedule times for tests, inspections, obtaining samples, and similar activities.

## PART 2 - PRODUCTS (Not Used)

## PART 3 - EXECUTION

### 3.1 TEST AND INSPECTION LOG

- A. Test and Inspection Log: Prepare a record of tests and inspections. Include the following:
1. Date test or inspection was conducted.
  2. Description of the Work tested or inspected.
  3. Date test or inspection results were transmitted to Architect.
  4. Identification of testing agency or special inspector conducting test or inspection.
- B. Maintain log at Project site. Post changes and revisions as they occur. Provide access to test and inspection log for Engineer's reference during normal working hours.

### 3.2 REPAIR AND PROTECTION

- A. General: On completion of testing, inspecting, sample taking, and similar services, repair damaged construction and restore substrates and finishes.
1. Provide materials and comply with installation requirements specified in other Specification Sections or matching existing substrates and finishes. Restore patched areas and extend restoration into adjoining areas with durable seams that are as invisible as possible. Comply with the Contract Document requirements for cutting and patching in Section 017300 "Execution."
- B. Protect construction exposed by or for quality-control service activities.
- C. Repair and protection are Contractor's responsibility, regardless of the assignment of responsibility for quality-control services.

END OF SECTION 014000

**SECTION 015000**  
**TEMPORARY FACILITIES AND CONTROLS**

**PART 1 - GENERAL**

**1.1 SUMMARY**

- A. Refer to General Conditions for requirements for the CONTRACTOR to provide temporary facilities as required for performance of the Work and fulfillment of the Contract. This section specifies certain minimum temporary facilities to be provided by CONTRACTOR regardless of methods and means selected for performance of the Work. This section is not intended to limit the CONTRACTOR's provisions for temporary facilities nor does it assure compliance with local governing regulations. Use of alternate provisions for temporary facilities is the CONTRACTOR's option, subject to the ENGINEER's acceptance. Temporary facilities are defined to exclude tools and construction machines, testing, demolition, alterations, soil borings, mock-ups and similar items.

**1.2 SEPARATE PRIME CONTRACTORS**

- A. The CONTRACTOR will be responsible for maintaining temporary facilities. The CONTRACTOR will be responsible for all temporary facilities described herein as part of this WORK.
- B. The CONTRACTOR will be responsible for providing his own Field Office and Materials Storage.
- C. Installation of temporary electrical and water service shall be provided by the CONTRACTOR.

**1.3 RELATED SERVICES**

- A. Intent: The provisions and intent of the AGREEMENT, including the General Conditions, Supplemental General Condition, and other requirements of the Contract Documents apply to the WORK as specified in this Section. WORK related to this Section is described throughout the Specification.

**PART 2 - PRODUCTS**

**2.1 MATERIALS STORAGE**

- A. Provide suitable and sufficient enclosed and covered spaces, with raised flooring, to protect materials and equipment subject to damage by weather or construction. Materials stored on site which have not been properly protected will not be acceptable for use in construction or approved for payment.

## 2.2 FENCING AND BARRICADES

- A. Provide fences and barricades and protection devices sufficient to prevent injury to persons or damage to property in accordance with Safety Requirements of applicable standards, codes, ordinances, and insurance agencies.
- B. Provide temporary walkways as necessary for safe, uninterrupted pedestrian traffic.

## 2.3 SCAFFOLDING AND SHORING

- A. Provide scaffolding, ramps, runways, platforms, guards, rails, stairs, and ladders as necessary for this work.
- B. Meet safety requirements of applicable Virginia and County standards, codes, and ordinances.
- C. Provide lights and signs to prevent damage or injury.
- D. Provide all shoring, bracing and sheeting as required for safety and proper execution of the Work. Remove when no longer required.

## 2.4 LIFTING AND HOISTING

- A. Provide hoists, temporary elevators, lifts, cranes, and towers necessary for expediting the handling of materials.

## 2.5 TOILETS

- A. Provide adequate and sanitary temporary outside toilet facilities for use of persons working at site. Provide toilet facilities with adequate light and ventilation and toilet tissue in suitable holder. Comply with applicable legal and health requirements. Toilet facilities shall be secluded from public observation and shall not create nor allow a public nuisance. Temporary sanitary facilities shall be removed upon completion of the work and the premises shall be left clean. Workmen shall not use permanent washroom facilities in existing facilities or new work except by written permission of the Owner.

## 2.6 ELECTRICITY

- A. Make arrangements for, and provide temporary equipment, poles, wiring, switches, and outlets necessary to provide an adequate supply of electricity for lighting and power for construction purposes. Cost of temporary service shall be borne by the CONTRACTOR.
- B. The CONTRACTOR shall make arrangements for meter installation, service connections, and wiring to meet the requirements of the completed project.

## 2.7 WATER

- A. CONTRACTOR is responsible for obtaining a water meter from OWNER to be installed by CONTRACTOR for use of water during construction activities. Reasonable use of

water for flushing and testing purposes will be provided by OWNER. OWNER reserves the right to recover costs from the CONTRACTOR if the OWNER believes that an excessive use of water has occurred beyond the reasonable amount anticipated for the construction of this project.

- B. The CONTRACTOR shall make arrangements for main connection, and incoming pipes to meet requirements of the completed project.

## 2.8 HEAT

- A. The General Contractor shall provide temporary heat during the course of the project to provide protection for the workmen and all installed materials and equipment during cold weather. The technical specifications outline minimum temperatures required for various portions of the Work.
- B. The General Contractor shall pay for fuel and attendance of the permanent heating system for all heat during construction to maintain the integrity of the building and all installed equipment until the project is accepted by the OWNER as Substantially Complete.
- C. Temporary Heating shall be of a type approved by the ENGINEER and complying with all applicable safety and fire code regulations.

## 2.9 PUMPING AND DRAINING

- A. Provide pumping equipment to keep construction and storage areas free from standing water that could cause damage or that would interfere with the work.

## 2.10 ACCESS

- A. The Project Site shall at all times be accessible for delivery of construction materials and equipment. Maintenance of access points and access roads, loading and unloading areas and directional signage shall be the responsibility of the CONTRACTOR.
- B. Provide signage and barricades to clearly direct pedestrian and construction traffic.
- C. Any damage to existing paved surfaces, curbing, landscaping, etc. shall be restored or repaired by the CONTRACTOR.
- D. Stabilize parking areas and access roads with a base of crushed stone as soon as practicable after finish grading.

## 2.11 FINISHES

- A. The General Construction Contractor shall protect all finished surfaces, including the jambs and soffits of all openings used as passageways or through which materials are handled, against any possible damage resulting from the conduct of work by all trades.

- B. All finished surfaces, including factory finished and job finished items, shall be clean and not marred upon delivery of the building to the OWNER. GENERAL CONTRACTOR shall be responsible for its Subcontractors compliance with this section.
- C. Protect all types of finished floor surfaces in traffic areas with plywood, planking, reinforced non-staining kraft paper, or other approved material.

## 2.12 FIRST AID FACILITIES AND ACCIDENTS

### A. First Aid Facilities

- 1. The CONTRACTOR shall provide at the site, such reasonable equipment and facilities as are necessary to supply first aid to any of his personnel who may be injured in connection with the work.

### B. Accident

- 1. The CONTRACTOR shall promptly report in writing to OWNER and ENGINEER all accidents whatsoever arising out of, or in connection with, the performance of the work, whether on or adjacent to the site, which cause death, personal injury or property damage, giving full details and statements of witnesses.
- 2. If death or serious injuries or serious damages are caused, the accident shall be reported immediately by telephone or messenger to both the OWNER and the ENGINEER.
- 3. If any claim is made by anyone against the CONTRACTOR or a subcontractor on account of any accidents, the CONTRACTOR shall promptly report the facts in writing to the OWNER and ENGINEER, giving full details of the claim.

## 2.13 BARRICADES, WARNING SIGNS AND LIGHTS

### A. General

- 1. CONTRACTOR shall provide, erect and maintain as necessary, strong and suitable barricades, fencing, danger signs and warning lights and as may be required for the safety of all those employed in the work, visiting the construction site, and for the general public.

### B. Accommodation of Traffic

- 1. All work in the VDOT right-of-way or local right-of-ways shall be done in accordance with VDOT regulations or local regulations.
- 2. During the progress of the work, streets, driveways, sidewalks, and crossings shall be kept open for the passage of traffic and pedestrians and shall not be unnecessarily obstructed unless authorized by the authority having jurisdiction over same. The CONTRACTOR shall take such measures at his own expense, as



may be necessary to keep the street open for traffic, and shall give advance notice to the Fire and Police Departments of his proposed street operations.

3. Warning signs shall be provided along all highways while work is in progress; and where traffic direction is required flagmen shall be designated by the CONTRACTOR to direct traffic past the equipment, machinery, or construction operations. Barricades and lights shall be provided as required to protect traffic. Where trenches have been cut in road shoulders on which traffic may pass at times, red flags and warning signs shall be placed at frequent intervals and maintained until the shoulder is safe for travel. The traveling public shall be warned of the construction with signing that is in accordance with VDOT policy.
4. The CONTRACTOR shall notify the VDOT five working days in advance of work in highway right-of-way, and shall fully cooperate with the Department.
5. The CONTRACTOR shall construct and maintain, without extra compensation, such adequate and proper bridges over excavations as may be necessary or directed for the purpose of accommodating pedestrians or vehicles.
6. All temporary means constructed by the CONTRACTOR for maintaining traffic shall be removed upon completion of the work unless otherwise specified by the ENGINEER and any damage done to public or private property shall be made good by the CONTRACTOR.
7. All dirt spilled from the contractor's trucks on existing pavements over which it is hauled or which has otherwise been deposited thereon shall be removed by the CONTRACTOR at the end of the work day.

#### 2.14 PUBLIC CONVENIENCE AND PROTECTION

- A. During progress of the work, the convenience and protection of the public must be provided for, and interferences held to a minimum.
- B. The CONTRACTOR shall, at all times, conduct the work in such a manner as to insure the least practicable obstruction to public travel. The convenience of the general public and of the residents along or adjacent to the area of the work shall be provided for in a satisfactory manner, consistent with the operation and local conditions. Road and streets must be kept open at all times or suitable detours provided. Access to fire hydrants and other fire extinguishing equipment shall be provided and maintained at all times.
- C. When necessary, for the protection of the public, the CONTRACTOR shall provide watchmen and/or lights to burn between twilight and sunrise, and shall erect and maintain barriers and all other necessary protection around the work at his own expense. He shall also take other precautions as may be necessary to protect life, and property. The OWNER reserves the right to remedy any neglect on the part of the CONTRACTOR as regards to the protection of the work after twenty-four (24) hours notice in writing; and, in cases of emergency, the OWNER shall have the right to remedy any neglect without previous notice, and in either case deduct the cost of such remedy from money due the CONTRACTOR.

#### 2.15 PERIODIC CLEAN UP; BASIC SITE RESTORATION

TEMPORARY FACILITIES AND CONTROLS  
HALIFAX COUNTY SERVICE AUTHORITY

SEYMOUR DRIVE AND HODGES STREET WATERLINE IMPROVEMENTS

015000 - 5

- A. During construction, the CONTRACTOR shall regularly remove from the site of the work all accumulated debris and surplus materials of any kind which result from his operations. Unused equipment and tools shall be stored at the CONTRACTOR's yard or base of operations for the project.
- B. When the work involves installation of sewers, drains, water mains, manholes, underground structures, or other disturbance of existing features in or across streets, rights-of-way, easements, or private property, the CONTRACTOR shall (as the work progresses) promptly backfill, compact, grade, and otherwise restore the disturbed area to the basic condition which will permit resumption of pedestrian or vehicular traffic and any other critical activity or functions consistent with the original use of the land. All work within 500 feet of the forward progress shall be complete with the exception of testing. The CONTRACTOR's forward progress is subject to being suspended if in the opinion of the ENGINEER the above requirement is not met. The requirements for temporary paving of streets, walks, and driveways are specified elsewhere. Unsightly mounds of earth, large stones, boulders, and debris shall be removed so that the site presents a neat appearance.
- C. The CONTRACTOR shall perform the clean-up work on a regular basis and as frequently as ordered by the ENGINEER. Basic site restoration in a particular area shall be accomplished immediately following the installation or completion of the required facilities in that area. Furthermore such work shall also be accomplished, when ordered by the ENGINEER, if partially completed facilities must remain incomplete for some time period due to unforeseen circumstances.
- D. Upon failure of the CONTRACTOR to perform periodic clean-up and basic restoration of the site to the ENGINEER's satisfaction, the OWNER may, upon five (5) days prior written notice to the CONTRACTOR, without prejudice to any other rights or remedies of the OWNER, cause such work for which the CONTRACTOR is responsible to be accomplished to the extent deemed necessary by the ENGINEER, and all costs resulting there-from shall be charged to the CONTRACTOR and deducted from the amounts of money that may be due him. The CONTRACTOR shall receive no consideration for time extension or compensation for production time lost while not in compliance with the requirements for clean up.

## **PART 3 - EXECUTION**

### **3.1 GENERAL**

- A. Maintain all temporary facilities until the project has reached Substantial Completion and is accepted by the OWNER. Project sign(s) shall be maintained until Final Acceptance by the OWNER.
- B. Provide sheds and covered spaces suitable for storage of materials and equipment requiring protection as approved by the ENGINEER.
- C. Erect and maintain scaffolding, ramps, platforms, guards, rails, stairs, and ladders as necessary for this work to meet all applicable safety laws and ordinances.

- D. Maintain safety lights, signage, and other safety provisions. Keep safety lights burning from dark to dusk.
- E. Install lifting and hoisting equipment to meet all applicable safety requirements.
- F. Maintain adequate toilet facilities and keep toilets in clean and sanitary condition.
- G. Make arrangements and install temporary water, electric, and telephone service required for the project.
- H. Maintain temporary heating system during cold weather to adequately protect the work in place or work being placed. Specific requirements for environmental conditions can be found in the technical sections of the Specifications.
- I. Pump or drain water to keep work and storage area free from water which could interfere with the work, or could cause damage. Distribute discharge to prevent erosion.
- J. Remove all temporary work at the completion of the project, unless directed otherwise by the ENGINEER.
- K. Clean spaces that were occupied by temporary work. Periodically, and as directed by the ENGINEER, remove all debris and rubbish from the site.

### 3.2 PAYMENT

- A. Work specified under this Section shall be included for payment in the CONTRACTOR's price bid for other Pay Items of this Contract. No specific payment will be made under this Section.

### **END OF SECTION**

## SECTION 016000 - PRODUCT REQUIREMENTS

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. Section includes administrative and procedural requirements for selection of products for use in Project; product delivery, storage, and handling; manufacturers' standard warranties on products; special warranties; and comparable products.
- B. Related Requirements:
  - 1. Section 012500 "Substitution Procedures" for requests for substitutions.
  - 2. Section 014200 "References" for applicable industry standards for products specified.

#### 1.3 DEFINITIONS

- A. Products: Items obtained for incorporating into the Work, whether purchased for Project or taken from previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.
  - 1. Named Products: Items identified by manufacturer's product name, including make or model number or other designation shown or listed in manufacturer's published product literature, that is current as of date of the Contract Documents.
  - 2. New Products: Items that have not previously been incorporated into another project or facility. Products salvaged or recycled from other projects are not considered new products.
  - 3. Comparable Product: Product that is demonstrated and approved through submittal process to have the indicated qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics that equal or exceed those of specified product.
- B. Basis-of-Design Product Specification: A specification in which a specific manufacturer's product is named and accompanied by the words "basis-of-design product," including make or model number or other designation, to establish the significant qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics for purposes of evaluating comparable products of additional manufacturers named in the specification.

#### 1.4 ACTION SUBMITTALS

- A. Comparable Product Requests: Submit request for consideration of each comparable product. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.
  - 1. Include data to indicate compliance with the requirements specified in "Comparable Products" Article.
  - 2. Engineer's Action: If necessary, Engineer will request additional information or documentation for evaluation within one week of receipt of a comparable product request. Engineer will notify Contractor of approval or rejection of proposed comparable product request within 15 days of receipt of request, or seven days of receipt of additional information or documentation, whichever is later.
    - a. Form of Approval: As specified in Section 013300 "Submittal Procedures."
    - b. Use product specified if Engineer does not issue a decision on use of a comparable product request within time allocated.
- B. Basis-of-Design Product Specification Submittal: Comply with requirements in Section 013300 "Submittal Procedures." Show compliance with requirements.

#### 1.5 QUALITY ASSURANCE

- A. Compatibility of Options: If Contractor is given option of selecting between two or more products for use on Project, select product compatible with products previously selected, even if previously selected products were also options.
  - 1. Each contractor is responsible for providing products and construction methods compatible with products and construction methods of other contractors.
  - 2. If a dispute arises between contractors over concurrently selectable but incompatible products, Engineer will determine which products shall be used.

#### 1.6 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, and handle products using means and methods that will prevent damage, deterioration, and loss, including theft and vandalism. Comply with manufacturer's written instructions.
- B. Delivery and Handling:
  - 1. Schedule delivery to minimize long-term storage at Project site and to prevent overcrowding of construction spaces.
  - 2. Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.
  - 3. Deliver products to Project site in an undamaged condition in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.

4. Inspect products on delivery to determine compliance with the Contract Documents and to determine that products are undamaged and properly protected.

C. Storage:

1. Store products to allow for inspection and measurement of quantity or counting of units.
2. Store materials in a manner that will not endanger Project structure.
3. Store products that are subject to damage by the elements, under cover in a weathertight enclosure above ground, with ventilation adequate to prevent condensation.
4. Protect foam plastic from exposure to sunlight, except to extent necessary for period of installation and concealment.
5. Comply with product manufacturer's written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage.
6. Protect stored products from damage and liquids from freezing.
7. Provide a secure location and enclosure at Project site for storage of materials and equipment by Owner's construction forces. Coordinate location with Owner.

## 1.7 PRODUCT WARRANTIES

- A. Warranties specified in other Sections shall be in addition to, and run concurrent with, other warranties required by the Contract Documents. Manufacturer's disclaimers and limitations on product warranties do not relieve Contractor of obligations under requirements of the Contract Documents.

1. Manufacturer's Warranty: Written warranty furnished by individual manufacturer for a particular product and specifically endorsed by manufacturer to Owner.
2. Special Warranty: Written warranty required by the Contract Documents to provide specific rights for Owner.

- B. Special Warranties: Prepare a written document that contains appropriate terms and identification, ready for execution.

1. Manufacturer's Standard Form: Modified to include Project-specific information and properly executed.
2. Specified Form: When specified forms are included with the Specifications, prepare a written document using indicated form properly executed.
3. See other Sections for specific content requirements and particular requirements for submitting special warranties.

- C. Submittal Time: Comply with requirements in Section 017700 "Closeout Procedures."

## PART 2 - PRODUCTS

### 2.1 PRODUCT SELECTION PROCEDURES

- A. General Product Requirements: Provide products that comply with the Contract Documents, are undamaged and, unless otherwise indicated, are new at time of installation.

1. Provide products complete with accessories, trim, finish, fasteners, and other items needed for a complete installation and indicated use and effect.
2. Standard Products: If available, and unless custom products or nonstandard options are specified, provide standard products of types that have been produced and used successfully in similar situations on other projects.
3. Owner reserves the right to limit selection to products with warranties not in conflict with requirements of the Contract Documents.
4. Where products are accompanied by the term "as selected," Architect will make selection.
5. Descriptive, performance, and reference standard requirements in the Specifications establish salient characteristics of products.
6. Or Equal: For products specified by name and accompanied by the term "or equal," or "or approved equal," or "or approved," comply with requirements in "Comparable Products" Article to obtain approval for use of an unnamed product.

B. Product Selection Procedures:

1. Product: Where Specifications name a single manufacturer and product, provide the named product that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.
2. Manufacturer/Source: Where Specifications name a single manufacturer or source, provide a product by the named manufacturer or source that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.
3. Basis-of-Design Product: Where Specifications name a product, or refer to a product indicated on Drawings, and include a list of manufacturers, provide the specified or indicated product or a comparable product by one of the other named manufacturers. Drawings and Specifications indicate sizes, profiles, dimensions, and other characteristics that are based on the product named. Comply with requirements in "Comparable Products" Article for consideration of an unnamed product by one of the other named manufacturers.

C. Visual Selection Specification: Where Specifications include the phrase "as selected by Engineer from manufacturer's full range" or similar phrase, select a product that complies with requirements. Engineer will select color, gloss, pattern, density, or texture from manufacturer's product line that includes both standard and premium items.

## 2.2 COMPARABLE PRODUCTS

A. Conditions for Consideration: Engineer will consider Contractor's request for comparable product when the following conditions are satisfied. If the following conditions are not satisfied, Architect may return requests without action, except to record noncompliance with these requirements:

1. Evidence that the proposed product does not require revisions to the Contract Documents, that it is consistent with the Contract Documents and will produce the indicated results, and that it is compatible with other portions of the Work.
2. Detailed comparison of significant qualities of proposed product with those named in the Specifications. Significant qualities include attributes such as performance, weight, size, durability, visual effect, and specific features and requirements indicated.

3. Evidence that proposed product provides specified warranty.
4. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners, if requested.
5. Samples, if requested.

PART 3 - EXECUTION (Not Used)

END OF SECTION 016000



## SECTION 017300 - EXECUTION

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. Section includes general administrative and procedural requirements governing execution of the Work including, but not limited to, the following:
  - 1. Construction layout.
  - 2. Field engineering and surveying.
  - 3. Installation of the Work.
  - 4. Cutting and patching.
  - 5. Progress cleaning.
  - 6. Starting and adjusting.
  - 7. Protection of installed construction.
- B. Related Requirements:
  - 1. Section 01010 "Summary" for limits on use of Project site.
  - 2. Section 01770 "Closeout Procedures" for submitting final property survey with Project Record Documents, recording of Owner-accepted deviations from indicated lines and levels, and final cleaning.

#### 1.3 DEFINITIONS

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

#### 1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For land surveyor.

## 1.5 QUALITY ASSURANCE

- A. Land Surveyor Qualifications: A professional land surveyor who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing land-surveying services of the kind indicated.
- B. Cutting and Patching: Comply with requirements for and limitations on cutting and patching of construction elements.
  - 1. Structural Elements: When cutting and patching structural elements, notify Engineer of locations and details of cutting and await directions from Engineer before proceeding. Shore, brace, and support structural elements during cutting and patching. Do not cut and patch structural elements in a manner that could change their load-carrying capacity or increase deflection
  - 2. Operational Elements: Do not cut and patch operating elements and related components in a manner that results in reducing their capacity to perform as intended or that results in increased maintenance or decreased operational life or safety. Operational elements include the following:
    - a. Control systems.
    - b. Communication systems.
    - c. Electrical wiring systems.
  - 3. Visual Elements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch exposed construction in a manner that would, in Engineer's opinion, reduce the building's aesthetic qualities. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner.
- C. Cutting and Patching Conference: Before proceeding, meet at Project site with parties involved in cutting and patching, including mechanical and electrical trades. Review areas of potential interference and conflict. Coordinate procedures and resolve potential conflicts before proceeding.
- D. Manufacturer's Installation Instructions: Obtain and maintain on-site manufacturer's written recommendations and instructions for installation of products and equipment.

## PART 2 - PRODUCTS

### 2.1 MATERIALS

- A. In-Place Materials: Use materials for patching identical to in-place materials. For exposed surfaces, use materials that visually match in-place adjacent surfaces to the fullest extent possible.
  - 1. If identical materials are unavailable or cannot be used, use materials that, when installed, will provide a match acceptable to Engineer for the visual and functional performance of in-place materials.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Existing Conditions: The existence and location of underground and other utilities and construction indicated as existing are not guaranteed. Before beginning sitework, investigate and verify the existence and location of underground utilities, and other construction affecting the Work.
  - 1. Before construction, verify the location and invert elevation at points of connection of sanitary sewer, storm sewer, and water-service piping; underground electrical services, and other utilities.
  - 2. Furnish location data for work related to Project that must be performed by public utilities serving Project site.
- B. Examination and Acceptance of Conditions: Before proceeding with each component of the Work, examine substrates, areas, and conditions, with Installer or Applicator present where indicated, for compliance with requirements for installation tolerances and other conditions affecting performance. Record observations.
  - 1. Examine roughing-in for mechanical and electrical systems to verify actual locations of connections before equipment and fixture installation.
  - 2. Examine walls, floors, and roofs for suitable conditions where products and systems are to be installed.
  - 3. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
- C. Written Report: Where a written report listing conditions detrimental to performance of the Work is required by other Sections, include the following:
  - 1. Description of the Work.
  - 2. List of detrimental conditions, including substrates.
  - 3. List of unacceptable installation tolerances.
  - 4. Recommended corrections.
- D. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

### 3.2 PREPARATION

- A. Existing Utility Information: Furnish information to Owner that is necessary to adjust, move, or relocate existing utility structures, utility poles, lines, services, or other utility appurtenances located in or affected by construction. Coordinate with authorities having jurisdiction.
- B. Field Measurements: Take field measurements as required to fit the Work properly. Recheck measurements before installing each product. Where portions of the Work are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

- C. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.
- D. Review of Contract Documents and Field Conditions: Immediately on discovery of the need for clarification of the Contract Documents caused by differing field conditions outside the control of Contractor, submit a request for information to Engineer according to requirements in Section 013100 "Project Management and Coordination."

### 3.3 CONSTRUCTION LAYOUT

- A. Verification: Before proceeding to lay out the Work, verify layout information shown on Drawings, in relation to the property survey and existing benchmarks. If discrepancies are discovered, notify Engineer promptly.
- B. General: Engage a land surveyor to lay out the Work using accepted surveying practices.
  - 1. Establish benchmarks and control points to set lines and levels at each story of construction and elsewhere as needed to locate each element of Project.
  - 2. Establish limits on use of Project site.
  - 3. Establish dimensions within tolerances indicated. Do not scale Drawings to obtain required dimensions.
  - 4. Inform installers of lines and levels to which they must comply.
  - 5. Check the location, level and plumb, of every major element as the Work progresses.
  - 6. Notify Engineer when deviations from required lines and levels exceed allowable tolerances.
  - 7. Close site surveys with an error of closure equal to or less than the standard established by authorities having jurisdiction.
- C. Site Improvements: Locate and lay out site improvements, including pavements, grading, fill and topsoil placement, utility slopes, and rim and invert elevations.
- D. Building Lines and Levels: Locate and lay out control lines and levels for structures, building foundations, column grids, and floor levels, including those required for mechanical and electrical work. Transfer survey markings and elevations for use with control lines and levels. Level foundations and piers from two or more locations.
- E. Record Log: Maintain a log of layout control work. Record deviations from required lines and levels. Include beginning and ending dates and times of surveys, weather conditions, name and duty of each survey party member, and types of instruments and tapes used. Make the log available for reference by Engineer.

### 3.4 FIELD ENGINEERING

- A. Identification: Owner will identify existing benchmarks, control points, and property corners.
- B. Reference Points: Locate existing permanent benchmark, control point, and similar reference points before beginning the Work. Preserve and protect permanent benchmark and control point during construction operations.

1. Do not change or relocate existing benchmarks or control points without prior written approval of Engineer. Report lost or destroyed permanent benchmarks or control points promptly. Report the need to relocate permanent benchmarks or control points to Engineer before proceeding.
  2. Replace lost or destroyed permanent benchmarks and control points promptly. Base replacements on the original survey control points.
- C. Benchmarks: Establish and maintain a minimum of two permanent benchmarks on Project site, referenced to data established by survey control points. Comply with authorities having jurisdiction for type and size of benchmark.
1. Record benchmark locations, with horizontal and vertical data, on Project Record Documents.
  2. Where the actual location or elevation of layout points cannot be marked, provide temporary reference points sufficient to locate the Work.
  3. Remove temporary reference points when no longer needed. Restore marked construction to its original condition.

### 3.5 INSTALLATION

- A. General: Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.
1. Make vertical work plumb and make horizontal work level.
  2. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.
- B. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.
- C. Install products at the time and under conditions that will ensure the best possible results. Maintain conditions required for product performance until Substantial Completion.
- D. Conduct construction operations so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy.
- E. Sequence the Work and allow adequate clearances to accommodate movement of construction items on site and placement in permanent locations.
- F. Tools and Equipment: Do not use tools or equipment that produce harmful noise levels.
- G. Templates: Obtain and distribute to the parties involved templates for work specified to be factory prepared and field installed. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing products to comply with indicated requirements.
- H. Attachment: Provide blocking and attachment plates and anchors and fasteners of adequate size and number to securely anchor each component in place, accurately located and aligned with other portions of the Work. Where size and type of attachments are not indicated, verify size and type required for load conditions.

1. Mounting Heights: Where mounting heights are not indicated, mount components at heights directed by Engineer.
  2. Coordinate installation of anchorages. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.
- I. Joints: Make joints of uniform width. Where joint locations in exposed work are not indicated, arrange joints for the best visual effect. Fit exposed connections together to form hairline joints.

### 3.6 CUTTING AND PATCHING

- A. Cutting and Patching, General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.
1. Cut in-place construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.
- B. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during installation or cutting and patching operations, by methods and with materials so as not to void existing warranties.
- C. Temporary Support: Provide temporary support of work to be cut.
- D. Protection: Protect in-place construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations.
- E. Existing Utility Services and Mechanical/Electrical Systems: Where existing services/systems are required to be removed, relocated, or abandoned, bypass such services/systems before cutting to minimize interruption to occupied areas.
- F. Cutting: Cut in-place construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction. If possible, review proposed procedures with original Installer; comply with original Installer's written recommendations.
1. In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots neatly to minimum size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
  2. Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces.
  3. Concrete and Masonry: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.
  4. Excavating and Backfilling: Comply with requirements in applicable Sections where required by cutting and patching operations.
  5. Proceed with patching after construction operations requiring cutting are complete.
- G. Patching: Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other work. Patch with durable seams that are as invisible as

practicable. Provide materials and comply with installation requirements specified in other Sections, where applicable.

1. Inspection: Where feasible, test and inspect patched areas after completion to demonstrate physical integrity of installation.
  2. Exposed Finishes: Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will minimize evidence of patching and refinishing.
    - a. Clean piping, conduit, and similar features before applying paint or other finishing materials.
    - b. Restore damaged pipe covering to its original condition.
- H. Cleaning: Clean areas and spaces where cutting and patching are performed. Remove paint, mortar, oils, putty, and similar materials from adjacent finished surfaces.

### 3.7 PROGRESS CLEANING

- A. General: Clean Project site and work areas daily, including common areas. Enforce requirements strictly. Dispose of materials lawfully.
1. Comply with requirements in NFPA 241 for removal of combustible waste materials and debris.
  2. Do not hold waste materials more than seven days during normal weather or three days if the temperature is expected to rise above 80 deg F (27 deg C).
  3. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.
    - a. Use containers intended for holding waste materials of type to be stored.
  4. Coordinate progress cleaning for joint-use areas where Contractor and other contractors are working concurrently.
- B. Site: Maintain Project site free of waste materials and debris.
- C. Work Areas: Clean areas where work is in progress to the level of cleanliness necessary for proper execution of the Work.
1. Remove liquid spills promptly.
  2. Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.
- D. Installed Work: Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.
- E. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.

- F. Exposed Surfaces in Finished Areas: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.
- G. Waste Disposal: Do not bury or burn waste materials on-site. Do not wash waste materials down sewers or into waterways. Comply with waste disposal requirements in Section 01500 "Temporary Facilities and Controls."
- H. During handling and installation, clean and protect construction in progress and adjoining materials already in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.
- I. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.
- J. Limiting Exposures: Supervise construction operations to assure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.

### 3.8 STARTING AND ADJUSTING

- A. Start equipment and operating components to confirm proper operation. Remove malfunctioning units, replace with new units, and retest.
- B. Adjust equipment for proper operation. Adjust operating components for proper operation without binding.
- C. Test each piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
- D. Manufacturer's Field Service: Comply with qualification requirements in Section 01400 "Quality Requirements."

### 3.9 PROTECTION OF INSTALLED CONSTRUCTION

- A. Provide final protection and maintain conditions that ensure installed Work is without damage or deterioration at time of Substantial Completion.
- B. Comply with manufacturer's written instructions for temperature and relative humidity.

END OF SECTION 017300



**SECTION 017700  
CLOSEOUT PROCEDURES**

**PART 1- GENERAL**

**1.1 SUMMARY**

- A. This Section provides for the orderly and efficient transfer of the WORK from the CONTRACTOR to OWNER.

**1.2 RELATED SECTIONS**

- A. The provisions and intent of the AGREEMENT, including the General Conditions, Supplemental Conditions, and other requirements of the Contract Documents apply to the WORK as specified in this Section. WORK related to this Section is described throughout the Specifications.

**1.3 SUBMITTALS**

- A. Guarantees/Warranties: Four (4) copies of all guarantees, warranties and bonds called for in these Specifications commencing on the date of Substantial Completion.
- B. Governmental Compliance: Provide evidence of compliance with requirements of governmental agencies having jurisdiction, but not necessarily limited to:
  - 1. Certificates of Inspection
  - 2. Certificates of Occupancy
  - 3. Certificate to Operate
- C. Insurance: Provide four (4) copies of Certificates of Insurance for products and completed operations.
- D. Affidavit of Payment of Claims: Provide evidence of payment and release of liens.
- E. Affidavit of Release of Liens
- F. Consent of Surety for Final Payment.
- G. Contractor's Certification of Completion.
- H. Final Pay Application
- I. List of Project Participants: Provide a list of subcontractors, service organizations, and principal vendors, including names, addresses, and telephone numbers where they can be reached for emergency service at all times including nights, weekends, and holidays.

**1.4 WARRANTIES AND GUARANTEES**

- A. Contractor shall provide Warranties and Guarantees on all materials, equipment, workmanship, installations, labor and operation items provided and /or installed by the

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Contractor or any of its subcontractors and /or suppliers.

- B. Warrantees and Guarantees shall be for a period of one year after:
1. Being placed in service by owner for the owners use before substantial completion of the project.
  2. Date of substantial completion of the project.
  3. Being installed and put in service after substantial completion of the project.
  4. Equipment installed does not constitute being “in service”.
- C. Guarantee: CONTRACTOR warrants the equipment and/or materials delivered and installed under the AGREEMENT are free from defects in design, material or workmanship, and against damage caused prior to final inspection.
- D. Prompt Repair: CONTRACTOR shall promptly repair or replace all defective or damaged items delivered under the AGREEMENT. CONTRACTOR may elect to have any replaced item returned to its plant at its sole expense.
- E. Owner's Option: In the event of equipment and/or materials failure, during such time or in such a location that immediate repairs are mandatory, CONTRACTOR shall respond promptly, regardless of time. If CONTRACTOR is not available, OWNER personnel or other contractors, secured by OWNER, will affect repairs. CONTRACTOR shall then reimburse OWNER for parts and labor and/or other contractors costs necessary to correct deficiencies as defined within the warranty clause and time.
- F. This specification shall apply to all sections of the specifications as applicable whether mentioned in a specific specification or not. Should the specific specification section have additional requirements or more stringent requirements that this section the more stringent shall apply.
- G. The warranty shall not cover any item that has been subjected to external damage, disassembled and/or repaired by unauthorized persons, flooded or otherwise mistreated. Items normally consumed in service such as grease, oil, v-belts, fuses, filters, seals, etc., shall not be warranted.

## **PART 2- PRODUCTS**

### **2.1 SUBSTANTIAL COMPLETION**

- A. Record Drawings: The CONTRACTOR shall maintain an accurate set of Record Drawings and Specifications. Prior to Substantial Completion when the WORK is divided into separate contracts, each Prime Completion, CONTRACTOR shall prepare marked prints showing the installed locations and sizes of all underground or concealed portions of the WORK that are different from those shown in the Contract Documents. These Drawings shall be based on the set kept at the Project site and shall also show any other changes made to the Project during construction. These Drawings shall be submitted to ENGINEER at completion of the WORK.

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Record drawing information shall include the following as a minimum, where applicable:

1. Size, horizontal and vertical location of any existing utilities uncovered during the course of the work. This shall include telephone cables and conduits, fiber-optic cables and conduits, television cables, electrical cables and conduits, gas lines, water lines, sewer force mains, sanitary sewers, storm sewers, and the like.
2. Horizontal and vertical location of all sewer mains and force mains installed at every 100 foot station.
3. To all cleanouts new and existing, size of service lines installed, and the like.
4. Location of lines plugged or capped.
5. Swing ties to all structures installed such as manholes, air vents, hydrants, valve boxes, blowoffs, cleanouts, and the like.
6. Depth from rim of valve box to top of operating nut on all valves, and length of valve extensions installed.
7. Sizes and types of materials used and changes in sizes and types of materials. Rims and inverts of all manholes installed or tied into shall be provided.
8. Location of all sleeves, bends, and other fittings including method of restraint used; for example, thrust block, retainer glands, tie rods, and the like.
9. The Record Documents are a specific contract requirement of the Contractor. Final payment will not be issued until said documents have been submitted to the Engineer in an acceptable form.

B. Owner's Manuals: Not applicable.

## 2.2 WARRANTIES

A. Three (3) copies of all warranties shall be submitted prior to substantial completion.

## 2.3 TRAINING

- A. CONTRACTOR shall provide a written schedule of all training that will be provided to the OWNER to be reviewed and approved, a minimum of 1 month before the first scheduled training session.
- B. Training shall consist of, at a minimum, the level of training as recommended by the manufacturers of the equipment to be installed.
- C. CONTRACTOR shall give the OWNER at least 2 weeks advance notice of each anticipated training session to allow for proper personnel to be present at the training.
- D. The OWNER reserves the right to request specific training on equipment as he deems necessary for the successful transfer of ownership of the equipment from the CONTRACTOR to the OWNER.

## CLOSEOUT PROCEDURES

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- E. All training shall be completed prior to issuance of Substantial Completion.

## **PART 3- EXECUTION**

### **3.1 SUBSTANTIAL COMPLETION PROCEDURES**

- A. Owner's Use: The following procedures are to be applied towards OWNER'S utilizing the Project:
  - 1. Initial Punch List: Within a reasonable time after receipt from CONTRACTOR of a comprehensive list of items which need to be completed or corrected, the ENGINEER will determine status of completion.
  - 2. Incomplete Work: Should ENGINEER determine that the WORK is not substantially complete:
    - a. Notification: ENGINEER will promptly so notify CONTRACTOR, in writing, given the reasons therefore. Contractor Remedy: CONTRACTOR shall promptly remedy the deficiencies and notify ENGINEER when ready for inspection.
    - b. Additional Cost: The cost of re-inspection for Substantial Completion will be borne by CONTRACTOR.
  - 3. Completed Work: When ENGINEER concurs that the WORK is substantially complete:
    - a. Engineer's Acceptance: ENGINEER will submit the Certificate to OWNER and to CONTRACTOR for their written acceptance of the responsibilities assigned to them in the Certificate.
  - 4. Occupancy: Upon Substantial Completion, CONTRACTOR shall obtain a temporary Certificate of Occupancy or other permission from the inspecting authority for OWNER to begin moving in its equipment and furnishings.

### **3.2 INSTRUCTIONS TO OWNER**

- A. Operation and Maintenance: CONTRACTOR shall instruct OWNER or its authorized representative in the proper operation and maintenance of all elements of the Project systems as specified.

### **3.3 CLEAN-UP/RESTORATION**

- A. Definition: Except as otherwise specifically provided, "clean" (for the purpose of this Section) shall be interpreted as meaning the level of cleanliness generally provided by VDOT roadway construction projects.
- B. General: Prior to completion of the WORK, remove from the job site all tools, surplus materials, equipment, scrap, debris, and waste. Conduct final progress cleaning as

#### **CLOSEOUT PROCEDURES**

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described above. Restore all disturbed areas to a condition equal to or better than that prior to construction.

- C. Site: Unless otherwise specifically directed by ENGINEER, hose down all paved areas on the site. Completely remove all resultant debris.
- D. Structure: Perform the following:
  - 1. Exterior: Visually inspect all exterior surfaces and remove all traces of soil, waste material, smudges, and other foreign matter. Remove all traces of splashed materials from adjacent surfaces. If necessary to achieve a uniform degree of exterior cleanliness, hose down the exterior of the structure. In the event of stubborn stains not removable with water, ENGINEER may require light sandblasting or other cleaning at no additional cost to OWNER.
  - 2. Interior: Visually inspect all interior surfaces and remove all traces of soil, waste material, smudges, and other foreign matter. Remove all traces of splashed materials from adjacent surfaces. Remove all paint droppings, spots, stains, and dirt from finished surfaces. Use only the specified cleaning materials and equipment.
- E. Timing: Schedule final cleaning as approved by ENGINEER, to enable OWNER to receive a completely clean Project.

### 3.4 FINAL COMPLETION

- A. Notification: Prepare and submit to ENGINEER a written notice that the Project is complete and ready for final inspection and acceptance.
- B. Releases/Consent of Surety: Contractor shall forward a completed "Release of Liens", "Release and Waiver of Debts and Claims" and "Consent of Surety" to ENGINEER prior to Final Payment.
- C. Verification: Verify that the WORK is complete.
- D. Certification: CONTRACTOR shall certify that:
  - 1. Review: Contract Documents have been reviewed
  - 2. Inspection: WORK has been inspected for compliance with the Contract Documents.
  - 3. Completeness: WORK has been completed in accordance with the Contract Documents.
  - 4. Testing: Equipment and systems have been tested as required, and are operational.
  - 5. Final Inspection: WORK is completed and ready for final inspection.

- E. Incomplete Determination: Should ENGINEER determine that the WORK is incomplete or defective:
  - 1. Notification: ENGINEER will promptly so notify CONTRACTOR, in writing, listing the incomplete or defective WORK.
  - 2. Contractor Remedy: CONTRACTOR shall remedy the deficiencies promptly, and notify ENGINEER when ready for inspection.
  - 3. Additional Cost: The cost of re-inspection for Final Completion will be borne by CONTRACTOR.
- F. Acceptance: When ENGINEER determines that the WORK is acceptable under the Contract Documents, it will request the final Application for Payment from CONTRACTOR.
- G. Reimbursement: CONTRACTOR shall reimburse OWNER for all trips to the Project site by ENGINEER after Substantial Completion in excess of two (2) trips if such excess trips are necessitated due to the Project's remaining incomplete.
- H. Retainage: Retainage will be released per the provisions of the Contract Documents.

### 3.5 FINAL PAYMENT

- A. Application: Submit a final Application for Payment to ENGINEER, showing all adjustments to the agreed to sum.
- B. Change Order: If so required, ENGINEER will prepare a final Change Order showing adjustments to the AGREEMENT which were not made previously by Change Orders.

**END OF SECTION 01770**

## SECTION 017839 - PROJECT RECORD DOCUMENTS

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. Section includes administrative and procedural requirements for project record documents, including the following:
  - 1. Record Drawings.
  - 2. Record Product Data.
- B. Related Requirements:
  - 1. Section 017300 "Execution" for final property survey.
  - 2. Section 017700 "Closeout Procedures" for general closeout procedures.
  - 3. Section 017823 "Operation and Maintenance Data" for operation and maintenance manual requirements.

#### 1.3 CLOSEOUT SUBMITTALS

- A. Record Drawings: Comply with the following:
  - 1. Number of Copies: Submit one set(s) of marked-up record prints.
- B. Record Product Data: Submit one paper copy of each submittal.
  - 1. Where record Product Data are required as part of operation and maintenance manuals, submit duplicate marked-up Product Data as a component of manual.

### PART 2 - PRODUCTS

#### 2.1 RECORD DRAWINGS

- A. Record Prints: Maintain one set of marked-up paper copies of the Contract Drawings and Shop Drawings, incorporating new and revised drawings as modifications are issued.
  - 1. Preparation: Mark record prints to show the actual installation where installation varies from that shown originally. Require individual or entity who obtained record data, whether individual or entity is Installer, subcontractor, or similar entity, to provide information for preparation of corresponding marked-up record prints.

- a. Give particular attention to information on concealed elements that would be difficult to identify or measure and record later.
  - b. Accurately record information in an acceptable drawing technique.
  - c. Record data as soon as possible after obtaining it.
  - d. Record and check the markup before enclosing concealed installations.
- 2. Content: Types of items requiring marking include, but are not limited to, the following:
  - a. Dimensional changes to Drawings.
  - b. Revisions to details shown on Drawings.
  - c. Locations and depths of underground utilities.
  - d. Revisions to routing of piping and conduits.
  - e. Revisions to electrical circuitry.
  - f. Actual equipment locations.
  - g. Changes made by Change Order or Work Change Directive.
  - h. Changes made following Engineer's written orders.
  - i. Details not on the original Contract Drawings.
  - j. Field records for variable and concealed conditions.
  - k. Record information on the Work that is shown only schematically.
- 3. Mark the Contract Drawings and Shop Drawings completely and accurately. Use personnel proficient at recording graphic information in production of marked-up record prints.
- 4. Mark record sets with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at same location.
- 5. Mark important additional information that was either shown schematically or omitted from original Drawings.
- 6. Note Construction Change Directive numbers, alternate numbers, Change Order numbers, and similar identification, where applicable.
- B. Format: Identify and date each record Drawing; include the designation "PROJECT RECORD DRAWING" in a prominent location.
  - 1. Record prints: Organize record prints and newly prepared record Drawings into manageable sets. Bind each set with durable paper cover sheets. Include identification on cover sheets.
  - 2. Identification: As follows:
    - a. Project name.
    - b. Date.
    - c. Designation "PROJECT RECORD DRAWINGS."
    - d. Name of Engineer.
    - e. Name of Contractor.

## PART 3 - EXECUTION

### 3.1 RECORDING AND MAINTENANCE

- A. Recording: Maintain one copy of each submittal during the construction period for project record document purposes. Post changes and revisions to project record documents as they occur; do not wait until end of Project.



- B. Maintenance of Record Documents and Samples: Store record documents and Samples in the field office apart from the Contract Documents used for construction. Do not use project record documents for construction purposes. Maintain record documents in good order and in a clean, dry, legible condition, protected from deterioration and loss. Provide access to project record documents for Engineer's reference during normal working hours.

END OF SECTION 017839

## SECTION 024119 - SELECTIVE DEMOLITION

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. Section Includes:

- 1. Demolition and removal of selected portions of waterline.
  - 2. Abandonment of waterline in place.

- B. Related Requirements:

- 1. Section 011000 "Summary" for restrictions on the use of the premises, Owner and Resurgence Properties occupancy requirements, and phasing requirements.

#### 1.3 DEFINITIONS

- A. Remove: Detach items from existing construction and legally dispose of them off-site unless indicated to be removed and salvaged or removed and reinstalled.
- B. Remove and Reinstall: Detach items from existing construction, prepare for reuse, and reinstall where indicated.
- C. Existing to Remain: Existing items of construction that are not to be permanently removed and that are not otherwise indicated to be removed, removed and salvaged, or removed and reinstalled.

#### 1.4 MATERIALS OWNERSHIP

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

#### 1.5 INFORMATIONAL SUBMITTALS

- A. Schedule of Selective Demolition Activities: Deliver sequence of demolition including anticipated means and methods for review prior to starting demolition activities.

## 1.6 CLOSEOUT SUBMITTALS

- A. Landfill Records: Indicate receipt and acceptance of hazardous wastes by a landfill facility licensed to accept hazardous wastes.

## 1.7 FIELD CONDITIONS

- A. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.
- B. Notify Engineer of discrepancies between existing conditions and Drawings before proceeding with selective demolition.
- C. If hazardous materials are encountered, notify the Owner immediately.
- D. Storage or sale of removed items or materials on-site is not permitted.
- E. Utility Service: Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations. Contractor shall be responsible for providing all temporary utilities necessary to perform work or as a result of damage incurred to utilities during work. Contractor shall repair all utilities damaged during construction to the satisfaction of the Owner at his expense.

## PART 2 - PRODUCTS

### 2.1 PERFORMANCE REQUIREMENTS

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

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Prior to excavation, locate all utilities and report any conflicts to the Engineer in writing prior to excavation. Location and protection of existing utilities shall be the responsibility of the Contractor.
- B. Verify that utilities have been disconnected, isolated and capped as necessary before starting selective demolition operations.
- C. Review record documents of existing construction provided by Owner. Owner does not guarantee that existing conditions are same as those indicated in record documents. Contractor

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is responsible for verifying all field conditions to his satisfaction prior to performing demolition activities.

- D. Survey existing conditions and correlate with requirements indicated to determine extent of selective demolition required.
- E. When unanticipated mechanical, electrical, or structural elements that conflict with intended function or design are encountered, investigate and measure the nature and extent of conflict. Promptly submit a written report to Engineer.

### 3.2 UTILITY SERVICES AND MECHANICAL/ELECTRICAL SYSTEMS

- A. Existing Services/Systems to Remain: Maintain services/systems indicated to remain and protect them against damage.
  - 1. Comply with requirements for existing services/systems interruptions specified in Section 011000 "Summary."
- B. Existing Services/Systems to Be Removed, Relocated, or Abandoned: Locate, identify, disconnect, and seal or cap off indicated utility services and mechanical/electrical systems serving areas to be selectively demolished.
  - 1. Owner will arrange to shut off indicated services/systems when requested by Contractor.
  - 2. Arrange to shut off indicated utilities with utility companies.
    - a. The existing 6" gas line can only be shut off during extreme emergency and should be coordinated with Southwestern Virginia Gas. Point of contact is Brian Hairfield, 276.732.4580.
  - 3. If services/systems are required to be removed, relocated, or abandoned, provide temporary services/systems that bypass area of selective demolition and that maintain continuity of services/systems to other parts of the facilities.

### 3.3 PREPARATION

- A. Site Access and Temporary Controls: Conduct selective demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.
  - 1. Comply with requirements for access and protection specified in Section 015000 "Temporary Facilities and Controls" and Section 011000 "Summary".
- B. Temporary Facilities: Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.
  - 1. Provide protection to ensure safe passage of people and operating personnel around selective demolition area.
  - 2. Provide temporary weather protection, during interval between selective demolition of existing utility and installation of new utility.
  - 3. Provide all temporary shoring for trench excavation.

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### 3.4 SELECTIVE DEMOLITION, GENERAL

- A. General: Demolish and remove existing facilities as indicated on the Contract Drawings and described in the Specifications. Use methods required to complete the Work within limitations of governing regulations and as follows:
  - 1. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. Use hand tools or small power tools designed for sawing or grinding, not hammering and chopping, to minimize disturbance of adjacent surfaces. Temporarily cover openings to remain.
- B. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during selective demolition.

### 3.5 HAZARDOUS MATERIALS

- A. While hazardous materials are not expected to be present except as indicated, the Owner reserves the right to negotiate removal of identified hazardous materials by the Contractor as described in Section 003126 "Existing Hazardous Materials Information" under award of this Contract.
- B. In the event hazardous materials are discovered, Contractor shall take all precautions to remove materials in accordance with abatement industry standard demolition practices.
- C. Removal of all identified asbestos containing materials shall be performed by a Contractor or Subcontractor licensed for asbestos abatement in the state of Virginia.
- D. Any pipe containing asbestos material within VDOT's right-of-way that is scheduled to be abandoned must be removed.
  - 1. VDOT is to receive copies of disposal manifests related to the removal of asbestos pipe within VDOT's right-of-way.
- E. Contractor shall provide all materials, equipment and labor to perform the work in accordance with standard abatement practices including but not limited to: sampling, testing, isolating work area, demolition, collection of materials, transport and final disposal of materials in a hazardous materials approved landfill.

### 3.6 DEMOLITION/ABANDONMENT OF EXISTING UTILITY

- A. The Contractor shall completely demolish and remove the existing utility where new utility is being installed within the existing alignment.
  - 1. Excavate pipe section to be demolished to an elevation below the bottom of the pipe, shoring trenching as required. Demolish pipe in small sections. Using power-driven saw or similar cutting device, cut pipe out and protect limits to remain. Dislodge pipe segments from adjacent segments at joints and then remove demolished segments.
- B. For segments where parallel utilities are being installed, the existing utility shall be demolished and removed completely or abandoned in place.

#### SELECTIVE DEMOLITION

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- C. Abandonment in place shall be performed utilizing one (1) of the following methods:
  - 1. Abandon in place where indicated on the plans.
  - 2. Installation of a low-psi flowable fill grout within the existing pipe. All voids shall be completely filled in a manner which does not allow depressions to form within the soil as the pipe material continues to deteriorate.

### 3.7 DISPOSAL OF DEMOLISHED MATERIALS

- A. General: Except for items or materials indicated to be reused, salvaged, reinstalled, or otherwise indicated to remain Owner's property, remove demolished materials from Project site and legally dispose of them in an EPA-approved landfill.
  - 1. Do not allow demolished materials to accumulate on-site.
  - 2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
- B. Burning: Do not burn demolished materials.
- C. Disposal: Transport demolished materials off Owner's property and legally dispose of them. Contractor shall be responsible for all costs including but not limited to transportation and labor costs and all disposal fees.

### 3.8 CLEANING

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

### 3.9 SELECTIVE DEMOLITION SCHEDULE

- A. Existing Construction to Be Removed: Segment of collapsed (and/or with excess ovality) 42" CMP or as noted on the Contract Drawings.
- B. Existing Debris to Be Removed: Remove existing construction debris within the slope in its entirety within the limits noted on the drawings and as necessary to perform work in accordance with the design intent.

END OF SECTION 024119

**SECTION 033300**  
**CAST-IN-PLACE CONCRETE**

**PART 1- GENERAL**

**1.1 RELATED DOCUMENTS**

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

**1.2 SUMMARY**

- A. This Section specifies cast-in place concrete, including formwork, reinforcement, concrete materials, mixture design, placement procedures, and finishes, for the following:
  - 1. Footings.
  - 2. Foundation and Retaining walls.
  - 3. Slabs-on-grade.
  - 4. Suspended slabs.
  - 5. Building frame members.

**1.3 SUBMITTALS**

- A. Submittals shall be in accordance with Division 1.
- B. Product Data: For each type of product indicated.
- C. 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.
- D. 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.
- E. Formwork Shop Drawings: Prepared by or under the supervision of a qualified professional engineer detailing fabrication, assembly, and support of formwork.
- F. 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. Bonding agents.
  - 8. Adhesives.

9. Vapor barriers.
10. Repair materials.

#### 1.4 QUALITY ASSURANCE

- A. Installer Qualifications: An experienced installer who has completed concrete Work similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.
- B. Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C 94 requirements for production facilities and equipment. Manufacturer shall be certified according to NRMCA's "Certification of Ready Mixed Concrete Production Facilities".
- C. Testing Agency Qualifications: An independent agency, qualified according to ASTM C 1077 and ASTM E 329 for testing indicated, as documented according to ASTM E 548.
  1. Personnel conducting field tests shall be qualified as ACI Concrete Field Testing Technician, Grade 1, according to ACI CP-01 or an equivalent certification program.
  2. Personnel performing laboratory tests shall be ACI-certified Concrete Strength Testing Technician and Concrete Laboratory Testing Technician - Grade I. Testing Agency laboratory supervisor shall be an ACI-certified Concrete Laboratory Testing Technician - Grade II.
- D. 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.
- E. ACI Publications: Comply with the following unless modified by requirements in the Contract Documents:
  1. ACI 301, "Specification for Structural Concrete," Sections 1 through 5.
  2. ACI 117, "Specifications for Tolerances for Concrete Construction and Materials".
- F. Concrete Testing Service: Engage a qualified independent testing agency to perform material evaluation tests and to design concrete mixtures.

#### 1.5 DELIVERY, STORAGE, AND HANDLING

- A. Steel Reinforcement: Deliver, store, and handle steel reinforcement to prevent bending and damage.
- B. Waterstops: Store waterstops under cover to protect from moisture, sunlight, dirt, oil, and other contaminants.



## **PART 2- PRODUCTS**

### **2.1 MANUFACTURERS**

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

### **2.2 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. Exterior-grade plywood panels, suitable for concrete forms, complying with DOC PS 1, and as follows:
    - a. Medium-density overlay, Class 1 or better; mill-release agent treated 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. Forms for Cylindrical Columns, Pedestals, and Supports: Metal, glass-fiber-reinforced plastic, paper, or fiber tubes that will produce surfaces with gradual or abrupt irregularities not exceeding specified formwork surface class. Provide units with sufficient wall thickness to resist plastic concrete loads without detrimental deformation.
- D. Void Forms: Biodegradable paper surface, treated for moisture resistance, structurally sufficient to support weight of plastic concrete and other superimposed loads.
- E. Chamfer Strips: Wood, metal, PVC, or rubber strips, 3/4 by 3/4 inch, minimum.
- F. Rustication Strips: Wood, metal, PVC, or rubber strips, kerfed for ease of form removal.
- G. 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. Formulate form-release agent with rust inhibitor for steel form-facing materials.
- H. 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 dampproofing or waterproofing.

## 2.3 STEEL REINFORCEMENT

- A. Reinforcing Bars: ASTM A 615, Grade 60, deformed.
- B. Plain-Steel Wire: ASTM A 82.
- C. Plain-Steel Welded Wire Reinforcement: ASTM A 185, plain, fabricated from as-drawn steel wire into flat sheets.

## 2.4 REINFORCEMENT ACCESSORIES

- A. Joint Dowel Bars: ASTM A 615, 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.

## 2.5 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. Supplement with the following:
    - a. Fly Ash: ASTM C 618, Class F.
- 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 inch nominal unless noted otherwise. Use 3/4 inch nominal at floor slabs.
  2. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.
- C. Water: ASTM C 94 and potable.

## 2.6 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 calcium chloride.
  - 1. Water-Reducing Admixture: ASTM C 494, Type A.
  - 2. Retarding Admixture: ASTM C 494, Type B.
  - 3. Water-Reducing and Retarding Admixture: ASTM C 494, Type D.
  - 4. High-Range, Water-Reducing Admixture: ASTM C 494, Type F.
  - 5. High-Range, Water-Reducing and Retarding Admixture: ASTM C 494, Type G.
  - 6. Plasticizing and Retarding Admixture: ASTM C 1017, Type II.

## 2.7 WATERSTOPS

- A. Flexible PVC Waterstops: CE CRD-C 572, for embedding in concrete to prevent passage of fluids through joints. Factory fabricate corners, intersections, and directional changes.
  - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
    - a. BoMetals, Inc.
    - b. Greenstreak.
    - c. Paul Murphy Plastics Company.
    - d. Vinylex Corp.
  - 2. Profile: Flat, dumbbell without center bulb.
  - 3. Dimensions: 6 inches by 3/8 inch thick; nontapered.
- B. Self-Expanding Butyl Strip Waterstops: Manufactured rectangular or trapezoidal strip, butyl rubber with sodium bentonite or other hydrophilic polymers, for adhesive bonding to concrete, 3/4 by 1 inch.
  - 1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
    - a. Carlisle Coatings & Waterproofing, Inc.; MiraSTOP.
    - b. CETCO; Volclay Waterstop-RX.
    - c. Concrete Sealants Inc.; Conseal CS-231.
    - d. Greenstreak; Swellstop.
    - e. Henry Company, Sealants Division; Hydro-Flex.

- f. JP Specialties, Inc.; Earth Shield Type 20.

## 2.8 VAPOR BARRIERS

- A. Plastic Vapor Barrier: ASTM E 1745, Class A with a Perm Rating less than or equal to 0.012 perms (grains / (ft<sup>2</sup> \*hr \*in. Hg)) as tested by ASTM E 96.
  - 1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
    - a. Stego Wrap (15 mil) Vapor Barrier by Stego Industries, LLC.
    - b. Perminator (15 mil) by W.R. Meadows.
    - c. Vaporguard by Reef Industries.
- B. Vapor Barrier Accessories:
  - 1. Seal Tape: Water vapor transmission rate per ASTM E 96 of 0.3 perms or less.
  - 2. Vapor Proofing Mastic: Water vapor transmission rate per ASTM E 96 of 0.3 perms or less.
  - 3. Pipe Boots: Construct pipe boots from vapor barrier material, pressure sensitive tape and/or mastic per manufacturer's instructions.

## 2.9 CURING MATERIALS

- A. Evaporation Retarder: Waterborne, monomolecular film forming, manufactured for application to fresh concrete.
  - 1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
    - a. Axim Concrete Technologies: Cimfilm.
    - b. Burke by Edoco: BurkeFilm.
    - c. Dayton Superior Corporation: Sure Film.
    - d. Euclid Chemical Company (The): Eucobar.
    - e. Kaufman Products, Inc.: Vapor Aid.
    - f. MBT Protection and Repair: Div. of ChemRex; Confilm.
    - g. Meadows, W. R., Inc.: Sealtight Evapre.
    - h. Metalcrete Industries: Waterhold.
    - i. Nox-Crete Products Group, Kinsman Corporation: Monofilm.
    - j. Sika Corporation, Inc.: SikaFilm.
- B. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.
- C. Water: Potable.
- D. Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B, dissipating.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
  - a. Anti-Hydro International, Inc.: AH Curing Compound #2 DR WB.
  - b. Burke by Edoco: Aqua Resin Cure.
  - c. ChemMasters: Safe-Cure Clear.
  - d. Dayton Superior Corporation: Day Chem Rez Cure (J-11-W).
  - e. Euclid Chemical Company (The): Kurez DR VOX.
  - f. Kaufman Products, Inc.: Thinfil 420.
  - g. Lambert Corporation: Aqua Kure-Clear.
  - h. Meadows, W. R., Inc.: 1100 Clear.
  - i. Nox-Crete Products Group: Kinsman Corporation; Resin Cure E.
  - j. Unitex: Hydro Cure 309.
  
- E. Clear, Waterborne, Membrane-Forming Curing and Sealing Compound: ASTM C 1315, Type 1, Class A.
  1. Available Products:
    - a. Burke by Edoco: Cureseal 1315 WB.
    - b. ChemMasters: Polyseal WB.
    - c. Euclid Chemical Company (The): Super Diamond Clear VOX.
    - d. Kaufman Products, Inc.: Sure Cure 25 Emulsion.
    - e. Lambert Corporation: UV Safe Seal.
    - f. Meadows, W. R., Inc.: Vocomp-30.
    - g. Metalcrete Industries: Metcure 30.
    - h. Symons Corporation, a Dayton Superior Company: Cure & Seal 31 Percent E.
    - i. Tamms Industries, Inc.: LusterSeal WB 300.
    - j. US Mix Products Company: US Spec Radiance UV-25.

## 2.10 RELATED MATERIALS

- A. Expansion- and Isolation-Joint-Filler Strips: ASTM D 1751, asphalt-saturated cellulosic fiber or ASTM D 1752, cork or self-expanding cork.
- B. Semirigid Joint Filler: Two-component, semirigid, 100 percent solids, aromatic polyurea with a Type A shore durometer hardness range of 90 to 95 per ASTM D 2240.
- C. Bonding Agent: ASTM C 1059, Type II, non-redispersible, acrylic emulsion or styrene butadiene.
- D. 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.
- E. 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

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of concrete or debris.

- F. High-Strength Epoxy Doweling System: Epoxy doweling system shall consist of an injectable two-part epoxy complying with the requirements of ASTM C881-90, Type IV, Grade 3, Class B and C except gel times. Epoxy doweling system shall be tested in accordance with ICC Acceptance Criteria 308 demonstrating compliance with the performance features of ACI 355.2. Epoxy doweling system shall have an ICC-ES Evaluation Report (ESR) indicating it is intended for use in normal weight concrete in Seismic Design Categories A and B. The epoxy doweling system shall be installed according to manufacturer's instructions.
1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
    - a. Hilti HY 150 MAX Epoxy Adhesive Anchoring System (ICC ESR-2262)
    - b. ITW Red Head EPCON G5 Adhesive Anchoring System (ICC ESR-1137)
    - c. Powers AC100+ Gold Adhesive Anchor System (ICC ESR-2582)
    - d. Simpson Strong-Tie SET-XP Epoxy Adhesive Anchors (ICC ESP-2508)

## 2.11 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 4,000 psi at 28 days when tested according to ASTM C 109.
- 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 5,000 psi at 28 days when tested according to ASTM C 109.

## 2.12 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: 20 percent.
- C. Limit water-soluble, chloride-ion content in hardened concrete to 0.30 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 water-reducing admixture in pumped concrete, concrete required to be watertight, and concrete with a water-cementitious materials ratio below 0.50.

## 2.13 CONCRETE MIXTURES FOR BUILDING ELEMENTS

- A. Footings: Proportion normal-weight concrete mixture as follows:
  1. Minimum Compressive Strength: 3,000 psi at 28 days.
  2. Slump Limit: 4 inches, plus or minus 1 inch.
  3. Air Content: 6 percent, plus or minus 1.5 percent at point of delivery for 1-inch nominal maximum aggregate size.
- B. Foundation Walls or Cantilevered Retaining Walls: Proportion normal-weight concrete mixture as follows:
  1. Minimum Compressive Strength: 4,000 psi at 28 days.

2. Maximum Water-Cementitious Materials Ratio: 0.45.
  3. Slump Limit: 4 inches plus or minus 1 inch. 8 inches for concrete with verified slump of 2 to 4 inches before adding high-range water-reducing admixture or plasticizing admixture.
  4. Air Content: 6 percent, plus or minus 1.5 percent at point of delivery for 1-inch nominal maximum aggregate size.
- C. Slabs-on-Grade: Proportion normal-weight concrete mixture as follows:
1. Minimum Compressive Strength: 4,000 psi at 28 days.
  2. Slump Limit: 4 inches, plus or minus 1 inch. 8 inches for concrete with verified slump of 2 to 4 inches before adding high-range water-reducing admixture or plasticizing admixture.
  3. Air Content: Do not allow air content of interior troweled finished floors to exceed 3 percent. For exterior slab-on-grade, air content of 6 percent, plus or minus 1.5 percent at point of delivery for 3/4-inch nominal maximum aggregate size.
- 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 interior troweled finished floors to exceed 3 percent.
- E. Building Frame Members: Proportion normal-weight concrete mixture as follows:
1. Minimum Compressive Strength: 4,000 psi at 28 days.
  2. Slump Limit: 4 inches, plus or minus 1 inch. 8 inches for concrete with verified slump of 2 to 4 inches before adding high-range water-reducing admixture or plasticizing admixture.
  3. Air Content: Air content of 6 percent, plus or minus 1.5 percent at point of delivery for 1-inch nominal maximum aggregate size.

## 2.14 FABRICATING REINFORCEMENT

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

## 2.15 CONCRETE MIXING

- A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete according to ASTM C 94 and ASTM C 1116, 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.
- B. Project-Site Mixing: Not allowed.

## **PART 3- EXECUTION**

### **3.1 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.
  1. Install keyways, reglets, recesses, and the like, for easy removal.
  2. Do not use rust-stained steel form-facing material.
- F. 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.

### 3.2 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 dovetail anchor slots in concrete structures as indicated.

### 3.3 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 beams, slabs, and other structural elements that supports weight of concrete in place until concrete has achieved at least 70 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 Architect.

### 3.4 VAPOR BARRIERS

- A. Plastic Vapor Barriers: Place, protect, and repair vapor retarders according to ASTM E 1643 and manufacturer's written instructions. Lap joints 6 inches and seal with manufacturer's recommended tape.

### 3.5 STEEL REINFORCEMENT

- A. General: Comply with CRSI's "Manual of Standard Practice" for placing reinforcement. 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.
- 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 in either direction. Lace overlaps with wire.

### 3.6 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 Architect.
  - 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 horizontal joints in walls and columns at underside of floors, slabs, beams, and girders and at the top of footings or floor slabs.
  - 4. Space vertical joints in walls as indicated. Locate joints beside piers integral with walls, near corners, and in concealed locations where possible.
  - 5. Use epoxy-bonding adhesive at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.
- C. Contraction Joints in Slabs-on-Grade: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least one-fourth of concrete thickness as follows:
  - 1. Grooved Joints: Form contraction joints after initial floating by grooving and finishing each edge of joint to a radius of 1/8 inch. Repeat grooving of contraction joints after applying surface finishes. Eliminate groover tool marks

on concrete surfaces.

2. Sawed Joints: Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch-wide joints into concrete when cutting action will not tear, abrade, or otherwise damage surface and before concrete develops random contraction cracks.
- D. Isolation Joints in Slabs-on-Grade: After removing formwork, install joint-filler strips at slab junctions with vertical surfaces, such as column pedestals, foundation walls, grade beams, and other locations, as indicated.
1. Extend joint-filler strips full width and depth of joint, terminating flush with finished concrete surface, unless otherwise indicated.
  2. Where joint is permanently exposed, terminate full-width joint-filler 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 joint-filler strips in lengths as long as practicable. Where more than one length is required, lace or clip sections together.
- E. 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.

### 3.7 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.

### 3.8 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. Before test sampling and 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 mixture.
- C. 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

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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.
- D. 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.
- E. 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.
- F. Hot-Weather Placement: Comply with ACI 305 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.

### 3.9 FINISHING FORMED SURFACES

- A. Rough-Formed Finish: As-cast concrete texture imparted by form-facing material with tie holes and defects repaired and patched. Remove fins and other projections that exceed specified limits on formed-surface irregularities.
  1. Apply to concrete surfaces not exposed to public view.
- 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 defects. Remove fins and other projections that exceed specified limits on formed-surface irregularities.
  1. Apply to concrete surfaces exposed to public view or surfaces to be covered with a coating or covering material applied directly to concrete.
- C. 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.

### 3.10 FINISHING FLOORS AND SLABS

- A. General: Comply with ACI 302.1R recommendations for screeding, restraighening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.
- B. 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 restraighening until surface is left with a uniform, smooth, granular texture.
  1. Apply float finish to surfaces to receive trowel finish.
- C. 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 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 3/16 inch.

- D. Trowel and Fine-Broom Finish: Apply a first trowel finish to surfaces where ceramic or quarry tile is to be installed by either thickset or thin-set method. While concrete is still plastic, slightly scarify surface with a fine broom.
  - 1. Comply with flatness and levelness tolerances for trowel finished floor surfaces.
- E. Broom Finish: Apply a broom finish to exterior concrete platforms, steps, and ramps, and elsewhere as indicated.
  - 1. Immediately after float finishing, slightly roughen trafficked surface by brooming with fiber-bristle broom perpendicular to main traffic route. Coordinate required final finish with Architect before application.

### 3.11 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.

### 3.12 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 308.1, by one or a combination of the following methods:
  - 1. 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. Use moisture-retaining covers to cure concrete surfaces to receive floor coverings.
    - b. Use moisture-retaining covers to cure concrete surfaces to receive penetrating liquid floor treatments.
    - c. 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.
  - 2. 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. Curing and Sealing Compound: Apply uniformly to floors and slabs indicated in a 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. Repeat process 24 hours later and apply a second coat. Maintain continuity of coating and repair damage during curing period.

### 3.13 JOINT FILLING

- A. Prepare, clean, and install joint filler according to manufacturer's written instructions.
  - 1. Defer joint filling until concrete has aged at least one month. Do not fill joints until construction traffic has permanently ceased.
- B. Remove dirt, debris, saw cuttings, curing compounds, and sealers from joints; leave contact faces of joint clean and dry.
- C. Install semirigid joint filler full depth in saw-cut joints and at least 2 inches deep in formed joints. Overfill joint and trim joint filler flush with top of joint after hardening.

### 3.14 CONCRETE SURFACE REPAIRS

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- A. Defective Concrete: Repair and patch defective areas when approved by Architect. Remove and replace concrete that cannot be repaired and patched to Architect'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 Architect.
- 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 Architect's approval, using epoxy adhesive and patching mortar.
- F. Repair materials and installation not specified above may be used, subject to Architect's approval.

### 3.15 FIELD QUALITY CONTROL

- A. Testing and Inspecting: Contractor shall engage a Special Inspector and a qualified independent testing and inspecting agency to perform field tests and inspections and prepare test reports per the requirements of the Statement of Special Inspections.
- B. Inspections:
1. Steel reinforcement placement.
  2. Verification of use of required design mixture.
  3. Curing procedures and maintenance of curing temperature.
  4. 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 shall be performed according to the following requirements:
1. Testing Frequency: Obtain a minimum of one (1) composite sample for each day's pour of each concrete mixture 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; 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; 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.
  - a. Cast and laboratory cure one set of four standard cylinder specimens for each composite sample.
6. Compressive-Strength Tests: ASTM C 39; test one laboratory-cured specimen at 7 days and two specimens at 28 days, and retain one specimen for later testing at 56 days if 28 day strength falls below the required specified strength.
  - a. A compressive-strength test shall be the average compressive strength from a set of two specimens obtained from same composite sample and tested at age indicated.
7. 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.
8. Test results shall be reported in writing to Architect, 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.
9. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by Architect but will not be used as sole basis for approval or rejection of concrete.
10. 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 Architect. Testing and inspecting agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42 or by other methods as

directed by Architect.

11. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
12. Correct deficiencies in the Work that test reports and inspections indicate dos not comply with the Contract Documents.

**END OF SECTION 033300**

## SECTION 223333 - FACILITY SANITARY SEWERS

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. Contractor shall provide and install all necessary manholes, fittings and all appurtenances to install the sanitary sewer in accordance with the Contract Documents. Final installation shall be structurally sound and fully functional in accordance with the design intent of the Engineer, meeting all requirements of the Contract Documents and requirements of jurisdictions having authority.
- B. Section Includes:
  - 1. Pipes.
  - 2. Manholes.
- C. Related Requirements:
  - 1. Division 31 Section "Earth Moving" for procedures to perform excavation and backfill of the sanitary sewer.
  - 2. Division 31 Section "Excavation Support and Protection (Trenching)" for requirements for temporary trench support systems.

#### 1.3 ACTION SUBMITTALS

- A. Shop Drawings:
  - 1. Manholes: Include plans, elevations, section, details, frames and covers, coating systems and all sealant materials.
  - 2. Sanitary Sewer Line: Include plans, elevations, section, details, fitting and all connections. Manufacturer's cut sheets shall be provided for all materials to be provided for use within the sanitary sewer installation.
  - 3. Contractor shall provide all required submittals supporting that all materials meet the requirements for American Iron and Steel certification.

#### 1.4 DELIVERY, STORAGE, AND HANDLING

- A. Protect pipe, pipe fittings, and seals from dirt, moisture and damage including but not limited to UV exposure, weather, mechanical damage, coating damage and liner damage.
- B. Handle manholes according to manufacturer's written rigging instructions.

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- C. All seals and gaskets shall be stored in a dark, dry environment until ready for installation.
- D. Pipe shall at no time be dragged or pulled into place. Pipe shall be supported from both ends and placed into final position so as not to damage the pipe material or any manufacturer applied coatings.
- E. Contractor shall repair or replace any damaged material or coating to like new condition in accordance to manufacturer's recommended repair method and as approved by the Engineer.

## 1.5 PROJECT CONDITIONS

- A. Interruption of Existing Sanitary Sewerage Service: Interruption of existing sewer collection services shall only occur after written approval is delivered to the Owner and Engineer and approved by the Owner and Engineer at their sole discretion. In the event it is deemed necessary to interrupt the existing sanitary sewer, the Contractor shall provide adequately sized bypass pumping facilities with acceptable redundancy in accordance with the Contract Documents to maintain continual operation of the existing gravity sewer.
- B. Interruption requests shall include the following:
  - 1. Description of need to interrupt services
  - 2. Description of temporary services to be provided during outage (i.e., bypass pumping plan)
- C. The Owner reserves the right to request that the Contractor provide alternative means and methods to achieve a satisfactory installation in lieu of approving bypass pumping as not reflected in the Contract Documents.

## PART 2 - PRODUCTS

### 2.1 DUCTILE IRON PIPING

- A. Ductile iron pipe shall be centrifugally cast and conform to ASTM A746 and AWWA C151/A21.51, Thickness Class 52.
- B. Joints and rubber gaskets shall conform to AWWA C111/A21.11, push-on type, unless shown otherwise on the Contract Drawings.
- C. Interior coating: Piping shall be provided with a manufacturer applied Protecto 401 ceramic epoxy liner or an equivalent Engineer approved lining system.
- D. Exterior Coating: Piping shall be provided with a manufacturer applied asphaltic coating in conformance with AWWA C151/A21.51.

### 2.2 PVC PIPE AND FITTINGS

- A. PVC Type PSM Sewer Piping:

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1. PVC, AWWA Pipe: PVC pipe with bell end with gasket, and with spigot end unless specified otherwise. The material shall equal or exceed cell class 12454 as defined in ASTM C1784
2. Pipe and Fittings: PVC Type PSM sewer pipe with bell-and-spigot ends for gasketed joints.
  - a. 4" to 15" PVC: shall conform to AWWA C905/ASTM 3034 (SDR 21)
  - b. 18" to 36" PVC: shall conform to AWWA C905/ASTM F679 (SDR 21)
3. The pipe shall be joined with an integral bell, bell-and-spigot-type rubber gasketed joint. Rubber gasket shall conform to ASTM F477. The rubber gasket shall be compressed radially on the pipe spigot to form a watertight seal in accordance with ASTM D3212.
4. Standard lengths shall be 20 feet plus or minus 1 inch.
5. Sections of pipe 6 inches long shall be subjected to a free falling type impact (20 pounds Type A) in accordance with ASTM D244 with no evidence of splitting or shattering (denting is not considered a failure).
6. Pipe shall be laid with Class 1 bedding conditions.
7. Fittings shall be made of PVC having a cell classification of 12454B or 12454C or as defined in ASTM D1784. Fabricated fittings with solvent-cemented components shall be made in accordance with ASTM D2855 and taking cognizance of ASTM F402.
  - a. Fittings shall be Harco Fittings (Harrington) or equal.
8. Air testing and deflection testing to be performed in accordance with the requirements of this section.

## 2.3 PIPE ACCESSORIES

- A. Fittings - Same size, material and class as pipe, molded or formed to suit pipe size and end design, in required tee, bends, elbows, cleanouts, reducers, couplings, adapters and other configurations required.
- B. Pipe Connections - When connecting dissimilar pipe materials or when connecting new pipe to existing pipe, the following connections shall be used:
  1. Rubber Adapter With Stainless Steel Shear Rings - Fernco Flexible Couplings by the General Engineering Company, Box 609, Frederick, MD 21701, or equal.
  2. Repair Clamp - Dresser Model 360 "All-Around" pipe repair clamps in stainless steel; or equal.
- C. Identification - Each pipe length, coupling, and fitting shall be clearly marked with:
  1. Manufacturer's name and trademark.
  2. Nominal pipe size and class.
  3. Material designation.
- D. Connections to Manholes - Provide rubber boot-type connectors with all stainless steel hardware as manufactured by NPC, Inc., Model Kor N' Seal; Press Seal Gasket Corporation, Model PSX; or equal.

## 2.4 SHOP TESTS

- A. All shop tests of pipe and pipe materials required by this section and/or the applicable ASTM/AWWA specifications shall be performed at the Contractor's expense.
- B. The manufacturer shall submit a performance affidavit certifying his product meets or exceeds these specifications and the applicable ANSI/ASTM and AWWA requirements. If required by the Engineer, certified test reports of prior tests shall be submitted with the performance affidavit.

- C. Tests shall be conducted at the pipe manufacturer's plant or when approved test facilities do not exist at the point of manufacture, the tests shall be conducted in certified private testing laboratories approved by the Engineer.
- D. All testing machines, gages, laboratory apparatus and other devices used for the required shop tests shall be in first class condition and accurately calibrated. Shop tests shall be conducted by qualified personnel.
- E. The Contractor shall submit to the Engineer the name or names of the proposed manufacturers of pipe for this project, including shop drawings of the proposed pipe and appurtenances. Each pipe manufacturer shall notify the Engineer and the Contractor when shop tests on the lot or lots of pipe for this project are to take place, allowing sufficient time for the Engineer to send a representative to witness the tests.
- F. Tests shall be conducted in accordance with the applicable ANSI/ASTM or AWWA specifications except as modified by these Specifications.
- G. Wherever in the appropriate ANSI/ASTM or AWWA Specification tests are required to be performed for all pipe furnished for this project, certified copies of all test (and retest) results shall be submitted jointly to the Engineer and the Contractor.
- H. Specific modifications and/or amendments to the applicable ASTM Specifications are as follows:
  - 1. Crushing Strength - Crushing strength tests shall be conducted using the 3-edge bearing method except that the lower bearing strips utilized in these tests may be of hardwood or hard rubber material complying with the applicable ASTM Specification, unless such option is precluded under the companion ASTM Specification which covers the pipe itself.
- I. Upon completion of shipment of the pipe furnished for this project, the pipe manufacturer shall provide the Engineer with a certificate, signed by an officer of the corporation or firm and witnessed by a notary public, attesting that the pipe and appurtenances furnished were manufactured and successfully tested in full accordance with these specifications and the applicable ASTM Specifications.
- J. Any section or lot of pipe, fittings or specials which does not meet the requirements of these specifications and the applicable ASTM/ANSI or AWWA Specifications under which the product is required to be manufactured, will be rejected.

## 2.5 MANHOLES

### A. Standard Precast Concrete Manholes:

- 1. Description: ASTM C 478 (ASTM C 478M), AASHTO M-199, precast, reinforced concrete, of depth indicated, with provision for sealant joints.
- 2. Diameter: as indicated on the plans
- 3. Ballast: Increase thickness of precast concrete sections or add concrete to base section, as required to prevent flotation.
- 4. Base Section: Listed below is the minimum thickness for floor slab and wall for different size manholes:

Manhole Diameter	Base Slab	Wall
48 inch	6-inch	5 inch
60 inch	8-inch	6 inch
72 inch	8-inch	7 inch
84 inch	8-inch	8 inch
96 inch	8-inch	8.5 inch



5. Riser Sections: Length to provide depth indicated.
6. Top Section: Eccentric-cone type unless concentric-cone or flat-slab-top type is indicated; with top of cone of size that matches grade rings.
7. Joint Sealant: ASTM C 990 (ASTM C 990M), bitumen or butyl rubber.
8. Resilient Pipe Connectors: ASTM C 923 (ASTM C 923M), standard boot type, cast into manhole walls, for each pipe connection.
9. Steps: ASTM A 615/A 615M, deformed, 1/2-inch (13-mm) steel reinforcing rods encased in ASTM D 4101, PP; wide enough to allow worker to place both feet on one step and designed to prevent lateral slippage off step. Cast or anchor steps into sidewalls at 12- to 16-inch (300- to 400-mm) intervals. Omit steps if total depth from floor of manhole to the top of the manhole is less than 60 inches (1500 mm).
10. Grade Rings: Reinforced-concrete rings, 6- to 9-inch (150- to 225-mm) total thickness, with diameter matching manhole frame and cover, and with height as required to adjust manhole frame and cover to indicated elevation and slope.
11. Manhole interior shall be coated with TNEMEC 434-5022 Perma-Shield H<sub>2</sub>S Modified Polyamide Epoxy coating system, Epoxytex CPP, Raven 405 or Engineer approved equal coating system. Coating system shall be applied at the time of MH manufacturing prior to shipment for new manholes. Contractor shall touch up finish in the field prior to time of installation. Contractor may elect to utilize a manufacturer certified coating applicator to apply coating system within the field. Flow management during installation will be there contractor's responsibility.
12. In lieu of utilizing circular manhole bases as indicated on the Construction Plans, the Contractor may elect to utilize the T-series manholes as produced by Tindall Corp or Engineer approved equal. Selection of manhole design shall consider deflection of the sewer necessary for installation within the existing easement. Provided manholes shall allow for proper tie in of the existing sewer collection lines and laterals. Contractor shall be responsible for field verifying these conditions within all existing manholes prior to ordering new manholes.

B. Manhole Frames and Covers:

1. Description: Ferrous; 24-inch (610-mm) ID by 7- to 9-inch (175- to 225-mm) riser, with 4-inch- (100-mm-) minimum-width flange and 26-inch- (660-mm-) diameter cover. Include indented top design with lettering cast into cover, using wording equivalent to "SANITARY SEWER."
2. Material: ASTM A 48 Class 35B gray iron unless otherwise indicated.
3. Manufacturers: Standard ring and cover shall be U.S. Foundry & Mfg. Corp. Item No. 710. Watertight frame and cover shall be Item No. 710 SGG or approved equal. Where American Iron and Steel certification is required, equivalent domestic products shall be provided.

## 2.6 CONCRETE

- A. General: Cast-in-place concrete complying with ACI 318, ACI 350/350R (ACI 350M/350RM), and the following:
1. Cement: ASTM C 150, Type II.
  2. Fine Aggregate: ASTM C 33, sand.
  3. Coarse Aggregate: ASTM C 33, crushed gravel.
  4. Water: Potable.

- B. Portland Cement Design Mix: 4000 psi (27.6 MPa) minimum, with 0.45 maximum water/cementitious materials ratio.
  - 1. Reinforcing Fabric: ASTM A 185/A 185M, steel, welded wire fabric, plain.
  - 2. Reinforcing Bars: ASTM A 615/A 615M, Grade 60 (420 MPa) deformed steel.
- C. Manhole Channels and Benches: Factory or field formed from concrete. Portland cement design mix, 4000 psi (27.6 MPa) minimum, with 0.45 maximum water/cementitious materials ratio. Include channels and benches in manholes.
  - 1. Channels: Concrete invert, formed to same width as connected piping, with height of vertical sides to three-fourths of pipe diameter. Form curved channels with smooth, uniform radius and slope.
    - a. Invert Slope: as shown on drawings.
  - 2. Benches: Concrete, sloped to drain into channel.
    - a. Slope: 4 percent.
    - b. Design Air Capacity: 98 scfm at 150 psig (kPa) differential pressure.

### PART 3 - EXECUTION

#### 3.1 EARTHWORK

- A. Excavating, trenching, and backfilling are specified in Section 312000 "Earth Moving."
- B. Provide all necessary excavation support as defined in Section 315000 "Excavation Support and Protection" and as necessary to perform a safe excavation.

#### 3.2 PIPING INSTALLATION

- A. General Locations and Arrangements: Drawing plans and details indicate general location and arrangement of underground sanitary sewer piping. Location and arrangement of piping layout take into account design considerations. Install piping as indicated, to extent practical. Where specific installation is not indicated, follow piping manufacturer's written instructions.
- B. Install piping beginning at low point, true to grades and alignment indicated with unbroken continuity of invert. Place bell ends of piping facing upstream. Install gaskets, seals, sleeves, and couplings according to manufacturer's written instructions for using lubricants, cements, and other installation requirements.
- C. Install manholes for changes in direction unless otherwise indicated.
- D. Install couplings where different materials of pipes are connected unless indicated otherwise on the drawings.
- E. Clear interior of piping and manholes of dirt and superfluous material as work progresses.
- F. Pipe shall not be deflected beyond the limits recommended by the manufacturer where excess stress is exerted on the material.
- G. Deflections shall not exceed 5% at any joint unless prior authorization has been given by the Engineer.

- H. Parallel sewers (including manholes) installed to be tied into the existing sanitary sewer shall be equipped with appropriate temporary protection to ensure extraneous dirt and debris cannot access the system. Protections provided shall be adequate to prevent unauthorized access by both persons and animal within the utility at the conclusion of construction until the sewer is placed into service. Protection systems shall be implemented in a manner which shall not damage the existing installation. All damage resulting from the temporary protection methods shall be the responsibility of the Contractor. The Contractor shall restore the system to like new condition following the directions of the manufacturer at his expense.

### 3.3 COUPLING INSTALLATION

- A. Clamp assemblies, tension bands and tightening mechanism shall be tested to withstand the manufacturer's required installation torque or a minimum of 60 in-lb (8.5 N-m) of applied torque without visible signs of failure.
- B. One coupling for each size or type shall be tested, unless otherwise specified or waived by the Engineer.
- C. Where there is a failure in the original test, the entire test shall be rerun and any failure shall be cause for rejection.
- D. The joint shall have sufficient flexibility to permit deflection in any direction of  $\frac{1}{4}$  deflection in/linear foot and shall show no visible leakage when so deflected while under an internal hydrostatic pressure of 4.3 psi (30KPa) for a period of 15 minutes.

### 3.4 MANHOLE INSTALLATION

- A. General: Install manholes complete with appurtenances and accessories indicated.
- B. Install precast concrete manhole sections with sealants according to ASTM C 891.
- C. Form continuous concrete channels and benches between inlets and outlet.
- D. Set tops of frames and covers flush with finished surface of manholes that occur in pavements. Set tops at elevation as indicated on the Contract Drawings.

### 3.5 CONCRETE PLACEMENT

- A. Place cast-in-place concrete according to ACI 318.

### 3.6 GRAVITY SEWER WATER TIGHTNESS TESTS

- A. General
  - 1. Sanitary sewer shall be tested for water tightness by one of the following methods:
    - a. Infiltration tests (pipe)
    - b. Vacuum Test (manhole)

2. Conditions under which each tests may be used and criteria for passing or failing are stated under the description of the respective test.
3. The Contractor shall provide the materials, labor and equipment to conduct all tests. All test methods shall be conducted after backfilling and the results submitted to Engineer. The Contractor may test the pipeline and manholes prior to backfilling to inform him of the condition of the installation. However, the results of testing taken prior to backfilling will not be accepted. Water for testing shall be provided by the Contractor.
4. Test sections shall be determined by the Engineer. Generally, a test section shall be one manhole and the downstream pipe to the inlet of the next manhole. Several such pipe sections shall be tested as one test section if directed by the Engineer.
5. All tests for record shall be conducted in the presence of the Engineer or his representative.
6. Test sections which fail any of the tests described herein shall be corrected and retested by the Contractor at no additional cost to the Owner.

B. Low Pressure Air (Pipe) and Ex-filtration Tests (Manhole)

1. Procedures:
  - a. Air testing-minimum time requirements for pipe: When the air test is specified, the Engineer shall give explicit instructions for conducting the test. The Contractor shall pressurize the line to at least 3.5 psi but not greater than 5 psi. Once stabilized, the Contractor shall measure the time it takes for the pressure to drop from 3.5 to 2.5 psi. The recommended time for a 1.0 psi air pressure drop from 3.5 to 2.5 psi is shown in Table II below. This data has been taken from Uni-Bell specification UNI-B-679, "Recommended Practice for Low Pressure Air Testing of Installed Sewer Pipe." Should any test on any section of pipeline disclose an air loss expense, locate and repair defective joints or pipe sections. After the repairs are completed, the pipeline shall be retested until the air loss rate is within the specified allowance.
  - b. Manhole Vacuum Testing: The installation and operation of vacuum equipment and indicating devices shall be in accordance with equipment specifications for which performance information has been provided by the manufacturer and approved by the Bureau.
    - 1) A measured vacuum of 10" of mercury shall be established in the manhole. The time for the vacuum to drop to drop to 9" of mercury shall be recorded. Acceptance standards for leakage shall be established from the elapsed time for a negative pressure change from 10" to 9" of mercury as shown in Table I below.
    - 2) If the manhole fails the test, necessary repairs shall be made and the vacuum test and repairs shall be repeated until the manhole passes the test.
    - 3) If a manhole joint mastic is completely pulled out during the vacuum test, the manhole shall be disassembled and the mastic replaced.

Table I. Minimum Test Time for Various Manhole Diameters

<b>Minimum Test Time for Various Manhole Diameters (Seconds)</b> <b>(from ASTM C1244)</b>							
<b>Manhole Depth</b>	<b>Manhole Diameter (ft)</b>						
<b>(ft)</b>	<b>4.0</b>	<b>4.5</b>	<b>5.0</b>	<b>5.5</b>	<b>6.0</b>	<b>7.0</b>	<b>8.0</b>
	<b>Time (seconds)</b>						
8	20	23	26	29	33	41	49
10	25	29	33	36	41	51	61
12	30	35	39	43	49	58	68
14	35	41	46	51	57	69	81
16	40	46	52	58	67	85	103
18	45	52	59	65	73	89	105
20	50	53	65	72	81	99	117
22	55	64	72	79	89	109	129
24	59	64	78	87	97	117	137
26	64	75	85	94	105	127	149
28	69	81	91	101	113	137	161

TABLE II

Specification time required for a 1.0 PSIG pressure drop for size and length of the pipe indicated for PVC sewer pipe.

1 Pipe Diameter (In.)	2 Minimum Time (min: Sec)	3 Length for Minimum Time (ft)	4 Time for Longer Length (sec)	Specification Time for Length (L) Shown (min:sec)							
				100 ft	150 ft	200 ft	250 ft	300 ft	350 ft	400 ft	450 ft
4	3:46	597	.380L	3:46	3:46	3:46	3:46	3:46	3:46	3:46	3:46
6	5:40	398	.854L	5:40	5:40	5:40	5:40	5:40	5:40	5:42	6:24
8	7:34	298	1.520L	7:34	7:34	7:34	7:34	7:36	8:52	10:08	11:24
10	9:26	239	2.374L	9:26	9:26	9:26	9:53	11:52	13:51	15:49	17:48
12	11:20	199	3.418L	11:20	11:20	11:24	14:15	17:05	19:56	22:47	25:38
15	14:10	159	5.342L	14:10	14:10	17:48	22:15	26:42	31:09	35:36	40:04
18	17:00	133	7.692L	17:00	19:13	25:38	32:03	38:27	44:52	51:16	57:41
21	19:50	114	10.470L	19:50	26:10	34:54	43:37	52:21	61:00	69:48	78:31
24	22:40	99	13.674L	22:47	34:11	45:34	56:58	68:22	79:46	91:10	102:33
27	25:30	88	17.306L	28:51	43:16	57:41	72:07	86:32	100:57	115:22	129:48
30	28:20	80	21.366L	35:37	53:25	71:13	89:02	106:50	124:38	142:26	160:15
33	31:10	72	25.852L	43:05	64:38	86:10	107:43	129:16	150:43	172:21	193:53
36	34:00	66	30.768L	51:17	76:55	102:34	128:12	153:50	179:29	205:07	230:46
42	39:48	57	41.883L	69:48	104:42	139:37	174:30	209:24	244:19	279:13	314:07
48	45:34	50	54.705L	91:10	136:45	182:21	227:55	273:31	319:06	364:42	410:17
54	51:02	44	69.236L	115:24	173:05	230:47	288:29	346:11	403:53	461:34	519:16
60	56:40	40	85.476L	142:28	312:41	284:55	356:09	427:23	498:37	569:60	641:04

END OF SECTION 333300

## SECTION 223345 – SANITARY SEWER MANHOLE REHABILITATION

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. The Contractor shall furnish all material, labor and special equipment required to accomplish the Work in accordance with these Specifications. The installation shall affect the relining of the existing brick manholes and shall result in a smooth, hard, strong and chemically inert interior finish, closely following the contours of the existing manhole.
- B. Work includes:
  - 1. Installation of trowelable, rapid-setting, cementitious repair mortar for existing manholes.
  - 2. Installation of a trowelable, aggregate reinforced, epoxy modified cementitious mortar for new manholes.
  - 3. Installation of corrosion-resistant, spray-applied, fiber reinforced high-build epoxy lining for all manholes.
- C. Cleaning, surface preparation, lining application and thicknesses shall be as specified herein and shall meet or exceed the lining manufacturer's requirements and recommendations. When the manufacturer's requirements and recommendations. When the manufacturer's minimum recommendations exceed the specified requirements, Contractor shall comply with the Manufacturer's minimum recommendations.
- D. Related Requirements:
  - 1. Section 333300 "Facility Sanitary Sewers" for manhole replacement requirements.

#### 1.3 COORDINATION

- A. Coordinate surface preparation of substrates to avoid later difficulty or delay in performing the work in this Section. Coordinate all CIPP liner rehabilitation work prior to lining of the manholes to eliminate damage to the manhole liner system.
- B. Review installation procedures as described in this Specification and as recommended by the manufacturer.
- C. All substrate surface preparation and lining application, including manhole resurfacing, to be completed by manufacturer's approved Applicator.

## 1.4 REFERENCES

- A. This Section contains references to the governing standards and documents listed below. They are a part of this Section as specified and modified; the current version shall apply unless otherwise noted. In case of conflict between the requirements of this section and those of the listed documents, the more stringent of the requirements shall prevail.

1. American Concrete Institute, (ACI)

- a. ACI 224.1R – Causes, Evaluation and Repair of Cracks in Concrete Structures
- b. ACI 301 – Specifications for Structural Concrete
- c. ACI 308R – Guide to Curing Concrete
- d. ACI 350 – Code Requirements for Environmental Engineering Concrete Structures and Commentary
- e. ACI 515 – A Guide to the use of Waterproofing, Dampproofing, Protective, and Decorative Barrier Systems for Concrete
- f. ACI 546.R – Concrete Repair Guide
- g. ACI 546.3R – Guide for the Selection of Materials for the Repair of Concrete

2. ASTM International, (ASTM)

- a. ASTM C 868 – Standard Test Method for Chemical Resistance of Protective Linings
- b. ASTM C 1583/1583M – Standard Test Method for Tensile Strength of Concrete Surfaces and the Bond Strength or Tensile Strength of Concrete Repair and Overlay Materials by Direct Tension (Pull-off Method)
- c. ASTM D 2794 – Standard Test Method for Resistance of Organic Linings to the Effects of Rapid Deformation (Impact)
- d. ASTM D 4060 – Standard Test Method for Abrasion Resistance of Organic Linings by the Taber Abraser
- e. ASTM D 4285 – Standard Test Method for Indicating Water or Oil in Compressed Air
- f. ASTM D 4263 – Standard Test Method for Indicating Moisture in Concrete by the Plastic Sheet Method
- g. ASTM D 4414 – Standard Practice for Measurement of Wet Film Thickness by Notch Gages
- h. ASTM D 6944 Standard Test Method for Measuring Humidity with a Psychrometer
- i. ASTM D 7682 – Standard Test Method for Replication and Measurement of Concrete Surface Profiles Using Replica Putty
- j. ASTM F 1869 – Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride
- k. ASTM F 2170 – Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes
- l. ASTM F 2414 – Standard Practice for Sealing Sewer Manholes Using Chemical Grouting

3. International Concrete Repair Institute, (ICRI)

- a. Guideline No. 310.1R – Guide for Surface Preparation for the Repair of Deteriorated Concrete Resulting from Reinforcing Steel Corrosion

- b. Guideline No. 310.2 – Selecting and Specifying Concrete Surface Preparation for Sealer, Linings, and Polymer Overlays
- 4. NACE International, (NACE)
  - a. NACE Publication 6D-173 – A Manual for Painter Safety
  - b. NACE SP0188 – Standard Practice for Discontinuity (Holiday) Testing of Protective Linings
  - c. NACE SP0892 – Standard Practice for Coatings and Linings over Concrete for Chemical Immersion and Containment Service
  - d. NACE No. 6/SSPC-SP13 – Surface Preparation of Concrete
- 5. Occupational Safety and health Administration, (OSHA)
  - a. Safety and health Standards (29 CFR 1910/1926)
- 6. SSPC: The Society for Protective Linings, (SSPC)
  - a. SSPC-SP13/NACE No. 6 – Surface Preparation of Concrete
  - b. SSPC-Guide 12 – Guide for Illumination of Industrial Painting Projects
- 7. Standard Practice for the Rapid Evaluation of Coatings and Linings by Severe Wastewater Analysis Test, (S.W.A.T.)
  - a. Corrosion Testing Laboratories, Inc., Newark, DE, USA. ([www.corrosionlab.com](http://www.corrosionlab.com)). Contact: Brad Krantz 302-454-8200.
  - b. RAE Engineering and Inspection, LTD., Edmonton, Alberta, CANADA. ([www.raeengineering.ca](http://www.raeengineering.ca)) Contact: Linda Gray 780-440-9391.
- B. Unless otherwise specified, references to documents shall mean the documents in effect at the time of receipt of Bids. If referenced documents have been discontinued by the issuing organization, references to those documents shall mean the replacement documents or the last version of the document before it was discontinued, whichever is most recent.

## 1.5 QUALITY ASSURANCE

- A. Applicator Qualifications:
  - 1. Contractor shall be a qualified Applicator by the corrosion protection lining manufacturer. Submit proof of acceptability of Applicator by manufacturer to Engineer for approval.
  - 2. For a manhole coating or lining product to be considered for this Contract, a minimum of 2,000 vertical feet of documented manhole rehabilitation must have been completed by the Contractor in the previous three (3) years, and a minimum of five (5) years of experience.
  - 3. In all cases a minimum of five (5) recent verifiable references of the Contractor's work is required, indicating the successful application of the coating system of the same type as specified herein or to be furnished by the Contractor and applied in a similar project environment as included in these contract specifications.
  - 4. Installation equipment shall be acceptable to the protective lining manufacturer.



5. Applicator to establish quality control procedures and practices to monitor phases of surface preparation, storage, mixing, application, and inspection throughout the duration of the project.
  6. Applicator's quality control procedures and practices must include the following items:
    - a. Training of personnel in the proper surface preparation requirements.
    - b. Training of personnel in the proper storing, mixing, and application and quality control testing of the linings.
- B. Coating System shall be of sufficient quality meeting the standards of this specification in addition to:
1. For all components of the coating system to be considered for this Contract, a minimum of three (3) years of successful installation history must be documented.
- C. Performance Criteria: The surfaces to receive the protective lining shall be capable of withstanding under constant exposure to raw wastewater, permeation from hydrogen sulfide and other sewer gases, and attack from organic acids generated by microbial sources. Products must have sufficient field history and accelerated laboratory testing to substantiate product viability for these exposures.
- D. Source Quality Control: Provide each component of protective lining produced by a single manufacturer.
- E. Reference Standards: Comply with applicable provisions and recommendations of all standards listed in Section 1.4 except as otherwise shown or specified.

## 1.6 LIABILITY

- A. In addition to liability requirements defined elsewhere in the Contract Documents, the Contractor will be held fully liable and shall repair any damage to manholes, laterals, piping, and personal property that is caused by the Contractor's negligence during the rehabilitation of the manholes.

## 1.7 SUBMITTALS

- A. The Contractor shall submit to the Owner or Owner's Engineer documentation which may include shop drawings, ASTM Standards, and manufacturer's data for the following items:
1. Product Data Sheets: Copies of current technical data for each component specified and applied as outlined in this Section.
  2. Material Safety Data Sheets: Copies of current MSDS for any materials brought on-site including all clean-up solvents, repair or resurfacing mortars and lining materials.
  3. Qualification Data: Approved Installer Training Certificates from manufacturer certifying Applicator.
  4. Performance Testing Reports: Copies of test data for the entire physical, chemical, and permeation properties listed herein and as outlined within this Section.
  5. Installation Instructions: Manufacturer's written installation instructions for the materials specified in this Section.
  6. Construction Details: Copies of manufacturer's computer generated standard lining details for specified materials.

7. Certificate indicating the applicator is factory trained and certified to apply the product.
8. Maintenance Manual: Upon completion of the Work, submit five (5) copies of corrosion protection lining manufacturer's written instructions for recommended maintenance practices. Include the following information:
  - a. Product name and number.
  - b. Name, address, e-mail address and telephone number of manufacturer and local representative.
  - c. Detailed procedures for routine maintenance and cleaning.
  - d. Detailed procedures for repairs.

- B. The submittal items listed above shall be submitted by Contractor to the Owner or Owner's Engineer after Notice of Award and prior to beginning the work.

## 1.8 PRODUCT DELIVERY, STORAGE AND HANDLING

### A. Delivery of Materials

1. Deliver materials in manufacturer's original, unopened and undamaged packages.
2. Clearly identify manufacturer's name, brand name, contents color, batch number and any personal safety hazards associated with the use of or exposure to the materials on each package.
3. Packages showing indications of damage that may affect condition of contents are not acceptable.

### B. Storage of Materials

1. Materials shall be stored in accordance with manufacturer's recommendations in enclosed structures and shall be protected from weather and adverse temperature conditions. Flammable materials shall be stored in accordance with state and local codes. Materials exceeding storage life as defined by the manufacturer shall be removed promptly from the site. Store all materials only in area or areas designated solely for this purpose.
2. Store in original packaging under protective cover and protect from damage.
3. Stack containers in accordance with manufacturer's recommendations.

### C. Handling of Materials

1. Handle materials in such a manner as to prevent damage to products or finishes.

## 1.9 JOB CONDITIONS

### A. Environmental Requirements

1. Proceed with corrosion protection lining Work only when temperature and moisture conditions of substrates, air temperature, relative humidity, dew point and other conditions comply with the corrosion protection lining manufacturer's written recommendations and when no damaging environmental conditions are forecasted for the time when the material

will be vulnerable to such environmental damage. Record all such conditions and include in report to the Owner.

2. Maintain substrate temperature and ambient temperature before, during and after installation above 50°F (10°C) and rising in accordance with protective lining material manufacturer's instructions.
3. Provide adequate ventilation during installation and full curing periods of the protective lining.
4. Protective lining shall not be applied when ambient air temperature is within 5°F (3°C) of the dew point and falling.
5. Protective Lining shall not be applied when relative humidity is outside of material manufacturer's recommendations. Do not prepare surfaces or apply materials in rain, snow, fog, mist, or otherwise inclement weather as per material manufacturer's instructions.

B. Dust and Contaminants

1. Protect work and adjacent areas from excessive dust and airborne contaminants during protective lining application and curing. Schedule Work to avoid excessive dust and airborne contaminants.

1.10 WARRANTY

- A. Protective Lining Manufacturer shall warranty its product as free from material defects for a minimum period of two (2) years. Provide associated Warranty Certificate.
- B. Contractor shall warranty the installed protective lining system as free from workmanship defects for a minimum period of two (2) years.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Protective Lining shall be comprised of:
  - a. Concrete/brick repair mortar or Epoxy resurfacer
  - b. Spray-applied, fiber-reinforced epoxy mortar
1. Cementitious Repair Mortar (existing manholes): Trowelable grade, rapid-setting, cementitious repair mortar when concrete/brick/mortar is deteriorated greater than a depth of ¼-inch (6.35 mm) and when recommended by the Manufacturer to rehabilitate and restore manhole and provide level substrate for application of the protective lining; or
2. Epoxy Resurfacer: Epoxy-polymer modified cementitious resurfacer (thin overlay) applied to new or existing manhole to a depth of ¼-inch (6.35 mm). Repair new or existing materials to fill all bugholes, surface imperfections and provide a uniform, level substrate for application of the protective lining; and
3. 100% aggregate reinforced epoxy mortar to provide a chemical, permeation, and abrasion resistant protective lining against physical and chemical attack phenomena typically associated with municipal wastewater headspace conditions; and

- B. Contractor shall provide all accessory components such as polysulfide sealants and curing compounds as recommended by the manufacturer for maximum protective lining adhesion to substrate, and long-term service performance.
- C. Cementitious Repair Mortar
  - 1. Shall be Tnemec Series 217 MortarCrete, Sauereisen F-121 Restokrete Resurfacer or equal.
  - 2. Installation Requirements:
    - a. Minimum Thickness: 1/4 inches
    - b. Maximum Thickness: 2.0 inches
  - 3. Shall be a cementitious repair mortar. Shall be a single-component, rapid setting, hydraulic cementitious resurfacer used to restore deteriorated concrete and brick surfaces.
- D. Epoxy Cementitious Resurfacer
  - 1. Shall be Tnemec Series 218 MortarClad, Sauereisen No. 208 Restokrete Epoxy Modified Resurfacer or equal.
  - 2. Installation Requirements:
    - a. Minimum Thickness: 1/16 inches
    - b. Maximum Thickness: 1/4 inches
  - 3. Shall be an epoxy modified cementitious mortar. Shall be a high-performance, aggregate reinforced material for surfacing, patching and filling voids and bugholes in concrete and brick substrates. Shall be compatible with specified topcoat system.
- E. 100% Aggregate Reinforced Epoxy Mortar
  - 1. Shall be Tnemec Series 434 Perma-Shield H<sub>2</sub>S, Sauereisen No. 210T Trowelable Sewergard Epoxy or equal.
  - 2. Installation Requirements:
    - a. Thickness: 125 mils DFT
  - 3. Shall be a modified aliphatic amine epoxy mortar. Shall be a 100% solids, hybrid epoxy mortar designed for severe wastewater immersion and fume environments. Specifically formulated to withstand high levels of hydrogen sulfide gas (H<sub>2</sub>S), sulfuric acid (H<sub>2</sub>SO<sub>4</sub>), as well as other gases common to sewer exposures. Aggregate reinforcement shall provide additional resistance to abrasions and impacts. Shall be compatible with specified topcoat system.

## PART 3 - EXECUTION

### 3.1 GENERAL

- A. Provide at least 48 hour notice to the Owner prior to start of work for Inspector to review and document materials and equipment to be used.
- B. All coatings shall be installed in accordance with the Manufacturer's written instructions.

### 3.2 PRE-INSTALLATION SUBMITTALS

- A. Provide all current documents from the coating system Manufacturer, certifying that the Contractor's training, the Contractor's personnel and equipment comply completely with their product Quality Assurance requirements.

### 3.3 WATER USE

- A. Potable water to be used for pipe and manhole cleaning processes may be obtained from the Owner's fire hydrants when available, at no cost to the Contractor. If hydrant water is not available the Contractor must provide other sources of water for the cleaning lining process at its own expense. The Contractor shall be responsible for obtaining all necessary fire hydrant permits. The Contractor shall provide all piping, hoses, valves, connections, or tank vehicles necessary to complete the Work.

### 3.4 PRECONSTRUCTION SUBMITTALS

- A. At least ten (10) days prior to beginning Work, the Contractor shall submit the following items for the Engineer's approval:
  - 1. A proposed Work schedule.
  - 2. Bypass pumping plan.
  - 3. Waste and debris disposal plan.
- B. A comprehensive construction sequencing plan. At minimum, the plan shall include:

### 3.5 MANHOLE PREPARATION

- A. Manhole cleaning shall be performed by the Contractor to remove all debris, dirt, oil, grease scale, deposits old coating material, and any other extraneous material from the manhole walls, bottom and all appurtenances.
- B. Cleaning methods shall be high velocity air cleaning methods capable of removing all debris, loose mortar and concrete.

- C. The Contractor shall have available a high pressure hand gun system to allow for washing and scouring all components of a manhole including corbels, walls, troughs and inverts. The gun shall also be capable of producing a range of water pressures both sufficient enough to completely clean designated manholes to the level specified and to the satisfaction of the Engineer, yet gentle enough not to displace existing brick and mortar in more deteriorated manholes.
- D. The Contractor shall dispose of all sanitary debris and material in a lawful manner. Debris shall be removed from site on a daily basis. The Contractor shall not be reimbursed for disposal costs.
- E. Handle cleaning water to prevent water and residue from causing damage.
- F. Do not discharge debris downstream through the sanitary sewer system.
- G. Filter solids-laden water through a de-silting device.
- H. Contractor shall be responsible for all costs associated with repairing all manholes damaged as a result of improper cleaning practices. If a manhole cannot be satisfactorily repaired, the Contractor shall be replace the manhole in its entirety at no cost to the Owner.
- I. Repair irregularities in manhole using materials, compatible with proposed resurfacing material, as recommended by the Manufacturer.
- J. Repair leakage in manhole using materials, compatible with proposed resurfacing material, specified in this specification.
- K. Trim and grout incoming laterals and pipes as required.

### 3.6 CEMENTITIOUS REPAIR MORTAR

- A. Grouting should only be performed on a structurally sound manhole unless the grout is used to prevent water from entering the manhole during application of a lining or coating system. All structural repairs, adjustments to the frame and cover and installation of grade rings shall be completed prior to beginning the grouting operation. Normal grouting operations shall be performed at the temperatures and humidity as recommended by the Manufacturer.
- B. Grouting applications may include sealing a manhole from infiltration/inflow prior to application of a coating system or other structural rehabilitation components or using the grout for sealing the entire manhole structure. If the entire manhole is to be sealed, grouting shall include corbel, wall, pipe seals, bench and invert as recommended by the Manufacturer of the grouting material.
- C. Drilling grout injection holes in the manhole in strategic locations to re-direct flow coming through cracks and other defects in the wall, or to seal the entire exterior surface of the manhole, shall be in accordance with the recommendations of the grout manufacturer.
- D. Grout shall be injected through the drilled holes using the recommended probe and applying pressures that will effectively inject the grout but, not cause damage to the manhole structure or the surrounding area.

- E. Grout typically shall be injected through the lowest holes first, working the grout higher until the manhole is externally sealed with grout. Additional holes may be required to verify that the grout has encompassed the entire outside of the manhole.
- F. The injection holes shall be cleaned and patched as recommended by the Manufacturer.
- G. Testing includes visual inspection by the Inspector to verify that all leakage into the manhole has been eliminated.

### 3.7 CEMENTITIOUS RESTORATION

- A. General:
  - 1. Before starting any patch work or liner application install a perforated device, catch bucket, or other straining device to prevent construction debris from entering the downstream sewer.
  - 2. Provide all materials, labor, equipment, etc. required to perform the work as recommended by the Manufacturer and as required by the Contract Documents.
  - 3. Inspect each manhole to determine method of stopping leaks and applying patch repairs.
  - 4. Promptly inform Owner of errors or discrepancies between the Contract Documents and the field conditions found, in order that changed conditions can be evaluated and revised directives issues in a timely manner.
  - 5. Install all products in accordance with manufacturer's instructions regarding surface preparation, product application and curing.
  - 6. Confirm that all material to be used for the rehabilitation of the manhole are compatible with each other. Do not use any materials that have not been verified for compatibility.
- B. Sealing Active Leaks:
  - 1. The work consists of hand applying a dry quick-setting cementitious mix designed to instantly stop running water or seepage in all types of concrete and masonry structures. The applicator shall apply material in accordance with manufacturer's recommendations in accordance with the following minimum specifications.
    - a. The area to be repaired must be clean and free of all debris per the guidelines set forth elsewhere in this specification.
    - b. Once cleaned, prepare crack or hole by chipping out loose material to a minimum depth recommended.
    - c. As recommended by the Manufacturer, place a generous amount of the dry quick-setting cementitious material to the active leak, with a smooth fast motion, maintaining external pressure for 30 seconds, repeat until leak is stopped.
    - d. Proper application should not require any special mixing of product or special curing requirements after application.
- C. Invert Repair
  - 1. The work consists of hand mixing and applying a rapid setting, high early strength, non-shrink patching material to fill all large voids and repair manhole channels prior to spray lining of the manhole. For invert repairs, flow must be temporarily restricted by inflatable or mechanical plugs and bypass pumping as necessary prior to cleaning.
    - a. The area to be repaired must be cleaned and free of all debris per the guidelines set forth in this specification.
    - b. Mix water shall be clean potable water and require no additives or admixtures for use with cementitious patching materials.

- c. Cementitious material shall be mixed in a mortar tub or 5 gallon pail with quantities, to avoid setting prior to placement in voids or channels.
- d. Once mixed to proper consistency, the materials shall be applied to the invert or void areas by hand or trowel. In invert applications, care should be taken to not apply excessive material in the channel, which could restrict flow. Once applied, materials should be smoothed either by hand or trowel in order to facilitate flow.
- e. Flows in channels shall be re-established when material has cured enough to withstand the flow as determined by the Manufacturer.

### 3.8 EPOXY CEMENTITIOUS RESURFACER

- A. The work consists of troweling, spray applying and/or centrifugally spin-casting a cementitious based liner to the inside of the existing manhole. The necessary equipment and application methods to apply the cementitious based liner material shall be only as recommended and approved by the material Manufacturer.
- B. Material shall be mixed with water in accordance with Manufacturer's specifications. Once mixed to proper consistency, the materials shall be pumped via a rotor-stator style progressive cavity pump through a material plaster hose for delivery to the appropriate and/or selected application device. The equipment shall be as recommended by the manufacturer, matched for the material being applied.
- C. Spray Application of Cementitious Material:
  - 1. All material shall be applied and finished, by the Contractor, using equipment specified by the Manufacturer.
    - a. Material hose shall be coupled to a low-velocity spray application nozzle. Pumping of the material shall commence and the mortar shall be atomized by the introduction of air at the nozzle, creating a low-velocity spray pattern for material application.
    - b. Spraying shall be performed by starting at the manhole invert and progressing up the wall to the corbel and chimney area.
    - c. Material shall be applied to a specified uniform minimum thickness as required by the Manufacturer and as necessary for proper curing and application. Material shall be applied to the bench area in such a manner as to provide for proper drainage.
    - d. Material shall be troweled smooth to compact material into voids. A brush or broom finish may be applied when a top coating is desired.
- D. Spin Casting Application of the Cementitious Material:
  - 1. All material shall be applied and finished by the Contractor using equipment specified by the Manufacturer.
    - a. Material hose shall be coupled to a high speed rotating applicator device. The rotating casting applicator shall then be positioned within the center of the manhole at either the top of the manhole chimney or the lowest point elevation corresponding to the junction of the manhole bench and walls.
    - b. The high speed rotating applicator shall then be initialized and pumping of the material shall commence. As the mortar begins to be centrifugally cast evenly around the interior of the manhole, the rotating applicator head shall be raised and/or lowered at a controlled retrieval speed conducive to providing a uniform material thickness on the manhole walls.



- c. Controlled multiple passes are then made until the specified minimum finished thickness is attained. If the procedure is interrupted for any reason, simply stop the retrieval of the applicator head until flows are recommended.
- d. Material thickness may be verified at any point with a depth gauge and shall be no less than a uniform ½-inch. If additional material is required at any level, the rotating applicator head shall be placed at that level and application shall recommence until the area is thickened.
- e. Material shall be applied only when manhole is in a saturated surface dry state, with no visible water dripping or running over the manhole walls.
- f. The low-velocity spray nozzle and the centrifugal spin casting head may be used in conjunction to facilitate uniform application of the mortar material to irregularities in the contour of the manhole walls and bench areas.
- g. Troweling of materials shall begin immediately following the spray application. Initial troweling shall be in an upward motion, to compress the material into voids and solidify manhole wall. A brush or broom finish may be applied if top coating is desired.
- h. Curing will take place once the manhole cover has been replaced. It is important that the manhole cover is replaced no more than 10-20 minutes after troweling is complete to avoid moisture loss in the material due to sunlight and winds.
- i. Material shall not be applied during freezing weather conditions. Material shall not be placed when the ambient temperature is 37 degrees Fahrenheit and falling or when the temperature is anticipated to fall below 32 degrees Fahrenheit during the following 24 hour period.

E. Testing and Acceptance:

- 1. Visual inspection – verify no infiltration, cracks or loose material.
- 2. Cementitious Material Physical Property Testing

### 3.9 100% AGGREGATE REINFORCE EPOXY MORTAR

A. General:

- 1. New Portland cement concrete structures shall have cured a minimum of 28 days since manufacture prior to commencing coating installation or as recommended by the Manufacturer.
- 2. Any active flows shall be dammed, plugged or diverted as required to ensure all liquids are maintained below or away from the surfaces to be coated.
- 3. Temperature of the surface to be coated should be maintained between 40 degrees Fahrenheit and 120 degrees Fahrenheit or as recommended by the Manufacturer.
- 4. Specified surfaces should be shielded to avoid exposure to direct sunlight or other intense heat source. Where varying surface temperatures do exist, coating application shall be scheduled when the temperature is falling and not rising or as recommended by the Manufacturer.
- 5. Prior to commencing surface preparation, Contractor shall inspect all surfaces specified to receive coating and notify Owner, in writing, of any noticeable disparity in the site, structure or surfaces which may interfere with the work, use of materials or procedures as specified herein.

B. Surface Preparation:

1. Oils, grease, incompatible existing coatings, waxes, form release, curing compounds, efflorescence, sealers, salts or other contaminants which may affect the performance and adhesion of the coating to the substrate shall be entirely removed.
2. Concrete and/or mortar damaged by corrosion, chemical attack or other means of degradation shall be removed so that only sound substrate remains.
3. Choice of surface preparation method(s) should be based upon the condition of the structure and concrete or masonry surface, potential contaminants present, access to perform work, and required cleanliness and profile of the prepared surface to receive the specified polymer coating product, as recommended by the Manufacturer.
4. Surface preparation methods or combination of methods that may be used include high pressure water cleaning, high pressure water jetting, abrasive blasting and others as described in NACE No. 6/SSPC SP-13. Whichever method(s) are used, they shall be performed in a manner that provides a uniform, sound clean neutralized surface with sufficient profile to promote an acceptable bond with the specified polymer coating.
5. Infiltration shall be stopped by using a material which is compatible with the repair products and is suitable for top-coating with the epoxy coating product. The Manufacturer shall verify the product compatibility, in writing, to the Owner.
6. Manhole Chimney Joint and Casting: The area between the manhole and the manhole ring and the manhole casting shall be a termination point of the specified epoxy coating product.

C. Application of Repair and Resurfacing Products:

1. Resurfacing products shall be used to repair, smooth or rebuild surfaces with rough profiles to provide a concrete or masonry substrate suitable for the polymer coating product to be applied. These products shall be installed to minimum thickness as recommended with the Manufacturer's published guidelines. Should structural rebuild be necessary, these products shall be installed to a thickness as specified in the Contract Documents.
  - a. Repair and resurfacing products shall be handled, mixed, installed and cured in accordance with Manufacturer's recommendations.
  - b. All repaired or resurfaced surfaces shall be inspected for cleanliness and suitability to receive the coating product(s). Additional surface preparation may be required prior to coating application.

D. Application of Polymer Coating Product:

1. Application procedures shall conform to the recommendations of the epoxy coating product manufacturer, including environmental controls, product handling, mixing, application equipment and methods.
2. Spray equipment shall be specifically designed to accurately ratio, apply the polymer coating product, shall be in proper working order and shall be as recommended by the product Manufacturer.
3. Contractors qualified in accordance with this specification shall perform all aspects of polymer coating product installation.
4. Prepared surfaces shall be coated by spray application of the coating product(s) described herein to a minimum as recommended by the Manufacturer to meet the requirement of this specification.
5. Subsequent top coating or additional coats of the polymer coating product shall occur within the product's recoat time. Additional surface preparation procedures will be required if this recoat time is exceeded. The polymer Manufacturer's recoat time for the specific application, based on temperature and project conditions, shall be strictly followed by the Applicator.

6. The polymer coating product shall mechanically bond with adjoining construction materials throughout the manhole structure to effectively seal and protect concrete or masonry substrates from infiltration and attack by corrosive elements. Procedures and materials necessary to effect this bond shall be as recommended by the polymer coating product Manufacturer. No hollow spots will be accepted.
  7. Contractor shall submit manufacturer's recommended method for terminating a coating or lining in a manhole for review and approval.
  8. If required by the Manufacturer's requirements, sewage flow shall be stopped, bypassed or diverted for application of the polymer coating product to the invert and interface with pipe materials.
- E. Testing and Acceptance:
1. Visual Inspection – Installed coating system shall be completely free of pinholes and hollow spots/voids and other defects that will reduce the life expectancy of the applied system.
  2. Film thickness measurements – (either wet or dry) Coating thickness shall be the minimum value as specified in the Contract Documents.
  3. Holiday Detection Test (Spark Testing), to identify pinholes, thin material and any defects that will affect the life of the installed system.
  4. Adhesion Testing – To verify that the system has consistently mechanically bonded to the host structure.

### 3.10 QUALITY ASSURANCE AND TESTING

- A. General
1. The Contractor shall test the installed coating system components as specified by this specification. 10% of all installed coating systems shall be tested using a testing procedure as further delineated below. If more than 5% of the tested coating systems fail the test, an additional 10% of the manhole coating systems shall be selected for further testing. This process continues until the coating systems tested meet the requirements of this specification, to the satisfaction of the Owner.
- B. Chain of Custody
1. The Contractor shall perform all testing/sample collection in the presence of the Inspector. The Contractor shall transmit samples to a third party testing laboratory. A chain of custody for all samples shall be maintained by the Contractor and be available on site at all times.
- C. Testing Requirements
1. Visual Inspection
    - a. All manholes shall be visually inspected by the Inspector. Any leakage into the manhole in areas where coating systems were installed by the Contractor shall be identified.
    - b. The Contractor shall provide samples for testing to the Inspector for the actual installed coating system. Samples shall be provided, at a minimum from one location per every ten (10) manholes coated.
  2. Cementitious Material Property Testing
    - a. Where specified one (1) 2" x 2" sample cube shall be taken for every 50 bags of material used. Samples shall be sprayed from nozzle, identified in the presence of the Inspector and sent to an independent test laboratory for compression strength testing as described in ASTM C-109.

3. Film Thickness Measurements
  - a. Where applicable and specified during application, a wet film thickness gauge, meeting ASTM D4414 – Standard Practice for Measurement of Wet Film Thickness of Organic Coatings by Notched Gages, shall be used. Measurements shall be taken, in the presence of the Inspector, documented and attested to by Contractor for submission to Owner.
4. Holiday Detection Test
  - a. Where specified Holiday Detection shall be performed for all coating systems installed in corrosive environments.
  - b. After the epoxy coating product has set in accordance with Manufacturer's instructions, all surfaces shall be inspected for holidays with high-voltage holiday detection equipment. Reference NACE RPO 188-99 for performing holiday detection.
  - c. All detected holidays shall be marked and repaired by abrading coating surface with grit disk paper or other hand tooling method. After abrading and cleaning, additional coating can be hand applied to the repair area.
  - d. All touch-up/repair procedures shall follow the coating Manufacturer's recommendations.
  - e. Documentation on areas tested, results and repairs made shall be provided to the Owner, in writing, by Contractor.
5. Adhesion Testing
  - a. Where specified a minimum of 10% of the manholes coated shall be tested for adhesion/bond of the coating to the subsurface. Testing shall be conducted in accordance with ASTM D4541, ASTM D7234, or NACE SP018. Inspector shall select the manholes to be tested.
  - b. A minimum of three (3) – 50 mm dollies shall be affixed to the coated surface at the cone area, mid-section and at the bottom of the structure or in areas suspect from non-destructive evaluation and testing. The adhesive used to attach the dollies to the coating shall be rapid setting with tensile strengths in excess of the coating product and permitted to cure in accordance with Manufacturer's recommendations. The coating and dollies shall be adequately prepared to receive the adhesive.
  - c. Failure of the dolly adhesive shall be deemed a non-test and require retesting. Prior to performing the pull test, the coating shall be scored to the substrate by mechanical means without disturbing the dolly or bond within the test area.
  - d. Two of the three adhesion pulls shall exceed 300 psi or concrete failure with more than 50% of the subsurface adhered to the coating.
  - e. Should a structure fail to achieve two successful pulls as described above, additional testing shall be performed at the discretion of the Inspector. Any areas detected to have inadequate bond strength shall be evaluated by the Owner.
  - f. Further bond tests may be performed in that area to determine the extent of the potentially deficient bonded area and repairs shall be made by the Contractor.

### 3.11 BYPASS PUMPING

- A. Bypass pumping shall be performed for manhole cleaning and rehabilitation operations as necessary to deliver a completely coated manhole.

### 3.12 INSPECTOR TRAINING

- A. The Contractor shall provide training by a Manufacturer's approved Trainer for the Owner's representatives/inspectors on the specific product being installed.
- B. The inspector training shall include sufficient amount of classroom time to instruct the Inspector on the basic concepts of the technology and what aspects are important to review and inspect in the field while the coating system is being installed by the Contractor. The inspector training shall also include a sufficient amount of time to instruct the Inspector on what needs to be inspected in the field, what needs to be inspected for each coating system component and what documentation is needed to verify that the coating system has been installed in accordance with the Contract Documents.
- C. Training shall also include a hands-on component where the Trainer observes coating of at least two (2) manholes with at least one (1) of these being brick. The Trainer shall advise on coating application and perform inspection training on the installation with the Owner's Inspector.

END OF SECTION 333318

**SECTION 226650  
POTABLE WATER SYSTEMS**

**PART 1 - GENERAL**

**1.1 SUMMARY**

- A. Extent of potable water system piping work is indicated on drawings and by requirements of this Section.

**1.2 RELATED DOCUMENTS**

- A. Drawings and general provisions of the AGREEMENT, including General Conditions, Supplementary Conditions, and other requirements of the Contract Documents apply to the WORK as specified in this Section. WORK related to this Section is described throughout the Specifications.

**1.3 QUALITY ASSURANCE**

- A. Manufacturer's qualifications: Firms regularly engaged in manufacture of potable water systems materials and products, of types and sizes required, whose products have been in satisfactory use in similar service.
- B. Codes and Standards:
  - 1. The Virginia Department of Health Waterworks Regulations
  - 2. AWWA

**1.4 SUBMITTALS**

- A. Product Data: Submit manufacturer's technical product data and installation instructions for potable water system piping and products, in accordance with requirements of Division 1.
- B. Record drawings: At project closeout, submit record drawings of installed potable water system piping and products, in accordance with requirements of Division 1.
- C. Maintenance Data: Submit maintenance data and parts lists for potable water system materials and products. Include this data, product data, shop drawings, and record drawings in maintenance manual; in accordance with requirements of Division 1.

**1.5 JOB CONDITIONS**

- A. Design Control: All quantities shown on Drawings are estimated. ENGINEER will provide location and benchmark controls as shown on the Drawings. Benchmark locations shown are approximate. CONTRACTOR should use B.M. (benchmark) description to locate.
- B. Field Control: CONTRACTOR will be responsible for establishing field controls for construction purposes.
- C. Quality Control: CONTRACTOR shall provide a level on the site at all times to be used by

OWNER and/or ENGINEER for checking grade.

- D. Locations of Items Shown on Drawings: The exact locations of all utility poles, brace poles, guy wires, signs, and buried utilities are unknown and may not be shown on the Drawings. Existing utility locations shown on the Drawings may indicate conflicts with the utility company's (power, telephones, gas, cable, etc.) property or equipment. All such conflicts may not be indicated on the Drawings.
- E. Field Verification: It is the responsibility of CONTRACTOR to field locate and verify items impacting or impacted by the construction and to contact the utility company prior to the start of excavation near existing underground utilities.
- F. Utility Notification: CONTRACTOR shall notify the utility company of its intent to construct the Project and inquire as to the possibility of such conflicts occurring with the utility's property or equipment. CONTRACTOR shall request the utility to field locate and mark existing underground utilities.
- G. Conflicts: CONTRACTOR shall notify ENGINEER of conflicts prior to the start of excavation. In the event CONTRACTOR requests work to be done by the utility, it shall be responsible for providing a written authorization to the utility stating the nature of the work required and CONTRACTOR will reimburse the utility company for their work. This work shall be included in the price for the pipe and no additional compensation will be allowed for temporary construction items required of the utility by OWNER. It shall be the responsibility of CONTRACTOR to fix utilities damaged during construction at no additional charge OWNER.
- H. Resetting Monuments: It is CONTRACTOR'S responsibility to replace property corners damaged at no additional charge. A surveyor licensed in the Commonwealth of Virginia shall accomplish resetting of monuments.
- I. Paving Verification: CONTRACTOR is responsible for identifying paved, concrete, and unpaved roads and parking lots. All property disturbed shall be restored to its original condition including fences, underground structures, etc.

## **PART 2 - PRODUCTS**

### **2.1 IDENTIFICATION**

Utility identification shall be in accordance with Division 2.

### **2.2 PIPE AND FITTINGS**

Water mains four (4) inches or larger may be either PVC, HDPE or DI, except where specified on the drawings:

#### **A. PVC Pipe:**

- 1. Pipe and Fittings: PVC 4-inches to 12-inches in diameter shall conform to the requirements of AWWA Specification C900, with gasket joints, DR-18 with cast iron pipe O.D. Pipe shall be certified by the National Sanitation Foundation. Joints shall be locked-in factory assembled rubber ring type. Joint material including gaskets and lubricants shall conform to AWWA C900. Cell classification shall be

POTABLE WATER SYSTEMS

HALIFAX COUNTY SERVICE AUTHORITY

SEYMOUR DRIVE AND HODGES STREET WATERLINE IMPROVEMENTS

226650-2

12454-B. PVC pipe shall have FM (Factory Mutual), UL (Underwriters Laboratory), and NSF (National Sanitation Foundation) certifications.

2. Manufacturer's Certification of ASTM and AWWA testing requirements will include the following:
  - (1) Each piece has been hydrostatically proof tested to AWWA C-900 Requirements.
  - (2) Pipe meets all other applicable ASTM & AWWA C-900 Requirements
3. Manufacturer's Certification will be signed by an officer of the company and will be furnished to the contractor and/or supplier before pipe is delivered to the project site. Certifications from supplier shall include:
  - (1) County Contract Number
  - (2) Location – Project Name
  - (3) Utilities Contractor Name
  - (4) Pipe type class
  - (5) Manufacturer's name
4. Fittings for PVC pipe shall be ductile iron ANSI/AWWA C153/A21.53, compact fittings with minimum pressure class of 350 psi. Manufacturer's standard asphaltic coating (one-mil thickness) shall be provided on the exterior of all fittings. Fittings shall have a double thickness cement-mortar lining in accordance with ANSI A21.4 (AWWA C104). Joint restraint shall be used where specified.
5. Gaskets for mechanical and push-on joints shall meet the latest AWWA Specifications. Hemp or jute shall not be used. Gaskets for 8" I.D. pipe and smaller shall be 1/16" thick and gaskets for installation on larger size pipe shall be 3/32".

B. High Density Polyethylene Pipe:

1. HDPE pressure pipe and fittings shall meet AWWA Standard C906 for water main applications. The pressure rating shall be DR-9 for 4-inch through 8-inch diameters and DR-11 for 10-inch through 24-inch diameters for water main applications. Pipe shall be DIPS.
2. **Due to the wall thickness of HDPE, a larger size may be required than shown on the plans so that the ID is the same as a typical PVC or DIP pipe. Contractor shall be prepared to purchase a larger diameter pipe if HDPE is used.**
3. Pipe and fittings shall be joined by thermal butt fusion, flange assemblies or mechanical methods in accordance with the manufacturer's recommendations and the requirements of AWWA C906. The HDPE pipe supplier shall provide the fusion equipment necessary for connecting the pipe and fittings. All butt fusions shall be done by McElroy fusion equipment or approved equal.
4. Pipe and fittings shall be marked with the manufacturer, date of manufacturer, lot number, size, PE code, pressure class, DR #, AWWA designation number, and other information as described in AWWA C906. All HDPE pipe shall be marked to distinguish between potable water and sewage force main. There shall be a minimum of two stripes at 180 degrees, colored blue for waterline and purple for force main.

C. Ductile Iron Pipe:



1. Ductile iron standard mechanical joint pipe shall conform to ANSI/AWWA C151/A21.51 or latest revision and shall be double-lined with cement mortar, seal coated and have a protective exterior coating. Thickness class shall be minimum Class 52. A greater thickness class may be required where conditions so dictate. Polyethylene encasement, in accordance with ANSI A21.5 (AWWA C105) may be required under certain soil conditions.
2. Where restrained joint pipe is to be used, it shall conform to ANSI/AWWA C151/A21.51, and shall be as manufactured by U.S. Pipe, TR Flex Restrained Joint Pipe, or approved equal.
3. Maximum allowable joint deflection for DI pipe shall be 2.5°. Should additional deflection be needed, Contractor shall provide appropriate bends to maintain alignment at no additional cost.
4. Polywrap polyethylene encasement shall be provided around the entire length of buried ductile iron waterline. The encasement shall conform to the following: 8 mil minimum, group 2, linear low density, flat tube, virgin polyethylene film and shall meet or exceed the requirements of AWWA C105-05, ANSI A21.5-05, ASTM D4976 and NT4112-05. The film shall be marked showing trademark, year of manufacture, type of resin, specification conformance, applicable pipe sizes and a corrosion protection warning.

D. Service Lines:

1. Pipe shall be 3/4" PEXa Municipex municipal water service piping as manufactured by REHAU, or approved equal.
2. Casing pipe for service lines under roads shall be 1.5" PEXa Municipex or approved equal. Carrier pipe shall be slid through the casing for ease of future maintenance.

## 2.3 JOINT RESTRAINT FOR PVC PIPE

- A. Where PVC pipe is connected to fittings, mechanical joint restraint shall be incorporated in the design of the follower gland and shall include a restraining mechanism which, when actuated, imparts multiple wedging action against the pipe, increasing its resistance as the pressure increases. Flexibility and minimal deflection of the joint shall be maintained after burial. Glands shall be manufactured of ductile iron conforming to ASTM A536-80. Restraining devices shall be of ductile iron heat treated to a minimum hardness of 370 BHN. There shall be no dissimilar metals allowed. Dimensions of the gland shall be such that it can be used with all AWWA approved standardized mechanical joint bell and tee-head bolts conforming to the latest revision of ANSI A21.11 and ANSI A21.53/AWWA C153. The mechanical joint restraint device shall have a working pressure of at least twice the working pressure of the pipe with a minimum of 150 psi. Twist-off nuts shall be used to ensure proper actuating of the restraining devices.
- B. All bell and spigot end joints within this length shall be restrained with a clamping ring and an additional ring designed to fit behind the bell end of the PVC pipe. The rings shall be connected with T-head bolts or rods.
- C. All clamping rings shall incorporate serrations on the inside surface to provide positive restraint on the outside surface of the pipe and shall provide full support around the

circumference of the pipe to maintain roundness.

- D. Restraining devices shall have a pressure rating equal to or greater than the PVC pipe, and shall be capable of withstanding a minimum test pressure of two times the pressure rating of the device.
- E. Restraining devices and T-bolts shall be manufactured from high strength ductile iron, ASTM A536, Grade 65-45-12. Clamping bolts and nuts shall be manufactured from corrosion-resistant material as approved by the ENGINEER.

## 2.4 JOINT RESTRAINT FOR DUCTILE IRON PIPE

- A. Mechanical joint restraint shall be incorporated in the design of the follower gland and shall include a restraining mechanism which, when actuated, imparts multiple wedging action against the pipe, increasing its resistance as the pressure increases. Flexibility and minimal deflection of the joint shall be maintained after burial. Glands shall be manufactured of ductile iron conforming to ASTM A536-80. Twist-off nuts shall be used to insure proper actuating of the restraining devices.
- B. Restraining devices shall be of ductile iron heat treated to a minimum hardness of 370 BHN. There shall be no dissimilar metals allowed. Dimensions of the gland shall be such that it can be used with all AWWA approved standardized mechanical joint bell and tee-head bolts conforming to ANSI/AWWA A21.11 and ANSI/AWWA C153.53/A21.53 of latest revision. The mechanical joint restraint device shall have a working pressure of at least twice the working pressure of the pipe. All bell and spigot end joints within this length shall be restrained with an approved bell and spigot restraint device. Clamping ring restraint devices require an additional ring be designed to fit behind the bell end of the ductile iron pipe. The rings shall be connected with T-Head Bolts or Rods. Rods must be protected from corrosion either by rod material or coating.

## 2.5 TRANSITION COUPLINGS

- A. Transition couplings shall be DIPS Bell MJ Adapter with Kit, by ISCO Industries or approved equal. Transition couplings shall be required where transitioning from 14" HDPE pipe to 12" PVC pipe for the waterline. PVC pipe shall be restrained with the use of a mechanical joint restraint system.

## 2.6 GATE VALVES

- A. Resilient Seat Gate Valves
  - 1. All resilient seat gate valves shall fully comply with AWWA C509 (3-inches-12-inches) or C515 (4-inches-12-inches), latest revision.
  - 2. All valves shall be manually operated, unless otherwise specified, and the valve body shall be ductile iron or high strength cast iron with reinforced flanges.

3. All buried valves shall utilize a non-rising stem, equipped with operating nut, unless otherwise specified.
4. All above-ground valves or exposed valves in vaults shall utilize outside screw and yoke (OS&Y) with rising stem, for installation in a vertical position, unless otherwise specified.
5. All iron surfaces, internal and external must be coated with a minimum 8 mils thickness of hand applied epoxy or 3-5 mils thickness fusion bonded epoxy.
6. The valve stem shall have an independent stem nut (not rigidly attached to the gate) which allows the gate to flex without stressing the stem.
7. All valves shall have either a bronze stem collar bushing with two O-rings above the stem or a stem collar with one O-ring below and one O-ring above the stem collar.
8. Seating shall use compression closure. The gate shall be of a true bi-directional, mirror image design.
9. Valves shall have a smooth bottom design.
10. All valves shall open left (counter-clockwise).
11. In general, interior or exposed gate valves shall have flanged ends, with handwheel, and exterior valves shall have mechanical joint ends with non-rising stem and valve box. The handwheel or operating nut of each valve shall have an arrow cast on it showing the direction of opening.
12. For AWWA C509 valves, the bodies, bonnets and other cast iron parts shall conform in all respects to ASTM Specification Designation A126, Class B for valve sizes 2 inches through 12 inches.  
  
For AWWA C515 valves, the bodies and bonnets shall conform in all respects to ASTM Specification Designation A536, Class 70-50-6 for valve sizes 4 inches through 12 inches.  
  
All castings whether ductile or cast iron shall be clean and perfect without blow or sand holes or defects of any kind. No plugging, welding or repairing of cosmetic defects will be allowed.
13. Valves must have a 250 psi working and 400 psi test pressure.
14. If the standard valve provided by a manufacturer does not fully comply with these specifications, but compliance can be attained by providing optional features, then each valve must be permanently marked to indicate the option or options that have been provided. The method of marking valves to indicate that options are included must be approved by the OWNER.

15. All internal and external bolts, **including the bonnet bolts**, shall be a minimum Type 304 stainless steel.
16. Valves shall be manufactured by American Flow Control, Kennedy, Mueller, or approved equal.

B. Resilient Seat Wedge Tapping Valves:

1. Tapping valves shall meet above specifications except, the body seat rings shall have a clear inside opening sufficient to pass a cutter of full diameter and equal to the nominal size of the valve. The outlet end shall be suitable for use with the type of pipe being utilized.
2. Tapping valves shall be suitable for use with all approved manufactured tapping sleeves without modification.

2.7 VALVE KEY EXTENSIONS

- A. The extension shall be 1-1/2 inch solid core steel with the upper operating nut and bottom coupling welded to the stem.
- B. The 2 inch square operating nut on top shall be welded to form a complete box with no openings.
- C. 2-1/2 inch square socket section on bottom shall be tapped on four sides for minimum 5/16 inch N.C. socket head stainless steel set screws and screws shall be provided.
- D. Valve extensions shall be coated with oil-based enamel or other rust preventative coating.
- E. The operating nut of the valve shall be drilled on all four sides to allow insertion of the setscrews.
- F. A 4-1/2 inch diameter steel plate, 1/4 inch thick centering disc, shall be welded to the stem 2 inches below the bottom of the top operating nut.

2.8 FIRE HYDRANTS

- A. Fire hydrants shall be manufactured in full compliance with this specification and shall also comply with the AWWA Fire Hydrant Specification C-502, latest revision and the following:
  1. Type: Compression – Dry Standpipe: Valve shall open against and close with the pressure. The design shall be such that all internal operating parts can be removed through the standpipe and main valve rod extended without excavating.
  2. Size: Internal valve diameter shall be minimum 5-1/4”.
  3. Inlet Size and Type: 6” mechanical joint end with accessories.

4. Hose Nozzles: Each hydrant shall be equipped with two 2-1/2" I.D. hose nozzles with National Standard threads, one quarter turn bayonet lock or threaded in with O-ring seal and suitable locking arrangement.
5. Steamer Nozzle: Each hydrant shall be equipped with one 4-1/2" Steamer Nozzle having National Standard Threads, one quarter turn bayonet lock or threaded in with O-ring seal and suitable locking arrangement.
6. Direction of Open: Left, counter-clockwise.
7. Size and Shape of Operating Nut and Cap Nuts: to be 1-1/2" point to flat pentagon. Each hydrant shall be equipped with a weather cap or weather seal.
8. Seal Plate: The hydrant shall be so constructed that a moisture-proof lubricant chamber is provided which encloses the operating threads, thereby automatically lubricating the threads each time the hydrant is operated. The lubricant chamber shall be enclosed with at least three O-rings. The two lower O-rings will serve as pressure seals; the third O-ring will serve as a combined dirt and moisture seal to prevent foreign matter from entering the lubricant chamber. The hydrant shall be equipped with either an anti-friction washer or bronze bushing to reduce operating torque. The bonnet will be secured to the hydrant using bolts and nuts.
9. Standpipe – Groundline Safety Construction: The standpipe sections shall be connected at the groundline by a two part, bolted safety flange or breakable lugs. The main valve rod sections shall be connected at the groundline by a frangible coupling. The standpipe and groundline safety construction shall be such that the hydrant nozzles can be rotated to any desired position without disassembling and removing the top operating components and the top section of the standpipe. The minimum inside diameter of the standpipe shall be 6".
10. Main Valve, Rod Assembly: The main valve rod assembly shall be so constructed to allow removal of all operating parts through the standpipe regardless of depth of bury, using a removal wrench which does not extend below the groundline of the hydrant. The main valve seat ring shall be bronze and its assembly into the hydrant shall involve bronze to bronze thread engagement, and the valve assembly pressure seals shall be obtained without the employment of torque compressed gaskets. The design of the main valve rod shall be such that the operating threads at the top of the rod and the valve assembly threads at the bottom of the rod are isolated from contact with water in the standpipe or in the hydrant inlet shoe.
11. Drain Valve: The operation of the drain mechanism shall be correlated with the operation of the main valve and shall involve a momentary flushing of the drain ports each time the hydrant is opened. The drain ports shall be fully closed when the hydrant valve is more than 2-1/2 turns open and the drainage channel in the bronze valve seat ring shall connect two or more outlet drain ports. No springs may be employed in the hydrant valve or drain valve mechanism.
12. Weep hole: in areas where the ground water stands at levels above that of the hydrant drain, the hydrant drain shall be plugged at the time of installation. Weep

hole shall be plugged in accordance to manufacturers recommendations. If the drain is plugged, hydrants in service in cold climate areas should be pumped out after usage. Contractor shall mark such hydrants to indicate the need for pumping out after usage. Marking system shall be coordinated with Owner.

13. Depth of Bury: Normally hydrants shall be suitable for installation in trenches 4 feet 6 inches deep. Required parts and materials to adjust fire hydrants to different depth of bury shall be provided by the manufacturer to meet actual field conditions as required.
14. Painting Instruction: At least two prime coats and one finish color coat shall be used and must be applied by the original manufacturer, unless otherwise specified. Exposed area of fire hydrant shall receive one field coat of color Rust-Oleum paint after installation, unless otherwise directed by the inspector. Final field coat shall be brush applied. The wetted surface of the hydrant shoe shall be epoxy coated to prevent corrosion of the waterway. All fire hydrants that arrive at the job site that are not factory painted with color selected by Owner will be rejected. Color to be coordinated with Owner.
14. Pressure Rating: Test pressure 400 psi, working pressure 200 psi.
- B. If the standard hydrant provided by the manufacturer does not fully comply with these specifications, but compliance can be attained by providing optional features, then each hydrant must be permanently marked to indicate the option or options that have been provided. The method of marking hydrants to indicate that options are included must be approved by the OWNER.
- C. Hydrants shall be traffic model either Mueller Centurion, Kennedy K81-D, or approved equal.

## 2.9 VALVE BOXES

- A. All underground valves shall be installed in approved cast iron valve boxes, having suitable base and shaft sections and covers to protect the valve and permit easy access and operation. Box assemblies shall have screw adjustment. Valve boxes shall be as manufactured by Bingham & Taylor, Tyler Union, or approved equal.

## 2.10 AIR RELEASE VALVE

- A. Type 1: Small orifice valves shall be either of the a) kinetic design type employing only one moving part, a stainless steel float ball or b) of the stainless steel float and lever type. It shall maintain the closed position to prevent the loss of water by positive seating of the float ball against a smoothly ground contact surface of the exhaust orifice.
- B. It shall automatically provide for the escape of air to atmosphere without the loss of water when the float ball moves away from the orifice seat. The body of the valve shall be cast iron and shall be coated to withstand a moist environment.
- C. Air release valves shall have a minimum of a 1 inch N.P.T. inlet for 6 inches, 8 inches, and

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12 inches, pipe sizes and a 2 inches N.P.T. inlet for pipes 16 inches and larger; and shall have a minimum of a 3/32 inch outlet orifice for 6 inches, 8 inches, and 12 inches pipe sizes and a minimum 3/16 inch outlet orifice with 16 inches and larger pipes.

- D. Air release valves shall be suitable for a minimum working pressure of 150 psi.
- E. All flushing attachments shall be provided with air release valves.
- F. Air release valves shall be APCO Product Bulletin No. 600, GA Industries Figure 912, Valmatic, Cla Val Model 34, ARI S-014, or approved equal.

## **PART 3 - EXECUTION**

### **3.1 INSPECTION**

General: Examine areas and conditions under which potable water system's materials and products are to be installed. Do not proceed with work until unsatisfactory conditions have been corrected in a manner acceptable to the OWNER.

### **3.2 INSTALLATION OF IDENTIFICATION**

Installation of utility identification shall be in accordance with Division 2.

### **3.3 INSTALLATION OF NEW WATER SYSTEMS**

#### **A. General**

- 1. Installation of pipe, fittings, valves, and associated appurtenances shall be in accordance with the requirements of the appropriate material specifications.
- 2. Every precaution shall be taken to ensure that the entire length of pipe is supported evenly with the joints mated securely together. Pipe bedding shall be as specified by the pipe manufacturer.

#### **B. Handling**

All materials shall be shipped, unloaded, and stored in accordance with the manufacturer's recommendations. All materials shall be handled in such a manner as to avoid damage to the material. When such damage cannot be repaired to the ENGINEER's satisfaction, the item shall be replaced at the CONTRACTOR's expense. The interior of all pipe and accessories shall be kept free from dirt and foreign matter at all times.

Pipe, fittings and accessories shall be handled in such a manner as to ensure that sound, undamaged items, entirely suitable in all respects to the specific requirements of each particular fitting, pipe and accessory, are provided and installed. Equipment, tools and methods used in loading, reloading, unloading, hauling, and laying pipe and fitting shall be such that no damage is done thereto or thereon. Where hooks are used for lifting, they shall have broad well-padded contact surfaces and shall be of such design and length that they will provide uniform support for a distance back from the end of the pipe not less than one-half of

the internal pipe diameter.

C. Trench Preparation

Trench preparation shall be in accordance with “Earthwork for Utilities”.

D. Dewatering

Dewatering shall be in accordance with “Dewatering”.

E. Excavating and Backfilling

1. CONTRACTOR shall do all excavating of any and all materials encountered in the course of excavating for all underground utility systems in accordance with Division 2.
  - a. After the pipe is in place, backfill with suitable earth free from rocks, organic material, etc.
  - b. Provide all necessary shoring required for the protection of excavations, existing utilities and workmen and do all necessary pumping required to keep excavation and pipe free of water from any source at all times.
  - c. Provide sufficient barricades, etc., adjacent to excavations to safeguard against injury to workmen and the public. Provide and maintain sufficient warning lanterns at walks, roadways, and parking areas to provide safety at all times.
  - d. Where roots of live trees are encountered in excavations, they shall be carefully protected during construction.
  - e. Exercise special care in backfilling trenches to guard against disturbing pipe joints.
  - f. Remove and dispose of any material not used for backfill.
2. Removal of subsurface obstructions which are uncovered during excavation for installation of the water systems shall be performed by the CONTRACTOR at his expense. This shall include removal of existing concrete or brick of existing building foundations, footings, abandoned utility piping, wires, structures, rock boulders, etc., which may not be visible from surface investigations before construction, but will interfere with new installations. If such obstructions are encountered they shall be removed 2 feet from around the area of new facility and backfilled with a suitable material as specified.

F. Pipe Installation:

1. Take all precautions to ensure that pipe and related items are not damaged in unloading, handling and placing in trench. Examine each piece of material just prior to installation to determine that no damage has occurred. Remove any damaged material from the site and replace with undamaged materials.
2. Keep pipe clean. Exercise care to keep foreign material and dirt from entering pipe during storage, handling and placing in trench. CONTRACTOR shall be responsible for plugging or capping line at the end of each day.



3. Do not lay pipe when weather or trench conditions are unsuitable.
4. Line and grade hubs shall be set by a registered surveyor at intervals to accurately insure proper location of waterline and appurtenances. This shall include finished grade centerline stakes for fire hydrants, stakes at all fittings referencing all property pins, etc. Cut sheets are required where the waterline is to be laid to a grade according to the profiles in the plans, or where the future road grade is not yet to within six (6) inches of its final location.
5. Water Pipe Laying:
  - a. Laying of water pipe shall be accomplished only after the trench has been dewatered and the foundation and/or bedding has been prepared. Mud, silt, gravel, and other foreign material shall be kept out of the pipe and off the jointing surfaces.
  - b. All pipe laid shall be retained in position so as to maintain alignment and joint closure until sufficient backfill has been completed to adequately hold the pipe in place. All pipe shall be laid to conform to the prescribed line and grade shown on the plans and shall include digging out for bell ends.
  - c. Water pipe runs intended to be laid straight shall be so laid. Deflection from a straight line may be made by deflecting the joints only when permission has been given by the OWNER and/or ENGINEER. Joint deflection in pipe shall not exceed one-half that recommended by AWWA Standards or the manufacturer whichever is less (ductile iron installations only). Changes in grade or alignment which cannot be made by deflecting pipe joints shall be made by use of proper bends, offsets or special fittings as required (ductile iron only).
  - d. The water pipe, unless otherwise approved by the inspector, shall be laid upgrade from point of connection of the existing water main or from a designated starting point. Water pipe shall be installed with the bell end forward or upgrade.
  - e. The pipe shall be fitted and matched so that when laid in the work, units will form a smooth, uniform invert.
  - f. Prior to joining the pipe, all surfaces of the pipe to be joined and the surfaces of factory made jointing materials shall be clean and dry. Lubricants, primers, adhesives, etc., shall be applied and the pipes joined as recommended by the manufacturer's specifications. Sufficient pressure shall be applied in making the joint to assure that the pipe is "home". The interior of the pipe shall be cleaned of all foreign material as the work progresses. At the end of the work day, the last pipe laid shall be blocked to prevent creep, and closed with a watertight plug or cap.
  - g. Joining Pipe:
    - 1) Ductile iron pipe to be joined as follows:
      - (a) Mechanical joint pipe:

- (1) When installing PVC pipe into M.J. fittings, the beveled end of the pipe must be cut off to allow for maximum insertion depth and sealing area to avoid leaks. Thoroughly clean inside of the bell and 8 inches of the outside of the spigot end of the joining pipe to remove oil, grit, excess coating and other foreign matter from the joint. Paint the bell and spigot with soap solution (1/2 cup granulated soap dissolved in 1 gallon water). Slip cast-iron gland on spigot end with lip extension of gland toward end of pipe. Paint rubber gasket with or dip into the soap solution and place on the spigot end with thick edge toward the gland.
- (2) Push the spigot end forward to seat in the bell. Then carefully press the gasket into the bell so that it is located evenly around the joint. The gland is moved into position, bolts inserted and nuts turned finger tight.

Tighten all nuts to torque listed below:

Bolt Size (inches)	Torque (ft – lbs)
5/8	40 – 60
3/4	60 – 90
1	70 – 100
1 – 1/4	90 – 120

- (3) Tighten nuts on alternate sides of the gland until pressure on the gland is equally distributed, and torque value is reached.
  - (4) Permissible deflection in mechanical joint pipe shall not be greater than one-half of that listed in AWWA C600.
- (b) Push-on joint ductile iron pipe:

- (1) Thoroughly clean inside of the bell and 8 inches of the outside of the spigot end of the joining pipe to remove oil, grit, excess coating, and other foreign matter. Flex rubber gasket and insert in the gasket recess of the bell socket. Apply a thin film of gasket lubricant supplied by pipe manufacturer, to the gasket and spigot end of the joining pipe.
- (2) Start spigot end of pipe into socket with care. The joint shall then be completed by forcing the plain end to the bottom of the socket with a forked tool or jack type device. Field cut pipe shall have the end filed to match the manufactured spigot end.

- (3) Permissible deflection in push-on joint pipe shall not be greater than 1/2 of that listed in AWWA C600.

2) Polyvinyl Chloride (PVC) Push-on Joint Pipe:

- (a) Thoroughly clean inside of the bell and 1 inch beyond the reference mark on the spigot end of the joining pipe. Make certain the bell and rubber gasket have no foreign material that could interfere with the proper assembly of the pipe spigot.
- (b) Lubricate the gasket and spigot end of the pipe, using lubricant supplied by pipe manufacturer.
- (c) Insert the spigot end into the bell. Align the pipe sections and push the spigot end in until the reference mark on the spigot end is flush with the end of the bell. Use a bar and block of wood to push pipe home.
- (d) Field cut pipe shall be square cut and beveled to insure proper assembly. Use a factory finished beveled end as a guide to produce an equivalent angle and length of taper.
- (e) Deflection of the length of pipe by bending is strictly prohibited for PVC pipe.

Waterline bend locations shall be included in the construction stake out.

- h. A tracing wire shall be installed and taped directly on top of the pipe in a manner that a continuous trace results. Wire is to be wrapped around hydrants, blow offs and corporation stops and shall be accessible for test hook-up at all water meter boxes, and test stations. The tracing wire must be continuous and completely insulated from ground. The tracing wire will be attached to the top of the pipe using duct tape at an interval no greater than 16 feet. Tracing wire within test stations and meter boxes shall be stripped 3/4 inch from the end and capped with a wire nut to minimize electrical ground contact. Test stations shall be installed within 2 feet of all fire hydrants and at intervals no greater than 1,000 feet. All connections at the main line must be electrically sound and physically secure with screw connections or clamps. All connections must be taped with electrical tape and sealed with an electrical coating sealant. See Division 2 for tracing wire material requirements.
- i. Place underground warning tape directly above all installed utilities, 18 inches above top of pipe. See Division 2 for tracing wire and warning tape requirements.

G. Installation of Valves, Fittings, and Hydrants

- 1. General: Valves, fittings and hydrants shall be set and joined to the piping system as specified for cleaning, laying and joining pipe.
- 2. Valves and Valve Boxes: Cast iron valve boxes shall be firmly supported, centered and plumb over the operating unit of valve. Box cover shall be set flush with the

surface of finished pavement or at such other level as may be directed by the inspector. Valve rod extension with guide shall be required to maintain a maximum distance of two-feet-four-inches from operating nut to top of box. All valves shall be properly restrained.

Valve boxes not located in pavement or concrete shall have a two foot square by 4 inches thick concrete pad poured around them. Concrete pad shall be neatly formed with a troweled finish. Concrete shall be minimum 3,000 psi concrete. In limited circumstances, such as when the valve box is located in a narrow ditch bottom (a situation that should be avoided if possible) and pouring the pad would require widening the ditch, the inspector may waive the requirement for the concrete pad or reduce the dimensions of the concrete pad.

3. Cross Connections: Drainage branches or blow offs shall not be connected to any sewer, submerged in any stream or installed in any manner which in the opinion of the inspector will constitute a contamination or cross-connection hazard.

4. Hydrants:

Connection to Main: Each hydrant shall be restrained and connected to the main as shown in the Standard Details. Each hydrant shall be provided with a minimum six inch diameter ductile iron branch, controlled by an independent six inch resilient seat gate valve.

Setting of Hydrants: When hydrants are set, a drainage pit 2 feet in diameter and 2 feet below the bowl of the hydrant shall be excavated.

All hydrant valves shall be restrained to the hydrant tee on the main line.

The pit shall be filled with coarse gravel or #57 clean stone, mixed with coarse sand, to a level of 6 inches above the weep hole. No hydrant drainage pit shall be connected to a sewer. The bowls of all hydrants shall be restrained to the pipe with approved restraint systems. All hydrants shall be thoroughly cleaned of dirt or foreign matter before setting.

5. Anchorage of Fittings: All fittings (i.e., each bend, tee, plug, valve and cap) shall be prevented from moving by means of adequate mechanical restraints in accordance with these specifications and approved by the inspector.

#### H. Installation of Services:

1. 3/4 inch and 1 inch:

- a. Taps on PVC pipe shall be made with service saddles. Saddles shall be bronze, brass or stainless steel. Cast iron saddles are not acceptable.
- b. Taps shall be made on a 45 degree angle and utilizing a saddle.
- c. Corporation stops shall have "cc" thread inlet and copper tubing size compression fitting outlet.
- d. Tap shall be made with a tapping machine equipped with a bit designed for the type of pipe being tapped.

- e. Distance between taps or from a joint or bell shall be a minimum of 18 inches.
- f. Services shall be installed with 36 inches minimum cover up to meter yoke where yoke shall be installed so that meter will set 12 inches to 18 inches below finished grade.
- g. Meter yoke and box shall be set 1 foot inside right-of-way or easement or as directed by the inspector. Meters shall be installed on reasonably level ground or conform to the angle of the slope. Meter locations shall be staked by a licensed surveyor in order to assure that they are properly located in reference to the right-of-way boundary, utility easement boundaries, and adjacent properties' separating boundary line.
- h. Backfill shall be hand tamped up to service pipe at tap to prevent corporation stop from being broken off during backfilling.
- i. All meter boxes are to be cast iron, nine inches by eighteen inches oval. The boxes are to be two feet deep.

### 3.4 CONNECTION TO EXISTING WATERLINE

- A. All waterline tie-ins to the existing distribution system including vertical and horizontal relocations shall be coordinated with the OWNER. Tie-ins shall be scheduled Monday thru Thursday from 9:00 a.m. to 4:00 p.m. Tie-ins may be required outside of this time and/or during nighttime hours.
- B. The OWNER reserves the right to require the CONTRACTOR to perform tie-ins outside of the normal working hours detailed above in the interest of public safety or customer service. No claim for additional compensation shall be made by the CONTRACTOR when such occasions occur.
- C. Proper preparation including field verification of the plans shall be accomplished to minimize shutdown time and prevent the tie-in from exceeding scheduled shutdown time. Sufficient personnel, equipment and materials shall be on-site prior to the water being shut off. Where applicable, excavation and preassembling of fittings shall be performed, and if in the opinion of the inspector sufficient resources are not available, the tie-in will be cancelled and rescheduled.
- D. Tie-ins involving fittings shall include provisions for temporary blocking until concrete blocking has cured unless mechanical restraint systems are used. All pipe and fittings used for a tie-in are to be swabbed with a one percent (1%) chlorine solution prior to connection.
- E. Before a tie-in will be allowed, all new valves, including fire hydrant valves, shall be accessible and verified fully open by the CONTRACTOR unless there are valves designated as "normally closed". Prior to tie-in, the inspector shall verify that all valves, including fire hydrant valves are fully open and accessible. Immediately after a tie-in has been made, all valves used during the shutdown shall be verified fully open by the inspector. All fire hydrants shall be checked by the inspector to ensure water is available and each hydrant is in working order.

### 3.5 TESTING

Testing shall be completed in accordance with “Utility Testing” specification.

**END OF SECTION**

**SECTION 227980**  
**UTILITY LOCATION AND IDENTIFICATION**

**PART 1 - GENERAL**

1.1 SUMMARY

The purpose of this Section is to specify the requirements for utility location tape, tracer wire, and test stations. In general, all utility pipelines shall be marked by appropriately marked metallic tape 12 inches below finished grade above the conduit.

1.2 RELATED SECTIONS

Intent: The provisions and intent of the AGREEMENT, including the General Conditions, Supplemental Conditions, and other requirements of the Contract Documents apply to the WORK as specified in this Section. WORK related to this Section is described throughout the Specifications.

1.3 REFERENCES

Code of Virginia

1.4 SUBMITTALS

Shop Drawings shall be submitted for all products specified in this Section as outlined in Division 1.

1.5 SEQUENCING

The tape shall be installed at the same time as the pipeline.

**PART 2 - PRODUCTS**

2.1 TRACING WIRE SYSTEM

A. Wire Types

1. Wire shall be 14 gauge copper wire. Wire shall be color coded blue for water and green for sewer.

B. Acceptable Wire Connectors:

1. Set screw pressure type for use with #12 stranded wire size. Holub Industries MA-2, Ideal Industries Model 30-222, or equal.
2. C-Tap for two way splicing of tracer wire, for use with #12 stranded wire size. T&B #54705 or equal.
3. Split bolts, three wire type for splicing of tracer wire, for use with #12 stranded wire size. ILSCO Catalog #SEL-2S or equal.
4. Wire nuts are not permitted underground

C. Test Station Box – Test station boxes shall be a minimum of 18 inches tall with cast iron

lid and collar and plastic body tube with flared bottom to prevent settling and pull-out. Cast iron collar shall be a minimum of 2 inches deep. Lid shall be bolted to collar with brass bolt. Lid shall be imprinted with the wording "TEST". Test Station Box shall be Bingham & Taylor Figure Number P-200 Test, 2-1/2 inches in size.

1. Electric Tap – vinyl electric tape.
2. Electrical Coating 0- Scotchkote 3M electrical coating Part No. 054007 or equal.
3. Wire nut – non-conductive for #12 stranded wire size.

## 2.2 WARNING AND IDENTIFICATION TAPE

- A. Polyethylene plastic and metallic core or metallic-faced, acid-and alkali-resistant, polyethylene plastic warning tape manufactured specifically for warning and identification of buried utility lines. Provide tape on rolls, 2-inch minimum width, color coded as specified below for the intended utility with warning and identification imprinted in bold black letters continuously over the entire tape length. Warning and identification to read, "CAUTION, BURIED (intended service) LINE BELOW" or similar wording. Color and printing shall be permanent, unaffected by moisture or soil.

### Warning Tape Color Codes

Yellow:	Gas, Oil, and Dangerous Materials
Blue:	Water
Green:	Sewer

- B. Warning Tape for Metallic Piping: Acid and alkali-resistant polyethylene plastic tape conforming to the width, color, and printing requirements specified above. Minimum thickness of tape shall be 0.003 inch. Tape shall have a minimum strength of 1500 psi otherwise, and 1250 psi crosswise, with a maximum 350 percent elongation.
- C. Detectable Warning Tape for Non-Metallic Piping: Polyethylene plastic tape conforming to the width, color, and printing requirements specified above. Minimum thickness of the tape shall be 0.004 inch. Tape shall have a minimum strength of 1500 psi lengthwise and 1250 psi crosswise. Tape shall be manufactured with integral wires, foil backing, or other means of enabling detection by a metal detector when tape is buried up to 3 feet deep. Encase metallic element of the tape in a protective jacket or provide with other means of corrosion protection. Color coded tape shall be installed flat with color side up 12 inches to 24 inches over all installed utility lines including main line and service lateral or service connection.

## 2.3 MARKERS

- A. In easements and in undeveloped wooded areas, plastic markers shall be installed every 200 feet, and at all manholes, valves, and fittings. Markers shall be as manufactured by Carsonite, Greenline, or approved equal. Exceptions are where sanitary gravity and force main lines are installed in "kept" yards where the property owners may object to the placement of these markers. Contractors will be required to properly install the markers per manufacturer's recommendations, parallel to the water line facing roadway, or as additionally directed by the local agency.
- B. All markers shall have one of the applicable decal description to reflect the following:
- 1) Upper decal, white and blue 2 7/8" x 11" standard, worded "CAUTION WATER



- 2) PIPELINE"; or  
Upper decal, white and blue 2 7/8" x 11" standard, worded "CAUTION WATER VALVE".
- C. In addition, the lower decal shall contain the following:
  - 3) Lower decal, white and blue 2 7/8" x 1 3/4" standard, worded "MISS UTILITY - 1-800-552-7001, HCSA".
- D. Total height shall be 66".
- E. Basic marker shall be white in color.

**END OF SECTION**

## **SECTION 229900 UTILITY TESTING**

### **PART 1 - GENERAL**

#### **1.1 SUMMARY**

The purpose of this Section is to specify the methods and requirements for testing and quality assurance of utility piping and utility structures.

#### **1.2 RELATED SECTIONS**

Intent: The provisions and intent of the AGREEMENT, including the General Conditions, Supplementary Conditions, and other requirements of the Contract Documents apply to the WORK as specified in this Section. WORK related to this Section is described throughout the Specifications.

#### **1.3 QUALITY ASSURANCE**

- A. Quality assurance testing shall be done in the presence of the ENGINEER or his representative. The first mile or 20% of the total quantity, whichever is less, of the waterline shall be tested prior to proceeding with the project. Thereafter, utility line testing shall be done in increments of one mile or 20% of the total quantity, whichever is less.
- B. Gravity sewer line testing shall be done for each line section upon completion of each manhole back to the previous manhole.
- C. Testing shall be completed before the project will be considered substantially complete.

#### **1.4 WARRANTY**

CONTRACTOR shall be responsible for the work for 1 year after the date of substantial completion.

#### **1.5 FEES**

The CONTRACTOR shall be responsible for all costs associated with testing.

### **PART 2 - PRODUCTS**

Not Applicable.

### **PART 3 - EXECUTION**

#### **3.1 TESTING OF WATERLINE AND FORCE MAIN**

- A. All testing will be performed in accordance with the ANSI/AWWA C600, latest revision. The CONTRACTOR shall provide the OWNER or OWNER'S representative with 48 hours notice prior to undertaking any tests.
- B. Pressure Test:
  - 1. Each properly isolated section of the piping system including all water services,

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shall be subjected to a hydrostatic pressure test of 150 psi, or 1-1/2 times the working pressure whichever is greater, measured at the high point of the system.

2. Prior to applying pressure to the lines, all reaction blocking, and/or mechanical restraints shall have been completed to the satisfaction of the Inspector.
3. Pressurization: Each valved section of pipe shall be filled with water slowly and the specified test pressure shall be applied by means of a pump connected to the pipe in a manner satisfactory to the Inspector. The water and container used to pump up the line to be tested shall be properly disinfected.
4. Air Removal: Before applying the specified test pressure, air shall be expelled completely from the pipe, valves, and hydrants. All air shall be expelled by providing manual air relief valves at the high points in the system.
5. Test Pressure Restrictions. Test pressures shall:
  - a. Not exceed pipe or thrust restraint design pressure;
  - b. Be of at least 2-hour duration;
  - c. Not vary by more than  $\pm 5$  psi;
  - d. Not exceed twice the rated pressure of the valves or hydrants when the pressure boundary of the test section includes closed gate valves or hydrants;
  - e. Not exceed the rated pressure of the valve.
6. Examination: All exposed pipe, fittings, valves, hydrants, and joints shall be examined carefully during the test. Any damaged or defective pipe, fittings, valves, or hydrants that are discovered following the pressure test shall be repaired or replaced with sound material and the test shall be repeated until it is satisfactory to the Inspector.
7. Any defects discovered during this test shall be repaired and the test repeated until the results are satisfactory to the inspector. The Contractor shall provide all equipment, materials and labor necessary to conduct the test.

C. Leakage Test: A leakage test shall be conducted concurrently with the pressure test.

1. Leakage Defined: Leakage shall be defined as the quantity of water that must be supplied into the newly laid pipe, or any valved section thereof, to maintain pressure within 5 psi of the specified test pressure after the air in the pipeline has been expelled and the pipe has been filled with water.
2. Allowable Leakage: No pipe installation will be accepted if the leakage is greater than that determined by the following formula:

$$L = \frac{SD\sqrt{P}}{148,000}$$

In which L is the maximum allowable leakage, in gallons per hour; S is length of pipe tested in feet; D is the nominal diameter of the pipe, in inches, and P is the average test pressure during leakage test, in pounds per square inch gauge.

3. When testing against closed metal-seated valves, an additional leakage per closed valve of 0.0078 gal/hr/in. of nominal valve size shall be allowed.
4. When hydrants are in the test section, the test shall be made against the closed

hydrant valve.

5. Acceptance of Installation: Acceptance shall be determined on the basis of allowable leakage. If any test of pipe laid discloses leakage greater than the allowable amount, the CONTRACTOR shall, at his own expense, locate and repair the defective material until the leakage is within the specified allowance.
6. All visible leaks are to be repaired regardless of the amount of leakage.
7. The Contractor shall provide a suitable test pump and properly calibrated gauge or other means for measuring leakage to include a clean 50 gallon barrel with top cut out, etc., which is satisfactory to the Inspector.

- D. CONTRACTOR shall be responsible for providing water used for flushing, sterilization, and testing. Filling of water mains may be performed provided permission has been obtained from the inspector who will be responsible for coordinating this activity with the County and the appropriate backflow prevention device is installed. Contractor is not permitted to operate valves on existing lines unless approved by the County's inspector.

### 3.2 DISINFECTION OF WATER MAINS

- A. **Contractor is required to keep a copy of ANSI/AWWA C651, latest edition, on site at all times.** Prior to being placed in service, the pipe line and appurtenances shall be disinfected in general accordance with ANSI/AWWA C651, latest edition; AWWA Standard for Disinfecting Water Mains and the supplemental procedures as set forth below.

1. Section 3 of AWWA C651 emphasizes six basic procedures in the disinfection process. These procedures are to:
  - a. prevent contaminating materials from entering the water main during storage, construction, or repair;
  - b. remove by flushing or other means, those materials that may have entered the water main;
  - c. chlorinate any residual contamination that may remain, and flush chlorinated water from the main;
  - d. protect the existing distribution system from backflow due to hydrostatic pressure test and disinfection procedures;
  - e. determine the bacteriological quality by laboratory test after disinfection; and
  - f. make final connection of the approved new water main to the active distribution system.

2. Preliminary Flushing:

The main shall be flushed prior to disinfection at a velocity of not less than 3.0 ft/s unless the County determines that conditions will not permit the required flow. Adequate provisions shall be made by the Contractor for disposal and neutralization of flushing water so that no physical or environmental damage results. Contractor will find additional instructions on flushing in the supplemental procedures within this section.

3. Forms of Chlorine for Disinfection:

It is the CONTRACTOR'S responsibility to be familiar with and have available for

his employees the “Product Data Safety Sheets” of any products used as a source of chlorine and to provide the proper safety instructions and personal protective equipment to the employees mixing and using materials for disinfection of the water facilities.

- a. **Only liquid sodium hypochlorite (household and industrial strength bleach) are acceptable sources of chlorine for disinfection.**

Sources of chlorine shall be in conformance with AWWA B300 Standard for Hypochlorites, and NSF 60 and 61.

- b. The use of chlorine gas is hazardous and is **strictly prohibited** for use of disinfection of public waterlines.
- c. The use of calcium hypochlorite pills affixed to the interior of water pipe for disinfection **shall not be an acceptable form of disinfection.**
- d. The mixing of a source of chlorine to obtain a suitable disinfecting solution shall be as follows:
  - 1) Liquid sodium hypochlorite is supplied in strengths from 5.25 percent available chlorine (commercially available household bleach) to 15 percent available chlorine (industrial strength sodium hypochlorite). A water-sodium hypochlorite solution shall be prepared by adding liquid sodium hypochlorite to water.
  - 2) A water calcium hypochlorite solution shall be prepared by dissolving calcium hypochlorite granules containing 65 percent available chlorine by weight in a pre-determined volume of water to make the desired water-calcium hypochlorite concentration. Disinfection of new mains by water calcium hypochlorite solution shall not be used unless a suction or in-line strainer is available on the solution pump to prevent any undissolved solids from entering the piping. An alternative method of straining the solution to remove undissolved granules may be approved by the inspector on a case-by-case basis.

#### 4. Method of Chlorine Application and Testing

- a. The continuous feed method of applying the disinfecting solution shall be as follows: Water from the existing distribution system or other approved sources of potable water supply shall flow through an approved backflow prevention device at a constant, measured rate into the newly laid pipeline. The water shall be mixed with a chlorine-water solution as prepared above, also fed at a constant measured rate. The two rates shall be proportioned so that the chlorine concentration of the water and water/chlorine solution in the pipe is elevated to and maintained at a minimum of 50 mg/l available chlorine. Since the forms of preparation for a water-sodium hypochlorite or water-calcium hypochlorite concentration are a batch process, a method acceptable to the inspector

shall be available to replenish the concentration being fed and mixed with the water flow, so there is no interruption of the flow of disinfection solution. To assure that this concentration is maintained, the chlorine residual shall be measured at intervals not exceeding 1,200 feet and at the end of all branch lines or cul-de-sacs in accordance with the procedures outlined herein. During the application of the chlorine-water solution, valves, hydrants and any other appurtenances shall be operated in order to be thoroughly disinfected. Chlorine-water solution application shall continue until the entire new main is filled with water having a residual of a minimum of 50 mg/l chlorine solution. The chlorinated water shall be retained in the main for at least 24 hours. The free chlorine residual must be at least 10 mg/l after 24 hours in accordance with AWWA C651.

- b. The Owner or Contractor will furnish the personnel and equipment for determining water-chlorine solution strengths and residuals.
- c. After the applicable retention period, the heavily chlorinated water shall be flushed (low-flow) from the main until the chlorine residual of the water leaving the main is equal to the chlorine residual of the incoming system water. Additional instructions for disposal of the heavily chlorinated water are covered in a subsequent section entitled "Flushing".

#### B. Bacteriological Test

- 1. After low-flow flushing, and before the water main is placed in service, samples shall be collected and tested for bacteriological quality. Two consecutive negative tests from the same location shall show the absence of coliform organisms. At least two samples shall be collected and tested by a State of Virginia certified laboratory at least 16 hours apart at intervals determined by the Inspector (not exceeding 1,200 feet apart and at the end of all branch lines and cul-de-sacs).
- 2. Samples for bacteriological analysis shall be collected in approved sterile bottles or bags treated with sodium thiosulfate. If laboratory results indicate the presence of coliform bacteria, the samples are unsatisfactory and disinfection shall be repeated as prescribed above until the samples are satisfactory. Cleaning, disinfection, and testing shall be under the direction of the Inspector but remains the responsibility of the CONTRACTOR. The CONTRACTOR shall be responsible for any cost associated with the loading, hauling, discharging, and dechlorination of the heavily chlorinated water.

### 3.3 SUPPLEMENTAL PROCEDURES FOR DISINFECTING, TESTING, AND FLUSHING

#### A. General:

- 1. All work shall be performed in general accordance with AWWA C651, latest edition.
- 2. The supplemental procedures are developed to compliment the AWWA C651

Standard, particularly with respect to flushing, testing and tie-in to the existing water distribution system.

3. These procedures and construction acceptance for final tie-in of new water main are performance based, predicated on the new construction passing pressure and bacteriological testing. In order to best assure satisfactory bacteriological results, it is essential that all aforementioned preventive and precautionary measures be taken prior to and during construction to protect the interiors of pipe, fittings and valves against contamination. Failure to follow the precautionary measures increases the likelihood of unsatisfactory bacteriological tests and increases the construction requirements necessary for final acceptance. Refer to AWWA C651, Section 4, entitled "Preventive and Corrective Measures During Construction".
4. No contaminated material or any material capable of supporting the growth of microorganisms or causing taste, odor, or other aesthetic water quality concerns shall be used in sealing joints. Sealing material or gaskets shall be handled in a manner that avoids contamination. The lubricant used in the installation or sealing gaskets shall be supplied by the pipe manufacturer and suitable for application in a potable water system. It shall be kept clean and applied clean with dedicated applicators.

Note: The County will not accept completed waterlines that exhibit taste and odor conditions as a result of the use of unapproved lubricants.

B. Filling and Testing Procedures:

1. Connection of the new water main to the existing distribution system for filling and testing shall be through a Contractor furnished flushing mechanism. The Contractor is to furnish the single gate valve, double check valve flushing assembly and all necessary fittings, reducers, increases and sleeves to make the piping connections. Assembly shall be approved by the County prior to its use. A suitable valved piping arrangement for the addition of the water-chlorine solution is to be available on the new line side of the flushing assembly. The assembly is to be furnished with 150 psi rated flange connections and installed in a manner approved by the Inspector.
2. System testing will not commence until all administrative items have been resolved and the project is ready for tentative acceptance pending the successful performance of all required testing.
3. Initial flush shall be at a flow rate to achieve a minimum velocity of 3.0 fps and shall be continued for the time needed for two (2) complete turnovers of the segment of water piping and appurtenances.
4. Pressure test the line as noted in these specifications.
5. Make any necessary repairs and pressure test again until the line passes this test.
6. Disinfect the line in accordance with AWWA C651, Section 5. A water-chlorine solution prepared in accordance with these specifications shall be used for disinfection.

7. After the applicable retention period, the heavily chlorinated water shall be flushed from the main until the chlorine residual of the water leaving the main is equal to the chlorine residual of the incoming system water.
  8. Bacteriological samples will be taken in accordance with AWWA C651, Section 7.
  9. If unsatisfactory bacteriological test results are received, repeat steps 6, 7 and 8.
  10. After receiving satisfactory bacteriological test results, the Contractor shall coordinate with the Inspector the connecting of the new main to the existing system. All connecting pipe and fittings shall be clean and free of debris and shall be swabbed or sprayed with a 1 percent sodium hypochlorite solution before they are installed. The Contractor shall tie-in new waterlines to the existing water system within 10 working days of successful completion of all bacteriological tests; otherwise the disinfection process must be repeated.
  11. Final flush of line shall maintain a minimum of 1 fps in the pipeline and shall continue until the disinfection solution is completely removed from the system.
- C. The Disinfection and Supplemental Procedures may be modified by the Owner for site specific problems that do not physically allow for following the normal disinfection procedures. Modified instructions will be given in writing from the Owner through the Inspector and will be executed by the Contractor in a manner that does not subject the existing distribution system to undue problems and assures that adequate disinfection and flushing will be given to the new main before placing it into service.
- D. The procedure for the disinfection of short leads to fire hydrants and the connector pipe to fire suppression systems/double detector check assemblies shall be as follows:

Connector piping, fittings and valves from an existing main to a fire hydrant or to a fire system double detector check assembly, which does not contain domestic use branches and is equal to or less than 18 feet in length from the main may be spray disinfected or swabbed with a minimum 1 percent solution of chlorine just prior to installation, tied-in and flushed at a velocity of not less than 3.0 ft/sec. Bacteriological sampling will be taken downstream for confirmation of uncontaminated water. Connections to existing mains must be done within 10 working days of the successful completion of bacteriological tests; otherwise, the disinfection process shall be repeated.

E. Flushing:

The use of water for making the new water main available for service will be as follows:

1. Initial Flush:

See table entitled "Flushing Schedule". This is to be a high velocity flush through all sections of the new line. Since the large volume of water may have effects on the existing distribution system, the initial flushing is to be done only with the approval of and under the direction of the Inspector. System demands may cause this flushing to be done at times when the existing distribution system demands are low.



Because of the large volume of water to be flushed from the fire hydrants or flushing hydrants, the Contractor must inspect the areas of discharge and provide the necessary equipment or materials to prevent any environmental damage or erosion. Sufficient hose length and termination fittings are to be provided so as to discharge the water into stable, heavily vegetated areas, drainage ponds, storm sewers, paved ditches, etc. The Contractor is to be responsible for any damage that may result from flushing.

2. Flush to remove disinfecting solution:

This is a low velocity, low flow, flush through fire or flushing hydrants to remove the disinfection solution from the new line. The Contractor is to provide sufficient hoses to connect from the hydrants to a suitable discharge point. The flushing of the disinfecting solution must not enter any streams or be discharged in a manner that causes any environmental damage. For site specific locations the Inspector may require the use of a neutralizing chemical and piping arrangement. The expense of a neutralizing station is the responsibility of the Contractor.

3. Final Flush:

See the table below. The final flush is a medium velocity, medium flow flush to clear the line of any chlorine solution used in the tie-in and to provide for fresh water throughout the new lines.

<b>FLUSHING SCHEDULE</b>			
Main size (Nominal)	Double Check Valve Single Gate Size (Note 1)	INITIAL FLUSH (Note 2) Min. Flow (gpm)	FINAL FLUSH (Note 2) Max. Flow (gpm)
6"	4"	265	88
8"	4"	470	160
12"	6"	1060	350
16"	6"	1,900	624
20"	8"	3,000	978
24"	10"	4,250	1,410

Notes:

1. Approximation of flushing flows can be made by using either a pitot tube or a method of measuring the static discharge pressure from a hydrant used for discharge of the flushing water. See Detail "Discharge Flow Rates for Flushing".
2. On a case-by-case basis, dependent upon such variables as length of new water main (<200'); space limitations or other unforeseeable obstacles, the Inspector may authorize the use of a smaller flushing device if the use of this device will provide for adequate flushing of the new water main.

**END OF SECTION**

**SECTION 311000  
SITE PREPARATION**

**PART 1- GENERAL**

**1.1 SCOPE**

- A. The CONTRACTOR shall be responsible for preparation of the site for construction of the project in accordance with the Contract Documents and as specified herein.

**PART 2- PRODUCTS**

Not Applicable

**PART 3- EXECUTION**

**3.1 STAKING AND LAYOUT OF WORK**

- A. The CONTRACTOR shall locate bench marks, monuments, base lines, reference lines, and other reference points for the staking and layout of the WORK. Locations of bench marks, base line control points, and other reference points which were established during design of the project by the ENGINEER will be made available to the CONTRACTOR one time only upon request without charge. The CONTRACTOR shall complete the layout of the WORK and shall be responsible for all measurements that may be required for the execution of the WORK, to the location and limits that may be required for the execution of the WORK, to the location and limit marks prescribed in the Contract Documents, subject to such modifications as the ENGINEER may require to meet changed conditions in the contract WORK. All WORK under this contract shall be done to the lines and grades shown on the Contract Drawings.
- B. The CONTRACTOR shall furnish competent men, tools, stakes, and other material as required, without charge, for properly staking out the WORK. He shall furnish the ENGINEER with one (1) copy of all field notes of such surveys. Final "cut" sheets/grade sheet shall be provided to the ENGINEER and OWNER. All staking and layout shall be performed under the supervision of a surveyor licensed in the Commonwealth of Virginia.
- C. It shall be the duty of the CONTRACTOR and his employees to call to the attention of the ENGINEER any reference lines or points, or any bench marks which may have been disturbed or which seem to be off line or grade.
- D. Where called for in the Contract Documents or required for accuracy and fit with existing WORK, the CONTRACTOR will make his own field measurements to verify any dimensions shown on the Contract Drawings.

**3.2 PROTECTION OF EXISTING PROPERTY IRONS AND MONUMENTS**

- A. The CONTRACTOR shall use care in protecting existing property irons and monuments adjacent to his working area. If a property iron or monument must be removed to install new facilities, the CONTRACTOR shall be responsible for locating the iron or monument in such a manner that it can be accurately replaced after construction of the new facilities by a properly registered surveyor. If a property iron or monument is destroyed because of neglect on the part of the CONTRACTOR, it shall be replaced at his expense by a properly registered surveyor.

### 3.3 RIGHT-OF-WAYS AND LIMITS OF CONSTRUCTION

- A. The CONTRACTOR shall confine his construction operations to the immediate vicinity of the location shown on the Contract Drawings and in no case shall he encroach beyond the limits of the OWNER'S property or rights-of-way. He shall place materials, equipment, supplies, etc. so as to cause the least possible damage to property and interference with traffic. His method of operation and placing of equipment and materials shall be subject to the review of the ENGINEER.
- B. It shall be the duty of the CONTRACTOR to locate the limits of the rights-of-way, or property lines, prior to beginning construction. He shall be solely responsible for damage to trees, crops or other property outside the boundaries of the rights-of-way and shall make satisfactory settlement for any damage directly with the property OWNER involved.
- C. Where timber is located within the limits of construction and inside the easements on the property or rights-of-way, the CONTRACTOR shall preserve and protect from damage all trees that do not directly interfere with the prosecution of the WORK. The CONTRACTOR shall not cut any tree greater in diameter than six (6) inches and located more than eight (8) feet from the centerline of ditch or structure without first consulting the ENGINEER.
- D. Where shrubbery or grass is located on the construction rights-of-way, the CONTRACTOR shall be fully responsible for any damage thereto. He shall remove, protect and replant all shrubbery to the full satisfaction of the ENGINEER, OWNER, and property OWNER and shall either remove and resod or replant all lawns or pasture grass damaged by the construction WORK. Topsoil shall be replaced and grass of the same type found shall be planted, fertilized, mulched and watered in accordance with the Specifications, until a satisfactory stand of grass is secured. Unless otherwise notified, all timber located on rights-of-way and easements is the property of the land OWNER, and the land OWNER must be given a reasonable amount of notice and time by the CONTRACTOR to remove any timber. Prior to removing any timber the land OWNER and the OWNER must be notified by the CONTRACTOR.
- E. Construction Rights-of-Way shall be defined as the designated property, easements, and public rights-of-way which comprise the work area for the project.
- F. Excavation, grading, fill, storm drainage, paving and any other construction or installations in rights-of-ways of streets, highways, public carrier lines, utility lines (either aerial, surface or subsurface), etc., shall be done in accordance with requirements of the authorities having jurisdiction and of applicable requirements of these Specifications. CONTRACTOR shall make all necessary arrangements with the proper authorities, including the obtaining of

permits, approval of construction methods, etc., and shall pay all costs charged in connection with the WORK.

### 3.4 PROTECTION OF PROPERTY AND EXISTING UTILITIES AND STRUCTURES

- A. CONTRACTOR shall be responsible for the preservation and protection of property adjacent to the WORK site against damage or injury as a result of his operations under this WORK. Any damage or injury occurring on account of any act, omission or neglect on the part of the CONTRACTOR shall be restored in a proper and satisfactory manner as determined by the ENGINEER and OWNER or replaced by and at the expense of the CONTRACTOR.
- B. CONTRACTOR shall comply promptly with such safety regulations as may be prescribed by the ENGINEER, OWNER or the local, state and federal authorities having jurisdiction and shall when so directed, properly correct any unsafe conditions created by, or unsafe practices on the part of his employees. In the event of the CONTRACTOR's failure to comply, the ENGINEER or OWNER may take the necessary measures to correct the conditions or practices complained of, and all costs thereof will be deducted from any monies due the CONTRACTOR. Failure of the ENGINEER to direct the correction of unsafe conditions or practices shall not relieve the CONTRACTOR of his responsibility hereunder.
- C. In the event of any claims for damage or alleged damage to property as a result of WORK under this WORK, the CONTRACTOR shall be responsible for all costs in connection with the settlement of or defense against such claims.
- D. Where existing utilities and structures are indicated on the Drawings, it shall be understood that all of the existing utilities and structures affecting the WORK may not be shown and that the locations of those shown are approximate only. It shall be the responsibility of the CONTRACTOR to ascertain the actual extent and exact location of existing utilities and structures. In every instance the CONTRACTOR shall notify the proper authority having jurisdiction and obtain all necessary directions and approvals before performing any WORK in the vicinity of existing utilities.
- E. The WORK shall be carried out in a manner to prevent disruption of existing services and to avoid damage to the existing utilities. Temporary connections shall be provided, as required, to ensure uninterrupted of existing services. Any damage resulting from Construction of this WORK shall be repaired within 24 hours. The CONTRACTOR shall make these repairs at his own expense in a manner approved by the ENGINEER, and further, subject to the requirements of any authority having jurisdiction, that they perform their own repairs or have them done by others, the CONTRACTOR shall be responsible for all costs thereof.
- F. Where excavations by the CONTRACTOR require any utility lines or appurtenant structure to be temporarily supported and otherwise protected during the construction WORK, such support and protection shall be provided by the CONTRACTOR. All such WORK shall be performed in a manner satisfactory to the ENGINEER and the respective authority having jurisdiction over such WORK. In the event the CONTRACTOR fails to provide proper support or protection to any existing utility, the ENGINEER may, at his direction, have the respective authority provide such support or protection as may be necessary to insure the safety of such utility, and the costs of such measures shall be paid by the CONTRACTOR.

### 3.5 OBSTRUCTIONS

- A. The CONTRACTOR shall be responsible for removing and disposing of any obstructions or obstacles at the site of the WORK or along the right-of-way therefore, to the satisfaction of the ENGINEER. Minor obstruction shall be removed and properly disposed of or protected and re-erected to as good condition as found, at the same or adjacent locations, as directed by the ENGINEER.

### 3.6 FENCES

- A. Fences at the site or along rights-of-way, which interfere with the construction operations, shall be maintained by the CONTRACTOR until completion of the WORK unless written permission is obtained from the OWNER thereof to leave the fence dismantled until construction is completed. He shall remove, rebuild and extend fences as necessary.

### 3.7 DEMOLITION

- A. Demolition shall be as specified in Division 2.

### **END OF SECTION**

**SECTION 312000  
EARTHWORK FOR UTILITIES**

**PART 1 - GENERAL**

1.1 SUMMARY

The CONTRACTOR shall furnish all labor and equipment for excavation, installation, backfill, and testing of all force main and gravity sewer lines, and appurtenances as shown on the Drawings and specified herein. This section specifies excavation and backfill for all underground utilities.

1.2 UNSUITABLE SOILS AND ROCK

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. No extra payment will be made for rock excavation.

1.3 RELATED SECTIONS

Intent: The provisions and intent of the AGREEMENT, including the General Conditions, Supplemental Conditions, and other requirements of the Contract Documents apply to the WORK as specified in this Section. WORK related to this Section is described throughout the Specifications.

1.4 REFERENCES

- A. American Society of Testing and Materials (ASTM)
- B. VDOT Road and Bridge Specifications
- C. American Society of Civil Engineers (ASCE), Manual No. 37
- D. American Association of State Highway and Transportation Officials (AASHTO)
- E. Federal Highway Administration (FHA), Bulletin No. 373
- F. Occupational Safety and Health Administration Regulations (OSHA)

1.5 QUALITY ASSURANCE

Standards: Backfill material shall comply with the standards of the American Association of State Highway and Transportation Officials:

T-191 "Density of Soil In-Place by the Sand-Cone Method"

T-180 "Moisture-Density Relations of Soils using a 10 lb. Hammer and an 18 inch Drop"

**PART 2 - PRODUCTS**

2.1 BACKFILL MATERIALS

- A. See details on plan sheets.
- B. (Select Fill) Initial backfill materials shall conform to the following:
  - 1. Classification: USCS Soil Classification System (FHA Bulletin No. 373).
  - 2. Class I: Angular, 6 to 25 mm (3 to 1 inch) graded stone.
  - 3. Class II: Coarse sands and gravels with maximum particle size of 25 mm (1 inch including variously graded sands and gravels containing small percentages of fine,

EARTHWORK FOR UTILITIES

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- generally granular and non-cohesive, either wet or dry. Soil types GW, GP, SW, and SP are included in this class.
4. Class III: Fine sand and clayey gravels less than 1 inch including fine sands, sand-clay mixtures, and gravel-clay mixtures. Soil types GM, GC, SM, and SC are included in this class.
- C. Pipeline backfill should consist of material classifying CH, CL, ML, SC, SM, SP, SW, GC, GM, GP, or GW per ASTM D-2487. Non-organic, on-site soils are expected to meet this criterion. The more highly plastic CH and MH soils should not be used within 2 ft of the pavement subgrade level or the ground surface in structural areas. If off-site borrow soils are needed, they should classify SC, SM, SP, SW, GC, GM, GP or GW per ASTM D-2487.

## **PART 3 - EXECUTION**

### **3.1 EXCAVATION**

- A. General: All excavation shall be open-cut type except where otherwise shown on the Drawings. The slope of the sides of the excavation shall be kept as nearly vertical as possible consistent with the types of materials encountered. Where trenches would become unreasonably large due to a deep excavation or extremely wet condition, CONTRACTOR shall slope or bench the trench walls to maintain safe working conditions per OSHA Trenching Criteria. A clear area shall be maintained a sufficient distance back from the top edge of the excavation to avoid overloading which may cause slides, cave-ins or shifting of the pipe. Any damage to pipes or structures occurring through settlements, heaving, water or earth pressures, slides, cave-ins or other causes shall be repaired by CONTRACTOR at its expense. CONTRACTOR has the option of shoring, including sheet piling, which shall be installed during excavation where required for the protection of workmen, banks, roadways and adjacent paving, structures, and utilities or as directed by ENGINEER. All excavation shall be performed in accordance with the current OSHA guide lines and any other regulatory authorities having jurisdiction. Provide adequate equipment to comply with OSHA regulations. At no time shall more than 100 feet of trench be open ahead of lines in streets and highways and not more than 200 feet in other locations.

All excavated materials shall be placed on the up gradient side of the trench.

- B. Excavation consists of removal and disposal of material encountered when establishing required trench elevations. Unauthorized excavation consists of removal of materials beyond indicated subgrade elevations or dimension without specific direction of ENGINEER.
- C. Protection: Protect existing structures, utilities, sidewalks, pavements, and other facilities from damage created by work or other operations in the area. Barricades for open excavations or work area shall be provided. All such barricades shall be in accordance with the requirements of the authorities or agencies within whose jurisdiction the design exists.
- D. Sheet piling, Shoring and Bracing: Provide sheet piling, shoring and bracing as necessary to prevent cave-in of excavation or damage to existing structures on or adjoining site. Shoring or sheet piling shall be removed as the WORK progresses, unless left in place by written order of ENGINEER.
1. Requirements that are established for trench shoring and bracing should comply with codes and authorities having jurisdiction over the work being performed. The CONTRACTOR's attention is called to Rules and Regulations Governing the Safety and Health of Employees Engaged in Construction as adopted by the Safety and Health Codes Commission of the State of Virginia and all latest

revisions thereto and issued by the Department of Labor and Industry.

The CONTRACTOR shall perform all construction operations in accordance with the U.S. "Occupational Safety and Health Act of 1970", the Standards of the U.S. Department of Labor, Occupational Safety and Health Administration and the latest amendments thereto.

2. Shoring, sheeting and bracing shall be removed as the WORK progresses, unless left in place with the approval of the ENGINEER. If left in place, shoring, sheeting and bracing must be cut off to a depth of not less than 2 feet below the surface.
- E. Trench Excavation: CONTRACTOR shall comply with all local, state and federal guidelines when excavating trenches. The width of the trench at and below the top of the pipe shall not exceed the outside diameter of the pipe plus 24 inches. The width of the trench above the top of the pipe may be as wide as necessary for sheeting and bracing and the proper performance of the WORK.
- F. Sidewalls: The sidewalls of pipe trenches shall be as nearly vertical as practicable to a point one pipe diameter above the top of the pipe.
- G. Overexcavation: Trenches shall be excavated to the design grade of the pipe to provide uniform bearing and support along the entire length of pipe. Care shall be taken not to over excavate. Over excavation of otherwise suitable material shall be replaced with suitable material as directed by ENGINEER. The cost of such fill shall be borne by CONTRACTOR.
- H. Rock: Where the bottom of the pipe trench occurs in rock, the rock shall be excavated to the trench depth specified in the bedding details for ductile iron pipe and plastic pipe provided on the plans. Overdepths in rock excavation and unauthorized overdepths shall be backfilled with VDOT Type B stone or sand.
- I. Unsuitable Material: Whenever wet or otherwise unsuitable material, which is incapable of properly supporting the pipe, is encountered in the trench bottom, such material shall be overexcavated to a depth necessary to allow for construction of a stable pipe bedding. The trench shall be backfilled with suitable materials to proper grade. The CONTRACTOR shall notify ENGINEER immediately when such conditions are encountered and the ENGINEER will determine the amount of overexcavation required. No additional compensation will be considered for additional excavation.
- J. Installation of Identification: See Division 2 for requirements.

### 3.2 SEPARATION OF WATERLINES AND SANITARY SEWERS

- A. Sewer Lines and Manholes shall be laid at least ten feet horizontally from water mains, the distance shall be measured edge-to-edge. When separation cannot be obtained, the sewer shall be constructed of AWWA approved water pipe, pressure-tested in place to 30 psi without leakage prior to back-filling; and the sewer manhole shall be of watertight construction and tested in place.
- B. Crossing: Sewer line crossing under water mains shall be laid to provide a separation of at least 18 inches between the bottom of the waterline and the top of the sewer whenever possible.



- C. When local conditions prevent a vertical separation described above, the following construction shall be used: (1) sewers passing over or under waterlines shall be constructed of AWWA approved water pipe, pressure tested in place to 30 psi without leakage prior to back-filling; (2) waterlines passing under sewers shall, in addition, be protected by providing:
1. A vertical separation of at least 18 inches between the bottom of the sewer and the top of the waterline.
  2. Adequate structural support for the sewer to prevent deflection of joints.
  3. That the length of waterline be centered at the point of the crossing so that joints shall be equidistant from the sewer.
  4. Sewer Manholes: If a waterline passes within 10 feet of a sewer manhole, the sewer manhole shall be tested and made watertight.
  5. Sewers and Sewer Manholes: No water pipes shall pass through or come in contact with any part of a sewer manhole.

### 3.3 BEDDING

- A. Pipe shall have minimum bedding as shown on the plans. Pipe bedding shall be VDOT Type B stone, sand, or other material approved by the ENGINEER. Large clods, sticks, stones, and other unsatisfactory material must be excluded from the initial backfill. Bedding material shall be compacted to a minimum 95 percent of maximum density as determined by ASTM D698 (standard Proctor).

### 3.4 HAUNCHING

- A. 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 springline and shall be compacted to a minimum 95 percent of maximum density as determined by ASTM D698 (standard Proctor).

### 3.5 BACKFILLING

- A. Operation: CONTRACTOR shall keep trenches backfilled on a daily basis. Prior to the end of the working day, each trench will be completely backfilled. All backfill shall be brought up equally along each side of the pipe in such manner as to avoid displacement of or damage to the pipe.
- B. Initial backfill: Initial backfill shall be with the same material as the haunching material and shall be placed in 6" layers to the crown of the pipe. The remainder of the initial backfill shall be with pipeline backfill material identified in Part 2 to a minimum level of 12" above the crown of the pipe. Large clods, sticks, stones, and other unsatisfactory material must be excluded from the initial backfill.
- C. Final backfill: The final backfill material shall consist of material which has been excavated from the trench except rubbish, frozen material, broken pavement or other debris, stones greater than a maximum dimension 6 inches, organic muck, or other materials considered deleterious by ENGINEER and shall be in conformance with pipeline backfill material identified in Part 2. In no case shall rock or asphalt be placed closer than two (2) feet vertically to the installed pipe.

- D. Disposal of Unsatisfactory Material: When, in the opinion of ENGINEER, the excavated material is not satisfactory for use as backfill, the material shall be disposed of under direction of ENGINEER. Select material shall be brought in by CONTRACTOR. No extra payment will be made for disposing of unsatisfactory material or bringing in select material.
- E. Compaction: The material to be used for backfill shall contain a moisture content that will facilitate compaction. The initial backfill shall be brought up in layers not exceeding 6 inches in compacted depth for the full length of pipe. Each layer shall be thoroughly compacted by rolling, or with mechanical tampers or hammers. This method of filling and compacting shall continue until the fill has reached an elevation 12 inches above the top of the pipe.
- The remainder of the trench shall be backfilled and compacted in layers not exceeding 6 inches. Other methods of achieving the compaction may be used, however, only after review by Licensed Geotechnical Engineer and written approval of ENGINEER.
- F. Open Areas: Backfill in open areas shall be compacted to a maximum density of 95 percent at optimum moisture as determined by ASTM D-698.
- G. Roadways: Backfill under roadways, VDOT Right of Ways, or other similar installations shall be compacted to a maximum density of 95 percent at optimum moisture as determined by ASTM D-698.
- Under walkways, scarify and recompact top 6 inches (150 mm) below subgrade and compact each layer of backfill or fill soil material at 92 percent.
- Under turf or unpaved areas, scarify and recompact top 6 inches (150 mm) below subgrade and compact each layer of backfill or fill soil material at 85 percent.
- For utility trenches, compact each layer of initial and final backfill soil material at 85 percent.
- H. Clay Dams: Where required, clay dams shall be installed in the trench to prevent groundwater from flowing down the trench and damaging the subgrade as directed by the inspector. Clay material with an imperviousness of  $1 \times 10^{-3}$  cm/sec shall be used in clay dams. Remaining trench backfill materials shall be compacted as indicated above. Inspector shall approve clay material prior to use.
- I. Testing: CONTRACTOR is responsible for all costs associated with testing. All pipe in VDOT Right-of-Way shall be tested per the VDOT Permit for compaction. In other areas, the backfill shall be tested every 400 feet or at the discretion of the OWNER/ENGINEER to insure that the required density is being achieved. ENGINEER shall select the depth at which the test is to be taken. Backfill not compacted to the required density shall be removed, recompact, and retested at CONTRACTOR'S expense until the requirements are met.
- J. Excess Disposal: Excess material shall be disposed of at the CONTRACTOR's expense.
- K. Settlement: All backfilled areas where settlement occurs shall be filled and maintained during the life of the Project and for a period of 1 year following the date of final acceptance of all WORK.

- L. Hazards: When the CONTRACTOR is notified by ENGINEER or OWNER that any backfill presents a hazard, CONTRACTOR shall correct such hazardous condition at once.

### 3.6 BORROW

- A. Availability: Where satisfactory materials are not available in sufficient quantity from required excavations, suitable materials shall be obtained from approved off-site borrow areas.
- B. Placement: Borrow material shall be placed and compacted only when approved by ENGINEER and a Licensed Geotechnical Engineer.
- C. Payment: No separate payment will be made for furnishing and placing approved borrow material. Compensation in full is included in the agreed to price paid for this Project.

### 3.7 COMPACTION

- A. Method: Where sands and/or gravels are used for backfill, the material shall be compacted to maximum possible density with a plate-type vibrating compactor of standard manufacture, consisting of a variable speed power unit attached to a vibratory plate. The vibrator may be single or multiple type and shall provide sufficient unit pressure on the vibratory plate to obtain maximum density. When the proper moisture content is obtained for all other soils to be used for backfill, they shall be compacted to a density of 95 percent of maximum density or increased as required in pavement areas.
- B. Moisture: Moisture density relations, specified for materials used for fills and backfill, shall be determined and the degree of compaction controlled (except where otherwise specified) in accordance with the requirements of ASTM D-698.

### 3.8 BLASTING

- A. Blasting can be used only if specifically approved by OWNER/ENGINEER and Appropriate Governing Agencies. Blasting shall be in accordance with local and state laws and regulations. CONTRACTOR shall be required to obtain all required permits and approvals prior to beginning any blasting operations.
- B. Regulations: Blasting operations shall be in strict accordance with “Rules and Regulations Governing Manufacture, Storage, Handling, Use and Sale Explosives” issued by the Department of Labor and Industry of Virginia and any County ordinances. All blasting shall be done at the sole risk of the CONTRACTOR and shall be done only by experienced licensed personnel. **Occupants of nearby structures shall be notified prior to beginning blasting operations.**
- C. CONTRACTOR shall be responsible for monitoring blasting activities via placement of calibrated and accurate seismographs. Additional seismographs may be required in the vicinity of structures of concern within one-quarter mile (1,320 feet +/-) of the blasting activity at the discretion of the OWNER and ENGINEER at no additional project cost.
- D. CONTRACTOR shall submit accurate and complete Blasting Reports, to include sketches with seismograph locations, for each blast completed. Blast Reports shall be submitted to the ENGINEER and OWNER within seven (7) days of the blast or with the next pay application, whichever is longer.

- E. When blasting is required, the CONTRACTOR shall conform to the following requirements:
1. Blasting shall not be permitted before 9:00 AM or after 5:00 PM on Monday through Friday unless otherwise authorized by the County.
  2. Blasting on Saturdays, Sundays or holidays shall not be permitted unless specifically authorized by the County.
  3. The CONTRACTOR shall, each day when necessary to blast, set up an approximate schedule of blasting operations and provide 24 hours notice to the County and property owners with occupied buildings within 1,000 feet of blasting.
  4. The CONTRACTOR shall use mats to minimize noise and control flying debris.
  5. The CONTRACTOR shall obtain all required permits including a permit from the OWNER.
- F. Protection: It shall be the responsibility of the CONTRACTOR to protect the public and existing structures (exposed and subsurface) from injury. The blast will be secured in a manner that will prevent the escape of flying material. Care shall be taken to protect facilities.
- G. Damage: In the event damage occurs, it shall be promptly repaired by the CONTRACTOR at its sole expense.
- H. Storage of Materials: Where there are no local ordinances governing blasting and the storage of materials, all blasting supplies shall be stored in a manner approved by the ENGINEER, and a watchman shall be stationed at all times at the place of storage. In no case shall caps or other exploders be kept at the place where dynamite or other explosives are stored.

**END OF SECTION**

**SECTION 312110  
CLEARING AND GRUBBING**

**PART 1 - GENERAL**

**1.1 SUMMARY**

The CONTRACTOR shall be responsible for preparation of the site for construction of the project in accordance with the Contract Documents and as specified herein.

This section includes the following:

- A. Protection of existing trees.
- B. Removal of trees and other vegetation in the project area.
- C. Clearing and grubbing.

**1.2 RELATED SECTIONS**

Intent: The provisions and intent of the AGREEMENT, including the General Conditions, Supplementary Conditions, and other requirements of the Contract Documents apply to the WORK as specified in this Section. WORK related to this Section is described throughout the Specifications.

**1.3 REFERENCES**

Virginia "Erosion and Sediment Control Handbook", latest edition.

**1.4 SUBMITTALS**

- A. Submittals shall be in accordance with Division 1.
- B. Off-Site Borrow Areas: If applicable, provide written assurance to ENGINEER that CONTRACTOR has the right to excavate and remove off-site borrow materials for use at the site.
- C. Erosion and Sediment Control: Submit and maintain on-site a copy of Erosion and Sediment Control permit issued by the local approving authority for both on-site and off-site operations. These permits are to be obtained by the CONTRACTOR.

**1.5 DELIVERY, STORAGE AND HANDLING**

Deliver materials to, store at the site, and handle in a manner which will maintain the materials in their original manufactured or fabricated condition until ready for use.

**PART 2 - PRODUCTS**

Not Applicable.

## **PART 3 - EXECUTION**

### **3.1 TRAFFIC**

Conduct site clearing operations to ensure minimum interference with roads, streets, walks, businesses, and other adjacent occupied or used facilities. Do not close or obstruct streets, walks or other occupied or used facilities without prior permission from ENGINEER, OWNER, DPW, VDOT, private business and/or property owners on which WORK is conducted, and/or authorities having jurisdiction.

### **3.2 PROTECTION**

- A. General: Provide temporary fences, barricades, coverings, or other protection to preserve existing items indicated to remain and to prevent injury or damage to persons or property. Provide protection for adjacent properties as required.
- B. Existing Trees/Vegetation: Protect existing trees and other vegetation adjacent to the actual WORK area from physical damage by providing temporary guards as follows:
  - 1. At a minimum, the limits of clearing shall be located outside the drip line of any tree to be retained and, in no case closer than 5 feet to the trunk of any tree.
  - 2. Marking: Prior to construction and before the preconstruction conference, individual trees and stands of trees to be retained within the limits of clearing shall be marked at a height visible to equipment operators.
  - 3. Equipment Operation and Storage: Heavy equipment, vehicular traffic, or stockpiles of any construction materials (including topsoil) shall not be permitted within the drip line of any tree to be retained. Trees being removed shall not be felled, pushed or pulled into trees being retained. Equipment operators shall not clean any part of their equipment by slamming it against the trunks of trees to be retained.
  - 4. Storage and Disposal of Toxic Materials: No toxic materials shall be stored closer than 100 feet to the drip line of any trees to be retained. Paint, acid, nails, gypsum board, wire, chemicals, fuels, and lubricants shall not be disposed of in such a way as to injure vegetation.
  - 5. Fencing and Armoring: Any device may be used which will effectively protect the roots, trunk and tops of trees retained on the site. However, trees to be retained within 40 feet of a proposed building or excavation shall be protected by fencing. Personnel must be instructed to honor protective devices. The devices described are suggested only, and are not intended to exclude the use of other devices which will protect the trees to be retained.
    - a. Snow Fence - Standard 40-inch high snow fence shall be placed at the limits of clearing on standard steel posts set 6 feet apart.
    - b. Board Fence - Board fencing consisting of 4-inch square posts set securely in the ground and protruding at least 4 feet above the ground shall be placed at the limits of clearing with a minimum of two horizontal boards

between posts. If it is not practical to erect a fence at the drip line, construct a triangular fence nearer the trunk. The limits of clearing will still be located at the drip line, since the root zone within the drip line will still require protection.

- c. Cord Fence - Posts with a minimum size of 2 inches square or 2 inches in diameter set securely in the ground and protruding at least 4 feet above the ground shall be placed at the limits of clearing with two rows of cord 1/4-inch or thicker at least 2 feet apart running between posts with strips of colored surveyor's flagging tied securely to the string at intervals no greater than 3 feet.

- d. Plastic Fencing - 40-inch high "international orange" plastic (polyethylene) web fencing secured to conventional metal "T" or "U" posts driven to a minimum depth of 18 inches on 6-foot minimum centers shall be installed at the limits of clearing. The fence should have the following minimum physical qualities:

Tensile yield:	Average 2,000 lbs. per 4-foot width (ASTM D638)
Ultimate tensile yield:	Average 2,900 lbs. per 4-foot width (ASTM D638)
Elongation at break (%):	Greater than 1000% (ASTM D638)
Chemical resistance:	Inert to most chemicals and acids

- e. Additional Trees - Additional trees may be left standing as protection between the trunks of the trees to be retained and the limits of clearing. However, in order for this alternative to be used, the trunks of the trees in the buffer must be no more than 6 feet apart to prevent passage of equipment and material through the buffer. These additional trees shall be reexamined prior to the completion of construction and either be given sufficient treatment to ensure survival or be removed.

- f. Trunk Armoring - As a last resort, a tree trunk can be armored with burlap wrapping and 2-inch studs wired vertically no more than 2 inches apart to a height of 5 feet encircling the trunk. If this alternative is used, the root zone within the drip line will still require protection. Nothing should ever be nailed to a tree.

- g. Fencing and armoring devices shall be in place before any excavation or grading is begun, shall be kept in good repair for the duration of construction activities, and shall be the last items removed during the final cleanup after the completion of the project.

C. Roads and Walks: Keep roads and walks free of dirt and debris at all times.

D. Utility Lines: Protect existing utility lines from damage. Notify ENGINEER immediately of damage to or an encounter with unknown existing utility lines. CONTRACTOR shall be

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responsible for the repairs of damage to existing utility lines that are indicated or made known to CONTRACTOR prior to start of clearing and grubbing operations. When utility lines which are to be removed are encountered within the area of operations, CONTRACTOR shall notify ENGINEER and OWNER and Utility Owner in ample time to minimize interruption of the service.

### 3.3 RESTORATION & REPAIR

- A. General: Restore damaged items to condition existing prior to start of WORK.
- B. Existing Trees/Vegetation: In spite of precautions, some damage to protected trees may occur. In such cases, the following maintenance guidelines should be followed:
  - 1. Soil Aeration - If the soil has become compacted over the root zone of any tree, the ground shall be aerated by punching holes with an iron bar. The bar shall be driven 1-foot deep and then moved back and forth until the soil is loosened. This procedure shall be repeated every 18 inches until all of the compacted soil beneath the crown of the tree has been loosened.
  - 2. Repair of Damage: Any damage to the crown, trunk, or root system of any tree retained on the site shall be repaired immediately.
    - a. Whenever major root or bark damage occurs, remove some foliage to reduce the demand for water and nutrients.
    - b. Damaged roots shall immediately be cut off cleanly inside the exposed or damaged area. Cut surfaces shall be painted with approved tree paint, and moist peat moss, burlap, or top-soil shall be spread over the exposed area.
    - c. To treat bark damage, carefully cut away all loosened bark back into the undamaged area, taper the cut at the top and bottom, and provide drainage at the base of the wound.
    - d. All tree limbs damaged during construction or removed for any other reason shall be cut off above the collar at the preceding branch junction.
    - e. Care for serious injuries shall be prescribed by a forester or a tree specialist at CONTRACTOR's expense.
  - 3. Fertilization: Broadleaf trees that have been stressed or damaged shall receive a heavy application of fertilizer to aid their recovery.
    - a. Trees shall be fertilized in the late fall (after October 1) or the early spring (from the time frost is out of the ground until May 1). Fall applications are preferred, as the nutrients will be made available over a longer period of time.
    - b. Fertilizer shall be applied to the soil over the feeder roots (see Plate 3.38-9). In no case should it be applied closer than 3 feet to the trunk. The root



system of conifers extends some distance beyond the drip line. Increase the area to be fertilized by one fourth the area of the crown.

- c. Fertilizer shall be applied using approved fertilization methods and equipment.
- d. Formulations and application rates shall conform to the guidelines given in the following table:

Tree Type	Special Conditions	Application Rate & Method		Formulation
Broad-Leaf Deciduous	Greater than 6 inches dbh* except American Beeches and Crabapples	Normal	2-4 lbs. per inch dbh; broadcast	Commercial 10-8-6 or 10-6-4
		Grade Change	4-5 lbs. per inch dbh; broadcast	Commercial 10-6-4
	Smaller than 6 inches dbh, including all American Beeches and Crabapples	Normal	1-2 lbs. per inch dbh; broadcast	Commercial 10-8-6 or 10-6-4
		Grade Change	2-3 lbs. per inch dbh; broadcast	Commercial 10-6-4
Narrow-Leaf Evergreen	Greater than 6 inches dbh, located in groups	2-4 lbs. per 100 sf of bed area; broadcast		Commercial 10-6-4
	Greater than 6 inches dbh, single specimens in open area	2 lbs. per inch dbh; broadcast		Commercial 10-6-4
	Smaller than 6 inches dbh	5 lbs. per 100 sf of bed area; incorporated into soil		Tankage or Cottonseed Meal
Broad-Leaf Evergreen	Where nitrogen in soil is sufficient	Liberal quantities incorporated into soil and applied as mulch		Acid Peat Moss or Rotted Oak Leaf Mold
	Where additional nitrogen is necessary	Also add 5 lbs. per 100 sf of bed area incorporated into soil		Tankage or Cottonseed Meal
*dbh: Diameter at breast height (4.5 feet above ground level).				

- e. Maintain a ground cover of organic mulch around trees that is adequate to prevent erosion, protect roots, and hold water.

### 3.4 EROSION/SEDIMENT CONTROL FOR OFFSITE BORROW AREAS

Provide appropriate erosion and sediment control measures for any off-site borrow areas in full compliance with the Virginia Erosion and Sediment Control Handbook and regulations of the local jurisdiction. CONTRACTOR shall be solely responsible for all borrow sites outside of the Project area.

### 3.5 CLEARING

Clearing shall consist of the felling, trimming, and cutting of trees into sections and the satisfactory disposal of the trees and other vegetation designated for removal, including downed timber, snags, brush, and rubbish occurring within the areas to be cleared. Cut off flush with or below the original ground surface trees, stumps, roots, brush, and other vegetation in areas to be cleared, except for trees

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and vegetation indicated or directed to be left standing.

### 3.6 TREE REMOVAL

Where indicated, remove designated trees and stumps and grub roots. A tree trimming permit shall be obtained from VDOT by CONTRACTOR to remove/trim any trees located within the VDOT right-of-way.

### 3.7 GRUBBING

Remove and dispose of roots larger than 3 inches in diameter, matted roots, and stumps from the indicated grubbing areas. Excavate this material together with logs, organic and metallic debris, brush, and refuse and remove to a depth of not less than 18 inches below the original soil surface in areas indicated to be grubbed and in areas indicated as construction areas for this Project. Fill depressions made by grubbing with suitable material and compact in accordance with the requirements of the Contract Documents to make the new surface conform with the existing adjacent surface of the ground.

### 3.8 DISPOSAL OF CLEARED AND GRUBBED MATERIALS

A. CONTRACTOR shall make available all Saleable Timber to the property owner of the area that was cleared and grubbed. Property owner shall have thirty (30) days to claim material. After thirty (30) days, CONTRACTOR shall be responsible for the disposal of said material.

B. Nonsalable Materials: Disposal shall be CONTRACTOR's responsibility.

### 3.9 STORING MATERIALS

Strip and stockpile topsoiling material and other cleared materials that will be reused in the WORK.

### 3.10 EXISTING IMPROVEMENTS/FACILITIES

Remove existing improvements, both above-grade and below-grade to extent indicated or as otherwise required to permit new construction and provide for proper disposal off-site. Existing improvements and facilities such as mailboxes, signs, ornamental or decorative items, etc. that require temporary removal to permit new construction shall be promptly replaced and/or restored to the location and condition prior to construction. Improvements and facilities that are damaged by the CONTRACTOR during the course of construction shall be promptly replaced at the CONTRACTOR'S expense.

### 3.11 SALVABLE ITEMS

If applicable, carefully remove items indicated to be salvaged, and store on OWNER's premises where indicated or directed.

### 3.12 FUGITIVE DUST

Control air pollution caused by dust and dirt; comply with governing regulations. Provide a water truck as required.

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3.13 FILLING

Fill depressions and voids resulting from site clearing operations. Using satisfactory soil materials, place in maximum 6 inches deep horizontal layers and compact each layer to density of surrounding original ground.

3.14 GRADING

Grade ground surface to conform to required contours and to provide positive surface drainage away from the WORK or borrow area.

3.15 DISPOSAL

Dispose of waste materials, including trash and debris, and excess topsoil, off-site at the CONTRACTOR'S expense.

3.16 BURNING

Burning of waste material on-site is prohibited for this project.

**END OF SECTION**

## **SECTION 312319 DEWATERING**

### **PART 1 - GENERAL**

#### **1.1 SUMMARY**

- A. Keep all excavations and site structures free from water during construction.

#### **1.2 RELATED SECTIONS**

- A. Intent: The provisions and intent of the AGREEMENT, including the General Conditions, Supplementary Conditions, and other requirements of the Contract Documents apply to the WORK as specified in this section. WORK related to this Section is described throughout the Specifications.

#### **1.3 SUBMITTALS**

- A. Dewatering Plan: CONTRACTOR shall submit, for ENGINEER'S review, Drawings and data showing its proposed plan and required equipment for dewatering of all WORK areas. The Drawings and data shall include the planned method of dewatering excavations, wells, well points, sumps, collection and discharge lines, standby units proposed, and protective fills and ditches required for control of ground water, leachate and surface water.
- B. Schedule: The plan for dewatering shall be submitted within 15 days before the start of work. CONTRACTOR shall furnish such other information as may be required for ENGINEER'S complete understanding and analysis of the dewatering, grading and excavation plan.
- C. Engineer's Review: Review by ENGINEER shall not relieve CONTRACTOR of the responsibility for the adequacy of the dewatering plan or for furnishing all equipment, labor and materials necessary for dewatering the various parts of the WORK. If, during the progress of the WORK, it is determined by ENGINEER that the dewatering system grading and excavation Drawings, text and proposed methodology are inadequate, or that CONTRACTOR'S plan of construction is inoperative, CONTRACTOR shall, at its sole expense, furnish, install and operate such additional dewatering equipment and make such changes in other features of the Dewatering Plan or operation as may be necessary to perform the WORK in a manner satisfactory to ENGINEER.

### **PART 2 - PRODUCTS**

Not Applicable.

## **PART 3 - EXECUTION**

### **3.1 METHODS**

- A. Method: Dewatering can be accomplished by ordinary pumping methods, by the use of underdrains or deep well points, whichever will produce the above results. The CONTRACTOR shall ensure that continuous dewatering can be provided through the method chosen.
- B. Location: All site WORK areas shall be dewatered where surface and/or ground water flows, if any, will adversely impact construction.
- C. Maintenance: All permanent improvements shall be constructed in areas free from water. Construct and maintain all permanent or temporary slopes, dikes, levees, drainage ditches, sumps, and observation wells necessary for the removal of water from WORK areas. Design, furnish, install, maintain, and operate all necessary pumping and other dewatering equipment required for dewatering the various site WORK areas and for keeping the foundation and other areas free from water from any and all sources.
- D. Schedule: All dewatering shall be performed in advance of grading, excavation and/or filling. The dewatering shall be accomplished in a manner that will prevent loss of fines from the foundation, will maintain stability of all excavated slopes and bottoms of excavations, and will permit all construction operations to be performed in the dry. Dewatering of excavations shall be performed to the extent required to permit placement of compacted fill materials in the dry and to prevent sloughing of the excavation side slopes.
- E. Requirements: Lower the ground water level a minimum of 3 feet below sub-foundation grade or as recommended by Geotechnical Engineer prior to sub-foundation preparation and placement of foundation materials. During the placement and compaction of fill or bedding materials, the water level shall be maintained at this level in order that the required compaction can be achieved.
- F. Where conditions are such that running or standing water occur in the trench bottom or the soil in the trench bottom displays a "quick" tendency, the water shall be removed by pumps and suitable means such as well points or previous underdrain bedding until the pipe has been installed and the backfill has been placed to a efficient height to prevent pipe flotation.
- G. No installation will be permitted in trenches unless the subgrade is dry. If, in the opinion of the ENGINEER, the CONTRACTOR has failed to obtain a dry subgrade by use of all known methods of trench dewatering, the ENGINEER may then order the CONTRACTOR to excavate below grade and place sufficient selected fill material over the trench bottom. Additional excavation and fill shall meet the requirements of Division 2 and be at no extra cost.

### 3.2 PROTECTION OF FOUNDATIONS AND EXISTING FACILITIES

- A. Contingency: Furnish standby equipment of sufficient size and capacity to insure continuous operation of the dewatering system. Any damage to structures due to a failure of dewatering equipment shall be repaired by CONTRACTOR at its expense, to the satisfaction of ENGINEER. CONTRACTOR may consider the use of recharge systems or other methods of protection of existing facilities.
- B. Completion: Dewatering shall be maintained in the WORK areas for as long as is necessary for the completion of WORK. Upon completion of the dewatering and control of water operation, all temporary dewatering facilities shall be removed in a manner satisfactory to ENGINEER.

### 3.3 DISPOSAL OF DRAINAGE WATER

- A. The disposal of all water from the dewatering and control of water operation and surface drainage shall be accomplished in a manner to have no detrimental effect on any of the new or existing facilities or cause siltation of existing streams. The method and location of disposal of all water shall be subject to the approval of ENGINEER and OWNER; in addition, no water shall be drained into WORK completed or under construction without prior consent of ENGINEER or OWNER. All Commonwealth of Virginia erosion and sediment control requirements shall be met.

**END OF SECTION**

**SECTION 312500**  
**EROSION AND SEDIMENT CONTROL**

**PART 1- GENERAL**

**1.1 SUMMARY**

- A. This work shall be performed in accordance with the erosion and sediment control plan of the Construction Drawings and the details provided therein, and as described, detailed and required by the Virginia Erosion and Sediment Control Handbook, latest edition, and land disturbance permit. The land disturbance permit shall be obtained by the Contractor from the Halifax County department having jurisdiction.

The Contractor shall be responsible for providing an employee who will be responsible for the erosion and sediment control plan and requirements for the project that is certified by the Virginia Department of Conservation and Recreation as a Responsible Land Disturber (RLD). The name of the Contractor's RLD and copy of his current certification shall be provided to the Owner, Engineer, and Erosion and Sediment Control Plan Approving Authority.

- B. The erosion and sediment control measures and devices shown on the Drawings and described herein have been reviewed and approved by the appropriate governing State and/or Local agencies. The Contractor is responsible for stabilizing all disturbed areas, fill slopes, borrow areas, etc. with whatever means necessary to ensure a dense, well vegetated ground cover. If the Contractor has not installed, repaired, or maintained these devices, or seeded disturbed areas at optimum dates, additional measures or devices may be required at no additional cost to the Owner.

The Contractor's selected construction methods may require modifications to the erosion and sediment control measures shown on the Drawings. The Contractor is responsible for complying with the land disturbance permit and obtaining approval for any modifications to the approved Erosion and Sediment Control Plan.

**1.2 RELATED SECTIONS**

Intent: The provisions and intent of the AGREEMENT, including the General Conditions, Supplemental Conditions, and other requirements of the Contract Documents apply to the WORK as specified in this Section. WORK related to this Section is described throughout the Specifications.

**1.3 REFERENCES**

Virginia Erosion and Sediment Control Handbook

**1.4 SUBMITTALS**

- A. Submittals shall be in accordance with Division 1.

B. Permanent Seed Mixture: Provide written notification as to the permanent seed mixture to  
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be used.

- C. Temporary Seed Mixture: Provide written notification as to the temporary seed mixture to be used.
- D. Erosion and Sediment Control: Submit and maintain on-site a copy of the Erosion and Sediment Control permit issued by the local approving authority for both on-site and off-site operations.
- E. Responsible Land Disturber: Copy of Certification to be submitted at the pre-construction meeting.

## 1.5 MAINTENANCE

- A. Maintain all erosion and sediment control structures to be utilized during the life of the Project in compliance with the regulations of the Division of Soil and Water Conservation and the requirements of the County DPW until vegetative cover is acceptable to the Division's and DPW's field personnel and approval acceptance is received.

## PART 2- PRODUCTS

### 2.1 PRODUCTS

- A. All products shall comply with details shown on the Drawings and the requirements of the Virginia Erosion and Sediment Control Handbook, latest edition.

## PART 3- EXECUTION

### 3.1 EROSION AND SEDIMENT CONTROL MEASURES

- A. Sequencing: All WORK shall be performed to limit the area of construction necessary to install Erosion and Sediment control devices prior to conducting WORK.
- B. Siltation and Erosion Control Measures: Inlet protection, slope protection, mat linings, ditch linings, diversion dikes, silt fence, construction entrances, temporary & permanent vegetation, sediment traps & ponds, diversion ditches and all other items for siltation and erosion control shall be constructed as directed by the Engineer or in the locations shown or designated on the plans in accordance with the details provided.
  - 1. The Contractor shall institute the erosion control program as part of clearing and grubbing, and prior to rough grading. The initial program shall include, but not be limited to, the installation of construction entrance, inlet protection, silt fence, as shown on the Drawings at the limits of clearing and grubbing where silt-carrying surface water runoff may be diverted and/or filtered prior to leaving the disturbed area.
  - 2. All siltation and erosion control devices installed during the course of construction shall be maintained in proper working order at all times, and shall



not be removed until final stabilization of all disturbed areas or at the direction of the Engineer or local regulating authority.

- C. Temporary Seeding: All disturbed areas that have no construction activity in close proximity shall be temporarily seeded within 7 days of completion of the disturbing activities. Establish temporary cover for erosion control by seeding and/or mulching. This shall be accomplished as soon as rough grading work is done.
  - 1. When construction schedule requires seeding outside of the appropriate seeding dates, temporary seeding shall be installed per the detailed seeding schedules on the Drawings. Contractor shall reseed at an appropriate time.
- D. Steep Slopes: On all steep slopes, where erosion is probable, hydroseed areas as soon as possible in strict accordance with applicable provision, of Section 603, of the VDOT *Road and Bridge Specifications*. Maximum allowable slope to be seeded is 2:1.
- E. Cleaning of Roads and Streets: The Contractor shall maintain a vehicle wash rack or gravel bed at all vehicle egress areas. All vehicles shall be thoroughly cleaned of mud and silt before leaving the construction site to avoid tracking mud and silt onto roads, streets, and highways. In the event that tracking does occur, the Contractor shall immediately clean the street or road of all debris, mud or silt and shall pay all damages resulting therefrom. A daily survey of the condition of the adjacent streets and roads shall be made and recorded in the field log.
- F. Protection of Stormwater Systems: Stormwater structures which will receive runoff from the construction shall be protected from the buildup of mud or silt as detailed on the Drawings and shall be cleaned out as silt loading occurs and prior to end of construction.
- G. Fines for Siltation and Erosion Control: Any fines that are assessed upon the Contractor or Owner by the governing agency due to negligence of the Contractor shall be paid by the Contractor.

#### **END OF SECTION**

## SECTION 315000 - EXCAVATION SUPPORT AND PROTECTION (TRENCHING)

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. Section includes temporary excavation support and protection systems.
- B. Related Sections:
  - 1. Division 01 Section "Construction Progress Documentation" for recording preexisting conditions and excavation support and protection system progress.
  - 2. Division 01 Section "Temporary Facilities and Controls" for temporary utilities and support facilities.
  - 3. Division 31 Section "Dewatering" for dewatering system for excavations.

#### 1.3 PERFORMANCE REQUIREMENTS

- A. Design, furnish, install, monitor, and maintain excavation support and protection system capable of supporting excavation sidewalls and of resisting soil and hydrostatic pressure and superimposed and construction loads.
  - 1. Delegated Design: Design excavation support and protection system to provide safe excavation and installation of the new sanitary sewer while protecting the existing sanitary sewer.
  - 2. Prevent surface water from entering excavations by grading, dikes, or other means.
  - 3. Install excavation support and protection systems without damaging existing buildings, structures, and site improvements adjacent to excavation.

#### 1.4 SUBMITTALS

- A. Shop Drawings: For excavation support and protection system.

#### 1.5 PROJECT CONDITIONS

- A. Interruption of Existing Utilities: Do not interrupt any utility serving facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary utility according to requirements indicated:
  - 1. Notify Owner no fewer than two (2) days in advance of proposed interruption of utility.

2. Do not proceed with interruption of utility without Owner's written permission.
  3. Interruption of utilities shall be in accordance with expressly written direction of the Utility Owner.
  4. Provide all temporary service and bypass pumping requirements during construction.
- B. Project-Site Information: Owner's geotechnical information collected is included in Section 003132 "Geotechnical Data" for review and informational purposes. Available data does not constitute a warranty of existing site conditions.

## PART 2 - PRODUCTS

### 2.1 MATERIALS

- A. General: Provide materials that are either new or in serviceable condition.
- B. Structural Steel: ASTM A 36/A 36M, ASTM A 690/A 690M, or ASTM A 992/A 992M.

## PART 3 - EXECUTION

### 3.1 PREPARATION

- A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards that could develop during excavation support and protection system operations.
  1. Shore, support, and protect utilities encountered.
- B. Install excavation support and protection systems to ensure minimum interference with roads, streets, walks, and other adjacent occupied and used facilities.
  1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction. Provide alternate routes around closed or obstructed traffic ways if required by authorities having jurisdiction.
- C. Locate excavation support and protection systems clear of permanent construction so that forming and finishing of concrete surfaces are not impeded.
- D. Monitor excavation support and protection systems daily during excavation progress and for as long as excavation remains open. Promptly correct bulges, breakage, or other evidence of movement to ensure that excavation support and protection systems remain stable.
- E. Promptly repair damages to adjacent facilities caused by installing excavation support and protection systems.

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### 3.2 REMOVAL AND REPAIRS

- A. Remove excavation support and protection systems when construction has progressed sufficiently to support excavation and bear soil and hydrostatic pressures. Remove in stages to avoid disturbing underlying soils or damaging structures, pavements, facilities, and utilities.
  - 1. Fill voids immediately with approved backfill compacted to density specified in Division 31 Section 312000 – "Earth Moving."
  - 2. Repair or replace, as approved by Engineer, adjacent work damaged or displaced by removing excavation support and protection systems.

END OF SECTION 315000

## SECTION 321216 - ASPHALT PAVING

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. Section Includes:
  - 1. Cold milling of existing asphalt pavement.
  - 2. Hot-mix asphalt patching.
  - 3. Hot-mix asphalt paving.
  - 4. Hot-mix asphalt overlay.
- B. Related Requirements:
  - 1. Section 312000 "Earth Moving" for subgrade preparation, fill material, unbound-aggregate subbase and base courses, and aggregate pavement shoulders.

#### 1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
  - 1. Include technical data and tested physical and performance properties.
  - 2. Job-Mix Designs: Certification, by authorities having jurisdiction, of approval of each job mix proposed for the Work.

#### 1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For manufacturer and testing agency.
- B. Material Test Reports: For each paving material, by a qualified testing agency.
- C. Field quality-control reports.

#### 1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications: A paving-mix manufacturer registered with and approved by authorities having jurisdiction or the DOT of state in which Project is located.
- B. Testing Agency Qualifications: Qualified according to ASTM D 3666 for testing indicated.

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## 1.6 FIELD CONDITIONS

- A. Environmental Limitations: Do not apply asphalt materials if subgrade is wet or excessively damp, if rain is imminent or expected before time required for adequate cure, or if the following conditions are not met:
  - 1. Prime Coat: Minimum surface temperature of 60 deg F (15.6 deg C).
  - 2. Tack Coat: Minimum surface temperature of 60 deg F (15.6 deg C).
  - 3. Slurry Coat: Comply with weather limitations in ASTM D 3910.
  - 4. Asphalt Base Course: Minimum surface temperature of 40 deg F (4.4 deg C) and rising at time of placement.
  - 5. Asphalt Surface Course: Minimum surface temperature of 60 deg F (15.6 deg C) at time of placement.

## PART 2 - PRODUCTS

### 2.1 AGGREGATES

- A. General: Use materials and gradations that have performed satisfactorily in previous installations.
- B. Coarse Aggregate: ASTM D 692/D 692M, sound; angular crushed stone, crushed gravel, or cured, crushed blast-furnace slag.
- C. Fine Aggregate: ASTM D 1073 or AASHTO M 29, sharp-edged natural sand or sand prepared from stone, gravel, cured blast-furnace slag, or combinations thereof.
  - 1. For hot-mix asphalt, limit natural sand to a maximum of 20 percent by weight of the total aggregate mass.
- D. Mineral Filler: ASTM D 242/D 242M or AASHTO M 17, rock or slag dust, hydraulic cement, or other inert material.

### 2.2 ASPHALT MATERIALS

- A. Asphalt Binder: AASHTO M 320, PG 64-22.
- B. Tack Coat: ASTM D 977 or AASHTO M 140 emulsified asphalt, or ASTM D 2397 or AASHTO M 208 cationic emulsified asphalt, slow setting, diluted in water, of suitable grade and consistency for application.
- C. Water: Potable.
- D. Undersealing Asphalt: ASTM D 3141/D 3141M; pumping consistency.

### 2.3 AUXILIARY MATERIALS

- A. Sand: ASTM D 1073 or AASHTO M 29, Grade No. 2 or No. 3.

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## 2.4 MIXES

- A. Hot-Mix Asphalt: Dense-graded, hot-laid, hot-mix asphalt plant mixes approved by authorities having jurisdiction and complying with the following requirements:
  - 1. Provide mixes with a history of satisfactory performance in geographical area where Project is located.
- B. Emulsified-Asphalt Slurry: ASTM D 3910, Type 2.

## 2.5 UTILITY TRENCH PAVEMENT RESTORATION

- A. Refer to the VDOT LUP-OC detail provided in the drawings.
  - 1. 10" minimum aggregate base material Type I; Size No. 21A or 21B.
  - 2. 8" minimum asphalt concrete base Type BM-25.0A to the surface for future milling.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Verify that subgrade is dry and in suitable condition to begin paving.
- B. Proof-roll subgrade below pavements with heavy pneumatic-tired equipment to identify soft pockets and areas of excess yielding. Do not proof-roll wet or saturated subgrades.
  - 1. Completely proof-roll subgrade in one direction. Limit vehicle speed to 3 mph (5 km/h).
  - 2. Proof roll with a loaded 10-wheel, tandem-axle dump truck weighing not less than 15 tons (13.6 tonnes).
  - 3. Excavate soft spots, unsatisfactory soils, and areas of excessive pumping or rutting, as determined by Architect, and replace with compacted backfill or fill as directed.
- C. Proceed with paving only after unsatisfactory conditions have been corrected.

### 3.2 COLD MILLING

- A. Clean existing pavement surface of loose and deleterious material immediately before cold milling. Remove existing asphalt pavement by cold milling to grades and cross sections indicated.
  - 1. Mill to a depth of 2 inches (50 mm).
  - 2. Mill to a uniform finished surface free of excessive gouges, grooves, and ridges.
  - 3. Control rate of milling to prevent tearing of existing asphalt course.
  - 4. Repair or replace curbs, manholes, and other construction damaged during cold milling.
  - 5. Excavate and trim unbound-aggregate base course, if encountered, and keep material separate from milled hot-mix asphalt.
  - 6. Patch surface depressions deeper than 1 inch (25 mm) after milling, before wearing course is laid.

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7. Handle milled asphalt material according to approved waste management plan required in Section 017419 "Construction Waste Management and Disposal."
8. Keep milled pavement surface free of loose material and dust.
9. Do not allow milled materials to accumulate on-site.

### 3.3 PATCHING

- A. Asphalt Pavement: Saw cut perimeter of patch and excavate existing pavement section to sound base. Excavate rectangular or trapezoidal patches, extending **12 inches (300 mm)** into perimeter of adjacent sound pavement, unless otherwise indicated. Cut excavation faces vertically. Remove excavated material. Recompact existing unbound-aggregate base course to form new subgrade.
- B. Portland Cement Concrete Pavement: Break cracked slabs and roll as required to reseal concrete pieces firmly.
  1. Pump hot undersealing asphalt under rocking slab until slab is stabilized or, if necessary, crack slab into pieces and roll to reseal pieces firmly.
  2. Remove disintegrated or badly cracked pavement. Excavate rectangular or trapezoidal patches, extending into perimeter of adjacent sound pavement, unless otherwise indicated. Cut excavation faces vertically. Recompact existing unbound-aggregate base course to form new subgrade.
- C. Tack Coat: Before placing patch material, apply tack coat uniformly to vertical asphalt surfaces abutting the patch. Apply at a rate of 0.05 to 0.15 gal./sq. yd. (0.2 to 0.7 L/sq. m).
  1. Allow tack coat to cure undisturbed before applying hot-mix asphalt paving.
  2. Avoid smearing or staining adjoining surfaces, appurtenances, and surroundings. Remove spillages and clean affected surfaces.
- D. Placing Patch Material: Fill excavated pavement areas with hot-mix asphalt base mix for full thickness of patch and, while still hot, compact flush with adjacent surface.

### 3.4 REPAIRS

- A. Crack and Joint Filling: Remove existing joint filler material from cracks or joints to a depth of 1/4 inch (6 mm).
  1. Clean cracks and joints in existing hot-mix asphalt pavement.
  2. Use emulsified-asphalt slurry to seal cracks and joints less than 1/4 inch (6 mm) wide. Fill flush with surface of existing pavement and remove excess.
  3. Use hot-applied joint sealant to seal cracks and joints more than 1/4 inch (6 mm) wide. Fill flush with surface of existing pavement and remove excess.

### 3.5 SURFACE PREPARATION

- A. General: Immediately before placing asphalt materials, remove loose and deleterious material from substrate surfaces. Ensure that prepared subgrade is ready to receive paving.

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- B. Cutback Prime Coat: Apply uniformly over surface of compacted unbound-aggregate base course at a rate of 0.15 to 0.50 gal./sq. yd. (0.7 to 2.3 L/sq. m). Apply enough material to penetrate and seal, but not flood, surface. Allow prime coat to cure.
  - 1. If prime coat is not entirely absorbed within 24 hours after application, spread sand over surface to blot excess asphalt. Use enough sand to prevent pickup under traffic. Remove loose sand by sweeping before pavement is placed and after volatiles have evaporated.
  - 2. Protect primed substrate from damage until ready to receive paving.
- C. Emulsified Asphalt Prime Coat: Apply uniformly over surface of compacted unbound-aggregate base course at a rate of 0.10 to 0.30 gal./sq. yd. per inch depth (0.5 to 1.40 L/sq. m per 25 mm depth). Apply enough material to penetrate and seal, but not flood, surface. Allow prime coat to cure.
  - 1. If prime coat is not entirely absorbed within 24 hours after application, spread sand over surface to blot excess asphalt. Use enough sand to prevent pickup under traffic. Remove loose sand by sweeping before pavement is placed and after volatiles have evaporated.
  - 2. Protect primed substrate from damage until ready to receive paving.
- D. Tack Coat: Apply uniformly to surfaces of existing pavement at a rate of 0.05 to 0.15 gal./sq. yd. (0.2 to 0.7 L/sq. m).
  - 1. Allow tack coat to cure undisturbed before applying hot-mix asphalt paving.
  - 2. Avoid smearing or staining adjoining surfaces, appurtenances, and surroundings. Remove spillages and clean affected surfaces.

### 3.6 PLACING HOT-MIX ASPHALT

- A. Machine place hot-mix asphalt on prepared surface, spread uniformly, and strike off. Place asphalt mix by hand in areas inaccessible to equipment in a manner that prevents segregation of mix. Place each course to required grade, cross section, and thickness when compacted.
  - 1. Place hot-mix asphalt base course in number of lifts and thicknesses indicated.
  - 2. Place hot-mix asphalt surface course in single lift.
  - 3. Spread mix at a minimum temperature of 250 deg F (121 deg C).
  - 4. Begin applying mix along centerline of crown for crowned sections and on high side of one-way slopes unless otherwise indicated.
  - 5. Regulate paver machine speed to obtain smooth, continuous surface free of pulls and tears in asphalt-paving mat.
- B. Place paving in consecutive strips not less than 10 feet (3 m) wide unless infill edge strips of a lesser width are required.
  - 1. After first strip has been placed and rolled, place succeeding strips and extend rolling to overlap previous strips. Overlap mix placement about 1 to 1-1/2 inches (25 to 38 mm) from strip to strip to ensure proper compaction of mix along longitudinal joints.
  - 2. Complete a section of asphalt base course before placing asphalt surface course.

- C. Promptly correct surface irregularities in paving course behind paver. Use suitable hand tools to remove excess material forming high spots. Fill depressions with hot-mix asphalt to prevent segregation of mix; use suitable hand tools to smooth surface.

### 3.7 JOINTS

- A. Construct joints to ensure a continuous bond between adjoining paving sections. Construct joints free of depressions, with same texture and smoothness as other sections of hot-mix asphalt course.
  - 1. Clean contact surfaces and apply tack coat to joints.
  - 2. Offset longitudinal joints, in successive courses, a minimum of 6 inches (150 mm).
  - 3. Offset transverse joints, in successive courses, a minimum of 24 inches (600 mm).
  - 4. Construct transverse joints at each point where paver ends a day's work and resumes work at a subsequent time. Construct these joints [using either "bulkhead" or "papered" method according to AI MS-22, for both "Ending a Lane" and "Resumption of Paving Operations."
  - 5. Compact joints as soon as hot-mix asphalt will bear roller weight without excessive displacement.
  - 6. Compact asphalt at joints to a density within 2 percent of specified course density.

### 3.8 COMPACTION

- A. General: Begin compaction as soon as placed hot-mix paving will bear roller weight without excessive displacement. Compact hot-mix paving with hot, hand tampers or with vibratory-plate compactors in areas inaccessible to rollers.
  - 1. Complete compaction before mix temperature cools to 185 deg F (85 deg C).
- B. Breakdown Rolling: Complete breakdown or initial rolling immediately after rolling joints and outside edge. Examine surface immediately after breakdown rolling for indicated crown, grade, and smoothness. Correct laydown and rolling operations to comply with requirements.
- C. Intermediate Rolling: Begin intermediate rolling immediately after breakdown rolling while hot-mix asphalt is still hot enough to achieve specified density. Continue rolling until hot-mix asphalt course has been uniformly compacted to the following density:
  - 1. Average Density: 96 percent of reference laboratory density according to ASTM D 6927 or AASHTO T 245, but not less than 94 percent or greater than 100 percent.
  - 2. Average Density: 92 percent of reference maximum theoretical density according to ASTM D 2041, but not less than 90 percent or greater than 96 percent.
- D. Finish Rolling: Finish roll paved surfaces to remove roller marks while hot-mix asphalt is still warm.
- E. Edge Shaping: While surface is being compacted and finished, trim edges of pavement to proper alignment. Bevel edges while asphalt is still hot; compact thoroughly.

- F. Repairs: Remove paved areas that are defective or contaminated with foreign materials and replace with fresh, hot-mix asphalt. Compact by rolling to specified density and surface smoothness.
- G. Protection: After final rolling, do not permit vehicular traffic on pavement until it has cooled and hardened.
- H. Erect barricades to protect paving from traffic until mixture has cooled enough not to become marked.

### 3.9 INSTALLATION TOLERANCES

- A. Pavement Thickness: Compact each course to produce the thickness indicated within the following tolerances:
  - 1. Base Course: Plus or minus 1/2 inch (13 mm).
  - 2. Surface Course: Plus 1/4 inch (6 mm), no minus.
- B. Pavement Surface Smoothness: Compact each course to produce a surface smoothness within the following tolerances as determined by using a 10-foot (3-m) straightedge applied transversely or longitudinally to paved areas:
  - 1. Base Course: 1/4 inch (6 mm).
  - 2. Surface Course: 1/8 inch (3 mm).
  - 3. Crowned Surfaces: Test with crowned template centered and at right angle to crown. Maximum allowable variance from template is 1/4 inch (6 mm).

### 3.10 FIELD QUALITY CONTROL

- A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.
- B. Thickness: In-place compacted thickness of hot-mix asphalt courses will be determined according to ASTM D 3549.
- C. Surface Smoothness: Finished surface of each hot-mix asphalt course will be tested for compliance with smoothness tolerances.
- D. In-Place Density: Testing agency will take samples of uncompacted paving mixtures and compacted pavement according to ASTM D 979 or AASHTO T 168.
  - 1. Reference maximum theoretical density will be determined by averaging results from four samples of hot-mix asphalt-paving mixture delivered daily to site, prepared according to ASTM D 2041, and compacted according to job-mix specifications.
  - 2. In-place density of compacted pavement will be determined by testing core samples according to ASTM D 1188 or ASTM D 2726.
    - a. One core sample will be taken for every 1000 sq. yd. (836 sq. m) or less of installed pavement, with no fewer than three cores taken.

- b. Field density of in-place compacted pavement may also be determined by nuclear method according to ASTM D 2950 and correlated with ASTM D 1188 or ASTM D 2726.
- E. Replace and compact hot-mix asphalt where core tests were taken.
- F. Remove and replace or install additional hot-mix asphalt where test results or measurements indicate that it does not comply with specified requirements.

### 3.11 DISPOSAL

- A. Remove excavated materials from project site and legally dispose of them in an EPA approved landfill. Do not allow milled materials to accumulate on site.

END OF SECTION 321216

**SECTION 329200**  
**LAWNS AND GRASSES**

**PART 1- GENERAL**

**1.1 RELATED DOCUMENTS**

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

**1.2 SUMMARY**

- A. This section includes the following:
  - 1. Seeding.
  - 2. Hydroseeding.
  - 3. Sodding.
  - 4. Plugging.
  - 5. Sprigging.
  - 6. Erosion-control material(s).

**1.3 DEFINITIONS**

- A. Duff Layer: The surface layer of native topsoil that is composed of mostly decayed leaves, twigs, and detritus.
- B. Finish Grade: Elevation of finished surface of planting soil.
- C. Manufactured Topsoil: Soil produced off-site by homogeneously blending mineral soils or sand with stabilized organic soil amendments to produce topsoil or planting soil.
- D. Pesticide: A substance or mixture intended for preventing, destroying, repelling, or mitigating a pest. This includes insecticides, miticides, herbicides, fungicides, rodenticides, and molluscicides. It also includes substances or mixtures intended for use as a plant regulator, defoliant, or desiccant.
- E. Pests: Living organisms that occur where they are not desired or that cause damage to plants, animals, or people. These include insects, mites, grubs, mollusks (snails and slugs), rodents (gophers, moles, and mice), unwanted plants (weeds), fungi, bacteria, and viruses.
- F. Planting Soil: Standardized topsoil; existing, native surface topsoil; existing, in-place surface soil; imported topsoil; or manufactured topsoil that is modified with soil amendments and perhaps fertilizers to produce a soil mixture best for plant growth.
- G. Subgrade: Surface or elevation of subsoil remaining after excavation is complete, or top surface of a fill or backfill before planting soil is placed.
- H. Subsoil: All soil beneath the topsoil layer of the soil profile, and typified by the lack of organic matter and soil organisms.
- I. Surface Soil: Soil that is present at the top layer of the existing soil profile at the Project site. In undisturbed areas, the surface soil is typically topsoil, but in disturbed areas such as urban environments, the surface soil can be subsoil.

**1.4 SUBMITTALS**

- A. Submittals shall be in accordance with Division 1.

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- B. CONTRACTOR shall provide submittals for all materials to be used including but not limited to:
  - 1. Grass seed
  - 2. Fertilizer
  - 3. Top soil

#### 1.5 QUALITY ASSURANCE

- A. Installer qualifications: A qualified landscape installer whose work has resulted in successful sodded lawn installations.
- B. Soil-Testing Laboratory Qualifications: An independent laboratory or university laboratory, recognized by the State Department of Agriculture, with the experience and capability to conduct the testing indicated and that specializes in types of tests to be performed.
- C. Pre-installation Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Management and Coordination."

#### 1.6 DELIVERY, STORAGE, AND HANDLING

- A. Seed and Other Packaged Materials: Deliver packaged materials in original, unopened containers showing weight, certified analysis, name and address of manufacturer, and indication of conformance with state and federal laws, as applicable.
- B. Sod: Harvest, deliver, store, and handle sod according to requirements in "Specifications for Turfgrass Sod Materials" and "Specifications for Turfgrass Sod Transplanting and Installation" in TPI's "Guideline Specifications to Turfgrass Sodding." Deliver sod in time for planting within 24 hours of harvesting. Protect sod from breakage and drying.
- C. Bulk Materials:
  - 1. Do not dump or store bulk materials near structures, utilities, walkways and pavements, or on existing turf areas or plants.
  - 2. Provide erosion-control measures to prevent erosion or displacement of bulk materials, discharge of soil-bearing water runoff, and airborne dust reaching adjacent properties, water conveyance systems, or walkways.

#### 1.7 SCHEDULING

- A. Weather Limitations: Proceed with planting only when existing and forecasted weather conditions permit.

#### 1.8 LAWN MAINTENANCE

- A. Initial Turf Maintenance Service: Provide full maintenance by skilled employees of landscape Installer. Maintain as required in Part 3. Begin maintenance immediately after each area is planted and continue until acceptable turf is established but for not less than the following periods:
  - 1. Seeded Turf: 60 days from date of Substantial Completion.

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- a. When initial maintenance period has not elapsed before end of planting season, or if turf is not fully established, continue maintenance during next planting season.
  2. Sodded Turf: 30 days from date of Substantial Completion.
  3. Plugged Turf: 30 days from date of Substantial Completion.
  4. Sprigged Turf: 30 days from date of Substantial Completion.
- B. Maintain and establish lawn by watering, fertilizing, weeding, mowing, trimming, re-planting, and other operations. Roll, regrade, and replant bare or eroded areas and re-mulch to produce a uniformly smooth lawn:
1. In areas where mulch has been disturbed by wind or maintenance operations, add new mulch. Anchor as required to prevent displacement.
- C. Mow lawn as soon as top growth is tall enough to cut. Repeat mowing to maintain specified height without cutting more than 40 percent of grass height. Remove no more than 40 percent of grass-leaf growth in initial or subsequent mowings. Do not delay mowing until grass blades bend over and become matted. Do not mow when grass is wet. Schedule initial and subsequent mowings to maintain the following grass heights.
1. Mow grass 2 to 3 inches (50 to 75 mm) high.
- D. Lawn Postfertilization: Apply fertilizer after initial mowing and when grass is dry.
1. Use fertilizer and application rates recommended in Topsoil Analysis.

#### 1.9 MAINTENANCE SERVICE

- A. Lawns: Sixty days from date of Substantial Completion.

### PART 2- PRODUCTS

#### 2.1 SEED

- A. Grass Seed: Fresh, clean, dry, new-crop seed complying with AOSA's "Journal of Seed Technology; Rules for Testing Seeds" for purity and germination tolerances.
- B. Retain one of first two paragraphs below if specifying grass seed and mixes by species. Retain first paragraph if grass seed is certified by the State Department of Agriculture. Most states have seed-certification agencies. Retain second paragraph if the State Department of Agriculture does not regulate seed germination, purity, and weed seed or if there is no state seed certification. Delete both paragraphs if specifying proprietary grass seed mixes.
- C. Seed Species: State-certified seed of grass species as follows:
- D. Seed Species: Seed of grass species as follows, with not less than 95 percent germination, not less than 85 percent pure seed, and not more than 0.5 percent weed seed:
  1. Full Sun to Partial Shade: Proportioned by weight as follows:
    - a. 75 percent Tall Fescue (*Festuca arundinacea*) varieties, including Jaguar, Mustang, Rebel II, or Olympic.

- b. 15 percent Kentucky Bluegrass (*Poa pratensis*) varieties, including Medit and South Dakota.
  - c. 10 percent Perennial Ryegrass (*Lolium perenne*).
- 2. Shade: Proportioned by weight as follows:
  - a. 50 percent Chewings red fescue (*Festuca rubra* spp *rubra*).
  - b. 35 percent Rough Bluegrass (*Poa trivialis*).
  - c. 15 percent redtop (*Agrostis alba*).

## 2.2 TURFGRASS SOD

- A. Turfgrass Sod: Number 1 Quality/Premium, including limitations on thatch, weeds, diseases, nematodes, and insects, complying with TPI's "Specifications for Turfgrass Sod Materials" in its "Guideline Specifications to Turfgrass Sodding." Furnish viable sod of uniform density, color, and texture, strongly rooted, and capable of vigorous growth and development when planted. Sod shall be from a reputable local dealer.
- B. Turfgrass Species: Sod of grass species as follows, with not less than 95 percent germination, not less than 85 percent pure seed, and not more than 0.5 percent weed seed:
  - 1. Full Sun to Shade:
    - a. 90 percent Tall Fescue (*Festuca arundinacea*).
    - b. 10 percent Kentucky bluegrass (*Poa pratensis*).

## 2.3 INORGANIC SOIL AMENDMENTS

- A. Inorganic Soil Amendments: Lime, sulfur, iron sulfate, aluminum sulfate, perlite, agricultural gypsum, sand, diatomaceous earth, and zeolite.

## 2.4 ORGANIC SOIL AMENDMENTS

- A. Compost: Well-composted, stable, and weed-free organic matter, pH range of 5.5 to 8; moisture content 35 to 55 percent by weight; 100 percent passing through 3/4-inch sieve; soluble salt content of 5 to 10 decisiemens/m; not exceeding 0.5 percent inert contaminants and free of substances toxic to plantings; and as follows:
  - 1. Organic Matter Content: 50 to 60 percent of dry weight.

## 2.5 FERTILIZER

- A. Fertilizers: Bonemeal and slow-release fertilizer.

## 2.6 PLANTING SOILS

- A. Planting Soil: Existing, in-place surface soil. Verify suitability of existing surface soil to produce viable planting soil. Remove stones, roots, plants, sod, clods, clay lumps, pockets of coarse sand, concrete slurry, concrete layers or chunks, cement, plaster, building debris, and other extraneous materials harmful to plant growth.

## LAWNS AND GRASSES

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## 2.7 MULCHES

- A. Mulches: Straw and tackifier for hydroseeded areas.

## 2.8 PESTICIDES

- A. General: Pesticide, registered and approved by EPA, acceptable to authorities having jurisdiction, and of type recommended by manufacturer for each specific problem and as required for Project conditions and application. Do not use restricted pesticides unless authorized in writing by authorities having jurisdiction.
- B. Pre-Emergent Herbicide (Selective and Non-Selective): Effective for controlling the germination or growth of weeds within planted areas at the soil level directly below the mulch layer.
- C. Post-Emergent Herbicide (Selective and Non-Selective): Effective for controlling weed growth that has already germinated.

## 2.9 EROSION-CONTROL MATERIALS

- A. Erosion-Control Blankets: Biodegradable wood excelsior, straw, or coconut-fiber mat enclosed in a photodegradable plastic mesh. Include manufacturer's recommended steel wire staples, 6 inches long.
- B. Erosion-Control Fiber Mesh: Biodegradable burlap or spun-coir mesh, a minimum of 0.92 lb/sq. yd., with 50 to 65 percent open area. Include manufacturer's recommended steel wire staples, 6 inches long.
- C. Erosion-Control Mats: Cellular, non-biodegradable slope-stabilization mats designed to isolate and contain small areas of soil over steeply sloped surface, of 3-inch nominal mat thickness. Include manufacturer's recommended anchorage system for slope conditions.
  - 1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
    - a. Invisible Structures, Inc.; Slopetame 2.
    - b. Presto Products Company, a business of Alcoa; Geoweb.
    - c. Tenax Corporation - USA; Tenweb.

## PART 3- EXECUTION

### 3.1 EXAMINATION

- A. Examine areas to be planted for compliance with requirements and other conditions affecting performance.
  - 1. Verify that no foreign or deleterious material or liquid such as paint, paint wash-out, concrete slurry, concrete layers or chunks, cement, plaster, oils, gasoline, diesel fuel, paint thinner, turpentine, tar, roofing compound, or acid has been de-

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posited in soil within a planting area.

2. Do not mix or place soils and soil amendments in frozen, wet, or muddy conditions.
  3. Suspend soil spreading, grading, and tilling operations during periods of excessive soil moisture until the moisture content reaches acceptable levels to attain the required results.
  4. Uniformly moisten excessively dry soil that is not workable and which is too dusty.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.
- C. If contamination by foreign or deleterious material or liquid is present in soil within a planting area, remove the soil and contamination as directed by Architect and replace with new planting soil.

### 3.2 PREPARATION

- A. Protect structures, utilities, sidewalks, pavements, and other facilities, trees, shrubs, and plantings from damage caused by planting operations.
1. Protect adjacent and adjoining areas from hydroseeding and hydromulching overspray.
  2. Protect grade stakes set by others until directed to remove them.
- B. Install erosion-control measures to prevent erosion or displacement of soils and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways

### 3.3 LAWN PREPARATION

- A. Apply inorganic soil amendments, organic soil amendments and fertilizers as recommended in Topsoil Analysis.
- B. Finish Grading: Grade planting areas to a smooth, uniform surface plane with loose, uniformly fine texture. Grade to within plus or minus ½ inch of finish elevation.
- C. Compaction: Compact growing medium sufficiently to reduce settling but not enough to prevent movement of water through growing medium. Compacted medium should feel firm to foot pressure, leaving only slight heel prints.
- D. Moisten prepared lawn areas before planting if soil is dry. Water thoroughly and allow surface to dry before planting. Do not create muddy soil.
- E. Restore areas if eroded or otherwise disturbed after finish grading and before planting.

### 3.4 PREPARATION FOR EROSION-CONTROL MATERIALS

- A. Prepare area as specified in Section 3.3 Lawn Preparation.
- B. Retain first two paragraphs below for erosion-control matting.
- C. For erosion-control mats, install planting soil in two lifts, with second lift equal to thickness of erosion-control mats. Install erosion-control mat and fasten as recommended by material manufacturer.
- D. Fill cells of erosion-control mat with planting soil and compact before planting.
- E. Retain first paragraph below for erosion-control blanket or mesh.
- F. For erosion-control blanket or mesh, install from top of slope, working downward, and as recommended by material manufacturer for site conditions. Fasten as recommended by material manufacturer.
- G. Moisten prepared area before planting if surface is dry. Water thoroughly and allow surface to dry before planting. Do not create muddy soil.

### 3.5 SEEDING

- A. Sow seed with spreader or seeding machine. Do not broadcast or drop seed when wind velocity exceeds 5 mph. Evenly distribute seed by sowing equal quantities in two directions at right angles to each other.
  - 1. Do not use wet seed or seed that is moldy or otherwise damaged.
  - 2. Do not seed against existing trees. Limit extent of seed to outside edge of planting saucer.
- B. Revise first paragraph below to suit Project. Sowing rates vary with grass species and mixtures.
- C. Sow seed at a total rate per manufacturer's seed type recommendations.
- D. Rake seed lightly into top 1/8 inch of soil, roll lightly, and water with fine spray.
- E. Protect seeded areas with slopes exceeding 1:3 with erosion-control fiber mesh installed and stapled according to manufacturer's written instructions.
- F. Protect seeded areas with erosion-control mats where shown on Drawings; install and anchor according to manufacturer's written instructions.
- G. Protect seeded areas with slopes not exceeding 1:6 by spreading straw mulch. Spread uniformly at a minimum rate of 2 tons/acre to form a continuous blanket 1-1/2 inches in loose thickness over seeded areas. Spread by hand, blower, or other suitable equipment.
- H. Protection in paragraph below is usually required in warm, dry climates.

- I. Protect seeded areas from hot, dry weather or drying winds by applying compost mulch or peat mulch or planting soil within 24 hours after completing seeding operations. Soak areas, scatter mulch uniformly to a thickness of 3/16 inch, and roll surface smooth.

### 3.6 HYDROSEEDING

- A. Hydroseeding: Mix specified seed, fertilizer, and fiber mulch in water, using equipment specifically designed for hydroseed application. Continue mixing until uniformly blended into homogeneous slurry suitable for hydraulic application.
  1. Mix slurry with fiber-mulch manufacturer's recommended tackifier.
  2. Apply slurry uniformly to all areas to be seeded in a one-step process. Apply slurry at a rate so that mulch component is deposited at not less than 1500-lb/acre dry weight, and seed component is deposited at not less than the specified seed-sowing rate.
  3. Apply slurry uniformly to all areas to be seeded in a two-step process. Apply first slurry coat at a rate so that mulch component is deposited at not less than 500-lb/acre dry weight, and seed component is deposited at not less than the specified seed-sowing rate. Apply slurry cover coat of fiber mulch (hydromulching) at a rate of 1000 lb/acre.

### 3.7 SODDING

- A. Lay sod within 24 hours of harvesting. Do not lay sod if dormant or if ground is frozen or muddy.
- B. Lay sod to form a solid mass with tightly fitted joints. Butt ends and sides of sod; do not stretch or overlap. Stagger sod strips or pads to offset joints in adjacent courses. Avoid damage to growth media layer or sod during installation. Tamp and roll lightly to ensure contact with growth medium layer, eliminate air pocket, and form a smooth surface. Work growth medium or fine sand into minor cracks between pieces of sod; remove excess to avoid smothering sod and adjacent grass.
- C. Saturate sod with fine water spray within two hours of planting. During first week, water daily or more frequently as necessary to maintain moist soil to a minimum depth of 1-1/2 inches below sod.

### 3.8 TURF MAINTENANCE

- A. Maintain and establish turf by watering, fertilizing, weeding, mowing, trimming, replanting, and performing other operations as required to establish healthy, viable turf. Roll, regrade, and replant bare or eroded areas and remulch to produce a uniformly smooth turf. Provide materials and installation the same as those used in the original installation.
  1. Fill in as necessary soil subsidence that may occur because of settling or other processes. Replace materials and turf damaged or lost in areas of subsidence.

2. In areas where mulch has been disturbed by wind or maintenance operations, add new mulch and anchor as required to prevent displacement.
3. Apply treatments as required to keep turf and soil free of pests and pathogens or disease. Use integrated pest management practices whenever possible to minimize the use of pesticides and reduce hazards.

B. Watering.

1. Adjacent to Training and Maintenance Buildings: Install and maintain temporary piping, hoses, and turf-watering equipment to convey water from sources and to keep turf uniformly moist to a depth of 4 inches.
  - a. Schedule watering to prevent wilting, puddling, erosion, and displacement of seed or mulch. Lay out temporary watering system to avoid walking over muddy or newly planted areas.
  - b. Water turf with fine spray at a minimum rate of 1 inch per week unless rainfall precipitation is adequate.
2. All other areas.
  - a. Schedule watering to prevent wilting, puddling, erosion, and displacement of seed or mulch.

C. Mow turf as soon as top growth is tall enough to cut. Repeat mowing to maintain specified height without cutting more than 1/3 of grass height. Remove no more than 1/3 of grass-leaf growth in initial or subsequent mowings. Do not delay mowing until grass blades bend over and become matted. Do not mow when grass is wet. Revise timing of fertilizer application in paragraph below if a slow-release fertilizer was initially applied.

D. Turf Postfertilization: Apply fertilizer after initial mowing and when grass is dry.

1. Use fertilizer that will provide actual nitrogen of at least 1 lb/1000 sq. ft. to turf area.

### 3.9 SATISFACTORY TURF

A. Turf installations shall meet the following criteria as determined by Engineer:

1. Satisfactory Seeded Turf: At end of maintenance period, a healthy, uniform, close stand of grass has been established, free of weeds and surface irregularities.
2. Satisfactory Sodded Turf: At end of maintenance period, a healthy, well-rooted, even-colored, viable turf has been established, free of weeds, open joints, bare areas, and surface irregularities.
3. Satisfactory Plugged Turf: At end of maintenance period, the required number of plugs has been established as well-rooted, viable patches of grass, and areas between plugs are free of weeds and other undesirable vegetation.

4. Satisfactory Sprigged Turf: At end of maintenance period, the required number of sprigs has been established as well-rooted, viable plants, and areas between sprigs are free of weeds and other undesirable vegetation.
- B. Use specified materials to reestablish turf that does not comply with requirements and continue maintenance until turf is satisfactory.

### 3.10 PESTICIDE APPLICATION

- A. Apply pesticides and other chemical products and biological control agents in accordance with requirements of authorities having jurisdiction and manufacturer's written recommendations. Coordinate applications with Owner's operations and others in proximity to the Work. Notify Owner before each application is performed.
- B. Post-Emergent Herbicides (Selective and Non-Selective): Apply only as necessary to treat already-germinated weeds and in accordance with manufacturer's written recommendations.

### 3.11 CLEANUP AND PROTECTION

- A. Promptly remove growth medium and debris created by lawn work from paved areas. Clean wheels of vehicles before leaving site to avoid tracking soil onto roads, walks, or other paved areas.
- B. Erect barricades and warning signs as required to protect newly planted areas from traffic. Maintain barricades throughout maintenance period and remove after lawn is established.
- C. Remove temporary erosion-control measures after grass establishment period.

## END OF SECTION